Sigma Xi, The Charleston Chapter

WANTS YOU TO JOIN AS A NEW MEMBER OR AS A RENEWED MEMBER

Sigma Xi, The Scientific Research Society, is the international society of science and engineering. In addition to all of the national and international efforts of the Society, your membership will afford you immediate local benefits. The Charleston Chapter is comprised of members from the Medical University of South Carolina, The College of Charleston, The Citadel, Trident Tech, Bayer Corporation, NOAA, SCDNR as well as other science and education based institutions. Membership in the Charleston Chapter brings you into immediate contact with scientists from all disciplines and in all work environments in our area.

Please consider nominating yourself for membership or renewing your membership and then enjoy the benefits:

- **Subscription to the *American Scientist***. The American Scientist, published bimonthly since 1913, contains articles to inform scientists and engineers about developments outside of their own fields.
- **Grants-in-Aid of Research**. Small grants to encourage the professional development of new scientists.
- **Support of Charleston Area Schools**. Our Chapter members serve as consultants for local teachers, give classroom presentations to encourage student interest in science, judge science fair projects, host classes for field trips to professional sites, and much more.
- **Support of Charleston Area Undergraduate and Graduate Research**. Our Chapter sponsors awards for Outstanding Research Presentations by students at MUSC's Student Research Day, CofC's Marine Biology Colloquium, The Citadel's Undergraduate Research Conference and the Annual Meeting of the South Carolina Academy of Sciences.
- **Local Professional Talks**. Throughout the year our Chapter sponsors research seminars and field activities featuring our own members and their broad range of scientific disciplines.
- **National Speakers**. At least once a year, we bring in a Sigma Xi National speaker. In recent years, the visit of our National speaker has been the highlight of "Darwin Week."
- **Annual Banquet**. Each spring we recognize the outstanding accomplishments of scientists and teachers in our Chapter with a banquet and a keynote address of particular scientific or policy interest.
- **Chapter Listserver.** Our chapter sponsors Chs-Sci-Net, the best way to stay informed about all manner of science activities in the Lowcountry and throughout South Carolina.

To join, complete the nomination form available at https://www.sigmaxi.org/docs/default-source/members-documents/join-nominate/nomformchapter8886d475e2936b72a79cff000094a25f.pdf?sfvrsn=9e15bf58_2
We can provide nomination signatures if you do not know other Sigma Xi members.
New member dues: $125 (students $40) + one time $20 initiation fee (chapter dues waived).
Transitional dues for recent graduates (e.g. postdocs): $45.00 + $20 initiation fee.

Send the completed form to:
Dr. Karen Burnett, Membership Chair
Charleston Chapter of Sigma Xi
Hollings Marine Laboratory
331 Fort Johnson Road
Charleston, SC 29412
Phone: 843-725-4826
E-mail: burnettk@cofc.edu

Questions? Contact:
Dr. Joe Carson, President
Charleston Chapter of Sigma Xi
Associate Professor, Dept. of Physics & Astronomy
College of Charleston
66 George Street
Charleston, SC, 29424
Phone: 843-953-3643; E-mail: carsonjc@cofc.edu

Perry V Halushka 2018 MUSC Research Day

will be held

Friday, NOVEMBER 2, 2018

Keynote Speaker:

Steven Houser, PhD, FAHA

4:00 PM, BSB 100

"Cardiac Injury and Repair"

Dr. Houser holds the William Wikoff Smith Endowed Chair in Cardiovascular Medicine and is Chairperson and Professor of Pharmacology, the Director and Professor for the Center for Translational Medicine in the Lewis Katz School of Medicine at Temple University in Philadelphia, Pennsylvania.

Dr. Houser's visit is co-sponsored by the College of Graduate Studies and the NHLBI T32 Training to Improve Cardiovascular Therapies as part of the 2018 Cardiovascular Training Grant Retreat

8:30-11:30 AM	Poster Session	Harper Center Gym
12:00 – 3:30 PM	Oral Sessions	Education Library Rooms BE 112
4:00 – 5:00 PM	Keynote Presentation	BSB 100
5:00 – 6:00 PM	Awards Ceremony	BSB 100

Please direct any questions regarding MUSC Research Day 2018 to Dr. Steven Kubalak at: kubalaks@musc.edu

INFORMATION FOR PARTICIPANTS

Poster Presentation Sessions:

Poster sessions will be held in the **Harper Student Center Gym**. Presenters are encouraged to view the posters currently on display on the walls of the Basic Science Building and at other locations around campus for examples of poster layout, design and size. For assistance with poster design and content, contact the MUSC Center for Academic Excellence. Most poster support boards are approximately 3' 6" tall by 5' 6" wide.

Poster boards will be available Friday morning for:

Group A between 8:00 and 8:30 AM: Session time: 8:30 – 10:00 AM

Group B between 10:00 and 10:30 AM Session time 10:30 – 12:00 PM

with numbers corresponding to the abstract numbers in this program.

Group A should take their posters down at 10:00 AM so Group be can put their posters up. Judging begins at 8:30 for Group A and at 10:30 for Group B. Group B can take their posters down at 12:00 noon. Presentations should be **10 minutes** followed by 5 minutes of question by the judges. **Please note that unless notified otherwise, you will have 3 judges for the regular sessions visit your poster – they may visit all together, in pairs, or they may come one at a time. Judges for the regular sessions will be wearing red nametags. Please do not leave your poster until you have presented it to all three regular session judges**. Special session judges are in addition to the regular session judges.

Oral Presentation Sessions:

Most of the oral sessions will be in the **Colbert Education Center and Library** in various rooms on the first floor. Please check the program for specific room assignments. Computer projection using a PC platform will be available. It is suggested that you save your presentation on memory stick (thumb drive, etc). Ensure that your presentation loads and runs correctly before you save it. Download your presentation to the desktop of the computer in the room where you will be presenting; do this **BEFORE** the start time of your session on Friday, November 2nd. Oral presentation time slots are 15 minutes. An oral presentation should last **10 minutes** with the remaining time for questions. The 15-minute time slot will be strictly adhered to by the session judges – you will receive a warning at minus 3 minutes. Remember that question handling is one of the criteria being evaluated and if you leave no time for questions, you will lose points.

Judging:

Teams of 3 judges will evaluate presentations in each of the sessions. Judges will be wearing red nametags. Presentations will be scored on a scale of 1 to 10 in ten categories (see next page for a sample judges' sheet). The scores for the ten categories (max 100 points) from each judge in that session will be used to compute a ranked score. 1st and 2nd place prizes will be awarded to the presentations with the highest and next highest mean ranked scores respectively. We have tried to assign judges so as to avoid possible conflicts of interest. Scores and evaluation sheets will be emailed to presenters by responding to the message from Dr. Kubalak indicating the score sheets have been compiled. Please note, the judges selecting presentations for prizes in the following categories: Sigma Xi, Interprofessional Research, Ralph H Johnson VA Research, Innovation, Health Humanities, and Aging Research will be operating as separate teams. If you selected that you wanted to be considered for these and your presentation qualifies for further judging, you will be visited by these additional judges.

Breaks:

Coffee, doughnuts and soft drinks will be available from 9:30 am – 11:30 pm in the Harper Center Gym. There will be a MUSC-catered lunch for presenters and other student attendees in the Harper Center Gym at 11:00 am.

Awards Ceremony:

The Awards Ceremony will begin at 5:00 pm in the Basic Science Building (Rm 100) on Friday, November 2nd. In each session there will be a 1st place prize of $500 and a 2nd place prize of $200. The special awards listed above have their own cash prizes that are in addition to the regular session prizes.

MUSC Research Day 2018

Individual Presenters Score Sheet **(This sheet will be returned to the presenter)**

Author: Presentation/Abstract #

Session **#** **Outstanding = 10**

		Poor			Good			Excellent			
A Scientific content / subject matter	(circle one number)										
1 **Hypothesis**	(clearly stated)	1	2	3	4	5	6	7	8	9	10
2 **Research Design**	(do the experiments address the problem?)	1	2	3	4	5	6	7	8	9	10
3 **Research Methods**	(are the methods clear & sufficient?)	1	2	3	4	5	6	7	8	9	10
4 **Data Collection**	(are data handled, sorted, described fully?)	1	2	3	4	5	6	7	8	9	10
5 **Data Analysis**	(are graphs, tables, statistics appropriate?)	1	2	3	4	5	6	7	8	9	10
6 **Summary and Conclusions**	(are these stated and are they clear?)	1	2	3	4	5	6	7	8	9	10

NB: quantity or completeness of data is of lesser importance than the scientific method used to obtain the data

B Delivery											
7 **Presentation Style**	(confident, clear, concise, 10 min?)	1	2	3	4	5	6	7	8	9	10
8 **Visuals**	(appropriate design of slides, or poster; not distracting)	1	2	3	4	5	6	7	8	9	10
9 **Organization**	(materials are logical & sequential)	1	2	3	4	5	6	7	8	9	10
C Handling of questions											
10 **Knowledge**	(demonstrates a solid depth of knowledge)	1	2	3	4	5	6	7	8	9	10

Total score (out of 100 max) _____

Comments _____

_____

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Poster and Oral Presentation Program

POSTER PRESENTATIONS - Harper Wellness Center Gym

Group A - 8:30 am - 10:00 am

		Abstracts
Session 1:	Undergraduate – I	001-008
Session 2:	Clinical / Professional / Masters – I	009-017
Session 3:	Clinical / Professional / Masters – II	018-031
Session 4:	Clinical / Professional / Masters – III	032-045
Session 5:	Clinical / Professional / Masters – IV	046-057
Session 6:	PhD – I Social/Behavioral Sciences	058-062
Session 7:	PhD – II Basic/Clinical Sciences	063-070
Session 8:	PhD – III Basic/Clinical Sciences	071-078
Session 9:	Postdoc / Resident / Fellow / Staff Scientist – I	079-086
Session 10:	Research Specialist / Technician – I	087-093

Group B - 10:30 am - 12:00 noon

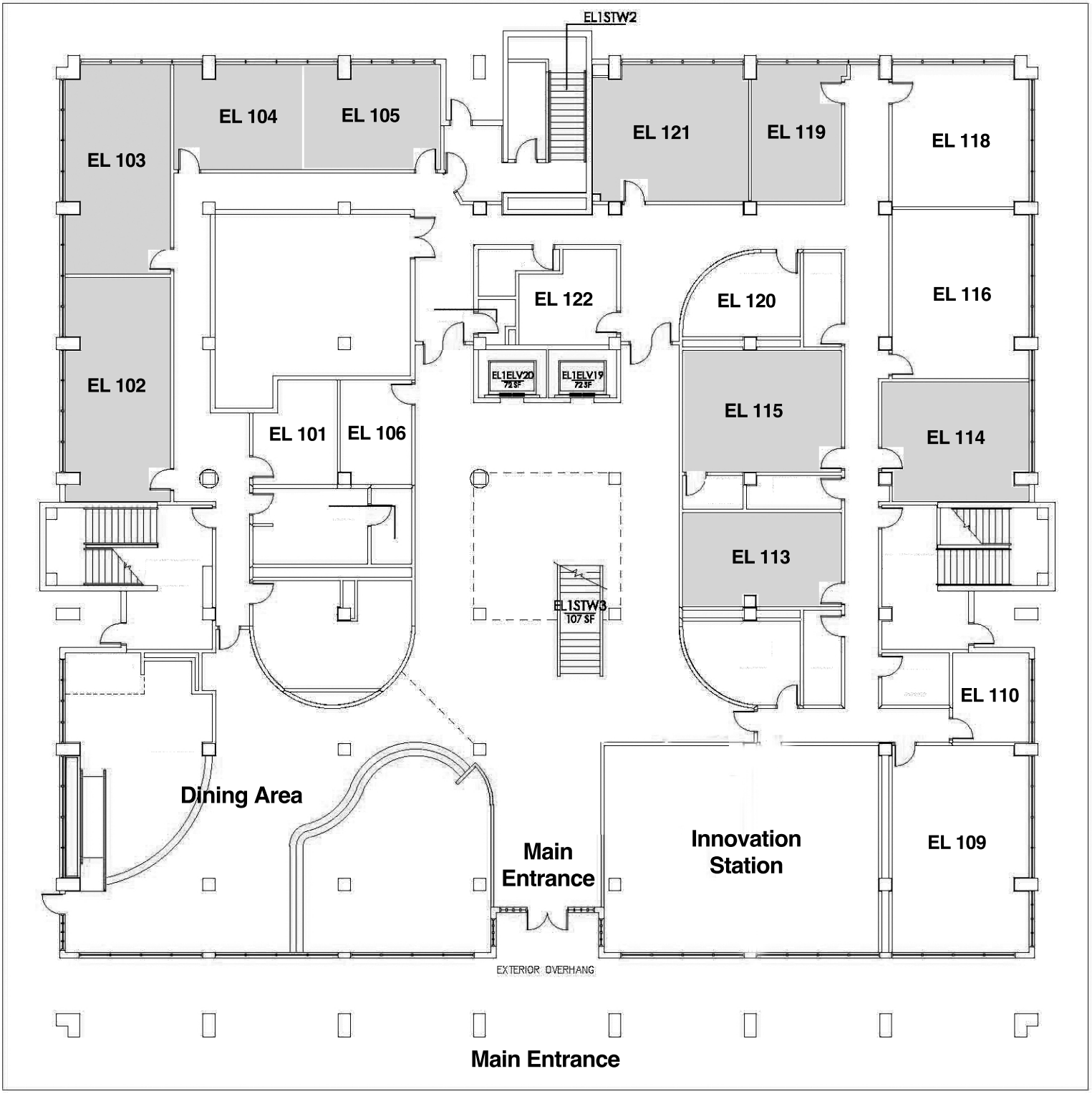
		Abstracts
Session 1:	Undergraduate – I	094-100
Session 2:	Clinical / Professional / Masters – I	101-110
Session 3:	Clinical / Professional / Masters – II	111-123
Session 4:	Clinical / Professional / Masters – III	124-136
Session 5:	Clinical / Professional / Masters – IV	137-149
Session 6:	PhD – I Social/Behavioral Sciences	150-153
Session 7:	PhD – II Basic/Clinical Sciences	154-161
Session 8:	PhD – III Basic/Clinical Sciences	162-169
Session 9:	Postdoc / Resident / Fellow / Staff Scientist – I	170-176
Session 10:	Research Specialist / Technician – I	177-182

ORAL PRESENTATIONS - Colbert Education Center and Library

		Room	Time	Abstracts
Session 11:	Undergraduate – II	EL 104	12:45-2:30	183-188
Session 12:	Clinical / Professional / Masters – V	EL 103	12:00-3:00	189-200
Session 13:	Clinical / Professional / Masters – VI	EL 114	12:00-3:15	201-212
Session 14:	Clinical / Professional / Masters – VII	EL 115	12:15-3:00	213-222
Session 15:	PhD – IV Basic/Clinical Sciences	EL 121	12:00-3:15	223-234
Session 16:	PhD – V Basic/Clinical Sciences	EL 102	12:00-3:15	235-246
Session 17:	PhD – VI Basic/Clinical Sciences	BE 112	12:00-3:00	247-257
Session 18:	Postdoc / Res / Fellow / Staff Sci – II	EL 113	12:30-2:45	258-265
Session 19:	Postdoc / Res / Fellow / Staff Sci – III	EL 119	12:30-2:30	266-272
Session 20:	Research Specialist / Technician – I	EL 105	12:45-2:00	273-277

EL = Colbert Education Library; **BE** = Bioengineering Building

LOCATION OF ORAL PRESENTATIONS



JAMES W. COLBERT EDUCATION CENTER & LIBRARY

First Floor Plan

Horseshoe Side of Building

ACKNOWLEDGEMENTS

The Perry V. Halushka Research Day Endowment

In 2006, in recognition of the many years of service given by their father, Dr. Perry V. Halushka, to the Medical University, Francine Halushka Katz, Marc Halushka, M.D., Ph.D., and Suzanne Friedman and their families have established, through the MUSC Foundation, **The Dr. Perry V. Halushka Research Day Endowment.** This endowment will help to support the activities of Student Research Day in perpetuity. Specifically, the endowment will enable the University to:

- Provide monetary awards for outstanding research presentations
- Attract world-class scientists as guest keynote speakers
- Provide funds to support the annual MUSC Research Day event

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MUSC Research Day Committee would like to thank the following for their support:

Lawrence Olanoff, MD, PhD
Eric James, PhD
Marine Polymer Technologies (John Vournakis, PhD) www.marinepolymer.com
Charleston Research Institute https://www.charleston.va.gov
MUSC Foundation for Research Development http://academicdepartments.musc.edu/frd/
VA Medical Center www.charleston.va.gov

The MUSC Research Day Committee

Steven Kubalak	College of Medicine (Chair)	Regenerative Medicine & Cell Biology
Eric Bartee	College of Medicine	Microbiology & Immunology
Brett Froeliger	College of Medicine	Neurosciences
Vamsi Gangaraju	College of Medicine	Biochemistry & Molecular Biology
Teri-Lynn Herbert	Education Library Center	Academic Affairs Faculty
Susan Newman	College of Nursing	Nursing Science Program
Mariana Pehar	College of Medicine	Cell & Mol Pharm & Exper Therap
Susan Reed	College of Medicine	Pediatrics/Neonatology/Stomatology
Michelle Woodbury	College of Health Professions	Health Sciences Research
Stephanie Brown-Guion	College of Graduate Studies	Administrative Assistant
Kelsey Moore	College of Graduate Studies	Student Representative
Connor West	College of Graduate Studies	Student Representative
Charlie Kerr	College of Graduate Studies	Student Representative

Session 1	Undergraduate I	Harper Center Gym

Group A 8:30 – 10:00 AM

1 The Role of Brain Insulin in Functional Recovery After Stroke in Mouse Model Hyperinsulinemia
Stacy Nguyen, Janet Boggs, Luke Watson, Catrina Sims-Robinson, College of Charleston, Department of Neurology, MUSC.

2 The Impact of Extra Cellular Matrix Remodeling on Mesenchymal Cells in Early Heart Development
Jeremy Laxner, Josh Mifflin, Jeanette Huber, Chiagoziem Ogbonna, Christine Kern, College of Charleston, Associate Professor, MUSC.

3 The Role of Inflammation on Collagen Deposition in a Murine Model of Diastolic Heart Failure
Shaoni Dasgupta, Hannah Riley, An O. Van Laer, Catalin F. Baicu, Michael R. Zile, Amy Bradshaw, Clemson, Department of Medicine, Division of Cardiology, Ralph H. Johnson Department of Veteran's Affairs Medical Center, MUSC.

4 BMP-Smad-RBPJ signaling axis in the endocardial lineage plays an essential role for AV valve morphogenesis
Miriam Atteya*, Patrick G. Smith*, Haleigh Ferro, Thomas Trusk, Jeremy L. Barth,*Co-First author, Yukiko Sugi, College of Charleston, Regenerative Medicine and Cell Biology, MUSC.

5 Tissue engineering strategies in bone; addition of a novel scaffold in optimizing wound healing
SarahRose Hall, R. Nicole Howie, PhD, Emily Durham, MA, Zachary Grey, Nicholas Larson, Meenal Mehrotra, Medicine, Pathology and laboratory medicine, MUSC.

6 BMP-Smad signaling interacts with Notch signaling components in the AV endocardial cushion mesenchymal cells
Haleigh Ferro, Smith Patrick, Atteya Miriam, Jiao Kai, Pleasant Dorea, Muise-Helmericks Robin, Yukiko Sugi, College of Charleston, Regenerative Medicine and Cell Biology, MUSC.

7 A Multi-Segment Method for Estimating Cerebral Blood Flow Using the Arterial Spin Labeling Images in the Space-Flight Analog with Hypoxia Experimentation
Grant Gauthier*, Ali Freitas*, Davud Asemani, Ph.D, Donna Roberts, M.D., *Co-First author, Donna Roberts, College of Charleston, Radiology, MUSC.

8 Regulation of Angiogenic Signaling in Pregnancy and Pre-eclampsia
James Sinkway, Oyindamole Awe, Elizabeth V. Schulz, Carol L. Wagner, Kyu-Ho Lee, College of Charleston, Pediatric Cardiology, MUSC.

Group B 10:30 – 12:00 PM

94 Factors affecting health status in community-residing older adults in low-income communities in the tri-county area: A qualitative study
Kaitlin Cassidy, Jordan Watkins, Melba Hernandez-Tejada, College of Charleston, College of Nursing, MUSC.

95 Microgravity regulation of p62 gene expression and proteasome activity in preosteoclast cells
Allie Ottinger, Kayla Haire, Purushoth Ethiraj, Sakamuri Reddy, Clemson, Department of Pediatrics/Endocrinology, MUSC.

96 Development of Wearable Stimulation App to Increase Hand Functional Recovery in Patients with Neurologic Disorder
Eli Schuster, Na Jin Seo, College of Charleston, Occupational Therapy, MUSC.

97 The development of a cognitive rehabilitation task for mice
Alexus Williams, Madison Patrick, Tyler Stone, Catrina Sims-Robinson, Savannah State University, Neurology, MUSC.

98 Hematopoietic Stem Cell-derived Osteoblasts in the Microenvironment Enhance Osteosarcoma Tumorigenicity
Nicholas Larson, Uday Baliga, Inhong Kang, Meenal Mehrotra, Medicine, Pathology and laboratory medicine, MUSC.

99 CRISPR-Cas9 generated allelic series of rat mutations confirms Tox3 as a breast cancer susceptibility gene
Emilia Ballou, Lauren B Shunkwiler, Royal Pipaliya, Cody C Ashy, Julia M Mook, Benjamine Van Peel, Yang Zhao, Jan Guz, Alexander Awgulewitsch, Michael J Kern, Bart Smits, College of Charleston, Pathology and Laboratory Medicine, MUSC.

100 Dealing with glioblastoma in preclinical models using single agent HDAC inhibitor
Jesse Hardee, Sarah Imam, William A. Vandergrift III, Scott M. Lindhorst, Abhay K. Varma, Libby Infinger, Narendra L. Banik, Sunil J. Patel, David Cachia, Arabinda Das, Citadel, Department of Neurosurgery, MUSC.

Session 2	Clinical / Professional / Masters I Social/Behavioral	Harper Center Gym

Group A 8:30 – 10:00 AM

9 What Do Stroke Survivors Know About Stroke?
Kathryn Mase, Paige Freudenberg, Michelle Nichols, Elizabeth R. Skidmore, Michelle Woodbury, Health Professions, Department of Health Science and Research, MUSC.

10 How Do Behavioral and Virtual Reality Neglect Assessment Scores Correlate with Each Other?
Emerson Hart, Kahla Vandenbulcke, Amanda Ward, Karalyn Chaney, Michelle Woodbury, Emily Grattan, Health Professions, Division of Occupational Therapy, MUSC; Ralph H. Johnson VA Medical Center, MUSC.

11 Standardizing Gait Pattern Terminology for Use in an Interprofessional Mobile Application
Jordan Smith, Rachel Leaphart, Kristine Knowles, Ryan Locklear, Eric Monsch, Stephanie McGowen, Sara Kraft, Amanda Giles, Health Professions, Occupational Therapy, MUSC.

12 Are Certain Neglect Assessments Better at Detecting Neglect than Others in Post-Stroke Patients?
Gabrielle Burns, Ashlee Hurt, Molly Young, Michelle L. Woodbury, Emily Grattan, Health Professions, Division of Occupational Therapy, MUSC; Ralph H. Johnson VA Medical Center, MUSC.

13 The Assessment Paradox: Does a Post-Stroke Upper Extremity Assessment Accurately Indicate Paretic Arm Use at Home?
Andrea Smith, Ellie Teaster, Taylor Kwiecinski, Austen Hayes, Scott Hutchison, Christian Finetto, Michelle Woodbury, Health Professions, Department of Health Sciences, MUSC.

14 Hand Surgery Referral Patterns Among Primary Care Physicians in South Carolina
Abhishek Jain, Fernando Herrera, Medicine, Department of Plastic Surgery, MUSC.

15 Is There A Correlation Between Self-Reported And Sensor-Based Measures In Post-Stroke Individuals During Daily Activities?
Whitney Stilwell, Nick Valencic, OTS; Austen Hayes, MS, CEO Recovr Inc; Scott Hutchison, OTR/L; Christian Finetto, PhD, Michelle Woodbury, Health Professions, Department of Health Science and Research, MUSC.

16 Establishing Healthy Habits through Exercise, Nutrition, Socialization, and Stress Reduction for Young Adults (15-25yo) with ASD or Mild Neurocognitive Disorders: Piece it Together 2015-2018
Carolyn Peterseim, Dr. Martina Mueller, Ms. Janis Newton, Ms. Carrie Papa, Eve Spratt, Medicine, MUSC, Department of Developmental Pediatrics, MUSC.

17 Initial Stages of Research and Plan for the Development of a Small-scale Fishery in Okurase, Ghana
Kaylan Gee, Rene Mueller, PhD, James Malm, PhD, Linda Norton, Cynthia Swenson, Medicine, Psychiatry and Behavioral Sciences, MUSC.

Group B 10:30 – 12:00 PM

101 Building Family Centered Practice in Vietnam: Validation and Translation of Occupation-Based Pediatric Assessments
Kat Jones, Ashley Brady, Emily Graves, Thomas Platt, Haley Ranson, Nguyen Ngoc Minh, Scott Hutchison, Craig Velozo, Patty Coker-Bolt, Health Professions, Occupational Therapy, MUSC.

102 Culturally Competent?: Student Perspectives on Academic Preparation for Working with Diverse and Underserved Communities
Emily Freeman, Gabrielle Mougey, Brianna Hatchell, Katherine Patterson, Jordan Collins, Taylor Shuler, Cristina Smith, Health Professions, Occupational Therapy, MUSC.

103 Identifying motor delays in infants with congenital heart defects: clinical utility of the STEP assessment
Rachel Fleming, Evie Needle, Turki Aljuhani, Dorothea Jenkins, Patty Coker-Bolt, Health Professions, Occupational Therapy, MUSC.

104 Knowledge and Delays in Diagnosis of Oropharyngeal Neoplasms
Amanda Barrett, Elise Zhao, Sean Nguyen, Terry Day, Dental Medicine (DMD, PhD), Otolaryngology, MUSC.

105 Interpersonal Trauma and Stress Processing in Youth
Elizabeth Evans, Casey Calhoun, Ph.D., Kathleen Crum, Ph.D., Christopher Sege, Ph.D., Carla Danielson, Medicine, Institute of Psychiatry, MUSC.

106 Relationship Between Perceived Social Support and Outcome in Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure
Serena Walker, Derik Yeager M.B.S., Sudie Back Ph.D, Elizabeth Santa Ana, Medicine, Psychiatry and Behavioral Sciences, MUSC.

107 Health Needs Assessment of Homeless Youth in Charleston, South Carolina
Chelsea Roach, Cristin Adams, Carole Berini, Marty Player, Vanessa Diaz, Medicine, Family Medicine, MUSC.

108 Uptake of postpartum long-acting reversible contraception among women with Emergency Medicaid
Marissa Bass, Angela Dempsey, Medicine, OB/Gyn, MUSC.

109 Textbooks: There's an App for That!
Sydney Mitchell, Charlotte Fletcher, Kirby Hazel, Amanda Giles, Health Professions, Department of Health Professions, MUSC.

110 BOLD-signal changes in brains of Parkinson's Disease patients with Freezing of Gait
Gustavo Carmen Lopez, Daniel Lench, Danielle Helms., Gonzalo Revuelta, Medicine, Neurology, MUSC.

Session 3 — Clinical / Professional / Masters II — Harper Center Gym
Basic/Clinical Sciences

Group A 8:30 – 10:00 AM

18 Functional EEG Analysis on Lesioned Brain
Jeremy Bose, Leonardo Bonilha, Na Jin Seo, Graduate Studies, Department of Health Professions, MUSC.

19 A Humanized Monoclonal Antibody to Secreted Frizzled Related Protein-2 Inhibits Osteosarcoma Growth in vivo
Ingrid Bonilla, Nasarre, Patrick Peterson, Yuri K Chakraborty, Paramita Spruill, Laura Broome, Marie Hill, Elizabeth Hilliard, Elanor Yustein, Jason T. Mehrotra, Shikhar, Nancy DeMore, Medicine, Surgery, MUSC.

20 Enolase Regulates Secondary Damage in Spinal Cord Injury
Rachel Polcyn, Denise Matzelle, Mollie Capone, Azim Hossain, Naren L. Banik, Azizul Haque, Medicine, Microbiology and Immunology, MUSC.

21 The Role of DZIP1 and Primary Cilia in Mitral Valve Prolapse
Reece Moore, Katelynn Toomer, Diana Fulmer, Lilong Guo, Kelsey Moore, Russel Norris, Medicine, Cardiovascular Developmental Biology Center, Department of Regenerative Medicine and Cell Biology, MUSC.

22 Effect of Smoke Exposure on Intervertebral Disc Degeneration: A Rat Model
Megan Carey, Pengling Ren, Elizabeth Lee, Vincent D. Pellegrini, Jr., Charles Reitman, Hai Yao, Yongren Wu, Medicine, Orthopaedics and Physical Medicine, MUSC.

23 Use of a Specific Single-Pill Combination Therapy for Hypertension in an Academic Medical Center
Trace Neal, Daniel Lackland, Medicine, Department of Neurology, MUSC.

24 Assessing Sam68/KHDRBS1 Cellular Localization and its Relevance to the Development of Preeclampsia
Alysia Washington, Kyu-Ho Lee, Medicine, Pediatrics, MUSC.

25 Assessing Feasibility of a Sustainable Faith-based Health Initiative to Encourage Blood Pressure Self-Monitoring
Kristen Harris, Daniel Lackland, Medicine, Neurology, MUSC.

26 Implementing an innovating diagnostic tool to be used in the Pediatric Concussion Clinic
Michelle Offit, Dr. Ryan Fiorini, Ramin Eskandari, Medicine, Neurosurgery, MUSC.

27 Changes in left ventricular end-diastolic pressure following alcohol septal ablation in hypertrophic obstructive cardiomyopathy
Courtney Kramer, Ahmedreza Karimianpour DO, Davis Leaphart, Mary Lark, Christopher Nielsen MD, Valerian Fernandes, Medicine, Department of Adult Cardiology, MUSC.

28 Early Discontinuation of long-acting reversible contraception (LARC) among women living with HIV
Elizabeth Francis, Angela Dempsey, Nicole Brzozowski, Lindsay Rucker, Gweneth Lazenby, Medicine, OB/GYN, MUSC.

29 Examination of Long-term Safety and Feasibility of TheraBracelet - Phase I Trial
Shannon Cain, Eli Schuster, Andrew Fortune, Wuwei Feng, Viswanathan, Ramakrishnan, Na Jin Seo, Health Professions, Department of Health Professions, MUSC.

30 Management of Incontinence Associated Dermatitis in the Surgical Intensive Care Unit
Brandon Gates, Joy Vess, Nursing, Nursing, MUSC.

31 Use of TheraBracelet during Pediatric Constraint Induced Movement Therapy - Feasibility & Safety Study
Catilyn Taylor, Alison M. Fluharty, Eli Schuster, Amanda A. Vatinno, Turki Aljuhani, V Ramakrishnan, Patty Coker-Bolt, Na Jin Seo, Health Professions, Department of Health Professions, MUSC.

Group B 10:30 – 12:00 PM

111 Utilizing Artificial Intelligence to Determine Bone Mineral Density via Chest CT
Rock Savage, Marly van Assen, Simon Martin, Pooyan Sahbaee, L. Parkwood Griffith, U. Joseph Schoepf, Medicine, Department of Radiology, Division of Cardiovascular Imaging, MUSC.

112 The Effect of Aging on Olfactory Dysfunction
Jonathan Hill, Tina Storck MS, Tegan Noonan BS, Zachary Soler MD, Nicholas Rowan MD, and Lois Matthews MS, Rodney Schlosser MD, Medicine, Otolaryngology- Head and Neck Sugery, MUSC.

113 Design of a Patient Navigation Intervention to Enhance Receipt of Surgery in African American Adults with Early Stage Non-Small Cell Lung Cancer
Alexandra Rice, Elizabeth Hill, PhD, Kendrea Knight, MSPH, Joanne Kim, MS, Angela M. Malek, PhD, Erica Martino, CHES, Elizabeth Davis, Ta'Myiah Reed, Alice Kim, Nestor Esnaola, MD, MPH, MBA, FACS, Marvella Ford, Medicine, Department of Public Health Sciences, MUSC.

114 Employing Artificial Intelligence to Predict Hematocrit Values from Non-Contrast CT Imaging Data - Towards Fully Automated CT-derived Myocardial Extracellular Volume Fraction Quantification
James Durden, Maximilian J. Bauer, Marly van Assen, Carlo N. De Cecco, Marco Scarabello, Lewis P. Griffith, Akos Varga-Szemes, Uwe Schoepf, Medicine, Radiology Department, MUSC.

115 Developing a Predictive Model for Premature Babies <30 Weeks Gestational Age Requiring Gastrostomy Tubes at MUSC
Daniel Gehle, Alison Chapman, Meghan Brunswick, Katherine George, Aaron Lesher, Rita Ryan, Medicine, Pediatrics, MUSC.

116 Super resolution imaging of mitochondria in polycystic kidneys
Andraia Li, Hanako Kobayashi, Craig Brooks, Kensei Taguchi, Volker Haase, Medicine, Nephrology and Hypertension, MUSC.

117 Evaluating the Prevalence of Social Communication Disorder in Children at risk for Autism Spectrum Disorder
Audrey Ward, Andrea Boan PhD, Laura Carpenter PhD, Catherine Bradley PhD, Medicine, Developmental-Behavioral Pediatrics, MUSC.

118 Maternal HIV Diagnosis Timing and Use of Guideline-Based Antiretroviral Therapies on Infant Outcomes
Ellery Cohn, Gweneth B Lazenby, Medicine, Departments of Obstetrics and Gynecology and Medicine, Division of Infectious Diseases, MUSC.

119 Arthroscopic Primary Labral Reconstruction Reduces Risk of Conversion to Total Hip Arthroplasty in Patients with Femoroacetabular Impingement, Irreparable Labral Tears, and Severe Chondral Defects
Michael Kopscik, David Maldonado, Joseph Laseter, Muriel Battaglia, Ajay Lall, Itay Perets, Benjamin Domb, Medicine, American Hip Institute, MUSC.

120 Shift Handoff Interruption Analysis in an Urban Academic Medical Center Emergency Department Setting
Bryce Robbins, Nolan Bagnal, Steven Saef MD, Diann Krywko MD, Kyle Embertson, MD, Medicine, Emergency Medicine, MUSC.

121 Changes in Left Ventricular Mass, Volume and Function After Successful Alcohol Septal Ablation (ASA) in Hypertrophic Obstructive Cardiomyopathy (HOCM)
Davis Leaphart, Ahmadreza Karimianpour, DO, Courtney Kramer, Mary Lark, Christopher Nielsen, MD, Valerian Fernandes, Medicine, Medicine: Cardiology, MUSC.

122 The Effect of a Physician's Years of Experience on Shift Handoff Length in an Emergency Department Setting
Nolan Bagnal, Bryce Robbins, Steven Saef MD, Diann Krywko MD, Kyle Embertson, Medicine, Emergency Medicine Residency Program, Department of Emergency Medicine, MUSC.

123 Author-Reported Affiliations on Accepted Abstracts at the POSNA Annual Meeting
Davis Osborn, Thomas Offerle, BS, William R Barfield, PhD, James F. Mooney, III, MD, Robert Murphy, Medicine, Orthopaedics, MUSC.

Session 4 — Clinical / Professional / Masters III — Harper Center Gym
Basic/Clinical Sciences

Group A 8:30 – 10:00 AM

32 Comparison of 0.1 and 0.05mg intrathecal morphine when administered with a multimodal pain regimen for post-cesarean analgesia: a single center, prospective, randomized, single-blinded trial
Carter Ellis, Kathryn Bridges, Medicine, Anesthesia, MUSC.

33 Association of computed tomography angiography parameters with clinical outcomes in patients with severe pulmonary embolism
Alexis Violette, Emily Hodskins, Thomas Todoran, Sheldon Litwin, John Nance, Medicine, Radiology and Radiological Science, MUSC.

34 Single session pharmaco-mechanical thrombectomy versus thrombolysis for lower extremity acute deep vein thrombosis (DVT)
Ben Archambault, Jonathan Perry, Heather Collins, Ricardo Yamada, Medicine, radiology and radiological sciences, MUSC.

35 Prevention of CVC VTEs in the PICU and the PCICU
Gabriel Clinton, Zachary Coffman, MD; Jordan Newman, MD, Elizabeth Mack, Medicine, Pediatrics, MUSC.

36 Radiofrequency wire technique and image fusion in the creation of an endovascular bypass to treat chronic central venous occlusion
Dominic Giovagnoli, Ricardo Yamada, Medicine, Radiology, MUSC.

37 Preferential Effect of Cigarette Smoke on Cartilage Tissue Area During Fracture Healing
Elizabeth Nadeau, Russell Reeves, Ryan Kelly, Glenn Hefter, Yongren Wu, William Barfield, Amanda LaRue, Vincent Pellegrini, Medicine, Orthopaedics, MUSC.

38 Iatrogenic right bundle branch block after alcohol septal ablation does not negatively impact right ventricular function and pulmonary pressures
Mary Lark, Ahmadreza Karimianpour, Davis Leaphart, Courtney Kramer, Christopher Nielsen, Michael Gold, Valerian Fernandes, Medicine, Department of Cardiology, MUSC.

39 Emergency Provider Adherence to Chronic Disease Guidelines: A Prospective Provider Inquiry
Jonathan Boland, Amy Walquist, Tyler Winders, Medicine, Emergency Medicine, MUSC.

40 Hypoxia and Pressure-Induced Cellular Injury to Human Neurons and Astrocytes
Samuel Jones, Charlotte Snook, Ramin Eskandari MD, Michael Smith, Medicine, Department of Neurosurgery, MUSC.

41 Comparison of Landmark and Ultrasound-Guided Knee Arthrocentesis in a Cadaver Model
Lauren Rocco, Christopher Robinson, Danika Brodak, Amy Wahlquist, Steven Kubalak, Aalap Shah, Brad Presley, Ryan Barnes, Medicine, Emergency Medicine, MUSC.

42 Association of Bronchiectasis and the Microbiome with Gastroesophageal Reflux in Alpha-1 Antitrypsin Deficiency
Madeline Bonaguro, Charlie Strange, Medicine, Pulmonology, MUSC.

43 Feasibility and Safety of using TheraBracelet during Task-Practice Therapy
Hannah Cox, Mary L Hall, Amanda Vatinno, Michelle L Woodbury, Na Jin Seo, Health Professions, Department of Health Professions, MUSC.

44 Identification of Risk Factors for Increased Perioperative Bleeding with Surgical Dilation and Evacuation
Dominique Williams, Bethany J. Wolf, William Ellison, William Fowler, Erick Woltz, Angela Dempsey, Sylvia Wilson, Medicine, Anesthesia and Perioperative medicine, MUSC.

45 Impact of TheraBracelet on Cortical Activity in Stroke Survivors
Allison Davis, Leonardo Bonilha, Jeremy Bose, Alexandra Wease, Na Jin Seo, Health Professions, Department of Health Professions, MUSC.

Group B 10:30 – 12:00 PM

124 Tendon Rupture Due to Implant Prominence of Volar Locking Plates
Cody Ashy, Andrew Ence MD, Andrew Leggett, William Barfield PhD, Eric Angermeier MD, Kyle Kokko, Medicine, Orthopaedics, MUSC.

125 Myelination of Human Spiral Ganglion Neurons
Annemarie Lam, Bradley A. Schulte, PhD, Hainan Lang, Medicine, Pathology and Laboratory Medicine, MUSC.

126 Comparison of BPE and Mammographic Breast Density Between Patients with Cancer and with Negative/Benign MRI
Caroline Spitznagel, Rebecca Leddy, Susan Ackerman, Madelene Lewis, Abid Irshad, Dag Pavic, Medicine, Radiology, MUSC.

127 Driving high reliability with adjunct CLABSI prevention bundles in pediatric hematology/oncology patients
Danielle Fishman, Jessica LaChance RN, Elizabeth Mack, Medicine, Pediatric Critical Care, MUSC.

128 Characterizing the Effect of Predator Odor Exposure in C57BL/6J Mice
India Robinson, Courtney King, Marcelo Lopez, Howard Becker, Medicine, Psychiatry and Behavioral Sciences, MUSC.

129 Effects of Cigarette Smoke Exposure on the Mechanical Strength of Femur Fracture Healing
Ryan Walsh, Yongren Wu, Russell Reeves, Glenn Hefter, Elizabeth Nadeau, Elizabeth Lee, William Barfield, Vincent Pellegrini, Medicine, Orthopedics, MUSC.

130 Medical Imaging in Esophageal Crohn's Disease: A Rare Cause of Dysphagia
Andrew Westberry, John Hughes, MD, Meryle Eklund, MD, Medicine, Department of Radiology, MUSC.

131 Treating Lung Cancer with Oncolytic Virus Understanding the efficacy of myxoma virus against NSCLC derivative A9-F1
Stephen Sauer, Mee Bartee, Chase Burton, Parker Dryja, Erica Flores, Cody Gowan, Eric Bartee, Medicine, Microbiology and Immunology, MUSC.

132 Cardiac Myeloid Sarcoma: A Rare Mediastinal Mass
Courtney Wiley, Joseph Kovacich, Meryle Eklund, Medicine, Radiology, MUSC.

133 Freezing of Gait on Dopamine Treatment affects Quality of Life in Parkinson's disease patients
Katherine Teague, Gonzalo Revuelta, Medicine, Department of Neurology, MUSC.

134 Unilateral Cochlear Nerve Aplasia with a Variant Trigeminal Nerve V3 Origin: A Case Report
Elizabeth Rhodes, Samuel Volin, M.D., Arindam Chatterjee, M.D., Medicine, Radiology and Radiological Science, MUSC.

135 Genetic Analysis of Leber Congenital Amaurosis and Early Onset Retinal Dystrophy in Costa Rican Children: A High Prevalence of Biallelic RPE65 mutations
Andre Bourg, Bailey Glen PhD, Joaquin Martinez MD, Ramses Badilla MD, Daynna Wolff PhD, Iya Znoyko PhD, R. Porras PhD, Robert Wilson PhD, Gary Hardiman PhD, M., Mae Millicent W. Peterseim MD, Medicine, Ophthalmology , MUSC.

136 Determining the importance of stereochemistry in the design of peptide siRNA-carriers for oral cancer therapy
Travis Hedrick, Andrew Jakymiw, Dental Medicine (DMD, PhD), Oral Health Sciences, MUSC.

Session 5	Clinical / Professional / Masters IV Basic/Clinical Sciences	Harper Center Gym

Group A 8:30 – 10:00 AM

46 Cigarette Smoke Exposure Preferentially Impairs Endochondral Fracture Healing: Micro-CT Analysis
Glenn Hefter, Russell A. Reeves M.D., Yongren Wu PhD., Elizabeth Nadeau MS, Ryan Walsh MS, William R. Barfield PhD., Hai Yao PhD, Vincent D. Pellegrini Jr., Graduate Studies, Orthopaedics and Physical Medicine, MUSC.

47 Relationship between Diffusion Properties and Tissue Calcification in Human Cartilage Endplate
Pengling Ren, Peng Chen, Barton L. Sachs, Haijun Niu, He Gong, Charles Reitman, Hai Yao, Yongren Wu, Graduate Studies, Orthopaedics and Physical Medicine, MUSC.

48 The Interaction Between Prpf8 and Dzip1 and its Role in Mitral Valve Prolapse
Janiece Glover, Russell Norris, Graduate Studies, Regenerative Medicine and Cell Biology, MUSC.

49 Radiology Perspective of Fibrolamellar Hepatocellular Carcinoma: A Case Report
Elisabeth A Sidden, Lara Hewett, Meryle J Eklund, Medicine, Pediatric Radiology, MUSC.

50 Functional Effects of Adductor Canal Block Versus Femoral Nerve Block for Arthroscopic Anterior Cruciate Ligament Repair: A Systematic Review
Matthew Edwards, Jennifer Hunnicutt PhD, Preston Bethea MD, Sylvia Wilson MD, Harris Slone MD, Shane Woolf, Medicine, Department of Orthopaedics, MUSC.

51 Identifying Novel Small Molecules Reducing Serum LDL-C Level in iPSC-derived Hepatocytes
Cooper Rutland, Dr. Ray Jui-Tung Liu, PhD, Stephen Duncan, Medicine, Department of Regenerative Medicine and Cell Biology, MUSC.

52 Collagen 1A1 gene expression levels in resected skin predict acute wound healing complications after skin reduction procedures
Anna Skochdopole, D Mullner, J Heyward, F Herrera, C Feghali-Bostwick, MB Armstrong, Adeyemi Ogunleye, Medicine, MUSC Plastic Surgery Department, MUSC.

53 Correlates of Hearing Loss in Children with Osteogenesis Imperfecta
Camille Sluder, Dani Inglesby, Yuan Liu, Ted Meyer, Medicine, ENT, MUSC.

54 Alcohol Septal Ablation Produces Similar Changes to CBC as Atherosclerotic Myocardial Infarction Without Evidence of Platelet Activation. Is There Less Inflammation With ASA?
Billy Mullinax, Davis Leaphart, Mira Patel, Alex Canova, Ashley Waring, Christopher Nielsen, Valerian Fernandes, Medicine, Cardiology, MUSC.

55 Withdrawn

56 Saddle pulmonary embolism and in-hospital mortality in patients with cancer
Irene Ruiz, Ashley Prentice, Erin Weeda, Pharmacy, College of Pharmacy, MUSC.

57 A Population Health Approach to Measuring the Impact of a State-wide Tele-Stroke Program
Cory Robinson, Jillian I. Harvey, Steven M. Delimbo, Ellen Debenham, Christine A. Holmstedt, Kit N. Simpson, Dee W. Ford, Annie Simpson, Health Professions, Dept of Healthcare Leadership & Management, MUSC.

Group B 10:30 – 12:00 PM

137 Effect of Tele-Consenting on Consent Quality and Decision Making in a Population of African Americans with and without Systemic Lupus Erythematosus
Trevor Faith, Jihad Obeid, Kit Simpson, Diane Kamen, Health Professions, Department of Medicine, Division of Rheumatology and Immunology, MUSC.

138 Modulating intracellular complement to reduce inflammation post ischemia reperfusion injury
Tara Sweeney, Caroline Wallace, Victoria Spadafora, Carl Atkinson, Satish Nadig, Medicine, Department of Surgery, Lee Patterson Allen Transplant Immunology, MUSC.

139 Effect of scan substrates on accuracy of 7 intraoral digital impression systems using human maxilla model
Chris Bocklet, Jansen Nash, Anthony Mennito, Thierry Bacro, Jason Latham, Zachary Evans, Mark Ludlow, Abigail L. Kelly, Sarandeep Huja, Wally Renne, Dental Medicine, Department of Oral Rehabilitation, MUSC.

140 Molecular Mechanism of Transglutaminase in Controlling Collagen Fiber Morphology in Periodontal Disease
Dylan Brown, Amy Bradshaw, Dental Medicine, Medicine, MUSC.

141 Accuracy of Optical Surface Scanning of Intraoral Mucosal Tissue and Surfaces
Roy Faulks, Zachary Evans, Dental Medicine, Assistant Professor - Department of Stomatology, Division of Periodontics, MUSC.

142 Developing a novel bipedal device and paradigm to investigate the neural circuits involved in lower extremity movement
John McLeod, Logan T. Dowdle, Daniel H. Lench, Ryan Downey, Ph.D., Christopher M. Gregory, Ph.D., Colleen Hanlon, Medicine, Psychiatry and Behavioral Sciences, MUSC.

143 Complement Peptide C3a Induces Mitochondrial Dysfunction and Respiration-Linked Cell Death in Candida Glabrata
Jessica Dinh, Hailey Kinsland, William Linder, SarahRose Hall, Silva Vaena, Caroline Westwater, Dental Medicine, Oral Health Sciences, MUSC.

144 Compliance Rates of Physician-Prescribed Deep Vein Thrombosis Prophylactic Mechanical Devices in Orthopaedic Patients
Jacob Balmer, William Barfield, PhD, Harry Demos, Medicine, Department of Orthopaedics, MUSC.

145 Twin beam dual-energy vs single-energy on a novel PET-dual energy CT: Phantom study and clinical validation.
Logan Jackson, Carlo De Cecco, Leoni Gordon, Philip Burchett, Marcus Bradshaw, Domenico De Santis, Joseph Schoepf, Medicine, Radiology and Radiological Science, MUSC.

146 Use of Daily Goals Sheets on a Medicine Ward to Facilitate Nurse-Physician Communication
Cole Buchanan, Kathleen Fowler R.N., Kevin Baker M.D., William Shelley, Medicine, MUSC Dept of Internal Medicine, MUSC.

147 Retrospective assessment of texture analysis parameters in abdominal lesions
Neil Shah, Melissa Picard, Mark Kovacs, Brian Flemming, Kyle Freeman, Andrew Hardie, Medicine, Department of Radiology, MUSC.

148 Impact of leveraging technology in the ambulatory care setting in a Veterans affairs medical center
Ashley Prentice, Veldana Nuhi, Pharmacy, Ralph H Johnson VA Medical Center, MUSC.

149 Satisfaction With Telehealth Pharmacy Precepting in an Interprofessional Clinical Practice Setting.
James Gerrald, Setu Shah, Hannah Green, Dr. Erin Weeda, and Dr. David Shirley, James Sterrett, Pharmacy, College of Pharmacy, MUSC.

Session 6 — PhD I — Harper Center Gym
Social/Behavioral Sciences

Group A 8:30 – 10:00 AM

58 Motor Outcome After Early Surgery for Infants Less than 12 months of age with Congenital Heart Defects: A Systematic Review
Turki Aljuhani, Heather Shaw Bonilha, Sinai Zyblewski, Dorothea Jenkins, Patricia Coker-Bolt, Health Professions, Occupational Therapy, MUSC.

59 The Art of Compassionate Patient Care: A Collaboration between the Medical University of South Carolina and the Gibbes Museum of Art
Brooke Mulrenin, Rebecca Hiester, Elise Detterbeck (Gibbes Museum faculty) , Cynthia Dodds, Health Professions, College of Health Professions; Division of Physical Therapy, MUSC.

60 Novel Pain Relievers: A Sham-Controlled Neuroimaging Study Evaluating the Relative Efficacy of Medial Versus Dorsolateral Theta Burst Stimulation
Logan Dowdle, Julia Imperatore, Sarah Hamilton, Mark George, Jeffrey Borckardt, Colleen Hanlon, Graduate Studies, Psychiatry and Behavioral Sciences, MUSC.

61 Brain Volume Abnormalities and Blunted Reactivity to Reward Associated with Externalizing Behaviors among School-age Children
Emilio Valadez, Matthew Fadus, Lindsay Squeglia, Medicine, Psychiatry and Behavioral Sciences, MUSC.

62 Inventing and optimizing a portable neuromodulatory device for quickly measuring consciousness
Kevin Caulfield, Philipp M. Summers, Xingbao Li, Matthew T. Savoca, Matteo Fecchio, Silvia Casarotto, Marcello Massamini, Mark George, Graduate Studies, Psychiatry, Radiology, and Neuroscience, MUSC.

Group B 10:30 – 12:00 PM

150 Difference in First and Second Swallows During Modified Barium Swallow Studies
Janet Horn, Annie Simpson, Heather Bonilha, Health Professions, Health Sciences and Research, MUSC.

151 Breast Cancer Survivors' Unmet Needs after Completion of Cancer Treatment including Radiation Therapy
Michelle Pembroke, Julie Bradley, MD, Associate Professor, University of Florida Radiation Oncology, Lynne Nemeth, Nursing, Professor, College of Nursing, MUSC.

152 Care-coordination Approach to Learning Lupus Self-Management (CALLS)
Ashley White, Trevor Faith, Dr. Ramesh Ramakrishnan, Dr. Jim Oates, Edith Williams, Graduate Studies, Assistant Professor, MUSC.

153 Withdrawn

Session 7 PhD II Harper Center Gym
Basic/Clinical Sciences

Group A 8:30 – 10:00 AM

63 Population attributable ratio for assessing dominant modifiable risk factors of stroke using case-control data
Fedelis Mutiso, Gebregziabher Mulugeta, Graduate Studies, Public Health Sciences, MUSC.

64 A 'Duel' of Complements
Nathaniel Parsons, Balasubramaniam Annamalai, Elisabeth Obert, Gloriane Schnabolk and Stephen Tomlinson, Baerbel Rohrer, Graduate Studies, Ophthalmology, MUSC.

65 High-fat diet-induced hyperinsulinemia reduces brain insulin levels and impairs tactile recognition
Luke Watson, Dominique Williams, Janet Boggs, Catrina Sims-Robinson, Graduate Studies, Neurology, MUSC.

66 Effect of Theta-Burst Stimulation Dose on Motor Cortex Excitability: a parametric evaluation of 600, 1200, 1800 pulses per session
Daniel McCalley, Daniel H. Lench, Jade D. Doolittle, Sarah Hamiliton, Will DeVries, Colleen Hanlon, Graduate Studies, Psychiatry, MUSC.

67 Risk of substance abuse onset in adults diagnosed with epilepsy or migraine.
Stephanie Jones, Dulaney Wilson, Jeffrey Korte, Graduate Studies, Public Health Sciences, MUSC.

68 Calpain Inhibitor Prevents Noise-induced Hair Cell Loss through Upregulation of p-Akt Signaling
Qiaojun Fang, Ruosha Lai, Song Pan, Khujista Haque, Suhua Sha, Graduate Studies, College of Medicine, MUSC.

69 Characterization of Extracellular Matrix Dysregulation and PTM patterns in Congenital Aortic Valve Stenosis using MALDI Imaging Mass Spectrometry
Cassandra Clift, Richard R. Drake, Peggi Angel, Graduate Studies, Cell and Molecular Pharmacology and Experimental Therapeutics, MUSC.

70 Developing a Rodent Model of Empathy
Stewart Cox, Angela Kearns, Carmela Reichel, Graduate Studies (MSTP), Neurosciences, MUSC.

Group B 10:30 – 12:00 PM

154 Utility of EEG in predicting recovery after stroke
Amanda Vatinno, Na Jin Seo, Health Professions, Occupational Therapy, MUSC.

155 Regulation of the Cell-cell Junction Associated RNAi Machinery in Colon Cancer
Amanda Daulagala, Lauren Rutledge, Mary C Bridges, Joyce Nair Menon, Antonis Kourtidis, Graduate Studies, Regenerative Medicine and Cell Biology, MUSC.

156 A Logic Ensemble Model for Identification of Interactions Associated with Continuous Disease Phenotypes
Sherry Livingston, Dr. Gary Hardiman, Bethany Wolf, Graduate Studies, Public Health Sciences, MUSC.

157 Geographic Distribution and Risk of Upper Urothelial Carcinomas in Croatia, 2001-2011
Danira Medunjanin, Zdenko Sonicki, Ante Cvitkovic, Sara Wagner Robb, John Vena, Graduate Studies, Department of Public Health Sciences, MUSC.

158 Modeling Birth Outcomes and Food Security: A comparison of skew-normal and skew-t regression models in frequentist and Bayesian frameworks
Carter Allen, Brian Neelon, Graduate Studies, Public Health Sciences, MUSC.

159 Modeling Space-Time Variation in Mild Cognitive Impairment and Alzheimer's Disease Incidence
Daniel Baer, Andrew Lawson, Graduate Studies, Public Health Sciences, MUSC.

160 Development of a Peptide-Derived Orally-Active Kappa Opioid Agonist as a Novel Analgesic
Tyler Beck, Carmela M. Reichel, Kristi L. Helke, Patrick M. Woster, Thomas Dix, Medicine (MD, PhD), Drug Discovery & Biomedical Sciences, MUSC.

161 SPARC Produced by Bone-Marrow Derived Cells Contributes to Myocardial Fibrosis
Hannah Riley, Ryan R. Kelly, Lindsay T. McDonald, An O. Van Laer, Catalin F. Baicu, Amanda C. LaRue, Michael R. Zile, Amy Bradshaw, Graduate Studies, Dept. of Medicine, Dept. of Oral Health Sciences, Ralph H. Johnson Dept. of Veteran's Affairs, MUSC.

Session 8 — PhD III — Harper Center Gym
Basic/Clinical Sciences

Group A 8:30 – 10:00 AM

71 Cilia Independent and Dependent Roles of PDGFRa in Mitral Valve Development and Disease
Kelsey Moore, Diana Fulmer, Lilong Guo, Janiece Glover, Rebecca Stairley, Russell Norris, Graduate Studies, Regenerative Medicine & Cell Biology, MUSC.

72 Using novel genetic tools to elucidate the role of NPAS4 in drug addiction
Brandon Hughes, Christopher Cowan, Graduate Studies, Neuroscience, MUSC.

73 Evaluation of the Association between Serum 25-hydroxy-vitamin D (25(OH)D) and Inflammatory Cytokines in Pregnant Women
Aastha Khatiwada, Bethany Jacobs Wolf, Carol Wagner, Graduate Studies, Pediatrics - Neonatology, MUSC.

74 Age-Related Alterations in Resident Macrophage Activity in the Cochlear Lateral Wall
Kenyaria Noble, Ting Liu, Annemarie Lam, Jeremy L. Barth, Bradley A. Schulte, Hainan Lang, Graduate Studies, Pathology and Laboratory Medicine, MUSC.

75 Autistic-like behaviors and increased microglial activation in a mouse model of MEF2C Haploinsufficiency Syndrome
Catherine Bridges, Adam Harrington, Kayla Blankenship, Jennifer Cho, Evgeny Tsvetkov, Ahlem Assali, Christopher Cowan, Graduate Studies, Neuroscience & Psychiatry, MUSC.

76 Preliminary characterization of the protein kinase C subtypes in mediation of sFlt1 release in human placental trophoblasts
Rebecca Chow, Jiawu Zhao, Timothy Lyons, Jeremy Yu, Graduate Studies, Endocrinology, MUSC.

77 Dynorphin-containing neurons in the Central Amygdala-BNST circuit contribute to binge ethanol drinking in mice.
Harold Haun, Howard Becker, Graduate Studies, Psychiatry, MUSC.

78 Supervised dimension reduction using Bayesian Hierarchical Modeling: a simulation study and application to ambient air pollutants
Ray Boaz, John Pearce, Andrew Lawson, Graduate Studies, Public Health Sciences, MUSC.

Group B 10:30 – 12:00 PM

162 A Novel Platform for N-Glycoprotein Cancer Biomarker Discovery from Biological Samples by Mass Spectrometry Imaging of Antibody Arrays
Alyson Black, Connor West, Peggi Angel, Richard Drake, Anand Mehta, Graduate Studies, Cell and Molecular Pharmacology, MUSC.

163 Knot Specification for Imputation of Missing Longitudinal Variables
Virginia Shipes, Reneé H. Martin, Yuko Palesch, Graduate Studies, Department of Public Health, MUSC.

164 Hypothesis Testing Framework for Dichotomization
Peter Greene, , Beth Wolf, Graduate Studies, Department of Public Health Sciences, MUSC.

165 The Role of HSC-Derived Osteogenic Progenitors in Fracture Repair
Nathaniel Jensen, Ryan Kelly, Amanda LaRue, Graduate Studies (MSTP), Department of Pathology and Laboratory Medicine, MUSC.

166 DPP-4-Cleaved SDF-1b Diminishes Migration and Osteogenic Differentiation Capacities of Bone Marrow Mesenchymal Stem Cells
Ahmed Elmansi, Khaled Hussein, Brian Volkman, Galina Kondrikova, Wendy Bollag, Sadanand Fulzele, Xingming Shi, Meghan Mcgee-Lawrence, Mark Hamrick, Carlos Isales, Sudharsan Periyasamy-Thandavan, William Hill, Graduate Studies, Pathology and Laboratory Medicine, MUSC.

167 Podocyte Development and Function Depends on Primary Cilia and the Exocyst Complex
Ashish Solanki, Ehtesham Arif, Matthew Sampson, Deepak Nihalani, Joshua Lipschutz, Medicine, MUSC.

168 Using Survivors' Voices to Guide the Identification and Care of Trafficked Persons by U.S. Healthcare Professionals: A Systematic Review
Stephanie Armstrong, V. Jordan Greenbaum, MD, Stephanie Armstrong, Nursing, College of Nursing, MUSC.

169 Uncoupling of p97 ATPase activity has a dominant negative effect on protein extraction from chromatin
Halley Rycenga, Kelly Beagan, David Long, Graduate Studies, Biochemistry and Molecular Biology, MUSC.

Session 9 Postdoc / Resident / Fellow / Staff Scientist I Harper Center Gym

Group A 8:30 – 10:00 AM

79 Pathogenic role of SAT1 variants in monogenic lupus
Lingxiao Xu, Betty P Tsao, Medicine, Rheumatology & Immunology, MUSC.

80 Structural evaluation of resistance mechanism in N. gonorrhoeae against extended-spectrum cephalosporins
Avinash Singh, Robert A Nicholas, Christopher Davies, Graduate Studies, Department of Biochemistry and Molecular Biology, MUSC.

81 Palmitic acid diet-induced steatohepatitis model in adult zebrafish
Ki-Hoon Park, Seok-Hyung Kim, Medicine (MD, PhD), Medicine, Regenerative Medicine and Cell Biology, MUSC.

82 Autologous Regulatory T Cell Transplantation Enhances Bone Repair in a Mouse Model of Osteogenesis Imperfecta
Inhong Kang, Paramita Chakraborty, Shilpak Chatterjee, Uday Baliga, Shikhar Mehrotra, Meenal Mehrotra, Medicine, Pathology and Laboratory Medicine, MUSC.

83 Management of acute pancreatitis in pediatric patients: Five year experience following NASPGHAN guidelines
Abdul Shahein, Susan Baker, MD PhD, Candi Jump, DO, Ricardo Arbizu, MD, Johanna Palmadottir, MD, Nagraj Kasi, MD, J. Antoni Quiros, Medicine, Pediatric Gastroenterology and Nutrition, MUSC.

84 Subcortical Envelope Representations But Not Age Predict Speech-In-Noise Recognition
Carolyn McClaskey, James W. Dias, Kelly Harris, Medicine, Otolaryngology - Head and Neck Surgery, MUSC.

85 Space Diffusion Syndrome: ATP Synthase as a potential drug Target to ameliorate the health of Astronauts.
Willian da Silveira, Renaud, Ludivine; Chan, Sherine S.L.; Costes, Sylvain V. ; Beheshti,Afshin., Gary Hardiman, Medicine, Public Health, MUSC.

86 Novel Doxorubicin-resistant Angiosarcoma Cell Line Demonstrates Resistance to Multiple Anti-tumorigenic Treatments In Vivo
Denise Garcia, Eleanor Hilliard, Nicholas Major, Ingrid Bonilla, Nancy Demore, Patrick Nasarre, Medicine, Surgery, MUSC.

Group B 10:30 – 12:00 PM

170 Predictors of improved naming ability in chronic stroke survivors after intensive aphasia therapy
Alexandra Basilakos, Lisa Johnson, Brielle C. Stark, Leonardo Bonilha, Chris Rorden, Julius Fridriksson, Medicine, USC Communication Sciences and Disorders, MUSC.

171 Implicit Bias in Elementary Education Disciplinary Practices
Matthew Fadus, Emilio A Valadez, Lindsay Squeglia, Medicine, Department of Psychiatry and Behavioral Sciences, MUSC.

172 High Flow Nasal Cannula: Too Much Flow for the Floor?
Madeleine Genereux, Morgan Sims, MD, Ian Kane, Medicine, Pediatrics, MUSC.

173 Uses of Point-of-Care ultrasound (POCUS) in a Rural Hospital in Western Uganda and How it Changes Patient Management
Danika Brodak, Brad Presley, MD Kyle Embertson, MD, Lacey MenkinSmith, Medicine, Emergency Department, MUSC.

174 Heme Oxygenase 1 Targeting by a Cytotoxic Isoflavone as a Determinant of Lung Cancer Sensitivity.
Leilei Zhang, Kenneth Tew, Pharmacy, Dept. of Cell & Molecular Pharmacology, MUSC.

175 Smoking-induced Emphysema in the uPARAP-null Mouse
Sarah Stephenson, Carole Wilson, Medicine, Medicine, MUSC.

176 Survival and Apoptotic Functions of PDI are Redox Dependent
Shweta Singh, Danyelle Townsend, Pharmacy, Department of Drug Discovery and Biomedical Sciences, MUSC.

Session 10 Research Specialist / Research Assistant I Harper Center Gym

Group A 8:30 – 10:00 AM

87 Which Electrode Position is Best for Closed-Loop Transcutaneous Auricular Vagus Nerve Stimulation (taVNS) to Enhance Oromotor Learning Development of Impaired Infants.
Daniel Cook, Bashar W. Badran, Will H. DeVries, Morgan M. Dancy, Georgia M. Mappin, Mark S. George, Dorothea Jenkins, Medicine, Neonatology, MUSC.

88 Vagus Nerve Stimulation Effects in an AAV6 Î±-Synuclein Rat Model of Parkinson's Disease
Luis Aponte Cofresi, Ariana Farrand, Rebecca Gregory, Heather Boger, Graduate Studies, Neuroscience, MUSC.

89 Transcutaneous Auricular Vagal Nerve Stimulation (taVNS) Paired with Feeding Coordination in Infants with Brain Injury
Georgia Mappin, Bashar W. Badran, Will H. DeVries, Morgan Dancy, Daniel Cook, Mark S. George, Dorothea Jenkins, Medicine, Neonatology, MUSC.

90 The Effects of Brain Stimulation on Social Skills Training in Autistic Adolescents
Delenn Solis, Laura Carpenter, Frampton Gwynette, Jeffrey Borckardt, Laura Lohnes, Jane Joseph, Graduate Studies, Neuroscience, MUSC.

91 Effect of Novel SET-targeting Compounds on SET/PP2A Association
Alexis Carey, Ryan M. DePalma, Besim Ogretmen, Graduate Studies, Biochemistry and Molecular Biology, MUSC.

92 Importance of antibody-dependent cell-mediated cytotoxicity to Age Related Macular Degeneration
Crystal Nicholson, Alex Woodell, Bryan Jones PhD, Carl Atkinson PhD, Baerbel Rohrer, Graduate Studies, Storm Eye Institute Ophthalmology, MUSC.

93 Just Say Know: Rethinking Drug Prevention Programs
Anna Maralit, Claudia Salazar, Lindsay Meredith, Suzanne Thomas, Sylvia Rivers, Lindsay Squeglia, Medicine, Psychiatry and Behavioral Sciences, MUSC.

Group B 10:30 – 12:00 PM

177 Investigation into the Role of Serotonylation in the Cardiac Micro-Environment
Nicolas Shealy, Yuhua Zhang, Michael Zile M.D., Amy Bradshaw, Graduate Studies, Cardiology, MUSC.

178 The Immune Profile of Circulating Fibroblast Precursors in High Fat Diet fed Mice
Darian Thomas, Sara J. Sidles, Amanda LaRue, Graduate Studies, Department of Pathology and Laboratory Medicine; Ralph H. Johnson VA Medical Center Research Services, MUSC.

179 NDST-1 Expression as a Candidate for Preferential Viral Binding of Myxoma to the Basal Epithelium
Erica Flores, Eric Bartee, Graduate Studies, Microbiology & Immunology, MUSC.

180 The role of mitochondria ROS in podocyte damage during salt-sensitive hypertension
Mark Domondon, Regina Sultanova, Elizaveta Kurashkina, Iuliia Polina, Kareem Heslop, Eduardo Maldonado, Daria Ilatovskaya, Medicine, Medicine/Nephrology, MUSC.

181 Blockade of the TIM-3 T cell Checkpoint Improves Oncolytic Virotherapy
Cody Gowan, Cody C. Gowan, Kati Baillie, Mee Y. Bartee, Eric Bartee, Graduate Studies, Microbiology and Immunology, MUSC.

182 Characterization of Pericytes from Normal and Idiopathic Pulmonary Fibrosis (IPF) Human Lungs
Seth Bollenbecker, Sarah Falta, Sarah Stephenson, Carole Wilson, Lynn Schnapp, Medicine, Medicine, MUSC.

Session 11 Undergraduate II EL 104

12:45 - 1:00

183 Injury Site-Targeted Complement Inhibition Improves Motor & Cognitive Recovery after Murine Ischemic Stroke
Zachary Berry, Amer Toutonji, Michael Holers, Stephen Tomlinson, Graduate Studies, Microbiology and Immunology, MUSC.

1:00 - 1:15

184 Novel Drug Delivery Strategies to Improve Delivery of Anticancer Drugs Across the Blood-Brain Barrier to Treat Glioblastoma
Adriana Carter, William A. Vandergrift III, Scott M. Lindhorst, Abhay K. Varma, Libby Infinger, Sunil J. Patel, David Cachia, Krista Cornehl, Arabinda Das, Medicine, Neurosurgery, MUSC.

1:15 - 1:30

185 Combination of O6-Benzylguanine, MGMT, and CDK 4/6 inhibitor or TGF-beta inhibitor Increases TMZ-Resistivity in Glioblastoma Cells
Indira Kanginakudru, Arabinda Das, Medicine (MD, PhD), Department of Neurosurgery, MUSC.

1:30 - 1:45 BREAK

1:45 - 2:00

186 Higher-Order Chromatin Organization of the Rat Tox3 Breast Cancer Susceptibility Locus
Kimberly King, Bart Smits, Graduate Studies, Department of Pathology & Laboratory Medicine, MUSC.

2:00 - 2:15

187 Maternal Marijuana use with and without the use of Opioids and their Effects on Infant Morphine Treatment
Tatiyana Adkins, Dr. Price Ward, Dr. Dorothea Jenkins, Medicine, Neonatology, MUSC.

2:15 - 2:30

188 A survey assessing patient self-reported frequency and severity of medication side effects and non-adherence in organ transplant recipients
Anushka Fernandes, Erika Andrade, Satish Nadig, David Taber, Medicine, Transplant Surgery, MUSC.

Session 12 Clinical / Professional / Masters V EL 103

12:00 - 12:15

189 Stroke Lesions and Behavioral Patterns Correlate with Severity of Post-Stroke Limb Spasticity
Colin Smith, Dr. Pratik Chhatbar, Dr. Eyad Allmallouhi, Wayne Feng MD MS, Medicine, Vascular Neurology, MUSC.

12:15 - 12:30

190 Attenuation of Fibroblast Differentiation by the Inhibition of TGF-b Signaling in a Murine Model of Thoracic Aortic Aneurysm
Caroline Besley, Christine Couch, Tyler Grespin, Elizabeth K. Nadeau, Robert E. Stroud, Rupak Mukherjee, PhD, Jeffrey A. Jones, Medicine, Division of Cardiothoracic Surgery, MUSC and Research Service of the Ralph H. Johnson Veterans Affairs Medical Center, Charleston, SC.

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191 Mechanical Regulation of microRNA Abundance
Camila Villacreses, Adam Akerman, Walker Blanding, Christine Couch, Robert Stroud, Rupak Mukherjee, Jeffrey Jones, Medicine, Cardiothoracic Surgery, MUSC.

12:45 - 1:00

192 Hematopoietic Cells in Healthy and Myxomatous Mitral Valves
Isabela Visintin, Ray Deepe, Emilye Hiriart, Andy Wessels, Medicine, Department of Regenerative Medicine and Cell Biology, MUSC.

1:00 - 1:15

193 Long-term impact of acute stress on cognition, anxiety, and reinstated heroin seeking in male and female rats
Jordan Carter, Angela Kearns, Rachel Weber, Carmela Reichel, Medicine, Neuroscience, MUSC.

1:15 - 1:30

194 **Burnout in Radiologists Practicing in South Carolina**
Roy Smith, Madelene Lewis, Medicine, Radiology, MUSC.

1:30 - 1:45 BREAK

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195 **Importance of Sleep Quality in Patients with Lupus: A Cross-Sectional Study**
Alexandra Schwab, Sarah Fox, Diane Kamen, MD, MSCR, Medicine, Department of Rheumatology, MUSC.

2:00 - 2:15

196 **Statin-Dependent Decrease in Mitochondrial Metabolism in Cancer Cells is not Mediated by Changes in Cellular or Mitochondrial Cholesterol Content**
Diana Fang, Charlye Christie, Elizabeth Hunt, Amandine Rovini, Morgan Morris, Kareem Heslop, Gyda Beeson, Craig Beeson, Eduardo Maldonado, Medicine, Drug Discovery and Biomedical Sciences, MUSC.

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198 **Oncolytic Myxoma virus synergizes with standard of care for treatment of glioblastoma multiforme**
Chase Burton, Arabinda Das, Daniel McDonald, William A. Vandergrift III, Sunil J. Patel, Davic Cachia, Eric Bartee, Graduate Studies, Microbiology and Immunology, MUSC.

2:30 - 2:45

199 **Dimethylguanidinovaleric Acid is a marker of Liver Fat that Predicts Future Development of Type 2 Diabetes**
Jordan Morningstar, John F. O'Sullivan, Qiong Yang, Baohui Zheng, Yan Gao, Sarah Jeanfavre, Justin Scott, Celine Fernandez, Hui Zheng, Sean O'Connor, Paul Cohen, Ramachandran S. Vasan, Michelle T. Long, James G. Wilson, Olle Melander, Thomas J. Wang, Caroline Fox, Randall T. Peterson, Clary B. Clish, Kathleen E. Corey, Robert Gerszten, Medicine, MUSC, Division of Cardiovascular Medicine, Beth Israel Deaconess Medical Center, Boston, MA.

2:45 - 3:00

200 **Characterization of Immune Subsets in Osteoarthritis Patients**
Molly Sekar, Kiley Lawrence, Matthew Essman, Katie Hurst, Gabriella Santa Lucia, Thomas Valente, Lee Leddy, MD, MSCR, Vincent Pellegrini, Jr., MD; Zeke Walton, MD, Jessica Thaxton, Medicine, Orthopaedics, Microbiology, and Immunology, MUSC.

3:00 - 3:15

276 **A prospective observational analysis of near visual acuity in pseudophakic children**
Jose Gallegos, Marion Edward Wilson, Medicine, Ophthalmology/Stom Eye Institute, MUSC.

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12:00 - 12:15

201 **miR-510 mediated negative regulation of Cav1 as a mechanism driving breast cancer disparity**
Bobbie Blake, Brooke King, Arabia Satterwhite, Lourdes Nogueira, Victoria Findlay, Medicine, Pathology & Laboratory Medicine, MUSC.

12:15 - 12:30

202 **PCBP1 promotes effector T cell functions via repression of regulatory T cell gene programs**
Davis Borucki, Ephraim A. Ansa-Addo, Huai-Cheng Huang, Zihai Li, Medicine, Microbiology & Immunology, MUSC.

12:30 - 12:45

203 **Quadratus Lumborum versus Transversus Abdominis Plane Nerve Block: A Comparison in Regional Anesthesia Techniques**
Logan Hood, Renuka George, Medicine, Anesthesia and Perioperative Medicine, MUSC.

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204 **Lymphovascular Space Invasion As an Independent Predictor of Lymph Node Status at a Single Academic Institution**
Alex Drohan, E. Green, L.M. Harbin, A. Wahlquist, W.A. Graybill, M.F. Kohler and W.T. Creasman, Laurel Berry, Medicine, Ob/Gyn, MUSC.

1:00 - 1:15

205 Does Early Cerebral Blood Flow in Asphyxiated Neonates Indicate Degree of Neural Injury?
Ann Hill, Leslie Hirsig, Milad Yazdani, Heather Collins, Dorothea Jenkins, Medicine, Pediatrics - Neonatology, MUSC.

1:15 - 1:30

206 Id1 and Id3 are required to maintain steady state hematopoiesis by promoting sinusoidal regeneration
Stephen Gadomski, Satyendra K. Singh, Shweta Singh, Kimberly D. Klarmann, Stephen Seaman, Jonathan Keller, Medicine, Senior Investigator, Mouse Cancer Genetics Program, MUSC.

1:30 - 1:45 BREAK

1:45 - 2:00

207 Assessment of cognitive impairment in various causes of dizziness: Preliminary Report Using the Neuropsychological Vertigo Inventory
Taylor Locklear, Shaun Nguyen MD, Rebecca English DPT, Christine Strange AuD, Habib Rizk, Medicine, Otolaryngology-Neurotology, MUSC.

2:00 - 2:15

208 Novel injury-site targeted complement modulation reverses cognitive deficit 60 days after traumatic brain injury
Farris Langley, Ali Alawieh, Mikaela York, Henry Broome, DeAnna Adkins, Stephen Tomlinson, Medicine (MD, PhD), Microbiology & Immunology, MUSC.

2:15 - 2:30

209 Self-navigated free-breathing radial whole heart magnetic resonance angiography for the assessment of thoracic aorta: Comparison with computed tomography angiography
Robert Stroud, Marly Van Assen, Joseph Schoepf, Davide Piccini, Akos Varga-Szemes, Medicine, Radiology, MUSC.

2:30 - 2:45

210 Commensal Microbiota Influence on Mesenchymal and Hematopoietic Differentiation in Osteoimmunology
Michael Chew, Jessica Hathaway-Schrader, Johannes Aartun, Nicole Poulides, Chad Novince, Dental Medicine, Oral Health Sciences, MUSC.

2:45 - 3:00

211 Evaluation of Surgical Skill and Competency Using Intraoperative Recordings of ENT Procedures.
Kyle Kulbarsh, Charmee Mehta, James Dornhoffer, Ted Meyer, Medicine, Department of Otolaryngology, MUSC.

3:00 - 3:15

212 Passive Changes in Muscle Length Reduce Lower Extremity Corticomotor Response to Transcranial Magnetic Stimulation
Benjamin G. Birley, John H. Kindred, Mark G. Bowden, Health Professions, Division of Physical Therapy, MUSC.

Session 14 Clinical / Professional / Masters VII EL 115

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213 Smoking Status is Associated with Increased Surgical Complications Following Total Shoulder Arthroplasty
Joshua Wilson, Alyssa Althoff, Sophia Traven, Shane Woolf, Harris Slone, Russell Reeves, Medicine, Orthopaedic, MUSC.

12:30 - 12:45

214 Are insured Emergency Department patients more likely to have a regular doctor than those with limited resources?
Emily Wolery, Gregory Hall, Steven Saef, Sarah Katchen, Medicine, Emergency Department, MUSC.

12:45 - 1:00

215 Orbital Atherectomy: An Analysis of Demographics and Outcomes Amongst Patients Undergoing Treatment at the Ralph H. Johnson VA Medical Center
Andrew Hill, Milad El-Hajj, Spenser Staub, Courtney Kramer, Valerian Fernandes, Anbukarasi Maran, Medicine, MUSC.

1:00 - 1:15

216 Smoking Status is Associated with Increased Complications and Readmission Following Extensor Mechanism Repair
Michael Byrd, Alyssa Althoff, Russell A. Reeves, MD, Sophia Traven, MD, Lee R Leddy, Harris Slone, Medicine, Orthopedics, MUSC.

1:15 - 1:30

217 **Withdrawn**.

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1:45 - 2:00

218 **Preferences in Stapes Surgery among Elite Otologists**
Avigeet Gupta, Yuan Liu, Shaun Nguyen, Paul Lambert, Timothy Jung, Medicine, Otolaryngology, MUSC.

2:00 - 2:15

219 **Treatment Options for Acute Noise-Induced Hearing Loss: a Systematic Review and Meta-Analysis**
Sina Koochakzadeh, Avigeet Gupta, Shaun Nguyen, Paul Lambert, Medicine, Otolaryngology - Head and Neck Surgery, MUSC.

2:15 - 2:30

220 **Ultra high resolution MR histology Using ROI-extraction and SNR-efficient gradient echo imaging**
Joseph Guy, Myfanwy Hill, Robin Franklin, Kevin Brindle, Daniel Reich, Medicine (MD, PhD), National Institute of Neurological Disorders and Stroke, MUSC.

2:30 - 2:45

221 **The Use of Structurally Augmented 3D Printed Cages in Segmental Defects of the Tibial Shaft**
Joseph Tracey, Selene Parekh, Medicine, Orthopaedics, Duke University, MUSC.

2:45 - 3:00

222 **Complement Modulation in Stroke: Closing the 'Reperfusion Mismatch'**
Ali Alawieh, E. Farris Langley, Stephen Tomlinson, Medicine, Microbiology and Immunology, MUSC.

Session 15 — PhD IV — EL 121

12:00 - 12:15

223 **Development and Validation of a Multidimensional Experimental Screening Instrument to Measure Multiple Barriers Associated with Individual Dietary Practices: A Secondary Analysis of NHANES Datasets 20**
Enia Zigbuo-Wenzler, Gayenell Magwood, Nursing, MUSC.

12:15 - 12:30

224 **Shortened ex vivo expansion of Th17 cells enhances anti-tumor immunity**
Hannah Knochelmann, Michelle Nelson, Aubrey Smith, Connor Dwyer, Megan Wyatt, Guillermo Rangel Rivera, Daniel Salas-Escabillas, Jacob Bowers, Daniel Neitzke, Mark Rubinstein, Chrystal Paulos, Graduate Studies, Microbiology & Immunology, Dermatology & Dermatologic Surgery, MUSC.

12:30 - 12:45

225 **TLR9 agonist, CpG, augments the function and persistence of adoptively transferred CD8+ T cells in a B cell dependent manner**
Aubrey Smith, Connor J. Dwyer, Hannah M. Knochelmann, Megan M. Wyatt, Guillermo O. Rangel Rivera, Michelle H. Nelson, Chrystal Paulos, Graduate Studies, Microbiology and Immunology, MUSC.

12:45 - 1:00

226 **STAT3 in Pancreatic Fibroblasts Promotes PDAC Tumorigenesis**
Julia Lefler, Katie A. Thies, Jason R. Pitarresi, Maria C. Cuitiño, Michael Ostrowski, Graduate Studies, Biochemistry and Molecular Biology, MUSC.

1:00 - 1:15

227 **Perfusion of Vascularized Composite Allografts with a Complement Inhibitor Protects Against Brain Death Induced Injury and IRI**
M. Mahdi Sleiman, Biao Lei, Qi Cheng, Stephen Tomlinson, Carl Atkinson, Medicine (MD, PhD), Microbiology and Immunology, MUSC.

1:15 - 1:30

228 **Inhibiting GARP-TGFbeta axis enhances anti-tumor efficacy of immune checkpoint blockade therapy**
Anqi Li, Bill X. Wu, Alessandra Metteli, Shaoli Sun, Zihai Li, Graduate Studies, Microbiology & Immunology, MUSC.

1:30 - 1:45 BREAK

1:45 - 2:00

229 Regulation of RNAi - lncRNA interactions by epithelial adherens junctions
Mary Catherine Bridges, Nair-Menon, Joyce, Antonis Kourtidis, Graduate Studies, Regenerative Medicine and Cell Biology, MUSC.

2:00 - 2:15

230 A New Enzymatic Approach to Distinguish Fucosylation Isomers of N-Linked Glycans in Tumor Tissues Using MALDI Mass Spectrometry Imaging
Connor West, Hongyan Liang, Anand Mehta, Richard Drake, Graduate Studies, Cell and Molecular Pharmacology and Experimental Therapeutics, MUSC.

2:15 - 2:30

231 Identifying ErbB3 as a potential therapeutic target for effectively treating Malignant Peripheral Nerve Sheath Tumors.
Ralph Tanios, Amanda M. Prechtl, Stephen T. Guest, Jody Longo, Stuart Worley, Kent Armeson, Elizabeth Garrett-Mayer, Steven Carroll, Graduate Studies, Pathology, MUSC.

2:30 - 2:45

232 Investigating the molecular mechanism of cephalosporin-resistance in Neisseria gonorrhoeae
Brandon Young, Christopher Davies, Graduate Studies, Biochemistry and Molecular Biology, MUSC.

2:45 - 3:00

233 RAGE signaling as a pharmacological target in Amyotrophic Lateral Sclerosis
Liping Liu, Kelby M. Killoy, Marcelo R. Vargas, Mariana Pehar, Graduate Studies, Department of Pharmacology, MUSC.

3:00 - 3:15

234 Anti-tumor Synergy Between Protein Disulfide Isomerase (PDI) and HDAC Inhibitors is Driven by CHOP and ATF3
Ravyn Duncan, Leticia Reyes, Katelyn Moats, Reeder M. Robinson, Holly A.F. Stessman, Nathan Dolloff, Graduate Studies, Cellular and Molecular Pharmacology and Experimental Therapeutics, MUSC.

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235 Transgenic Cas9-Expressing F344 Rat Model Provides Novel Platform for Somatic Gene Editing and Disease Modeling
Lauren Shunkwiler, Jan Guz, Benjamine van Peel, Alexander Awgulewitsch, Bart Smits, Graduate Studies, Pathology and Laboratory Medicine, MUSC.

12:15 - 12:30

236 Development of Inhibitors of KDM4B as a Therapeutic Strategy for Periodontal Disease
Joy Kirkpatrick, Rachel Wilkinson, Jonathan Turner, Patrick Woster, Dental Medicine, Drug Discovery and Biomedical Sciences, MUSC.

12:30 - 12:45

237 New Mutation Found in Mitral Valve Prolapse Dysregulates Wnt Signaling Through Interacting with Î2-catenin Antagonist
Lilong Guo, Katelynn Toomer, Diana Fulmer, Kelsey Moore, Janiece Glover, Rebecca Stairley, Sandra Ramos-Ortiz, Russell (Chip) Norris, Graduate Studies, Regenerative Medicine, MUSC.

12:45 - 1:00

238 Desert Hedgehog (Dhh) signaling through primary cilia contributes to mitral valve morphogenesis and disease
Diana Fulmer, Toomer Katelynn, Guo Lilong, Moore Kelsey, Glover Janiece, Stairley Rebecca, Moore Reece, Lipschutz Joshua, Russell Norris, Graduate Studies, Regenerative Medicine & Cell Biology, MUSC.

1:00 - 1:15

239 Heterogeneity of Mitochondrial Membrane Potential in Cancer Cells is Independent of the Cell Cycle and Determines Mitochondrial Maximal Hyperpolarization
Morgan E. Morris, Diana Fang, Kareem A. Heslop, Charleston F. Christie, Eduardo Maldonado, Graduate Studies, Drug Discovery & Biomedical Sciences, MUSC.

1:15 - 1:30

240 Novel Method for Systemic Removal of Thermosensitive Liposomal Doxorubicin to Reduce Toxicities
Anjan Motamarry, Marissa A Wolfe, Dieter Haemmerich, Graduate Studies, Pediatrics, MUSC.

1:30 - 1:45 BREAK

1:45 - 2:00

241 Tamoxifen and Trifluoperazine as a Treatment Option for Malignant Peripheral Nerve Sheath Tumors
Shannon Weber, Longo JF, Brosius SN, Worley S, Steven Carroll, Graduate Studies, Pathology, MUSC.

2:00 - 2:15

242 Diffusion Anisotropy of the Extra-Axonal Environment is Linked to Axon Alignment
Emilie McKinnon, Joseph Helpern, Leonardo Bonilha, Jens Jensen, Graduate Studies (MSTP), Neuroscience, MUSC.

2:15 - 2:30

243 Food for thought: The impact of FGF23 on axonal integrity and neural network architecture.
Barbara Marebwa, Robert J. Adams, Gayenell S. Magwood, Mark Kindy, Janina Wilmskoetter, Myles Wolf, Leonardo Bonilha, Graduate Studies, Neurology, MUSC.

2:30 - 2:45

244 The role of FABP7 upregulation in models of amyotrophic lateral sclerosis
Kelby Killoy, Mariana Pehar, Ben Harlan, Deep Sharma, Marcelo Vargas, Graduate Studies, Pharmacology, MUSC.

2:45 - 3:00

245 Cone Snail Venomics - Evolution-Driven Drug Design
Meghan Grandal, Mickelene Hoggard, Frank Mari, Graduate Studies, Drug Discovery and Biomedical Sciences, MUSC.

3:00 - 3:15

246 An ectonucleotidase CD73 can modulate Porphyromonas gingivalis intracellular growth and survival in the gingival epithelium
Jaden Lee, Nityananda Chowdhury, JoAnn S. Roberts, Ozlem Yilmaz, Dental Medicine, Oral Health Sciences, MUSC.

Session 17 PhD VI BE 112

12:00 - 12:15

247 Optimizing bone wound healing using BMP2: The addition of a novel nanofiber scaffold
Emily Durham, R. Nicole Howie, SarahRose Hall, Nicholas Larson, Brayden Oakes, Reed Houck, Zachary Grey, Martin Steed, Amanda C. LaRue, Robin Muise-Helmericks, James Cray, Graduate Studies, Oral Health Sciences, MUSC.

12:15 - 12:30

248 Establishment of a novel placental barrier model of pre-eclampsia complicated by diabetes
Rebecca McLeese, Jeremy Yu, Timothy Lyons, Medicine, Endocrinology, MUSC.

12:30 - 12:45

249 ADAMTS5 is coupled with mechanical load during mandibular condylar development
Alexandra Rogers, Sarah Cisewski, Christine Kern, Dental Medicine, Regenerative Medicine and Cell Biology, MUSC.

12:45 - 1:00

250 Mental Imagery Encoding Models Reveal Key Signatures of Inference in an Internal Generative Model
Jesse Bredlove, Ghislain St-Yves, Thomas Naselaris, Graduate Studies, Neurosciences, MUSC.

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251 The role of aversion in cocaine addiction
Maya Eid, Pullmann Dominika, Li Hao, Thomas Jhou, Medicine (MD, PhD), Neuroscience, MUSC.

1:15 - 1:30

252 Dysmyelination and Disruption of the Nodes of Ranvier in Aged Auditory Nerve
Clarisse Panganiban, Carolyn M. McClaskey, Kelly C. Harris, Hainan Lang, Graduate Studies, Pathology, MUSC.

1:30 - 1:45 BREAK

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253 **Equivalence of Maximum Likelihood Estimates of Parameters from Complete Distributions using Two Common Approaches for Limit of Detection Data**
Lutfiyya Muhammad, Viswanathan Ramakrishnan, Paul Nietert, Graduate Studies, Public Health Sciences, MUSC.

2:00 - 2:15

254 **Porphyromonas gingivalis Nucleoside-Diphosphate-Kinase Phosphorylates Heat Shock Protein-27 on Serine Residues to Inhibit Programmed Cell Death**
JoAnn Roberts, Jungnam Lee, Kalina R. Atanasova, Nityananda Chowdhury, Ozlem Yilmaz, Graduate Studies, Oral Health Sciences, MUSC.

2:15 - 2:30

255 **Structural and functional analysis of an essential cell cycle regulator reveals a novel mechanism of action**
Katelyn Williams, Shuo Qie, James Atkison, J. Alan Diehl, Shaun Olsen, Graduate Studies (MSTP), Biochemistry & Molecular Biology, MUSC.

2:30 - 2:45

256 **Pharmacological inhibition of HUNK by staurosporine synergizes with lapatinib in a HER2 inhibitor resistant HER2+ breast cancer model.**
Joelle Zambrano, Christina Williams, Carly Williams, Tinslee Dilday, Scott Eblen, Elizabeth Hill, Kent Armeson, Elizabeth Yeh, Graduate Studies, Cell and Molecular Pharmacology and Experimental Therapeutics, MUSC.

2:45 - 3:00

257 **Identifying Immunological Basis for Bladder Cancer Sex Bias**
Hyunwoo Kwon, Satoshi Kaneko, Ching-Ying Lin, Anqi Li, Mohammad Salem, Xue Li, Zihai Li, Graduate Studies (MSTP), Microbiology and Immunology, MUSC.

Session 18 Postdoc / Resident / Fellow / Staff Scientist II EL 113

12:30 - 12:45

258 **Targeting RAS Dimerization Domain by RAS specific monobody inhibits tumorigenesis in vivo**
Imran Khan, Russell Spenser Smith, John O'Bryan, Medicine, Department of Cell and Molecular Pharmacology & Experimental Therapeutics, MUSC.

12:45 - 1:00

259 **Targeting GARP/TGFbeta complex for cancer immunotherapy**
Alessandra Metelli, , Zihai Li, Graduate Studies, Microbiology and Immunology, MUSC.

1:00 - 1:15

260 **PI3K delta inhibition propagates CD8+ T cells with potent antitumor immunity**
Connor Dwyer, Hannah M. Knochelmann, Aubrey S. Smith, Megan M. Wyatt, Guillermo O. Rangel Rivera, Dimitrios C. Arhontoulis, Chrystal Paulos, Medicine (MD, PhD), Microbiology and Immunology, MUSC.

1:15 - 1:30

261 **Stromal Platelet Derived Growth Factor Receptor-Beta2 (PDGFRβ) Signaling: A Novel Therapeutic Target for Breast Cancer Brain Metastasis (BCBM)**
Katie Thies, Anisha M. Hammer, B. Eason Hildreth III, Luke O. Russell, Steven T. Sizemore, Anthony J. Trimboli, Raleigh D. Kladney, Chelsea M. Bolyard, Robert Pilarski, Lynn Schoenfield, Jose Otero, Arnab Chakravarti, Matthew Ringel, Balveen Kaur, Gustavo Leone, Michael C. Ostrowski and Gina M. Sizemore, Michael Ostrowski, Graduate Studies, Biochemistry and Molecular Biology, MUSC.

1:30 - 1:45 BREAK

1:45 - 2:00

262 **The interaction of AVP and ANP in Inner Medullary Collecting Duct**
Iuliia Polina, Elizaveta Kurashkina, Regina Sultanova, Mark Domondon, Daria Ilatovskaya, Medicine, Medicine/Nephrology Division, MUSC.

2:00 - 2:15

263 **Nuclear histone deacetylase 5 overexpression in the nucleus accumbens reduces heroin-seeking behaviors**
Ethan Anderson, Makoto Taniguchi, Ph.D., Chris Cowan, Medicine, Neuroscience, MUSC.

2:15 - 2:30

264 Haptoglobin concentration, pregnancy and preeclampsia in women with Type 1 diabetes
Clare Kelly, Jeremy Y. Yu, Alicia J. Jenkins, Alison Nankervis, Kristian F. Hanssen, Tore Henriksen, Satish K. Garg, Samar M. Hammad, Christopher E. Aston, Timothy Lyons, Medicine, Endocrinology, MUSC.

2:30 - 2:45

265 Establishment of a Cigarette Smoke-Exposure Protocol for the Study of Fracture Healing in a Bilateral Femur Fracture Model
Phillip Westbrook, Russell Reeves, Yongren Wu, Glenn Hefter, Hai Yao, William Barfield, Vincent Pellegrini, Medicine, Orthopaedics, MUSC.

Session 19 Postdoc / Resident / Fellow / Staff Scientist III EL 119

12:30 - 12:45

266 The novel role of Fli-1 in regulation of pericyte pyroptosis
Pengfei Li, Yue Zhou, Andrew J. Goodwin, James A. Cook, Perry V. Halushka, Xian K. Zhang, Carole, L Wilson, Lynn M Schnapp., Hongkuan Fan, Medicine, Department of Pathology and Lab Medicine, MUSC.

12:45 - 1:00

267 Specific Gut Bacterium Alters Commensal Microbiota Immunomodulatory Actions Regulating Skeletal Development
Jessica Hathaway-Schrader, Nicole Poulides, Sakamuri Reddy, Caroline Westwater, Chad Novince, Dental Medicine, Oral Health Sciences, MUSC.

1:00 - 1:15

268 Diagnostic and Treatment Challenges for immigrants and refugees with psychotic posttraumatic stress disorder (PTSD)
Ebele Compean, Jennifer Jones, MD, Linda Taimina, MS, Charli Kirby, BA, Ayaba Logan, MLIS, MPH, Mark Hamner, Graduate Studies, Department of Psychiatry and Behavioral Sciences, MUSC.

1:15 - 1:30

269 Development of Vitamin K analogs as therapeutics for medication-resistant epilepsy.
Ludivine Renaud, Richard A. Himes, Elizabeth S. Brooks, Tucker J. Williamson, C. James Chou, Sherine Chan, Pharmacy, Department of Drug Discovery and Biomedical Sciences, MUSC.

1:30 - 1:45 BREAK

1:45 - 2:00

270 Behavioral and Synaptic Characterization of a Mouse Model of Syndromic Autism
Adam Harrington, Kayla Blankenship, Jennifer Cho, Ahlem Assali, Catherine Bridges, Christopher Cowan, Medicine, Neuroscience, MUSC.

2:00 - 2:15

271 Age-Related Spatial Hearing Difficulty Predicted by the White-Matter Integrity of the Auditory 'Where' Pathway
James Dias, Carolyn McClaskey, Kelly Harris, Medicine, Otolaryngology - Head and Neck Surgery, MUSC.

2:15 - 2:30

272 Generation of a new mouse to model pancreatic cancer-induced cachexia.
Erin Talbert, Katherine J. Ladner, Maria C. Cuitino, Gustavo W. Leone, Denis Guttridge, Medicine (MD, PhD), Darby Children's Research Institute/Pediatrics, MUSC.

Session 20 Research Specialist / Research Assistant II EL 105

12:45 - 1:00

273 A Global Analysis of Receptor Tyrosine Kinase Action in Malignant Peripheral Nerve Sheath Tumors Identifies Key Therapeutic Targets
Victoria Alers, Brosius Stephanie, Prechtl Amanda, Guest Steven, Longo Jody, Worley Stuart, Garrett-Mayer Elizabeth, Findlay Victoria, Armeson Kent, Hull Kent, Steven Carroll, Graduate Studies, Pathology and Laboratory Medicine, MUSC.

1:00 - 1:15

274 Endoplasmic Reticulum Stress Contributes to Mitochondrial Exhaustion of CD8 T cells

Kiley Lawrence, Katie Hurst, Matthew Essman, Zeke Walton, Lee Leddy, Jessica Thaxton, Medicine, Dual appointment: Orthopaedics/Microbiology and Immunology, MUSC.

1:15 - 1:30

275 Importance of the enzymatic activity of CD26 expressed on tumor-specific Th17 cells for adoptive cell therapy

Megan Wyatt, Stefanie Bailey, Michelle Nelson, Connor Dwyer, Hannah Knochelmann, Aubrey Smith, Chrystal Paulos, Graduate Studies, Microbiology & Immunology, MUSC.

1:30 - 1:45

277 The prevalence and progression of hearing loss in children with concussion

Michaela Close, Charmee Mehta, Ted Meyer, Medicine, Otolaryngology-Head and Neck Surgery, MUSC.

LIST OF ABSTRACTS

1 The Role of Brain Insulin in Functional Recovery After Stroke in Mouse Model Hyperinsulinemia

Stacy Nguyen, Janet Boggs, Luke Watson, Catrina Sims-Robinson, College of Charleston, Department of Neurology, MUSC.

According to the National Institute of Neurological Disorders and Stroke, two-thirds of stroke survivors require rehabilitation. Despite rehabilitation, millions are left living with long-term disabilities following a stroke. The vast majority of stroke survivors experience hyperinsulinemia, which reduces transport of insulin from the periphery to the brain resulting in brain insulin deficiency. Brain insulin is anti-inflammatory, anti-thrombotic, and anti-vasodilatory and contributes to neuroplasticity and synaptogenesis. The purpose of this study is to determine the therapeutic potential of increasing brain insulin levels in a mouse model of hyperinsulinemia following stroke. Ischemic stroke was induced via following middle cerebral artery occlusion (MCAO) in mice on either a standard diet (STD) and high fat diet (HFD), a model of hyperinsulinemia. Survival, neurological severity, motor function, and cognitive function were assessed in mice treated with intranasal saline or insulin, which was administered after post-stroke day 1 or 5. Hence, this study consisted of the following groups: STD-saline, HFD-saline, and HFD-insulin. Our data demonstrate that HFD mice have elevated levels of peripheral insulin and reduced levels of brain insulin. HFD-insulin mice had better survival and neurological function compared with STD and HFD-saline mice. HFD-insulin mice experienced fewer errors in the ladder task compared to STD and HFD-saline mice. Finally, HFD mice demonstrated difficulty with completing complex cognitive tasks compared to STD mice. Overall, our data suggests that the HFD mouse model is an excellent hyperinsulinemia model. Furthermore, intranasal insulin may offer a potential treatment to improve functional stroke recovery. If positive results arise, intranasal insulin could provide a translatable therapy in future clinical trials for stroke patients. This work was supported by National Institute of Health NIGMS (P20GM109040), Alzheimer's Association (AARGD-16-440893), and National Institutes of Health NHLBI (R25 HL092611)

2 The Impact of Extra Cellular Matrix Remodeling on Mesenchymal Cells in Early Heart Development

Jeremy Laxner, Josh Mifflin, Jeanette Huber, Chiagoziem Ogbonna, Christine Kern, College of Charleston, Associate Professor, MUSC.

Abstract Withheld from Publication

3 The Role of Inflammation on Collagen Deposition in a Murine Model of Diastolic Heart Failure

Shaoni Dasgupta, Hannah Riley, An O. Van Laer, Catalin F. Baicu, Michael R. Zile, Amy Bradshaw, Clemson, Department of Medicine, Division of Cardiology, Ralph H. Johnson Department of Veteran's Affairs Medical Center, MUSC.

Introduction: A leading cause of death in the world is heart failure. One cause of heart failure is arterial hypertension, or high blood pressure. The type of heart failure most frequently associated with individuals with high blood pressure is classified as diastolic heart failure, or heart failure with preserved ejection fraction (HFpEF). Patients with HFpEF display increases in myocardial fibrosis and hypertrophy of cardiomyocytes. Interestingly, fibrosis not only is an accumulation of collagen, but is also an inflammatory response. Thus, the hypothesis is that inflammation, specifically macrophages, are a critical contributor to myocardial fibrosis in pressure-overload myocardium. Methods: Transverse Aortic Constriction (TAC) was implemented in C57Bl/6 mice to induce chronic pressure overload, a murine model that recapitulates cardiac remodeling similar to what is found in patients diagnosed with diastolic heart failure. Tissue sections of mice hearts were examined for the treatment of TAC, No TAC control, and Sham control at designated the time points of No TAC control, Sham control, 3 Day TAC, and 2 week TAC. Collagen volume fraction (CVF) as well as Inflammation was investigated by histology using Picro Sirius Red and Herovici's Collagen Stain. Additionally, immunohistochemistry was conducted to identify and quantify macrophages in order to measure increases in inflammation at each time point following TAC. Results: CVF analysis suggested that with the increase in time after TAC, collagen deposition also increases in hearts with pressure overload as in diastolic heart failure ($p<0.01$). These findings were complimented by histological analysis using Herovici's Collagen Stain. Moreover, immunohistochemistry analysis demonstrated that an increase in inflammation also progressed with time as shown by the increase in the quantity of macrophages ($p<0.0001$). Conclusion: Increase in myocardial collagen content can at least be associated with an increase in inflammation, specifically characterized by an increase in the presence of macrophages. This work was supported by VA Merit Award: CX001608. MUSC's Summer Undergraduate Research Program.

4 BMP-Smad-RBPJ signaling axis in the endocardial lineage plays an essential role for AV valve morphogenesis

Miriam Atteya, Patrick G. Smith*, Haleigh Ferro, Thomas Trusk, Jeremy L. Barth *Co-First Authors, Yukiko Sugi, College of Charleston, Regenerative Medicine and Cell Biology, MUSC.

Valvuloseptal defects are among the most common and serious congenital heart defects (CHDs). In the atrioventricular (AV) canal, mesenchymalized AV endocardial cushions (EC) undergo distal outgrowth, maturation and remodeling into the membranous ventricular septum and AV valves. In our previous, work we demonstrated that BMP2 expression in the endocardial lineage is required for AV endocardial cushion maturation and remodeling. In the present, work we have tested the hypothesis that interaction of BMP2-Smad with Notch signaling components is required for normal AV valvuloseptal tissue differentiation. To test this hypothesis in an in vivo context, we have investigated the effect of combining up-regulated BMP signaling and down-regulated Notch signaling in the endocardial lineage by using genetic activation of BMP signaling using conditionally activating Alk3 and disrupting the key Notch signaling transcription factor, Rbpj with an endocardial lineage specific cre-driver line, Nfatc1Cre. Resultant double mutants, caAlk3; RBPJflox/+; Nfatc1Cre mice, which have combined up-regulation of smad-dependent BMP signaling and down-regulation of Notch signaling exhibit AV mitral valve dysplasia at 8-week old, adolescent stage. Our 3D reconstruction with the Amira software shows dysmorphogenesis of the anterior leaflet of the mitral valves. Volumetric analyses show significant enlargement of the anterior leaflet but not in the posterior leaflet of the mitral valves. Disruption of versican protein expression and aberrant up-regulation of aggrecan were observed by immunohistochemistry. Our quantitative RT-PCR analyses show increased mRNA expression of Aggrecan and Has2 but down regulation of Col 1a and Versican in the anterior leaflet of mitral AV valves. On the contrary, the single mutant caAlk3; Nfatc1Cre mice do not exhibit valvular defects or aberrant up-regulation of ECM gene expression in the valve. These data indicate that BMP-Notch interaction in the endocardial lineage plays essential

roles in AV endocardial cushion maturation and remodeling into normal mitral AV valves. This work was supported by AHA Grant-in-Aid, 15GRANT25710305. AHA Transformation Project Award, 18TPA34170356. NIH/NIGMS (P20 GM103499DRP) NIH/NIGMS (P20 GM10399)

5 Tissue engineering strategies in bone; addition of a novel scaffold in optimizing wound healing

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The clinical reality is that often there is not adequate native tissue to use the gold standard autologous graft intervention for bone injury. Tissue engineering strategies can aid with this problem. Specifically, INFUSE comprised of an osteoconductive matrix and osteoinductive peptide (rhBMP2) has been employed. However concerns over inflammatory side effects have arisen. Thus, alternative scaffolding is needed. Here we tested the coordinated use of INFUSE with the addition of pGlcNAc, which is innately anti-inflammatory, employing titrated doses of rhBMP2 in a murine calvarial defect. ÂµCT and histological results suggested defects treated with a subclinical dose of rhBMP2 produced the best bone regenerate compared to defects treated with higher doses of rhBMP2. Further, the higher doses of rhBMP2 resulted in significant ectopic bone which is contra-indicated in healing. Our data suggest alternative scaffolding may not be necessary as using a lower dose of the peptide results in optimal healing. This work was supported by the AO Foundation [S-16-108C (JC)]; NIH/NIDCR [5T32DE017551]; [F31DE026684 to ELD]; NIH/NIGM [P30GM10331]; and research support towards this study was received from Medtronic Sofamore Danek USA and Marine Polymer Technologies Inc.

6 BMP-Smad signaling interacts with Notch signaling components in the AV endocardial cushion mesenchymal cells

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Valvuloseptal defects are among the most common and serious congenital heart defects (CHDs). In the atrioventricular (AV) canal, mesenchymalized AV endocardial cushions undergo distal outgrowth, maturation and remodeling into the membranous ventricular septum and stratified AV valves. In our previous work we demonstrated that BMP2 expression in the endocardial lineage is required for AV endocardial cushion maturation and remodeling. In the present work, we explored regulatory molecules that may interact with BMP signaling in the endocardial cushions. Our data indicate that BMP2 ligand and receptors, as well as Notch1 & 2, are expressed in the AV endocardial cushions. Notch1 & 2 are also known regulators for valvuloseptal morphogenesis and valve diseases. Expression patters of BMP2 and Notch1 & 2 lead us to hypothesize that BMP signaling intersects with Notch signaling in the endocardial cushion cells for AV valvuloseptal morphogenesis. Our chick endocardial cushion cell (ECMC) cultures show that BMP2 induces mRNA expression of Notch1 & 2 when cultured for 24 hours; however BMP2 does not induce Notch1 & 2 when cultured for 3 hours in the presence of a protein synthesis inhibitor Cycloheximide, indicating that BMP2 does not directly target Notch1 & 2. However, BMP2 induces a Notch pathway effector, Hey1 in the presence or absence of Cycloheximide, suggesting the presence of a BMP-Notch signaling interaction. Our Duolink assay shows that BMP pathway intermediate, Smad1 is associated with Notch intracellular domain, Notch2ICD in the nuclei of ECMCs in culture. Because BMP2 also induces Hey1 in the presence of Cycloheximide in mouse tsA58 AVM cells, to further rigorously test our hypothesis, we performed co-immunoprecipitation assay with tsA58 AVM cells. Our data shows that Smad1 interacts with Notch2ICD in tsA58 AVM cells. These data indicate that BMP2 signaling interact with Notch signaling though Smad1-Notch2ICD interaction in AV endocardial cushion cells. This work was supported by AHA Grant-in-Aid, 15GRANT25710305. AHA Transformation Project Award, 18TPA34170356. NIH/NIGMS (P20 GM103499DRP).

7 A Multi-Segment Method for Estimating Cerebral Blood Flow Using the Arterial Spin Labeling Images in the Space-Flight Analog with Hypoxia Experimentation

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With wide-spread attention on the long-term spaceflight mission to Mars, research on the characteristics of space inhabitation has become increasingly popular. The carbon dioxide scrubbers are a particular source of concern among researchers. Astronauts often experience hypoxia which can potentially interfere with cerebral blood flow. Continued exposure to hypoxic environments results in reduced oxygen supply and dynamic changes to the brain's structure.1,2 Arterial Spin Labeling (ASL) is a new technique available to healthcare professionals.3-5 In opposition to PET and CT methods, ASL does not require the use of a radioactive tracer for assessing cerebral perfusion. Instead, ASL magnetically labels the protons of blood in circulation before arriving to the imaging site. Then, multiple MRI images are averaged to create a perfusion map. The differences in proton structure between tissue and blood enables perfusion to be identified. One of the popular software packages available for ASL analysis is BASIL, a subset of FSL.6 BASIL uses multiple algorithms to average MRI images, extract the brain from the skull, and create the final perfusion map. Many parameters are involved in the creation of the image including proton inversion time, bolus duration, post-labeling delay, etc. ASL continues to develop, however, it has remarkable potential in both clinical and research environments. Within this study, ASL was employed alongside a bedrest study conducted in Germany. Volunteers were constantly kept at a -6ï,° tilt and exposed to high carbon dioxide concentrations in order to mimic the effects of space inhabitation. Additionally, a new ASL algorithm was created to better interpret the results. Rather than exposing the entirety of the MRI image to ASL estimation, the images were divided into three layers to account for differences in bolus duration and post-labeling delay. The result was more consistent and balanced perfusion maps.

8 Regulation of Angiogenic Signaling in Pregnancy and Pre-eclampsia

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Preeclampsia is a prevalent disease, affecting 7% of pregnancies worldwide, that can lead to complications and fatalities in the mother and the child. Currently, the only cure is delivery, and primary mechanisms of pathology are still unclear. In a prior study, we detected an association between expression levels of the Nkx2-5 transcription factor and the RNA splicing factor Sam68, with expression levels of the candidate preeclampsia marker sFlt-1 in placentae of women with early onset and severe preeclampsia. Statistically significant positive correlations between increased Nkx2-5 and increased Sam68 and sFlt-1 mRNA expression were particularly prominent in Caucasian

American populations versus African American populations with early onset and severe preeclampsia. Even stronger positive correlations were observed between Sam68 and sFlt-1 alone, regardless of race. The objective of this study was to determine the correlations between Nkx2-5, Sam68, and sFlt-1 expression in normal pregnancy through secondary analysis of term placental samples from a vitamin D supplementation study. This study found a correlation between higher vitamin D serum levels and lower sFlt-1 mRNA levels in placentae from uncomplicated term pregnancies. A secondary objective was to determine if vitamin D supplementation status also correlated with Nkx2-5 and Sam68 expression levels. This work was supported by SC Translational Research Center, NIH UL1 TR001450

9 What Do Stroke Survivors Know About Stroke?

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Introduction: Stroke is a chronic condition. Therefore, survivors must understand and competently manage their condition for the long-term. However, current hospital-based patient-education models fail to teach survivors about stroke or enable survivors to acquire self-management skills. New patient-education models are desperately needed. To that end, we are funded to create an innovative, e-learning, comprehensive, semester-long, educational program designed to improve survivors' stroke-related knowledge, autonomy, and self-management skills as well as connect them to other survivors and the healthcare team. However, to best serve our 'students', we must first determine survivors' baseline level of stroke-knowledge. Here we ask, what do survivors know about stroke? We hypothesized that survivors have at least some stroke-related knowledge of warning signs and risk factors and expect that stroke-knowledge negatively correlates with age and positively correlates with education level. Methods: A secondary analysis of existing data collected at the University of Pittsburgh. Stroke patients (n=130) admitted to inpatient rehabilitation provided informed consent then completed stroke-related knowledge tests in preparation for didactic stroke education. We described the sample's ability to list stroke warning signs/risk factors, then related stroke-knowledge to age and education level using Spearman's rank correlational analyses. Results: 51.5% of the participants could not name a single risk factor or a single warning sign. Age and risk factor knowledge were significantly correlated ($r_s = -0.27$, $p=0.005$). No other correlations were significant. Conclusions: These data show that survivors of a recent stroke have shockingly limited knowledge of stroke warning signs and risk factors upon admission to inpatient rehabilitation, but that younger survivors had slightly more knowledge of risk factors. The literature shows that in-hospital stroke education does not increase stroke-knowledge. Thus, these results support the need for a completely new stroke education model that teaches foundational stroke-related knowledge necessary for understanding of post-rehabilitation self-care. This study is supported by A COBRE in Stroke Recovery Pilot Project, PI. ML. Woodbury And an NIH/NIGMS Institutional Development Award (IDeA), P20GM109040, PI: S. Kautz.

10 How Do Behavioral and Virtual Reality Neglect Assessment Scores Correlate with Each Other?

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Introduction: One third of stroke survivors have neglect. Neglect causes impairments in attention, arousal, and awareness on one side of the body/environment and negatively affects long term outcomes (i.e. greater disability, longer recovery time). It is critical that clinicians assess stroke survivors for neglect in order to inform treatment. Research suggests that popular paper-pencil neglect assessments lack sensitivity and ecological validity, yet the measurement properties of other types of neglect assessments (e.g., behavioral or virtual reality) are not well studied. For example, the concurrent validity of behavioral (Catherine Bergego Scale [CBS], Behavioral Inattention Test [BIT], Naturalistic Action Test [NAT]) and virtual reality assessments (Virtual Reality Lateralized Attention Test [VRLAT]) is not clear. Because neglect is prevalent and disabling, therapists need clear guidelines on choosing the best tests to administer as a battery or in isolation. The purpose of this study was to determine the concurrent validity of behavioral and virtual reality neglect assessment scores. We hypothesized that each of these assessments will have a strong positive/negative ($r_s \geq 0.7$, $p<0.05$) linear relationship. Methods: We conducted a secondary analysis of data from a cross-sectional study involving 46 post-stroke patients who were given an extensive battery of clinical assessments. We examined the relationship between the neglect assessment scores (CBS, BIT, NAT, VRLAT) using Spearman's rank correlational analyses. Results: We found that the CBS, VRLAT, BIT and NAT all had moderate to strong correlations that were statistically significant ($p \leq 0.001$). The CBS and the VRLAT had the strongest correlation ($r_s=-0.84$, $p \leq 0.001$). The BIT and VRLAT had the weakest correlation ($r_s=0.65$, $p \leq 0.001$). Conclusions: The data suggest that behavioral and virtual reality assessment scores are moderately to strongly related with one another. The results further validate the VRLAT as a neglect assessment. This work was supported by a Career Development Award-2(1 IK2 RX002420-01A2) from the U.S. Department of Veterans Affairs, VA Office of Research and Development, Rehabilitation Research and Development; Ralph H. Johnson VA Medical Center; a grant from the MUSC Department of Health Professions Seed Grant Program; and an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number P20GM109040

11 Standardizing Gait Pattern Terminology for Use in an Interprofessional Mobile Application

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Background: MOBI: Mobility Aids (MOBI) is an interprofessional educational mobile application (app) that was created to teach healthcare professional students how to use ambulatory assistive devices. Mobile apps allow users to access instruction through video, pictures, and text, which 'bridge the gap between text-based knowledge and practical application' (Sandholzer, Rurik, Deutsch, & Frese, 2014). A quality improvement project was undertaken to add gait pattern content to MOBI, including videos and images. During this project, an inconsistency in the literature on gait patterns was noted which required the researchers to critically evaluate the definitions of gait pattern terminology prior to further development of MOBI. Aims: This project had two aims: (1) Establish new operational definitions for gait patterns, (2) Create supplemental videos and images on gait patterns, (3) Embed new content into MOBI. Project: A thorough review of existing gait pattern literature was conducted. MUSC occupational therapy (OT) and physical therapy (PT) faculty were consulted. New operational definitions for gait patterns were assigned. High-definition closed-captioned videos and images were created and added to MOBI. Implications for practice: The inconsistency among the literature emphasizes the need for standardized learning. Operational definitions allow for consistency in documentation and interprofessional communication, thereby providing an accurate image of the patient

across the healthcare continuum. An educational mobile application that includes videos and images of gait patterns promotes student learning and provides an easily accessible reference in the clinic. Future directions: Seek critical feedback from faculty, clinicians, and students regarding the benefits of MOBI and areas for further development, particularly with regard to new gait pattern content. This work was supported by MUSC Department of Health Professions Interdiv/Interdepartmental/Intercollege Seed Grant (2016)â€‹ MUSC College of Health Professions (2016)â€‹ MUSC Office of Instructional Technology and Faculty Resources (2016)â€‹ RehabLearning, LLC (www.rehablearning.com)

12 Are Certain Neglect Assessments Better at Detecting Neglect than Others in Post-Stroke Patients?

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Introduction: Neglect is the inability to orient or react to stimuli presented on one side of the body and is a common condition post stroke. Neglect leads to longer hospitalization and rehabilitation stays, greater financial burden, and less long-term functional recovery. Thus, it is critical to identify if stroke survivors have neglect in order to plan appropriate treatment. Research has shown behavioral and virtual reality tests are effective at detecting neglect, but there has been no conclusive data on which of these assessments (Behavioral Inattention Test [BIT], Catherine Bergego Scale [CBS], Naturalistic Action Test [NAT], Virtual Reality Lateralized Attention Test [VRLAT]) are the most effective and which should be utilized in the clinical setting. The purpose of this study was to investigate if commonly used neglect assessments are detecting neglect equally across patients. We hypothesized that the VRLAT would detect neglect the most accurately across the group, because it uses visual and auditory distractors that closely mirror situations that individuals encounter in daily life. Methods: We conducted a secondary analysis of cross-sectional study data. Thirty participants (unilateral hemispheric stroke, at least 18 years of age, exhibited symptoms of neglect) were administered a battery of neglect assessments (VRLAT, CBS, BIT, NAT). We conducted descriptive statistics and utilized published cut-off scores for the assessments to determine whether assessments categorized participants as having neglect. Results: The BIT detected neglect in 40% (12/30) of participants. In contrast, the VRLAT, NAT, and CBS detected neglect in 100% (30/30), 93.3% (28/30), and 93.3% (28/30) of participants, respectively. Conclusions: While the VRLAT, NAT, and CBS detected neglect across most participants, the BIT failed to detect neglect in more than half of participants. Notably, the VRLAT detected neglect in all participants. Therapists can take these results into consideration when selecting an assessment to assess stroke survivors for neglect. This work was supported by VA 1 IK2 RX002420-01A2; Ralph H. Johnson VA Medical Center; NIH P20GM109040; MUSC Department of Health Professions Seed Grant

13 The Assessment Paradox: Does a Post-Stroke Upper Extremity Assessment Accurately Indicate Paretic Arm Use at Home?

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BACKGROUND: Approximately 75% of stroke survivors exhibit upper extremity (UE) paresis reducing independence. Evaluating UE function is critical to predict recovery and guide therapy; therefore, stroke assessments should indicate actual function. The goal of therapy is to translate functional UE skills from the clinic to non-therapy contexts. However, paradoxically, assessment scores indicate therapy-related UE recovery, yet the literature shows consistent use of the UE at home is not happening. The aim of this study was to determine the association between UE impairment and at-home paretic arm use. To be consistent with the literature, we hypothesized that the in-clinic impairment score would not correlate with the at-home arm use measure. METHODS: A retrospective, secondary analysis of existing data from an IRB-approved, rater-blinded, randomized controlled stroke rehabilitation trial. Inclusion: >6 months but <7 years post-ischemic or hemorrhagic stroke and having some voluntary shoulder and elbow motion. Enrolled subjects provided informed consent, then completed the Fugl-Meyer Upper Extremity Assessment (FMAUE), a measure of paretic arm impairment. Subjects also wore arm accelerometers over 2-days to measure at-home paretic arm use. Data from the accelerometers was used to calculate the Arm Activity Ratio (AAR) to indicate paretic arm use relative to non-paretic arm use. RESULTS: Data from n=51 were included in analysis. Subjects averaged: 61 (SD 12.05) years of age; 29.79 (SD 26.58) months post stroke and were 54% male. The Pearson's correlation =0.548 ($p<0.05$). CONCLUSION: This study aimed to determine the association of an in-clinic UE impairment measure with an at-home paretic arm use measure. Contrary to our hypothesis, results showed a moderately strong relationship between the FMAUE and AAR suggesting that the FMAUE score is associated with the subject's actual function at home. This result is beneficial to therapists as it supports the use of in-clinic impairment assessments during a stroke evaluation. This study is supported by An NIH/NINDS Direct to Phase II Small Business Initiated Research (SBIR) Award, #R44NS097061, NCT03053492, mPIs: ML. Woodbury and A. Hayes. And an NIH/NIGMS Institutional Development Award (IDeA), P20GM109040, PI: S. Kautz.

14 Hand Surgery Referral Patterns Among Primary Care Physicians in South Carolina

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Introduction: Board certified hand surgeons go through one year of fellowship training after completing one of three residency programs: orthopedic surgery (OS), plastic surgery (PS), or general surgery (GS). The purpose of our study was to examine PCP referral patterns for hand surgery in South Carolina (SC). Methods: The participant was required to be practicing PCP in SC. PCPs across three academic medical institutions in SC were emailed a survey questionnaire. Questions were structured requiring the participant to choose one of three options: OS, PS, or GS that they would likely refer to for a specific pathology. Results: 287 questionnaires were sent. We had a 21% response rate with 60 PCPs, 36 male and 24 female, participating. For the treatment of arthritis 95.0% selected OS, 5.0% PS, and 0% GS. Nerve decompression 83.3% selected OS, 15.0 % PS, and 1.7% GS. Nerve injuries 60.0% selected OS, 40.0 % PS, and 0% GS. Tendon injuries 81.7% selected OS, 18.3 % PS, and 0% GS. Congenital deformities 50.0% selected PS, 50.0 % OS, and 0% GS. Hand fractures 98.3% selected OS, 1.7% PS, and 0% GS. Sports related injuries 100% selected OS and 0% selected PS and GS. Soft tissue masses 61.7% selected OS, 30.0 % PS, and 8.3% GS. Soft tissue coverage 93.3% selected PS, 5.0% OS, and 1.7% GS. Skin cancer related problems 81.7% selected PS, 13.3% GS, and 5.0% OS. Conclusion: Referrals for arthritis, nerve decompressions, tendon injuries, fractures, and sports injuries are more likely to be referred to OS. While referrals for soft tissue coverage and skin cancers are more likely to be referred to PS. Nerve injuries and congenital deformities referrals were similar between OS and PS. Further work should be conducted to determine why referral patterns vary among specific specialties with similarly trained hand surgeons.

15 Is There A Correlation Between Self-Reported And Sensor-Based Measures In Post-Stroke Individuals During Daily Activities?

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Introduction Stroke Rehabilitation therapists are confounded by the discovery that therapy-related improvements in paretic arm motor skills are not generalized to at-home improved paretic arm use. The reason for this clinic-to-home disconnection is not clear. One reason may be that at-home arm use is simply too difficult. We studied the association between a patient self-reported assessment of arm use difficulty and a quantitative measure of at-home arm use. Methods Secondary analysis of existing data collected from an IRB-approved, NIH-funded, rater-blinded, stroke rehabilitation RCT. Inclusion: >6 months post-ischemic or hemorrhagic stroke and having some voluntary paretic shoulder and elbow motion. Participants gave informed consent prior to testing. Outcomes: Subjects' perception of at-home task difficulty was measured with the Stroke Impact Scale Hand/Activities of Daily Living (SIS) subscales. A quantitative measure of at-home paretic arm use was measured with wrist-worn accelerometers. Accelerometer data was used to create the Arm Activity Ratio (AAR), a variable to indicate paretic arm use relative to non-paretic arm use. Data analysis: a Pearson's Correlational analyses of SIS and AAR data to determine the strength and significance ($p<0.05$) of the relationship. Results Data from n=53 participants were analyzed. The SIS and AAR were not significantly correlated ($r=0.251$, $p=0.070$). Post-hoc correlational analysis of SIS and total number of months post-stroke was not significant ($r=0.098$, $p=0.466$). Conclusion Results show that self-reported scores on the SIS were weakly associated with in-home paretic arm use, indicating that non-use of the paretic arm cannot be directly related to an individual's perceived difficulty of a task. Moreover, post-hoc analysis showed that time post-stroke was not associated with perceptions of task difficulty. Further analysis should look into this disconnect between clinic and at-home use of the paretic arm, such as underlying factors like lack of motivation, mental status or the need to use their arm. This work was supported by An NIH/NINDS Direct to Phase II Small Business Initiated Research (SBIR) Award, #R44NS097061, NCT03053492, mPIs: ML. Woodbury and A. Hayes. And an NIH/NIGMS Institutional Development Award (IDeA), P20GM109040, PI: S. Kautz.

16 Establishing Healthy Habits through Exercise, Nutrition, Socialization, and Stress Reduction for Young Adults (15-25yo) with ASD or Mild Neurocognitive Disorders: Piece it Together 2015-2018

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Abstract Withheld from Publication

17 Initial Stages of Research and Plan for the Development of a Small-scale Fishery in Okurase, Ghana

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Background: Fish are a significant source of protein for the people of Ghana. This study examined the feasibility of implementing a subsistence-level fishery in Okurase to address a need for greater food security, as well as a productive approach to mitigate water drainage issues at the proposed site. Methods: Much research was conducted on the process of creating a functioning fish farm. Topography, water quality, and site utility were assessed at the proposed site for the pond. In-person interviews and field visits with fish farmers were conducted to assess fishery scale and success. A report and practical manual were generated for future use as this project continues to develop. Results: A fish farm was determined to be a worthy venture for Project Okurase, though several aspects will require continued research. A drainage system was implemented to mitigate rainwater runoff drainage. The proposed site was determined have potential challenges, specifically maintaining the physical structure of an earthen pond, ensuring adequate freshwater flow for healthy fish production, and preventing escape of invasive species into the nearby freshwater stream. Various fish species were considered for stocking, namely tilapia and catfish. The paramount concern for pond sustainability was determined to be the specific persons responsible for pond maintenance, fish stock care, and security, which will necessitate much personal investment in the form of daily time commitment. Conclusion: This research provides a beginning framework for creation of a small-scale fish farm which will serve to improve access to animal-based protein for children in the community. Additionally, it was determined that a successful farm could generate a small profit and create employment opportunities for community members. The initial implementation plan is expected to undergo several adaptations as more research is completed by the secondary development team at College of Charleston.

18 Functional EEG Analysis on Lesioned Brain

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Stroke is a leading cause of long-term disability. Individual stroke survivors recover differently, with some recovering well and others showing little changes. Personalized rehabilitation approaches may maximize individual outcomes. Toward the long-term goal of personalized rehabilitation, it is essential to understand how different brain activity contributes to different functional level and how different interventions affect brain activity and recovery in heterogenous patients. The objective of our lab to investigate if electroencephalography (EEG) is a viable tool to assess individual patients' brain activity during functional tasks to explain behavioral impairment and assess individual brain responses to intervention to explain resulting recovery. EEG is a non-invasive, minimal-risk tool to assess functional brain activity with a high temporal resolution. We recorded high-density EEG during presentation of fingertip touch stimuli and during grip in stroke survivors with moderate to mild hand impairments. For localization of EEG sources, brain MRI was obtained for individual patients without contraindications to MRI. EEG signals were preprocessed and epochs were averaged. The MRI was co-registered and segmented and a BEM model was created. EEG sources were localized on the brain via current density reconstruction. Preliminary results show that a local current peak in the primary sensory cortex (S1) was seen in response to fingertip touch stimuli in most patients. Patients with lesions in S1 had perilesional activity or activities within the sensorimotor network. These results suggest that localization of sensory processing is possible in a lesioned brain using high-density EEG in combination with an MRI brain scan for individual patients. Current work includes analysis of grip-related EEG activity, and investigation of relationships between EEG and behavioral measures. This work was supported by NIH P20GM109040, College of Health Professions

19 A Humanized Monoclonal Antibody to Secreted Frizzled Related Protein-2 Inhibits Osteosarcoma Growth in vivo

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Abstract Withheld from Publication

20 Enolase Regulates Secondary Damage in Spinal Cord Injury

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Spinal Cord Injury (SCI) is an insult to the spinal cord resulting in devastating neurologic deficits and disability. Damage to the spinal cord is complicated by an increase in secondary injury factors causing neuronal damage imposed by activated microglia/macrophages and astrocytes. Elevation of enolase, especially Neuron Specific Enolase (NSE), in glial and neuronal cells triggers inflammatory cascades in acute spinal cord injury (SCI). Thus, there is an urgent need for a targeted therapy that reverses secondary damages and improves neurological function following SCI. In this study, we measured enolase/NSE expression and activity as well as key inflammatory mediators and neurotrophic factors after acute and sub-acute SCI in rats. The effects of a novel small molecule inhibitor of enolase (ENOblock) were also examined to determine the therapeutic efficacy of ENOblock in SCI. Analysis of SCI tissues by immunohistochemistry confirmed inhibition of elevated enolase decreased gliosis in SCI rats. Regulation of NSE by ENOblock altered metabolic hormones as well as pro-inflammatory cytokines/chemokines in SCI animals. ENOblock treatment also inhibited inflammatory pathways in injured spinal cord, promoting neuronal survival and recovery. Functional outcome was improved in subacute SCI following enolase inhibition, suggesting that elevation of enolase/NSE is deleterious as it activates inflammatory factors which activate glia and damage neurons after SCI. Overall, these data suggest that regulation of enolase may have potential therapeutic implications in altering inflammatory factors and improving neurological function following SCI. This work was supported by South Carolina Spinal Cord Injury Research Fund (#2016 I-03)

21 The Role of DZIP1 and Primary Cilia in Mitral Valve Prolapse

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Mitral valve prolapse (MVP) is a pervasive disease, affecting 1 in 40 individuals worldwide and causing significant morbidity and mortality. MVP can lead to secondary complications such as arrhythmias, heart failure, and sudden cardiac death. Although the etiology is poorly understood, MVP is a frequent cardiovascular finding in the context of diseases with alterations in structure and function of primary cilia. Familial and GWAS studies have demonstrated deleterious mutations in the primary cilia gene DZIP1 as causal to MVP in multiple families. Expression studies and genetic ablation experiments provided support for the role of DZIP1 in cardiac ECM deposition. Loss of primary cilia led to myxomatous degeneration and mitral valve pathology concurrent with MVP. Furthermore, our data show loss of primary cilia results in decreased valve interstitial cell density. A mouse model of the identified point mutation in the DZIP1 gene presented with impaired cilia development, myxomatous degeneration, and dysmorphic mitral valve anatomy. These studies illustrate the importance of primary cilia in cardiac development and the role of primary cilia in MVP. Uncovering how these developmental changes lead to clinically significant pathology later in life is crucial to the characterization of MVP.

22 Effect of Smoke Exposure on Intervertebral Disc Degeneration: A Rat Model

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INTRODUCTION: There is a higher frequency of back pain and disc degeneration among smokers than nonsmokers, but the mechanism by which smoke leads to disc degeneration remains unclear. Previous studies found that tobacco smoke or nicotine could disrupt disc homeostasis by increasing cytokines and reducing cellular activity. Other studies found that nicotine could cause degeneration by vasoconstriction. This study sought to examine the effect of smoke exposure on intervertebral disc (IVD) degeneration. METHODS: Sprague Dawley rats were randomly assigned into two groups: non-smoke (n=12) or smoke (n=12). The smoke group was exposed to cigarette smoke for 12 hours per week for two months. To investigate both immediate and post-cessation smoke effect, the rats were sacrificed at two randomly pre-determined time points: 2-month and 7-month. Harvested rat spines underwent histology, two-photon microscopy, and microCT. RESULTS: Histological analysis showed more degeneration areas in 2-month smoke group than in 2-month control group. Two-photon imaging analysis showed less cell viability of nucleus pulposus (NP) and annulus fibrosus (AF) in 7-month smoke group than in 7-month control group. Disorganization, delamination, matrix cracking, and fiber failure of laminate structure of AF was observed in 7-month smoke group. CONCLUSIONS: The results demonstrated that smoke exposure may lead to IVD degeneration by blocking nutrient transport and by changing cellular activity. Severe cartilaginous endplate calcification found in smoked animals indicates that smoke exposure may indirectly impact disc homeostasis by blocking the transport of nutrient solutes to the disc. Higher percentages of necrotic cells in both NP and AF regions of smoked animals suggests that smoke exposure may disrupt the balance of biosynthesis and degradation in the disc. Lack of significant recovery in extracellular matrix structure or cell viability after five months of smoke cessation suggests that the degenerative effect of smoke on IVD is potentially irreversible. This work was supported by Cervical Spine Research Society

23 Use of a Specific Single-Pill Combination Therapy for Hypertension in an Academic Medical Center

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Introduction High blood pressure affects approximately 75 million American adults and increases the risk of stroke and heart disease in those affected, but only slightly over half of Americans with hypertension have their blood pressure properly controlled. The implementation of evidence-based models of care and treatment protocols is critical to achieve effective hypertension treatment. The Kaiser Permanente Northern California (KPNC) healthcare system has employed a model for effective hypertension control, achieving 90%

control with the use of the Lisinopril/Hydrochlorothiazide (HCTZ) single-pill combination (SPC) in its treatment protocol, and the assessment of treatment and control through a 'registry' system. The degree that non-KPNC clinicians currently employ the use of single-pill combination medication for antihypertensive therapy is unclear. Methods This pilot project utilized the Epic electronic health record system at the Medical University of South Carolina (MUSC) to determine the number of hypertensive patients treated with the Lisinopril/HCTZ SPC. Results Of 81,867 hypertensive patients treated at MUSC outside of specialty areas since May 1st, 2012, the single-pill combination of Lisinopril and HCTZ was prescribed to 17,541 patients (21.43%), which is comparable but less than its usage in a model of effective hypertension control in the KPNC healthcare system. 6,804 patients (8.31%) outside of specialty areas were taking Lisinopril and HCTZ concurrently in two separate pills. Conclusions The results of this feasibility assessment indicate that Epic might be an effective way to evaluate treatment patterns for hypertensive patients within an academic medical center. Additional analyses will assess additional combination therapies, as well as disparities in care. Further studies are needed that examine the factors associated with the use of combination therapy for blood pressure control and risks associated with different therapies. This work was supported by MUSC SHP Program

24 Assessing Sam68/KHDRBS1 Cellular Localization and its Relevance to the Development of Preeclampsia

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Abstract Withheld from Publication

25 Assessing Feasibility of a Sustainable Faith-based Health Initiative to Encourage Blood Pressure Self-Monitoring

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Hypertension affects over a third of the adult population. Hypertension related outcomes account for over 50% of deaths, and 10% of people with hypertension do not know they have it, putting them at greater risk for incurring a cardiac event. Hypertension control rates are sub-optimal with health disparities evident. Hypertension interventions delivered at the community level offer the promise of decreasing cardiovascular disease across many at-risk populations, particularly amongst underserved and disadvantaged communities. For 2018, the Million Hearts 2022 campaign and the American Heart Association/American College of Cardiology called for self-monitoring blood pressure in their guidelines to address hypertension. Out-of-office blood pressure measurements are necessary to support accurate diagnoses of hypertension as well as to encourage personal responsibility in blood pressure management. The church has a long history of being used for health promotion, with little exploration of using the church to promote blood pressure self-monitoring. This project seeks to assess the feasibility of implementing a sustainable faith-based prevention method to address hypertension through encouraging blood pressure self-monitoring at church. This will be done by meeting with pastors to assess interest and then providing them with a blood pressure monitor and support for how to proceed in encouraging blood pressure measuring within their church. This project seeks to recognize the church as a potential avenue for encouraging out-of-office of blood pressure monitoring, and also has implications for future methods of utilizing religious institutions in addressing hypertension globally.

26 Implementing an innovating diagnostic tool to be used in the Pediatric Concussion Clinic

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1.6-3.8 million sports related mild traumatic brain injuries (mTBIs) happen annually in the U.S. Trainers do not have a quick and reliable method to assess for concussion events. Tests used to increase sensitivity of diagnosing concussions include balance and memory tests, symptom scales, and CT scans. There is no objective means for measuring the likelihood of mTBIs. The pediatric neurosurgery team hypothesizes mTBIs and other neurodegenerative conditions influence a patient's blinking capabilities, therefore a patient's blink reflex is impacted under these conditions. A new noninvasive experimental device, The Blink Reflexometer, captures the speed of the blink reflex, which provides latency, differential latency, lid velocity, log of time to open, log of number of oscillations, and log of total blink time. The device tested 24 Division-I male football athletes in the 2015-2016 seasons. Athletes were divided into 'Head Impact' or 'Control or Active Play' groups. The active play results included increased blink latency ($p<0.001$), decreased differential latency ($p = 0.017$), decreased lid velocity ($p = 0.005$), longer time to open ($p = 0.037$), fewer oscillations ($p < 0.001$), and shorter total blink duration ($p = 0.042$). Head impact results included decreased blink latency ($p < 0.028$), increased differential latency ($p < 0.001$), decreased log of the time to open ($p = 0.044$), and increased log of number of oscillations ($p = 0.029$). Our goal is to add the Blink Reflexometer as a novel diagnostic tool to the MUSC Pediatric Concussion Clinic. We will evaluate subjects 0-18 years old who have endured mTBIs and use the Blink Reflexometer to objectively diagnose their injury with the same tracking parameters as stated above. The Blink Reflexometer has been donated to the MUSC Concussion Clinic, and we will have it available for providers to test all willing patients. This work was supported by MUSC Blinktbi

27 Changes in left ventricular end-diastolic pressure following alcohol septal ablation in hypertrophic obstructive cardiomyopathy

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Left ventricular end diastolic pressure (LVEDP) is a representation of left ventricular performance. An increased LVEDP correlates with an increased left ventricular workload, which can be seen in pathologic conditions such as hypertrophic obstructive cardiomyopathy (HOCM) in which the left ventricular outflow tract (LVOT) is obstructed. Our study aims to determine the immediate effect of alcohol septal ablation (ASA) on LVEDP in HOCM patients. It is hypothesized that ASA produces an immediate reduction in LVEDP. In 46 HOCM patients that underwent ASA, pre- and post-ablation LVEDP was measured and compared. Both the pre- and post-ablation LVEDP were taken from pressure tracings obtained during the procedure. LVEDP was measured at the end-expiration R wave of the simultaneous ECG tracing during the procedure. Two pre-ablation LVEDP measurements were taken from the pressure curve at the post-'a' wave points at the start of the procedure (Group A) and immediately prior to the alcohol injection (Group B). One post-ablation LVEDP measurement was taken at the post-'a' wave point at the conclusion of the successful ablation (Group C). When comparing LVEDP of groups A and B using a two-tailed t-test, we found no statistical difference ($p=0.240$). When comparing groups A and C using a two-tailed t-test, the LVEDP was significantly

lower in group C (mean A=28.83 vs. mean C=23.22; p=0.046). When comparing groups B and C using a two-tailed t-test, the LVEDP was also significantly lower in group C (mean B=30.11 vs. mean C=23.22; p=0.023). These findings confirm our hypothesis that ASA does result in immediate reduction of LVEDP. Future implications of this finding include evaluation of a correlation between the degree of LVEDP reduction and long-term outcomes to predict the prognosis of HOCM patients.

28 Early Discontinuation of long-acting reversible contraception (LARC) among women living with HIV

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Objective The primary aim of this study was to determine the rates of early LARC discontinuation (removal within 12 months of placement) in women living with HIV (WLWH). The secondary aim was to determine the average time between LARC removal and subsequent delivery in WLWH with a focus on short interconceptual periods (two deliveries in <18 months). Methods This was an IRB-approved retrospective case control study. A request was made to SPARC for women who delivered at MUSC between 1/1/09 and 2/14/18 and who had a LARC device placed within 3 months postpartum. The electronic medical records were reviewed to confirm dates of delivery, LARC placement, and LARC removal. Patient age, parity, race/ethnicity, and LARC device were also determined using the medical records. 50 WLWH and 744 controls were included in the study cohort. Results There was no significant difference between the WLWH and the HIV-negative controls in the rates of early LARC discontinuation or short inter-conceptual periods. However, WLWH were found to have a significantly lower incidence of white race and IUD use. In addition, IUD users were found to have a significantly higher incidence of white race and older average age at time of LARC insertion. Short interconceptual periods were found to be very low in both cohorts. Conclusions The use of LARC in WLWH is still understudied. While we were unable to prove early rates of early LARC discontinuation in our HIV-positive sample, we were also underpowered to do so. Further research needs to be conducted in order to draw attention to potential healthcare disparities affecting unwanted pregnancy and perinatal HIV transmission in WLWH. The low rates of short interconceptual period after LARC also warrant further research into LARC efficacy.

29 Examination of Long-term Safety and Feasibility of TheraBracelet - Phase I Trial

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Strokes are a leading cause of long-term disability, leaving many stroke survivors with significant impairment. Current devices used to improve post-stroke hand function are bulky and therefore intended for short exercise bouts only. TheraBracelet is an assistive device wearable all day as a watch to enhance dexterity and hand sensation during activities of daily living. This Phase I trial examines the feasibility and safety of long-term use of TheraBracelet at home. Chronic stroke survivors with mild to moderate upper limb impairment were enrolled in a double-blind cross-over randomized trial. Subjects were randomly assigned to either the treatment or control condition for 1 month, followed by a two-week washout period, and then crossed over to the other condition for another month. All subjects were instructed to wear the TheraBracelet device on the paretic wrist for minimum 8 hours/day for each month. The device applied random-frequency vibration at 60% of the sensory threshold for the treatment group and no vibration for the control group. Feasibility was assessed weekly based on self-reported device wear time. Safety was assessed based on occurrence of adverse events (AE) during weekly assessments. AEs included deterioration in any of the following: hand sensation, dexterity, grip strength, upper limb pain, spasticity, skin irritation, swelling, or any other adverse events. Interim results show participants wore the device on average >8 hours/day in both the treatment and control months. A total 60 AEs were observed. All were mild except two severe AEs. The two severe AEs were deemed to be unlikely or not related to the intervention. Three mild AEs were possibly related to the intervention. In conclusion, long-term home-use of TheraBracelet appears to be feasible and safe for chronic stroke survivors. Safety in terms of AEs between conditions will be formally tested upon completion of study. This work was supported by NIH-NICHD STTR R41HD090792

30 Management of Incontinence Associated Dermatitis in the Surgical Intensive Care Unit

Brandon Gates, Joy Vess, Nursing, Nursing, MUSC.

Incontinence-associated dermatitis (IAD) is a distinct form of skin breakdown that occurs when skin is exposed to urine or feces, and all incontinent individuals are at risk. The purpose of this project was to determine if an algorithm for the management of fecal and urinary incontinence could reduce the rate of hospital-acquired IAD in patients over a four-month period in a surgical intensive care unit in an acute care urban hospital in the southeastern United States. A total of 211 patients were included in this pre/post-intervention quality improvement project in an 18-bed unit. Seventy-nine individuals with incontinence were included in the four-month pre-intervention period, and 132 in the four-month post-intervention period. After the intervention, there was a 24% reduction in the rate of hospital-acquired IAD from 29% to 5%. The average length of time from admission to onset of hospital-acquired IAD increased from 15 days in February 2018 to 25 days in May 2018. SICU nursing staff also used the Ghent Global IAD Categorization Tool to identify IAD on admission. The preintervention period had a 1% rate of IAD identified on admission and the post-intervention period had a 24% rate of IAD identified on admission. These findings suggest that use of an algorithm utilizing bundled skin care interventions can prevent hospital-acquired IAD and that the GLOBIAD assessment tool can be used by non-expert clinical nursing staff to identify IAD.

31 Use of TheraBracelet during Pediatric Constraint Induced Movement Therapy - Feasibility & Safety Study

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Cerebral palsy (CP) is the leading cause of motor impairment in children globally. Children with CP present with both sensory and motor deficits in the upper extremity, which can greatly impact children's daily lives. Constraint induced movement therapy (CIMT) is an evidence-based therapy treatment that is proven to increase upper extremity function. Effects of CIMT can be augmented by neuromodulation, and one recently developed neuromodulation method is TheraBracelet. It entails application of subthreshold vibratory stimulation to the wrist to increase cortical activities during therapy tasks. Studies have shown that TheraBracelet increased motor outcomes in adult stroke survivors without adverse events. Therefore, this pilot study was conducted to determine the safety and feasibility of TheraBracelet when

used in conjunction with pediatric CIMT. Thirteen children ages 3 to 9 participated in a pilot double-blinded stratified randomized controlled trial. Subjects were stratified based on their upper limb abilities (Manual Ability Classification System) and randomized into either a treatment or control group. The treatment group received subthreshold vibratory stimulation during CIMT, while the control group wore the same device, but received no vibration during CIMT. All subjects participated in CIMT for six hours/day for five days (30 hours). Device wear time and the pain scale/adverse events were taken at baseline, each day of treatment, and post-treatment. In results, device wear time and change in pain level were not significantly different between the two groups. Mild and transient skin irritation from the wrist strap was noted for 1-2 subjects for both groups. There were no other adverse events. In conclusion, using TheraBracelet during 30-hour CIMT was both safe and feasible. A larger clinical trial may be conducted in the future to determine the utility of TheraBracelet as a therapy adjuvant to increase functional upper extremity recovery for children with cerebral palsy. This work was supported by MUSC Department of Health Professions

32 Comparison of 0.1 and 0.05mg intrathecal morphine when administered with a multimodal pain regimen for post-cesarean analgesia: a single center, prospective, randomized, single-blinded trial

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The goal of this study was to determine if 0.05 mg of intrathecal morphine is non-inferior to 0.1 mg of intrathecal morphine in providing analgesia to post-caesarean patients. 200 patients will be assessed at the Medical University of South Carolina, with 100 receiving 0.05 mg of intrathecal morphine and 100 receiving 0.1 mg of intrathecal morphine during caesarean delivery. Patients are selected based off of determined inclusion and exclusion criteria, properly consented, and interviewed in a 24 and 48-hour follow up to determine pain scores and morphine-related side effects experienced. Patient charts are reviewed and combined with follow-ups in order to assess the primary outcome of time to first narcotic rescue dose and the secondary outcomes of total opiate consumption at 24 and 48 hours, time until first ambulation, visual analogue scale pain measurements at both rest and with walking at 24 and 48 hours, morphine-related side effects, and overall patient satisfaction with pain control. Two-tailed t-tests were used to assess preliminary data on 38 patients thus far, with significant differences found in 24-hour pain scores at rest and overall patient satisfaction. The lack of a significant difference in time to first narcotic rescue dose between the two groups of patients may indicate that 0.05 mg is non-inferior to 0.1 mg of intrathecal morphine. However, the significant difference in 24-hour pain score at rest and overall patient satisfaction contraindicates this conclusion, as the pain score was significantly higher and satisfaction significantly lower in the group receiving 0.05 mg. Further patient enrollment will be required to determine significance of results, though current data is similar to results found in previous studies. Our results suggest that 0.05 mg of intrathecal morphine may provide equivalent pain control compared to 0.1 mg of intrathecal morphine, while at the same time reducing morphine-related side effects. This work was supported by Summer Health Professionals Research Program

33 Association of computed tomography angiography parameters with clinical outcomes in patients with severe pulmonary embolism

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Purpose: To evaluate the prognostic parameters of computed tomography angiography (CTA) in severe pulmonary embolism (PE) patient risk stratification, treatment, and mortality. Materials and Methods: Retrospectively, 129 patients (60 male, 69 female; mean age, 64 +/- 17 years) with severe PE diagnosed using CTA were included in the study. Two readers evaluated a number of CTA parameters of embolism burden and potential right heart dysfunction, including Qanadli scoring system (extent and severity of thrombus within the pulmonary arterial tree), transverse right to left ventricular diameter ratio, main pulmonary artery diameter, interventricular septal bowing, central location of embolus, and contrast reflux into the inferior vena cava. All CTA parameters were correlated to age, heparin, tPA, EKOS catheter, other catheters, no treatment, and death. Treatments were separated into conservative and non-conservative groups for further analysis. Results: Pearson correlation showed no strong associations between CTA parameters and clinical characteristics/outcomes. Thrombus load, ventricular diameter ratio, septal bowing, and central location were significantly correlated with the subsequent treatment paradigm. Conclusions: The studied CTA parameters cannot reliably predict patient outcomes for risk stratification. Our findings suggest that the role of CTA remains predominantly in initial diagnosis, and patients' clinical conditions should direct further management. This work was supported by MUSC College of Medicine Dean's Office, MUSC Department of Radiology and Radiological Science

34 Single session pharmaco-mechanical thrombectomy versus thrombolysis for lower extremity acute deep vein thrombosis (DVT)

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Incidence of DVT can range from 45 to 117 per 100,000 person years. The AACP cites anticoagulation as first line treatment of DVT, however of those patients treated with anticoagulant therapy alone, 20-40% will develop post thrombotic syndrome (PTS), characterized by pain and swelling secondary to thrombotic vascular occlusion. Early recanalization via endovascular procedure has been shown to reduce PTS in patients with ilio-femoral segment low extremity (LE) DVT. We hypothesize that pharmaco-mechanical thrombectomy (PMT) may be an equivalent treatment with regards to safety and efficacy when compared to traditional thrombolytic infusion, prolonged up to 72 hours, referred to as catheter-directed thrombolysis (CDT). Forty-five patients who received tPA thrombolysis of their LEDVT were selected and divided into PMT and CDT cohorts and retrospectively examined for recanalization outcome, measured as either high (>99% clot removal) or low, and a number of disease-associated patient descriptors. Statistical analysis has revealed no significant difference between cohorts in any parameter, including recanalization outcome, supporting our hypothesis of equivalence between PMT and CDT treatment of LEDVT. This work was supported by MUSC Dean's office, MUSC Dept of Radiology

35 Prevention of CVC VTEs in the PICU and the PCICU

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Central venous catheter-associated VTE events are a serious problem in pediatric ICUs world wide. MUSC Children's Hospital is no exception. In fact, MUSC has a higher than average rate of VTEs in it's Children's Hospital. Research has been done that shows that implementation of a

three element bundle can reduce the rate of central venous catheter VTE events. This bundle was implemented at MUSC for the months of June and July. Multiple barriers to implementation were observed during this period. Documentation is weak by some providers for these elements, education about the elements is still in progress and using ultrasound during line placement is not common practice. These barriers need to be addressed before successful implementation of the three bundle elements can be completely compliant with every line. This work was supported by SHP fellowship grant

36 Radiofrequency wire technique and image fusion in the creation of an endovascular bypass to treat chronic central venous occlusion

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The goal of this case report is to demonstrate the feasibility, safety and efficacy of using the radiofrequency (RF) wire technique in conjunction with cone beam CT (CBCT) fusion to recanalize a severely symptomatic central venous occlusion (CVO) when previous endovascular techniques failed. The complex and chronic CVO was successfully treated without complications. The combination of these techniques provided an endovascular solution and could be considered in select cases.

37 Preferential Effect of Cigarette Smoke on Cartilage Tissue Area During Fracture Healing

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INTRODUCTION: Fracture healing occurs through two distinct pathways: intramembranous ossification (IO) and endochondral ossification (EO). Cigarette smoking is known to increase the risk of fracture non-union. However, the mechanism by which cigarette smoking inhibits fracture healing is unknown. This study sought to determine whether smoking has a differential effect on the two fracture healing pathways through the use of a bilateral femur fracture model. METHODS: Sprague Dawley rats underwent bilateral femur fracture and repair surgery; half of the cohort were subjected to cigarette smoke exposure both pre- and postoperatively. The EO pathway was induced through intramedullary nail (IMN) fixation while rigid fixation with plate and screws induced the IO pathway. Femurs were harvested at various time points during the healing process and histologic staining was used to assess cartilaginous tissue callus formation. RESULTS: Smoke exposed animals with IMN were found to have an early reduction in cartilage area at 10 days compared to control animals. Smoke exposed animals then exhibited a larger cartilage area compared with controls at both 1 and 3 months. In contrast, non-smoke exposed animals with plate-fixed femurs trended toward less cartilage callus than IMN femurs. Moreover, smoke exposed animals with plate-fixed femurs had a similar cartilage area as control animals at each of the three timepoints in the bone healing process. DISCUSSION AND CONCLUSION: Cigarette smoke appears to have a preferential effect on cartilage callus area in healing fractures as determined by the pathway of osseous healing; the greatest effect was observed in bones healing via EO. Because smoking is pro-inflammatory, early signaling in fracture healing may be disturbed, resulting in poor cartilage induction initially. A late increase in cartilage tissue in smoke exposed fractures may be due to a robust rebound in cartilage repair tissue or impairment of the conversion of cartilage callus to bone.

38 Iatrogenic right bundle branch block after alcohol septal ablation does not negatively impact right ventricular function and pulmonary pressures

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Introduction: Hypertrophic obstructive cardiomyopathy (HOCM) treated with alcohol septal ablation (ASA) often results in right bundle branch block (RBBB). The effect of RBBB-induced dyssynchrony on cardiac function has not been well described. We sought to determine the effect of ASA induced RBBB on RV function and pulmonary vascular bed remodeling. Methods: From the MUSC database of HOCM patients receiving ASA (2008-2015), sixty-seven patients (age 60.93 +/- SD 14.20 years, 27 M: 40 F) with 1-year follow-up full echocardiograms were selected. TAPSE and LVOT gradients were measured for 40 patients who developed RBBB post-ASA (age 60.64 +/- SD 13.61 years, 16 M: 24 F) and 27 control patients (age 61.36 +/- SD 15.37 years, 11 M: 16 F). High quality RVSP data was obtained and compared for 17 RBBB patients and 12 control patients. Two-sample t-test analysis was performed for each variable in the RBBB and control groups. Results: No significant difference in TAPSE was found between the experimental and control groups both before (21.73 mm vs 22.61 mm, p = 0.44) and after (22.93 mm vs 22.87 mm, p = 0.95) ASA. For both groups combined, resting (62.06 mmHg vs 21.21 mmHg, p=4.83 x 10-10) and provoked (109.99 mmHg vs 34.67 mmHg, p=1.14 x 10-15) LVOT gradients were lower post-ASA as compared to pre-ASA. Measured RVSP was not significantly different after ASA in the RBBB (39.47 mmHg vs 35.95 mmHg, p=0.51) or control (34.44 mmHg vs 32.05 mmHg, p=0.57) group. Pulmonary pressures subjectively estimated by echo reader for both groups combined were also unchanged (0.015 vs 0.015, p=1). Conclusions: In HOCM patients who underwent successful ASA, demonstrated by reductions in resting and provoked LVOT gradients, development of RBBB did not have a deleterious effect on RV function or pulmonary vascular bed remodeling. *=authors contributed equally to abstract

39 Emergency Provider Adherence to Chronic Disease Guidelines: A Prospective Provider Inquiry

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Objective: Describe Emergency Medicine healthcare provider practice patterns with regards to asymptomatic elevated blood pressure in low acuity patients discharged from the Emergency Department. Background: Recent publications emphasize the critical importance of controlling hypertension and indicate even modest reductions in systolic blood pressure can significantly improve mortality. However, only 1 in 3 U.S. adults with hypertension is aware that they have this dangerous condition, and many who have been diagnosed are simply unable to obtain adequate healthcare. For many underserved or disadvantaged populations, Emergency Departments (ED) are a common point of access to the healthcare system, and therefore, could be important venues in which to combat this significant threat to individual and population health. No study to date has prospectively evaluated emergency physician practice patterns in regards to asymptomatic hypertension in actual clinical settings, and knowledge of this information could lead to improved healthcare delivery methods and better patient outcomes. Methods: Eligible ED patients completed a questionnaire assessing any prior hypertensive diagnoses or treatment.

Following discharge, their ED providers (attendings, residents, or advanced practice providers) were briefly interviewed verbally regarding their recognition and treatment of each subject's hypertension. Finally, a brief chart review was performed to confirm each subject's hypertensive diagnosis history and to verify the follow-up instructions they had been given upon discharge. Results: Providers correctly identified elevated blood pressure status in 52 out of 98 patients (53%) and correctly identified previous hypertension diagnosis status in 58 out of 98 patients (59%). Three of the 27 encounters in which the provider correctly identified elevated blood pressure resulted in patient counseling and a primary care follow-up referral. Further statistical analysis of the results is ongoing.

40 Hypoxia and Pressure-Induced Cellular Injury to Human Neurons and Astrocytes

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In neonatal hydrocephalus (HCP), intracerebral pressure (ICP) is elevated to pathological levels and the cerebral ventricles become abnormally enlarged due to an imbalance between cerebrospinal fluid (CSF) production and absorption. As the ventricle dilate, surrounding brain tissue is compressed, including the vessels that supply blood to the rest of the parenchyma, producing hypoxic conditions. Given the comorbidities of elevated ICP and hypoxia in HCP, it is critical to understand how such factors affect neuron viability. Therefore, we assessed the effect of hypoxia and pressure on 3D cellular constructs, which better simulates the brain, containing both human astrocyte and human neuron. A novel pressure-controlled cell culture incubator (PC3I) capable of maintaining both elevated pressure (30cmH2O) and a hypoxic state (1% O2) was used to model the increased ICP and hypoxic conditions of HCP, as well as trials using normobaric ICP and hypoxia. Adenosine triphosphate (ATP) release was measured as a biomarker of cellular injury/stress, and cell viability was assessed using a Live/Dead assay. We hypothesized that as the time of exposure to hypoxia and pressure increased, ATP release would increase, and cellular viability would decrease. The cell-containing 3D constructs were subjected to pressure and hypoxia for 2, 8, 24, and 48-hour intervals. Compared to controls, ATP levels increased 10% at the 2-hour reading and 15% at the 8-hour reading but dropped for the 24 and 48-hour readings. Perhaps, the experimental conditions were so injurious to the cells that the initial ATP released was hydrolyzed, or our inhibitor of ATP hydrolysis (100 µM ARL 67156) was not active by these time points. To assess cellular viability, we are utilizing fluorescence microscopy imaging to detect live and dead astrocytes and neurons. Our preliminary data indicates that combined pathological elevations in ICP and hypoxia cause significant cellular injury. This work was supported by College of Medicine Dean's Office

41 Comparison of Landmark and Ultrasound-Guided Knee Arthrocentesis in a Cadaver Model

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BACKGROUND: Knee arthrocentesis has traditionally been guided by anatomic landmarks. Ultrasound offers an alternative means of needle guidance. While the aspiration success rate of these two techniques is similar, provider confidence, needle control, and patient comfort may be more favorable under ultrasound guidance. OBJECTIVE: To compare needle control and provider confidence in both landmark and ultrasound-guided knee arthrocentesis. METHODS: This was a prospective observational study. Sixty-one participants (33 novice-medical students/interns, 28 experienced-residents/physician assistants/attendings) completed a 20-minute training session and performed both landmark and ultrasound-guided knee arthrocentesis on embalmed cadavers with simulated joint effusions. Needle control (number of attempts and bone contact), user confidence, and user preference were the primary outcomes. RESULTS: All participants (61/61) successfully completed knee arthrocentesis using ultrasound guidance. All but one participant (60/61) successfully completed knee arthrocentesis using landmark guidance. Repeat attempts were required 21% (13/61) of the time when landmark guidance was used and 11% (7/61) of the time when ultrasound guidance was used. Bone was contacted 30% (18/61) of the time when landmark guidance was used and 5% (3/61) of the time when ultrasound guidance was used. Repeat attempts and bone contact were more frequent in novice users with both techniques, but this was not statistically significant. All users demonstrated a greater median level of confidence with the ultrasound-guided technique ($p<0.0001$). Eighty-nine percent (54/61) of participants preferred ultrasound over the landmark technique. CONCLUSION: Both landmark and ultrasound-guided techniques resulted in successful knee arthrocentesis. Ultrasound guidance yielded more first attempt success with less frequent bone contact. Participants were more confident with ultrasound guidance and preferred this over the landmark technique. This work was supported by MUSC College of Medicine Dean's Office

42 Association of Bronchiectasis and the Microbiome with Gastroesophageal Reflux in Alpha-1 Antitrypsin Deficiency

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Bronchiectasis is the airway damage from chronic inflammation seen in many lung disease states. Bacterial colonization of the airway both contributes to and results from this pathology. Chronic bacterial infection triggers the airway inflammatory response, driven by neutrophils and local cytokines. Microbes exit and enter the lung through several routes, causing even the healthy, baseline microbiome to be in constant heterogeneous flux. Microaspiration, often increased in Gastroesophageal Reflux (GERD), is considered a main entryway as supported by close similarities between oral and respiratory microbiota. This project focused on the patient population afflicted with Alpha-1 antitrypsin deficiency (AATD), a genetic disease that predisposes subjects to COPD, particularly after environmental exposures. A SERPINA1 gene defect results in lowered alpha-1-antitrypsin protein, an inhibitor of neutrophilic elastase. Uncontrolled activity of elastase in airways elevates risk of inflammation and tissue damage. Due to clinical relevance, emphasis was placed on examining the relationship between GERD and bronchiectasis severity. It was hypothesized that aspiration leads to increased bronchiectasis through changes in the lung microbiome. Retrospective analysis was performed on a data set gathered by a large, multi-center NIH study, GRADS. This included CT scans, clinical variables, and microbiomes of the mouth, bronchoalveolar lavage (BAL), and stool. BAL microbiome data was compared between subjects grouped by genotype, CT scores, and GERD symptoms. The software 'R-studio: Phyloseq' was used to analyze microbial alpha and beta diversity, yielding diversity values that were compared to the clinical variables. Multiple bacterial species were shown to vary significantly by genotype, in ZZ (+AATD) subjects vs. MZ carriers ($p=.028, .041$). Overall diversity was associated with the presence or absence of GERD, but not bronchiectasis. Though many associations found do not meet the threshold of significance, they provide informative guidance for future studies on these diseases and the lung microbiome. This work was supported by MUSC COM Dean's Office MUSC Department of Pulmonology and Critical Care

43 Feasibility and Safety of using TheraBracelet during Task-Practice Therapy

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Background: Stroke survivors commonly present with motor and sensory impairments in their affected upper extremity (UE) that diminish their ability to perform daily activities. Task-practice therapy generally enhances UE movement capacity in stroke patients. Due to limited resources, it is important to maximize efficacy of rehabilitation treatment. To augment therapy, TheraBracelet may be used to increase brain activity during therapy activities through application of imperceptible vibratory stimulation to the wrist, thereby improving clinical outcomes. Objective: The objective of this pilot study was to determine feasibility, safety, and preliminary efficacy of using TheraBracelet during 6-week (18-session) task-practice therapy. Method: Four chronic stroke survivors with moderate UE impairment wore a wristband device applying TheraBracelet stimulation to their affected wrist during 18 task-practice therapy sessions. Clinical UE outcomes were obtained at baseline, after therapy, and at one-month follow-up. Results: All participants completed 18 therapy sessions while wearing TheraBracelet with no serious adverse events. TheraBracelet did not interfere with therapy tasks. All subjects voluntarily reported that they use their affected hand more in a meaningful way, such as self-feeding. Preliminary data suggest that substantial improvement in the upper extremity function was achieved after therapy beyond the minimal clinically important difference or minimal detectable change in outcome measures such as Fugl-Meyer UE Assessment which was largely sustained at follow-up. Conclusion: It was feasible and safe to use TheraBracelet as a therapy adjunct for 18-session task-practice therapy. This study involves a small sample size and encourages a larger study to further investigate efficacy. This work was supported by NIH/NIGMS U54-GM104941

44 Identification of Risk Factors for Increased Perioperative Bleeding with Surgical Dilation and Evacuation

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Background: Although perioperative bleeding with dilation and evacuation (D&E) is uncommon, morbidity associated with hemorrhagic events may be significant. Thus, this study aimed to identify perioperative and patient factors associated with increased perioperative bleeding with D&E. Methods: The charts of 757 women who underwent D&E in a 50-month period were identified and examined and 388 women that had operative procedures evaluated. Descriptive statistics were calculated for all participants. Univariate associations between estimated blood loss (EBL) with perioperative and patient factors were examined using a Kruskal-Wallace approach for categorical factors and Spearman correlation for continuous factors. A multiple linear regression model of EBL was also fit. EBL was log-transformed to meet model assumptions. All variables with univariate P-values <0.2 were considered and the final model was selected using backwards selection retaining all variables with P<0.1. Results: Median EBL was 200ml (range 0-10,000ml). EBL over 1000ml was documented for 8% of patients and 5.2% required intraoperative (2.1%) and/or postoperative (3.9%) transfusion. Readmission for bleeding after discharge was required for 5% of subjects. EBL was not associated with patient age (P = 0.241) or parity (P = 0.328). Increased EBL was associated with increased gestational age. Specifically, a 1 week increase in gestational age was associated with a 17% increase in estimated blood loss (P <0.001, 95% CI: 13.3 to 20.4%). While estimated blood loss was lower in patients who had monitored anesthesia care sedation relative to general anesthesia (inhalational or TIVA) or spinal anesthesia (P = 0.001, 0.012, and 0.011 respectively), only 10 patients with early gestations received monitored anesthesia care. Notably, gestational age remained significant in the multivariable model of EBL (P <0.001). Conclusion: While increased gestational age is associated with increased bleeding, blood loss remains low for patients undergoing D&E and most patients do not require transfusion. This work was supported by Foundation for Anesthesia Education and Research

45 Impact of TheraBracelet on Cortical Activity in Stroke Survivors

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Stroke survivors often have sensory and motor deficits in the upper extremity which impair their abilities to perform functional and daily tasks. TheraBracelet was developed to facilitate recovery of hand function by stimulating the affected upper extremity throughout daily activities. Specifically, TheraBracelet entails application of imperceptible random-frequency vibratory stimulation to the wrist skin through a wearable device. Previous studies showed that stroke survivors and healthy adults could detect lighter fingertip touch, and stroke survivors could manipulate objects with the affected hand faster, while TheraBracelet stimulation was on vs. off. It was postulated that TheraBracelet subliminally stimulates the hand sensorimotor cortex toward greater cortical engagement during hand activities. A previous study tested this in healthy adults: cortical activity resulting from fingertip touch, known as somatosensory evoked potential (SEP), increased with TheraBracelet than without. However, the effect of TheraBracelet on cortical activity in stroke survivors is unknown. The objective of this study was to determine if TheraBracelet increases SEP in stroke survivors. In a single-session repeated-measured study, SEP was measured 100 times while TheraBracelet was turned off and 100 times while TheraBracelet was turned on (for a total of 200 trials). SEP was evoked by touch stimuli on the affected index fingertip and recorded using high-density EEG in chronic stroke survivors with mild to moderate upper extremity impairment. The order of TheraBracelet on and off trials was randomized. A vibrator was worn on the affected wrist during the entire study, but gave TheraBracelet stimulation only during TheraBracelet 'on' trials. Interim data suggest that TheraBracelet resulted in greater SEP. Data analysis is ongoing to test the hypothesis that cortical activity for sensing fingertip touch is increased with TheraBracelet. Future studies may also investigate effects of TheraBracelet on movement-related cortical activity and sensorimotor recovery. This work was supported by NIH P20GM109040; NIH U54-GM104941

46 Cigarette Smoke Exposure Preferentially Impairs Endochondral Fracture Healing: Micro-CT Analysis

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Cigarette smoking is known to increase the risk of fracture non-union. However, the mechanism by which cigarette smoking inhibits fracture healing pathways is unknown. We sought to determine the effects of smoke exposure on fracture healing through three-dimensional micro-CT of the fracture callus. Sprague Dawley rats (n=46) were studied using a bilateral femur fracture model, designed to concurrently assess both bone healing pathways in the same animal. Animals were subjected to cigarette smoke pre and postoperatively. The two fracture healing pathways were induced through use of plate and intramedullary fixation in each animal. Fracture healing was assessed by micro-CT at 1, 3, and 6 months by measuring the total volume of healing calcified callus (CV) to the volume of the native cortical bone (BV) as a ratio

(CV/BV). At one month, both smoke and control nailed femurs exhibited a significantly greater initial CV/BV compared to those fixed by compression plating. The three-month CV/BV ratios remained steady in both cohorts, regardless of fixation. At 6 months, control femurs exhibited lower CV/BV ratios than at 3 months, again regardless of fixation. At both 1 and 3 months, CV/BV ratios in smoked animals were similar to the control animals with the same fixation method. At 6 months, the ratios in control animals declined substantially below those of their smoke-exposed counterparts. Control animals with fractures fixed by nails exhibited lower CV/BV ratios than smoked animals with the same fixation. There was no statistical difference in the calcified callus between smoke-exposed and control animals fixed by compression plate at 6 months. These data demonstrate significantly greater healing calcified callus to pre-fracture bone volume ratios when comparing plate and nail fixation in control animals. Observed differences in CV/BV ratios between control and smoke-exposed animals demonstrates a preferential inhibition of endochondral fracture healing by smoke exposure.

47 Relationship between Diffusion Properties and Tissue Calcification in Human Cartilage Endplate

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Poor nutritional supply could play a critical role in Intervertebral disc (IVD) degeneration progression, and may further hinder IVD repair attempts. The cartilage endplate (CEP) was found to be the main nutrient supply pathway to the IVD. Although solute diffusion properties in healthy CEP have been characterized in prior studies, solute diffusion rates in calcified CEP from degenerated discs are unknown. Thus, the study objective was to characterize the diffusion properties of calcified CEP compared to healthy normal CEP, and determine the relationship between solute diffusivity and CEP calcification. Diffusion properties, calcification levels and collagen fiber ultrastructure of calcified and healthy CEPs were accessed using a digital X-ray cabinet, FRAP technique and scanning electron microscope. Our study demonstrated that solute diffusion rate could drop about 50% in calcified CEPs compared to healthy CEPs, indicating that tissue calcification could block nutrient solute transport through the CEP. As such, CEP calcification may further damage the delicate balance of nutrient supply and cellular consumption inside the human IVD and initiate/accelerate IVD degeneration. Furthermore, this study demonstrated a negative relationship between solute diffusivity and calcification, indicating that calcification affects the solute diffusion by changing the extracellular collagen fiber ultrastructure and biochemical composition. Additionally, this study found that small solute diffusions are isotropic, possible due to the compact extracellular matrix structure in both healthy and calcified CEPs. The next step of this study is to measure the biochemical compositions in the healthy and calcified CEPs, and characterize the potential relationship between solute diffusivity and biochemical composition. This study provides valuable insights into potential mechanisms related to disc degeneration as it relates to nutrient deficiency. By incorporating solute diffusion data at different calcification levels into a multiphasic finite element model of the human IVD, it could provide new insights into the early diagnosis of IVD degeneration. This work was supported by Cervical spine research society

48 The Interaction Between Prpf8 and Dzip1 and its Role in Mitral Valve Prolapse

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Mitral Valve Prolapse (MVP) is one of the most common cardiac diseases affecting 1 in 40 individuals worldwide. It has been shown that patients with defects in primary cilia (ciliopathies) have a higher prevalence of MVP. Through the examination of linkage analyses in multiple families with inherited MVP, we identified mutations in a known cilia gene, DZIP1. Currently, little is known about how mutations in the DZIP1 gene can influence the development of MVP. To address this question, a two-hybrid screening was completed, in which DZIP1 wild-type plasmid and mutant DZIP1 plasmid were used to determine DZIP1's binding partners. PRPF8, a central component of the spliceosome was found to interact with wild-type DZIP1 but not the mutant DZIP1. Additionally, a previous GWAS study on patients with MVP, identified a SNP in close proximity to the PRPF8 locus, which led us to hypothesize that this SNP could possibly function as an enhancer to regulate PRPF8 expression. Here we present data that shows that PRPF8 is expressed on mitral valves at various embryonic and postnatal stages, and that it co-localizes with DZIP1. Verification of the two-hybrid screening was tested through co-immunoprecipitation and luciferase assays were conducted to test the activity of the MVP SNP and the putative enhancer. The studies presented establish a mechanism by which DZIP1 mutations regulate RNA splicing, ultimately resulting in myxomatous valves and MVP in patients.

49 Radiology Perspective of Fibrolamellar Hepatocellular Carcinoma: A Case Report

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Fibrolamellar Hepatocellular carcinoma is a rare malignancy that affects 1 in 5 million people in the general population and comprises roughly 1% of all primary liver cancers. Given its scarcity and insidious nature of onset, FL-HCC is often discovered incidentally or in late stages of progression. This case report illustrates the incidental diagnosis of FL-HCC in a 15 year old female presenting with acute kidney injury. Ultrasound evaluation revealed a multilobulated and heterogenous right hepatic lesion measuring 12 cm. Subsequent MRI workup demonstrated a T1 hypointense and T2 hyperintense tumor when compared to background liver with a T2 hypointense central scar. Images additionally demonstrated a T2 hypointense central scar and nodal metastasis, features typical of FL-HCC. The aim of this poster is to highlight pertinent clinical and radiographic features in comparison to those of similar hepatic masses. Earlier detection and a better understanding of the imaging features of FL-HCC can allow for better prognosis and treatment planning.

50 Functional Effects of Adductor Canal Block Versus Femoral Nerve Block for Arthroscopic Anterior Cruciate Ligament Repair: A Systematic Review

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Background: Femoral nerve block (FNB) is a popular and opioid-sparing analgesic technique in anterior cruciate ligament repair (ACLR). However, there is evidence that FNB leads to quadriceps weakness and increased fall risk. Adductor canal block (ACB) is a motor-sparing alternative that targets the sensory innervation of the knee while sparing quadriceps motor innervation. The literature comparing the analgesic efficacy of ACB to FNB has been reviewed, but there has been no review of functional outcomes of the two techniques. The

purpose of this review is to evaluate available literature to compare the functional effects of ACB and FNB in ACLR. Methods: Following the 2009 Preferred Reporting Items for Systematic Reviews and Meta-Analyses, we searched Pubmed, CINAHL, Scopus, Ovid, Cochrane, and Google Scholar databases for studies comparing the effects of ACB and FNB in patients undergoing arthroscopic ACLR. Data were evaluated regarding analgesic and functional outcomes. Results: We found four randomized controlled trials comparing the efficacy of ACB versus FNB in ACLR. The heterogeneity of outcome measures precluded quantitative analysis. Three studies reported functional measures, which included quadriceps maximal voluntary isometric contraction (MVIC), straight leg raise (SLR) and timed-up-and-go (TUG) tests. ACB was found to preserve quadriceps strength in SLR in the first 12 hours in two trials. In one trial, ACB patients had greater ability to perform the TUG test. FNB patients had greater reduction in MVIC than ACB patients in another trial. Three studies found no difference in opioid consumption or pain scores, and one study found higher opioid consumption and pain scores ACB patients. Conclusion: This review suggests that ACB provides analgesia similar to FNB while preserving quadriceps strength. Evidence comparing the functional outcomes of ACB and FNB for ACLR is lacking, and more research evaluating functional outcomes with standardized measures is needed to draw adequate conclusions.

51 Identifying Novel Small Molecules Reducing Serum LDL-C Level in iPSC-derived Hepatocytes

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Hypercholesterolemia, a condition affecting more than 70 million American adults, is characterized by high levels of cholesterol in the blood (CDC, 2011). If untreated, it can result in severe cardiovascular disease via development of atherosclerotic plaques. Currently, patients with hypercholesterolemia are treated with statins or PCSK9 inhibitors which function by altering expression of low-density lipoprotein cholesterol (LDL-C) receptors in hepatocytes. However, a subset of patients responds poorly to this first-line treatment. There is a need for alternative drugs while lowering risks and costs. Recent work by the Duncan laboratory describes the efficient generation of hepatocyte-like cells from human induced Pluripotent Stem Cells (iPSC) as a model to discover novel lipid-lowering pharmaceuticals (Cayo et. al, 2017). Using a high-throughput drug screening method, 11 novel small molecules supplied by the South Carolina Compound Collection (SC3) were validated as capable of reducing serum ApoB in iPSC-derived hepatocytes. After assessing several parameters of the primary hits on LDL lowering effects, including dose-response analysis, time-dependent efficacy, and cell viability assay, we identified four potential lead compounds. Sandwich ELISA was used to detect ApoB secretion levels in hepatocyte-like cultures before and after treatment with lead compounds. Cell viability assays and immunofluorescent staining were used to characterize any detrimental effects of the potential leads on hepatocyte viability or morphology. These four potential leads demonstrate marked ApoB secretion over a range of applied concentration, do not reduce cell viability or expression of key hepatic markers and have observed time-dependent effects over a 48-hour treatment. This work was supported by NIH T35DK007431-34, Summer Health Professions Program at MUSC.

52 Collagen 1A1 gene expression levels in resected skin predict acute wound healing complications after skin reduction procedures

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BACKGROUND: Delayed wound healing is the most common complication after skin reduction procedures e.g. reduction mammaplasty and panniculectomy. While patient factors such as age, malnutrition and weight of skin resected have been shown to be associated with complications, we aimed to identify biomarkers in resected skin that may differentiate patients with higher risk of wound healing problems. METHODS: Patients undergoing bilateral reduction mammaplasty and panniculectomy/abdominoplasty in a university plastic surgery practice were enrolled in this prospective study. Patients with history of steroid use or skin fibrosis were excluded. Resected skin was analyzed for gene expression levels of four candidate biomarkers: Collagen 1A1, Fibronectin 1, connective tissue growth factor CTGF and alpha smooth muscle actin a-SMA. Patients were followed postoperatively in clinic and wound healing complications were documented. Any incident of a wound reported in the incision or surgical area, or seroma was classified as wound healing complication. RESULTS: Thirty-five patients were enrolled, 15 (43%) reduction mammaplasty, 14 (40%) panniculectomy/abdominoplasty procedures and 6 combined. The incidence of wound-healing complications was 37%. Mean postoperative follow-up was 18.6 weeks. Collagen 1A1 gene expression was positively associated with development of wound healing complications ($p<0.05$) in a logistic regression model. CONCLUSION: Collagen 1A1 gene expression levels in resected skin were significantly higher among patients who developed wound healing complications after skin reduction procedures. Further research may allow the use of this biomarker to estimate and mitigate risk of complications.

53 Correlates of Hearing Loss in Children with Osteogenesis Imperfecta

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Introduction: Osteogenesis imperfecta (OI) is a collagen synthesis disorder which has been implicated as a cause of hearing loss in about half of adults with the disorder. However, its effects on hearing in children has not been well-documented. Methods: A retrospective review of the Audiological and Genetic (AudGen) Database was conducted for children with osteogenesis imperfecta. Demographics, medical history, and audiograms were collected and analyzed. Hearing loss in this population was characterized. Linear regression was used to determine if there were any factors associated with hearing loss. Results: Of 95,764 children in the AudGen database, 92 had OI. Of these children, 51 had audiograms. Twenty-six children (51.0%) had chronic or acute otitis media and 9 (17.6%) had eustachian tube dysfunction. Thirty children (58.8%) had some degree of hearing loss ranging from mild to moderately severe. Among the children with hearing loss, 33.3% had conductive hearing loss, 5.9% had sensorineural hearing loss, and 31.4% had mixed hearing loss. The mean pure tone average was 27.0 Â± 19.7 dB. Univariate linear regression showed that age, sex, and ethnicity did not correlate with pure tone average. Logistic regression showed that the same factors did not correlate with the presence of conductive hearing loss. Conclusions: The is the largest characterization of hearing loss of children with OI. Age, sex, and ethnicity did not correlate with degree of or type of hearing loss. The effect of eustachian tube dysfunction and other comorbidities on the type and severity of hearing loss will be further elucidated.

54 Alcohol Septal Ablation Produces Similar Changes to CBC as Atherosclerotic Myocardial Infarction Without Evidence of Platelet Activation. Is There Less Inflammation With ASA?

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Background Atherosclerotic myocardial infarction (MI) is a pro-inflammatory and prothrombotic state associated with neutrophilic leukocytosis, anemia, and activated platelets. The degree of leukocytosis correlates with infarction size and, together with activated platelets, amplifies myocardial inflammation. Alcohol Septal Ablation (ASA) produces a targeted infarction in the hypertrophied septum to reduce left ventricular outflow obstruction. The inflammatory and thrombotic effects of this iatrogenic alcohol induced infarction have not been studied. Methods We evaluated 336 consecutive patients who underwent ASA with pre- and post-ASA hemoglobin, WBC count, mean platelet volume (MPV), platelet counts, creatine kinase (CK), and troponin. Results A total of 336 patients (age 61.34 ± 13.07, 148M, 188F) who underwent ASA were included in the study. Alcohol (2.05 ± 0.65cc) was injected into a targeted septal artery producing a peak troponin of 53.12 ± 42.94 ng/ml and CK of 1115 ± 827 U/L. After ASA, WBC increased from 6.91 ± 1.94 to 8.20 ± 2.51 ($p<0.001$), hemoglobin decreased from 13.42 ± 1.78 to 12.33 ± 1.91 ($p<0.001$), platelet counts decreased from 201 ± 55 to 178 ± 49 ($p <0.001$), and MPV decreased insignificantly from 10.81 ± 0.92 to 10.78 ± 0.92 ($p=0.6$). The leukocytosis was composed of 68% ± 10 neutrophils (n=30). Hemoglobin, WBC, MPV and platelet count tertiles showed no correlation to peak troponin, CK, permanent pacemaker placement (PPM) rate, or 30-day mortality following ASA. Alcohol volume injected did not affect any indices. Conclusions Similar to atherosclerotic MI, alcohol induced infarction leads to leukocytosis and anemia but ASA causes a reduced platelet count. The size of the ASA infarct, rate of PPM, and 30-day mortality did not correlate with blood count indices. The lack of platelet activation suggests ASA produces a reduced inflammatory response in comparison to atherosclerotic infarcts, which may explain why blood counts do not influence infarct.

55 The Accuracy of Ultrasound in Evaluating Osseous Features Associated with Peroneal Tendon Pathology

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Background: Peroneal tendinopathy is a common cause of lateral ankle pain. Certain predisposing factors such as a flat or convex fibular groove, low lying peroneal brevis muscle belly, and prominent peroneal tubercle may predispose patients to peroneal tendinopathy [2]. MRI is currently the modality of choice for evaluating these features [1], though there is little current literature on the accuracy of ultrasound for evaluating these osseous landmarks of the lateral ankle. Purpose(s) of study: Can ultrasound accurately (I) qualitatively characterize the retromalleolar groove morphology, (II) measure the depth of the groove and (III) characterize the osseous morphology of lateral calcaneus by evaluating the presence and size of the peroneal tubercle. Methods: Musculoskeletal ultrasound examinations of bilateral ankles of 22 cadavers were performed to assess the retromalleolar groove of the distal fibular and the retrotrochlear eminence and peroneal tubercle of the calcaneus. Ultrasound examinations were performed by a fellowship trained musculoskeletal radiologist with measurements performed by a fellowship trained musculoskeletal radiologist. Ankles were dissected and gross measurements were taken and agreed upon by two individuals. We then compared the data from the ultrasound examinations to the gross measurements, which served as our gold standard. Results: With only preliminary data available, results indicate that ultrasound accurately characterized fibular groove morphology 50% of the time, and identified the peroneal tubercle 64% of the time. Ultrasonographic measurements of fibular groove depth and peroneal tubercle height were correct 33% and 27% of the time, respectively. Conclusion: Although ultrasound is able to visualize the superficial cortical margins of bones, it may not be an adequate imaging modality for characterization of the detailed osseous morphology of the lateral ankle. A number of variables may have contributed to the discrepancies in measurement including inconsistencies in methods of measurement, ultrasound probe angle, and random error in gross measurements.

56 Saddle pulmonary embolism and in-hospital mortality in patients with cancer

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ABSTRACT Introduction: Saddle pulmonary embolism (PE) has been associated with an increased risk of one year mortality when compared to non-saddle PE among patients with cancer. Objective: To evaluate the association between saddle PE and in-hospital outcomes among patients with comorbid cancer. Methods: The 2013 and 2014 United States National Inpatient Sample was used to identify adult patients hospitalized for acute PE. Only patients with an International Classification Diseases, 9th Revision, Clinical Modification (ICD-9-CM) code indicating comorbid cancer were included. Identified admissions were stratified into the following 2 cohorts: saddle (defined as ICD-9-CM code=415.13) and non-saddle PE. Multivariable logistic regression was performed to determine the association between saddle PE and the odds of in-hospital mortality after adjustment for age ≥80 years and sex. Results: A total of 10,660 admissions for acute PE in patients with comorbid cancer were identified. Of which, 4.5% (n=475) had a saddle PE. Median age was 67 years (interquartile range= 58-76) and 48.9% were male. In-hospital mortality occurred in 6.1% of patients. Upon multivariable adjustment, the odds of in-hospital mortality were higher in saddle vs. non-saddle PE (odds ratio= 1.51; 95% confidence interval = 1.08 to 2.10). Conclusion: In this retrospective study of admissions for acute PE in patients with comorbid cancer, saddle PE was associated with a higher odds of in-hospital mortality.

57 A Population Health Approach to Measuring the Impact of a State-wide Tele-Stroke Program

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Background: Receipt of tPA and endovascular therapy (EVT) remains elusive for many ischemic stroke patients living in rural areas. Telemedicine programs have improved access for many. However, the potential for a greater population health impact exists through provider-to-provider knowledge-transfer. The impact of this phenomenon may be difficult to measure on the population-level given the temporal and geographic variation in reimbursement claims use and coding regulations, along with the tendency for tele-program evaluation to occur on a small scale. The purpose of this study was to measure the population-level impact of the South Carolina (SC) Telestroke (TS) program by examining the differences in tPA administration and EVT rates among ischemic stroke patients living in counties with and without tele-stroke programs from 2013-2016. Methods: Hospital billing data on all patient level hospitalizations for acute ischemic stroke (AIS) in SC from 2013-2016 were used to conduct a retrospective observational cross-sectional analysis on a cohort of AIS patients; identified using ICD and DRG codes. Primary outcomes included receipt of tPA or EVT during stroke hospitalization. Additional

outcomes examined discharge destination and in-hospital mortality. Results: Between 2013-2016 a total of 39,364 South Carolinians were hospitalized for AIS; 6.28% (N=2,472) recieved tPA and 1.1% (N=434) received EVT. Patients receiving EVT were more likely to live in counties with TS (1.20% of AIS patients in TS versus 0.92% of AIS patients without TS, p-value=0.01). Patients living in TS counties had a 24% higher risk of receiving tPA (RR 1.24, 95% CI 1.14-1.35, p<0.0001) and 26% higher risk of receiving EVT (RR=1.26, 95% CI 1.02-1.55, p=0.03) than patients living in counties without TS. Conclusions: In order to measure the impact of knowledge-transfer, patient outcomes must be examined on the population-level. Future research examining the geographic-based impact of provider exposure to TS programs should be examined further.

58 Motor Outcome After Early Surgery for Infants Less than 12 months of age with Congenital Heart Defects: A Systematic Review

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Background: Congenital heart defects (CHD) are the most common congenital malformations in newborn infants. Advances in surgical technology and neonatal care have led to significantly reduced mortality rates, but morbidities, particularly neurodevelopmental delays, remain significant problems. Early assessment and early referral to therapy might mitigate these developmental deficits, but current medical practices for infants with CHD do not encourage early handling pre-and post-surgery. As a consequence, CHD infants are not likely to receive therapeutic interventions in the 1 year of life. Furthermore, there are no systematic reviews that have aggregated data on early development in infants with CHD who have undergone surgery less than 6 months of age. Since recent studies indicate that developmental testing may be feasible and safe in these fragile infants, we performed a systematic review of the literature to determine what was known about early motor outcomes in post-surgical CHD infants less than 12 months of age. Methods: This systematic review followed PRISMA guidelines for peer-reviewed articles published between 2008- 2018 using PubMed and Scopus databases. We included studies that used standardized motor assessment of infants with single or 2-ventricle physiology, who underwent surgical repair or palliation up to 6 months. Qualities of the studies were assisted using Newcastle-Ottawa Quality Scale. Results: We identified and evaluated 58 articles for possible inclusion. We performed full text reviews on 33 articles and 16 were included in this review. Fifteen of the 16 studies reported that early motor scores of infants with CHD are 1-2 standard deviations lower than the expected mean in healthy infants. Infants with single-ventricle anatomy scored consistently lower in motor tests compared with CHD infants with 2-ventricle physiology. Conclusions: Infants with CHD are at significant risk for early motor delays that might be identified using systematic screening and assessment protocols prior to hospital discharge.

59 The Art of Compassionate Patient Care: A Collaboration between the Medical University of South Carolina and the Gibbes Museum of Art

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Introduction: Healthcare providers convey attentiveness and respect to patients through thoughtful observation and communication. This mindful approach fosters trusting therapeutic relationships that improve health outcomes. Although graduate education in health professions must focus on the cognitive and psychomotor domains of Bloom's Taxonomy, affective domain qualities (i.e. values, attitudes, and communication skills) should also be emphasized. In collaboration with the Gibbes Museum of Art, faculty at the Medical University of South Carolina (MUSC) have developed a course that aims to help graduate students become more compassionate healthcare providers. Methods: In spring of 2018, MUSC offered an interprofessional course called 'Eye Spy for MUSC Graduate Education: A Collaboration with Gibbes Museum of Art' for the first time. The second iteration of this course is currently in progress. Participants include students of occupational therapy, physical therapy, cardiovascular perfusion, medicine, nursing, dentistry, and graduate studies. Students collaborate to create narrative and visual art through writing, movement, and drawing. They also explore specially selected works of art at the Gibbes Museum and on the MUSC campus. Museum educators, MUSC faculty members, patients, and clinicians engage with students to discuss how individual factors influence health-related experiences. These processes are designed to build students' capacity for observation, self-reflection, communication, and perspective-taking. Outcome measures examine these affective qualities, interprofessional learning, and students' responses to the integration of humanities in healthcare education. Results: In this ongoing project, preliminary findings support students' self-reports of enhanced ability to observe, communicate, and create. Students have also reported a greater appreciation of team-based healthcare that fosters strong interprofessional collaboration and compassionate patient- and family-centered care. Conclusions: The processes of creating and appreciating art can transcend social and cultural boundaries. This course extends these powerful processes to future healthcare providers, thereby strengthening their capacity to provide compassionate patient care and promote healthy patient outcomes. This work was supported by Medical University of South Carolina SCTR Grant Team Science

60 Novel Pain Relievers: A Sham-Controlled Neuroimaging Study Evaluating the Relative Efficacy of Medial Versus Dorsolateral Theta Burst Stimulation

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Neuroimaging research over the last 10 years has demonstrated that there are at least 3 neural networks responsible for modulating pain perception - motor network, executive control network, and limbic/salience network. While the field of brain stimulation has extensively evaluated the motor cortex as a target for modulating pain, less is known about the relative efficacy of targeting the executive control or salience circuits. The primary goal of this experiment was to determine which of two stimulation strategies was more effective at reducing responses to acute pain: 1) amplifying the executive control system or 2) attenuating the limbic/salience system. 39 healthy individuals were randomized to receive a single session of: 1) intermittent theta burst stimulation (iTBS) to the dorsolateral prefrontal cortex (DLPFC; F3), 2) continuous TBS (cTBS) to the left medial prefrontal cortex (MPFC; FP1), or 3) active sham to the DLPFC or MPFC (110% RMT, 600 pulses). Behavioral and brain responses to thermal pain were measured immediately before and after stimulation using functional MRI and Quantitative Sensory Testing (QST). There was no effect of sham TBS or DLPFC iTBS on behavioral or brain responses to pain. MPFC cTBS, however, led to a significant reduction in self-reported pain intensity and unpleasantness ($p<0.05$) and increased QST pain thresholds

(p<0.05). Decreases in self-reported pain were associated with elevated activity in the anterior cingulate and premotor cortex (pFWE<0.05). These data suggest that MPFC cTBS may be an innovative target for attenuating pain. The correlation between pain relief and elevated activity in motor areas suggests that the neural mechanism through which MPFC cTBS attenuated pain may be similar to the mechanism of direct high frequency stimulation of the motor system. These findings lay the groundwork for the development of clinically effective pain treatments for chronic pain patients. This work was supported by F31 DA043330, T32 DA007288, DA036617, P50 DA015369, P50 AA010761, UL1TR001450

61 Brain Volume Abnormalities and Blunted Reactivity to Reward Associated with Externalizing Behaviors among School-age Children

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Introduction: Externalizing behaviors include a wide array of problem behaviors directed toward the external environment (e.g., fighting, defiance toward authority figures, destruction of property). Research examining neural correlates of externalizing behaviors among children has typically focused on symptoms of individual diagnoses, such as attention-deficit/hyperactivity disorder and conduct disorder; however, high rates of comorbidity and shared genetic risk factors among externalizing disorders suggest a shared etiology. The purpose of the present study was to identify structural and functional brain abnormalities common to the broad spectrum of externalizing behaviors among youth. Methods: Participants were 3,222 children (average age=10.0 years) from a demographically-representative nationwide community sample as part of the Adolescent Brain Cognitive Development Study. Youth completed structural magnetic resonance imaging (MRI) and functional MRI during a monetary incentive delay (MID) task. Parents reported on their child's externalizing behaviors via the Child Behavior Checklist. Results: Greater externalizing problems were associated with thinner cortices in bilateral paracentral lobules and lower subcortical volume in bilateral putamen and the left ventral diencephalon (R-squared = .0015-.0045, ps < .05). During the MID task, greater externalizing problems were associated with less discrimination between large and small rewards in the bilateral putamen and bilateral ventral diencephalon (R-squared = .0015-.0019, ps < .05). All findings remained significant after controlling for participant age and sex. Measures of structural volume and functional activation during the MID task were not correlated. Discussion: Although effect sizes were small, externalizing behaviors in children were significantly associated with individual differences in the structure and function of brain regions recruited by reward processing and incentive anticipation. Brain volume and activation during the MID task were not correlated, suggesting these neural indices may represent relatively independent risk markers for externalizing behaviors. This work was supported by U01 DA041093

62 Inventing and optimizing a portable neuromodulatory device for quickly measuring consciousness

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Background: Transcranial magnetic stimulation (TMS) combined with electroencephalography (EEG) is used to measure brain responses to a direct perturbation of a chosen cortical region. Researchers have proposed using EEG responses to TMS (TMS Evoked Potential; TEP) to derive a quantitative measure of the level of consciousness in physiological and pathological conditions. This measure is called the Perturbational Complexity Index (PCI). To date, most work has required bulky commercially-available TMS devices, MRI-guided neuronavigation, real-time electric field modeling, and accurate data preprocessing performed by a trained TMS-EEG analyst. We have as a goal developing an easy to use, turnkey, portable TMS-EEG system for recording TEPs and calculating PCI. Methods: 1) Design and build the portable TMS device. 2) Use this device to record TEPs using a 64-channel EEG system (BrainVision). 3) Calculate PCI. Results: We have assembled three TMS devices and have tested them out to 10,000 pulses at maximum machine output to ensure they maintain identical waveforms and power outputs. These machines run off regular AC wall current and fit into a 6.29Ã—10-2m3 space (61cmÃ—51cmÃ—20cm). We were able to record genuine TMS-EEG responses in awake healthy participants. TEP waveforms depend on the specific stimulation site, last up to 300 milliseconds, and are characterized by PCI values ranging from 0.39 to 0.57, confirming previous results in awake participants. Conclusions: A small dedicated TMS-EEG system for rapidly acquiring TEPs appears feasible. Further development and testing will focus on the repeatability of PCI values. Specifically, we will identify and standardize factors that affect TEPs and PCI values (such as TMS coil location, orientation, size, and intensity). Additional work involves refining and streamlining the EEG data analysis, moving toward a more automated system. This work was supported by The Tiny Blue Dot Foundation

63 Population attributable ratio for assessing dominant modifiable risk factors of stroke using case-control data

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Background: Globally, Sub-Saharan Africa experiences the highest incidence, prevalence, and fatality from stroke. However, less is known about specific risk factors and their role. We used population attributable risk (PAR), to identify and characterize the effect of leading modifiable risk factors for stroke in Sub-Saharan Africa. Methods: The Stroke Investigative Research and Education Network (SIREN) study is a multicenter, case-control study at 15 sites in Nigeria and Ghana (n=3800 pairs) undertaken between Aug 28, 2014 and June 15, 2017. Cases include adults (aged≥ 18 years) with stroke confirmed by CT or MRI while controls involve stroke-free adults (aged≥ 18 years) recruited from the communities in catchment areas of cases. Case-control matching using age and gender was applied. Standard instruments were used to perform comprehensive assessment for vascular, lifestyle, and psychosocial factors. We used conditional logistic regression to estimate PAR with 95% CIs to identify dominant risk factors. The 95% CI for PAR were estimated using composite and covariate specific approaches. Results: Our subsample data consist of 2118 case-control pairs (1192 [56%] men) with mean ages of 59.0 years (SD 13.8) for cases and 57.8 years (13.7) for controls, 1430 (68%) had ischemic stroke, 682 (32%) had hemorrhagic stroke, and six (<1%) had discrete ischemic and hemorrhagic lesions. The adjusted PAR associated with 11 potentially modifiable risk factors was 98.2% (95% CI 97.2-99.0). The PARs for top three risk factors were 90.8% (95% CI 87.9-93.7) for hypertension, 35.8% (25.3-46.2) for dyslipidemia, 31.1% (13.3-48.9) for regular meat consumption, and 26.5% (12.9-40.2) for elevated waist-to-hip ratio. Conclusion: Our study shows that PAR is a useful tool to identify dominant risk factors not only in cohort studies but also in case-control studies. Our future goal is to develop more appropriate estimates of PAR and its 95% CI for case-control studies.

64 A 'Duel' of Complements

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Purpose: Neovascular age-related macular degeneration (NVAMD) is the leading cause of blindness in the United States. Genetic alterations in complement proteins such as factor H, an alternative pathway (AP) regulator, and an overactive complement have been linked to an increase in AMD pathogenesis risk. It has been shown that anaphylatoxins C3a and C5a play an influential role in signaling, to stimulate choroidal neovascularization (CNV) through yet unknown mechanisms; but it has been hypothesized that anaphylatoxins also play a critical role in tissue repair. This investigation is focused on the potential role of C3a-receptor (C3aR) and C5a-receptor (C5aR) inhibition in CNV regression (days 6-23). Methods: In this study C57BL/6J mice were subjected to laser-induced intraocular lesions to create a murine model for AMD. Induced lesions were then measured via optical coherence tomography (OCT) and ImageJ image analysis. Anaphylatoxin levels were analyzed by ELISA. C3aR and C5aR activation were inhibited by IP injections of Triflouroacetic acid (TFA) or a C5a blocking antibody (CLS026), respectively. Effects were compared to animals treated with the AP inhibitor CR2-fH or C3aR -/- and C5aR -/- knockout mice. Results: Animals treated with AP inhibitor (CR2-FH) exhibited rapid CNV lesion regression; whereas mice treated with TFA or CLS026 exhibited slower lesion repair. C3aRC5aR-/- knockout mice were similarly insufficient at CNV regression. Finally, CNV increased C3a and C5a levels in RPE/choroid, levels which were normalized by CR2-fH. Conclusion: Results in this investigation are typical of the damaging role that complement activation plays by promoting CNV pathology, and the protective role that anaphylatoxins, generated by the lectin and classical pathway, possess in the CNV regression or reconstruction stage. The roles that complement plays in both injury and repair will be vital in determining the right balance of anaphylatoxins during tissue damage and considered when deciding the right inhibitory method.

65 High-fat diet-induced hyperinsulinemia reduces brain insulin levels and impairs tactile recognition

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High-fat diet (HFD), the most commonly used experimental model of metabolic disorders, negatively impacts cognitive function. Our previous studies demonstrated that HFD leads to hyperinsulinemia and impaired hippocampal insulin signaling. Given that insulin is involved in memory and synaptic plasticity, it is imperative to understand the impact of HFD-induced hyperinsulinemia on brain insulin levels. Hence, the purpose of the following studies are to determine HFD-induced alterations in brain insulin signaling and levels and the subsequent synaptic and behavioral deficits. In the current study, B6 mice were placed on either a standard diet (STD) or a HFD. Hippocampal insulin signaling was evaluated following in vivo insulin stimulation studies using hyperinsulinemic-euglycemic clamps after 6 weeks of diet treatment. To determine whether impaired insulin signaling was due to brain insulin deficiency, brain insulin levels were measured in the cerebrospinal fluid and hippocampal tissue lysate after 6 and 24 weeks of diet. Furthermore, changes in synaptic plasticity and subsequent behavior were evaluated in STD and HFD mice after 6 and 24 weeks of diet. HFD mice have reduced levels of insulin in the hippocampus and in the cerebrospinal fluid and downstream insulin signaling. This correlates with changes in synaptic genes involved in phosphorylation and glutamatergic neurotransmission. In addition, the HFD mice exhibit deficits in novel tactile recognition. Our data demonstrate that chronic hyperinsulinemia, induced by a HFD, leads to impaired insulin signaling and a deficiency of insulin in the brain. This deficiency of insulin correlates with changes in synaptic plasticity that is conducive to facilitating excitotoxicity. Furthermore, given that mice heavily rely on the whiskers for spatial recognition and exploration, we demonstrate that a HFD impairs tactile recognition. Future studies will evaluate the mechanisms involved in brain insulin transport that contribute to HFD-induced brain insulin deficiency. This work was supported by National Institute of Health (NINDS 1R01NS099595-01A1; NINDS 5K01NS079461, to C. S-R.) and the Alzheimer's Association (AARGD-16-440893).

66 Effect of Theta-Burst Stimulation Dose on Motor Cortex Excitability: a parametric evaluation of 600, 1200, 1800 pulses per session

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Introduction Theta-burst stimulation (TBS) is a relatively efficient form of repetitive transcranial magnetic stimulation (rTMS). Previous studies have demonstrated that 600 pulses of continuous or intermittent TBS can respectively decrease or increase cortical excitability for approximately the same amplitude and duration of 2000 pulses of fixed frequency rTMS. While 600 pulses has now been adopted as the standard TBS treatment dose, it is possible that the effects could be amplified by increasing the number of pulses per session (e.g. 1200, 1800). Objective The primary hypothesis of this study was that there would be an orderly relationship between increasing the pulses per session and increasing the amplitude or duration of the effects of TBS on motor cortex excitability. Methods Using a within-subjects, sham-controlled, randomized-order design, motor cortex excitability was measured before and in 6, 10 minute increments after a cohort of 30 right-handed healthy individuals received a 600, 1200, or 1800 pulses of continuous TBS (80% active motor threshold). This experiment was repeated with intermittent TBS in a new cohort. Results There was no orderly relationship between number of pulses per session and either the amplitude or the duration of change in cortical excitability following cTBS. Specifically, all real cTBS doses were associated with an initial increase in cortical excitability which was not present in the sham condition. Post hoc analysis further demonstrated that there was no effect of pulse number on MEP variability. Conclusion These data suggest that there is no apparent benefit to increasing the number of pulses per session with TBS. Furthermore, the data demonstrate that in a typical, community based sample of individuals (not screened for BDNF genotype, nor filtered based on baseline MEP variability), TBS may not produce canonically 'excitatory' or 'inhibitory' effects of iTBS and cTBS on motor cortex excitability. This work was supported by the National Institutes of Health (T32 TL1TR001451, T32 AA007474) and the American Heart Association (17PRE33660857).

67 Risk of substance abuse onset in adults diagnosed with epilepsy or migraine.

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Introduction: The study investigated whether adults diagnosed with epilepsy or migraine (a neurological disorder with common features to epilepsy) are at increased risk for developing substance abuse disorders following diagnosis compared to (presumably healthy) adults with lower extremity fracture (LEF). Methods: A retrospective cohort analysis was conducted using a subset of surveillance data of hospital admissions, emergency department visits and outpatient visits in South Carolina, USA from January 1, 2000 through December 31, 2011.

Individuals aged 18 years or older were identified using the International Classification of Disease, 9th Revision Clinical modification (ICD-9) with a diagnosis of epilepsy (case-cohort 1; n = 78,547; 52.7% female, mean age [SD] 51.3 years [19.2]), migraine (case-cohort 2; n = 121, 155; 81.5% female, mean age [SD] 40.0 years [14.5]), or LEF (control cohort; n = 73,911; 55.4% female, mean age [SD] 48.7 years [18.7]). Individuals with substance abuse or dependence treatment onset following epilepsy, migraine, or LEF were identified with ICD-9 codes. Cox Proportional Hazard Regression analyses modelled the time of substance abuse diagnosis comparing epilepsy to LEF and comparing migraine to LEF. Results: Adjusting for insurance payer, age and sex, adults diagnosed with epilepsy have a diagnosis of substance abuse disorders at 2.5 times the rate of those with LEF [HR 2.54 (2.43, 2.67)] and adults diagnosed with migraine have a diagnosis of substance abuse disorders at 1.10 times the rate of those with LEF [HR 1.10 (1.04, 1.16)]. An interaction between exposure and insurance payer was found with hazard ratios comparing epilepsy to LEF of 4.56, 3.60, and 1.94 within the commercial payer, uninsured and Medicaid strata, respectively. Conclusions: Compared to adults with LEF, adults with epilepsy had a significantly higher hazard of subsequent substance abuse, while adults with migraine showed a significant, though small, increased hazard of subsequent substance abuse. This work was supported by TL1 grant (TL1TR001451)

68 Calpain Inhibitor Prevents Noise-induced Hair Cell Loss through Upregulation of p-Akt Signaling

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Abstract Withheld from Publication

69 Characterization of Extracellular Matrix Dysregulation and PTM patterns in Congenital Aortic Valve Stenosis using MALDI Imaging Mass Spectrometry

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Congenital heart defects are a common type of birth defect, effecting 1 in every 150 people; congenital aortic valve stenosis (CAVS) accounts for 10% of these cases. CAVS progresses as an obstructive narrowing of the aortic opening due to dysregulated extracellular matrix (ECM) production in the aortic valve (AV) leaflet, resulting in heart failure. Despite the clinical significance of this disease, surgical AV replacement and repair are still the only available treatment. One therapeutic avenue in need of further scientific exploration is the targeting of collagen type proteins. Collagens are the fundamental scaffolding of valvular structure that influences valvular function and thus cardiac function. It has been well documented that stratification of collagens and other ECM proteins seen in healthy AVs becomes disorganized in CAVS. However, the translational regulation of these critical proteins in disease remains mostly unknown. To explore this, we are delineating collagen regulation in a cohort of pediatric CAVS samples through interdisciplinary approaches. Microscopic pathological evaluation via picrosirius red staining is being used to visualize collagen fiber thickening and orientation due to CAVS. Protein sequences and post-translational modifications (PTMs) are being detailed by matrix-assisted laser desorption/ionization imaging mass spectrometry (MALDI-IMS). MALDI IMS is an imaging technique that reports spatial localization and relative quantitation of collagen protein sequences, including PTMs, in thin tissue sections. Finally, we are using high resolution accurate mass LC-MS/MS to quantify collagen type peptides and novel PTMs, including hydroxylated collagens. A proof of concept is shown as preliminary data. These data are being compared to already collected RNA-Seq data from the same patients to evaluate transcriptional, translational, and post-translational regulation. Overall, this study will determine collagen regulators in AV and establish a foundation for PTM studies in AV disease and development. This study is expected to drive new therapies that inhibit CAVS progression. This work was supported by HL007260 (NHLBI) 16GRNT31380005 (American Heart Association) P20 GM103542 (NIH/NIGMS)

70 Developing a Rodent Model of Empathy

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Prosocial behaviors, such as social interaction and empathy, are imperative for an adaptive social structure by allowing for personal understanding of the perceived valence of others. Further, these behaviors may play a role in the underlying pathology of some cognitive disorders, such substance use disorder. There is evidence to suggest many animal species will behave prosocially in the hopes of receiving social reward, but only recently has it been intimated that animals other than humans and nonhuman primates are capable of behaving empathically. Empathy can be broadly defined as the capacity to experience the emotional valence of another. This emotional experience in turn generates a response more appropriate to another's emotional situation than one's own, independent of personal gain. The neurological underpinnings of empathy are poorly understood because there is a paucity of animal models designed to study it. Some research has demonstrated that a rat will perform a task, such as a lever press or door opening, to reduce the distress of a conspecific. Additionally, it has been shown animals that previously experienced the distressing event will learn and perform the operational task faster than if they had not. These data suggest an understanding of the valence of a conspecific, as well as a motivation to reduce the animal's perceived distress. Our lab has adapted a model of helping behavior, as well as implemented improvements on the task to eliminate social reward as a confound. We have found that, even in the absence of social reward, rats will reduce the distress of a conspecific and will perform the task significantly faster if they had previously experienced the distress. We believe this innovative behavioral task better models empathic responding in rodents compared to existing paradigms, and we hope to utilize it to further elucidate the underlying neural circuitry of empathy. This work was supported by NIH T32 GM08716 awarded SCOR Pilot project DA016511 NIDA T32 DA007288

71 Cilia Independent and Dependent Roles of PDGFRa in Mitral Valve Development and Disease

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Mitral valve prolapse (MVP) is a common condition that affects ~2-3% of the human population and is characterized by abnormal billowing and myxomatous degeneration of the valve leaflets. Our previous genetic and functional analyses have implicated mitral valve prolapse as a congenital disease of the primary cilia, yet the underlying molecular processes remain undetermined. Here we present new data that illustrates ciliary localized PDGFRa in-vivo and highlights the cell-type specific roles of PDGFRa during mitral valve development. We elucidate these roles with a conditional knockout mouse model where PDGFRa is ablated in distinct valve regions using Nfatc1 and Nfatc1

enhancer Cres. In both models, knockout (KO) mitral leaflets are enlarged at postnatal day zero as analyzed by 3D reconstructions of hematoxylin and eosin stains. Although KO leaflets are composed of more cells, immunohistochemical and western blot analyses revealed greater expression of endothelial to mesenchymal transition markers (-sma, vimentin) with no effect on proliferation or apoptosis. Additionally, endothelial cell-cell adhesion (PECAM) is disrupted in KO leaflets, which further implicates PDGFRa as an inhibitor of EndoMT during development. This work was supported by NIH NHLBI, Leducq Mitral Network, AHA

72 Using novel genetic tools to elucidate the role of NPAS4 in drug addiction

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Substance use disorder is a chronic, relapsing behavioral disorder that is characterized by compulsive drug seeking and use despite negative consequences to the individual. During the course of drug use, there are persistent neuroadaptations that occur in the nucleus accumbens (NAc), a brain region associated with reward and motivation. This region is highly involved in drug reward sensitivity and learning, where dysregulation contributes to multiple phases of addiction. In abstinent addicts, relapse can be triggered by environmental cues associated with previous drug use, but the molecular and cellular mechanisms underlying relapse triggers are not well understood. It is believed that drug use activates specific populations of neurons that are responsible for coding the association between reinforced behavior and drug-associated stimuli. We have previously shown that the epigenetic enzyme, histone deacetylase 5 (HDAC5), is critical for drug-related learning and memory. I hypothesize that a neuronal activity-dependent transcription factor and downstream target of HDAC5, neuronal PAS Domain Protein 4 (NPAS4), is involved in the formation of cocaine reward-context memories through its function in a specific subpopulation of neurons in the NAc. NPAS4 has been shown to shape neuronal function in response to activity, and it is strongly induced by exposure to novel or drug contexts. Using the combination of Cre transgenic lines with cutting-edge viral vector constructs, I aim to 1) elucidate the cell type-specific role of NPAS4 in drug reward-context learning and memory and 2) determine the role of NPAS4-inducing NAc neurons in the learned association between external cues and cocaine reward experiences. Together, these studies will provide fundamental knowledge about the role and regulation of NPAS4 during drug reward experiences, which could ultimately lead to a better understanding of its molecular contribution to relapse vulnerability and could help to identify a critical molecular pathway for therapeutic intervention in addictive behaviors. This work was supported by GAANN Teaching Fellowship (BWH) NIDA T32 DA07288 (BWH) NIH DA027664 and DA032708 (CWC)

73 Evaluation of the Association between Serum 25-hydroxy-vitamin D (25(OH)D) and Inflammatory Cytokines in Pregnant Women

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Background: Cytokine imbalances are common in pregnant women, but the mechanisms that orchestrate these imbalances are unknown and need to be investigated. The Kellogg study was a double blind randomized clinical trial conducted at MUSC to investigate the impact of plasma 25-hydroxy-vitamin D (25(OH)D) concentrations on immune balance in pregnant women. We hypothesize that plasma concentrations of anti-inflammatory cytokines in pregnant women will be associated with 25(OH)D concentration. Data and Methods: Pregnant women enrolled in the Kellogg trial in their first trimester (10-14 weeks' gestation) were randomized to receive 400 or 4400 IU vitamin D3/day and health, safety, and laboratory data were collected on 217 women at first, second, and third trimester visits. Laboratory measures included total circulating 25-hydroxy-vitamin D (25(OH)D) and 9 plasma cytokine concentrations. Associations between baseline serum cytokine concentrations with baseline 25(OH)D concentration as well as associations between cytokine concentrations over time with 25(OH)D controlling for patient characteristics were examined using a series of linear mixed models. Results: Baseline concentrations of TGFβ were found to significantly increase with increasing baseline serum 25(OH)D controlling for other factors ($p < 0.05$). Higher baseline 25(OH)D was associated with higher concentrations of IFNγ and IL2 over time after adjusting for other covariates. However, neither baseline 25(OH)D nor concentration over time were significantly associated with other cytokines after controlling for baseline cytokine concentrations and other covariates. Conclusion: Both treatment groups exhibited significant increases in 25(OH)D over time, greatest in the 4400 IU group. While women with higher baseline 25(OH)D concentrations did have some evidence of higher anti-inflammatory cytokine concentrations, supplementation with vitamin D did not impact cytokine concentrations during pregnancy after accounting for baseline concentration levels. These results suggest that early vitamin D status rather than supplementation during pregnancy impacts cytokine response. This work was supported by W. K. Kellogg Foundation Grant P3020828

74 Age-Related Alterations in Resident Macrophage Activity in the Cochlear Lateral Wall

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Background: Metabolic presbyacusis, one of the most prevalent forms of age-related hearing loss, is characterized by degeneration of cells in the cochlear lateral wall, leading to auditory function declines. Resident macrophages in the cochlear lateral wall are highly responsive to noise-induced injury and show morphological alterations with age. However, it is unclear how these age- and injury-related changes may contribute to degeneration of the cells in the cochlear lateral wall. In this work, transcriptomic and morphological analytical approaches were applied to assess macrophage- and inflammation-related alterations of the cochlear lateral wall in aged mice and in human temporal bones from older donors. Methods: Young adult and aged CBA/CaJ and CX3CR1GFP mice were used. Auditory function was assessed through recording of auditory brainstem response. Transcriptomic differences in cochlear lateral wall between young adult and aged mice were detected by RNA sequencing. Ultrastructural and morphological analysis of macrophages was performed by electron microscopy and quantitative immunohistochemistry. Macrophage functional status was assessed by immunofluorescence microscopy in mouse cochlear lateral wall tissue and in human temporal bones. Results: Transcriptomic analysis found that the inflammatory response was significantly enhanced in the aged mouse lateral wall. Upregulation was detected for genes associated with macrophage identity (Emr1, Itgam, and Cx3cr1) and activation (Aif1, CD68, Irf5, and Fcer1g). Morphometric analysis detected significant region-dependent changes in macrophage size and volume. Similar to mice, human temporal bones from older donors were found to have numerous macrophages (Iba1-positive cells) with rounded morphologies, consistent with a state of activation. Conclusions: Our data suggests that age-related enhancement of the innate inflammatory response is a major pathological component of cochlear lateral wall degeneration. Assessment of macrophage phenotype (pro- or anti-inflammatory status) will clarify how dysregulation of these immune cells contributes to presbyacusis. This work was

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75 Autistic-like behaviors and increased microglial activation in a mouse model of MEF2C Haploinsufficiency Syndrome

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Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by social/communication deficits and repetitive, restricted behaviors. MEF2C Haploinsufficiency Syndrome (MHS) is a syndromic form of autism. In addition to exhibiting the core symptoms of ASD, children affected by MHS also have epilepsy, hypotonia, and intellectual disability. The MEF2C protein functions as a transcription factor to regulate the expression of many genes, including other known autism risk genes. MHS is caused by mutations or deletions in one copy of the MEF2C gene. However, the underlying neurological changes associated with MHS are poorly understood. We generated a mouse model of MHS by genetically removing one allele of the Mef2c gene in every cell of the mouse (Mef2c hets). Mef2c hets exhibit behavioral phenotypes relevant to MHS, including social interaction and communication deficits, hyperactivity, and high pain tolerance. These Mef2c het mice display altered cortical glutamatergic synaptic transmission onto cortical layer 2/3 pyramidal neurons, without detectable changes in dendritic spine density. Microglia, the resident immune cells of the brain, play important roles during synapse formation and remodeling, and increased inflammation has been documented in humans with autism both inside and outside of the brain. We find that Mef2c het mice have increased microglial activation (increased Iba-1 fluorescence intensity) in the hippocampus and cortex. The increased microglial activation could be linked to a neuroinflammatory mechanism that causes symptoms of MHS. Future studies will work to determine the effect that microglia have on MHS-relevant behaviors and whether an anti-inflammatory therapeutic approach in Mef2c het mice could reduce the severity of MHS symptoms.

76 Preliminary characterization of the protein kinase C subtypes in mediation of sFlt1 release in human placental trophoblasts

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Preeclampsia is a leading complication of pregnancy: it affects 3-5% of pregnancies in general, but is 4-fold more prevalent in women with diabetes than those without. Currently there is no effective therapy, and better understanding of disease mechanism(s) is urgently needed. Recent studies have established that the angiogenic factor soluble fms-like tyrosine kinase-1 (sFlt1) plays an essential role in the pathogenesis of preeclampsia. It is also well known that diabetic vascular complications are associated with the activation of protein kinase C (PKC), which has been shown to modulate sFlt1 expression in non-placental cells. We hypothesized that the PKC pathway is also involved in sFlt1 regulation in placental trophoblasts, thereby playing a role in preeclampsia development, especially in pregnant women with diabetes. Cultured human HTR8/SVneo trophoblasts were treated with the PKC activator phorbol 12-myristate 13-acetate (PMA) for 24 hours, with or without pre-treatment of the general or subtype-specific PKC inhibitors. The mRNA expression of sFlt1 (both i13 and e15a transcripts) and protein secretion were measured by RT-PCR and ELISA, respectively. PMA (0-50 nM) elicited robust upregulation and release of sFlt1 in trophoblasts in a dose-dependent manner, which were abrogated by the general PKC inhibitor GF109203X (5 μM). The effect was also significantly inhibited by the PKCβ2-specific inhibitor LY333531 (6 μM), but not by PKCα±-specific inhibitor Ro 31-8220 (50 nM) or PKCδ-specific inhibitor rottlerin (3 μM). Our results suggest that PKCβ2 is likely to be involved in the upregulation of sFlt1 expression in trophoblasts, thus mediating the high risk of preeclampsia in women with diabetes.

77 Dynorphin-containing neurons in the Central Amygdala-BNST circuit contribute to binge ethanol drinking in mice.

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Binge drinking is the most common pattern of excessive alcohol (ethanol) consumption and is a precursor to the development of Alcohol Use Disorder (AUD). Recently, we have demonstrated involvement of the dynorphin/kappa opioid receptor (DYN/KOR) system in regulating excessive ethanol consumption in a rodent model of binge drinking. However, the discrete brain regions and circuitry that mediate the influence of DYN/KOR activity on binge drinking have not been fully investigated. Since there is dense expression of DYN-containing (DYN+) neurons and KOR within the extended amygdala, this macrostructure is a prime target for mediating these effects. More specifically, the bed nucleus of the stria terminalis (BNST) is rich in KOR and activity in this region has been associated with excessive drinking. In the current studies, we found that microinjection of a KOR agonist (U50,488; 0.2μg/side) into the BNST of male C57BL/6J mice significantly increased binge ethanol consumption by 71% compared to vehicle ($p<0.05$). In contrast, intra-BNST microinjection of a KOR antagonist (norBNI; 2.5μg/side) significantly decreased ethanol intake by 78% ($p<0.05$). Finally, systemic administration of U50,488 (5mg/kg) increased ethanol intake by 80% ($p<0.05$) which was blocked by intra-BNST norBNI (75% reduction, $p<0.05$). While these data suggest that KOR within the BNST contribute to binge drinking, the endogenous source of DYN mediating this effect is unknown. The central amygdala (CeA) contains a high density of DYN+ neurons that project to the BNST (CeA-BNST-DYN+). This circuit was selectively targeted and silenced in male prodynorphin-IRES-Cre mice using a chemogenetic approach to determine its influence on binge drinking. Inhibition of the CeA-BNST-DYN+ circuit resulted in a 56% reduction in binge ethanol intake ($p<0.05$) compared to vehicle. Taken together, these data support the hypothesis that KOR contribute to excessive drinking and suggest that KOR antagonists may serve as a pharmacological intervention for binge drinking and AUD. This work was supported by 1F31AA027420-01, T32 AA007474-27, U01 AA014095, U01 AA020929, P50 AA010761, and VA Medical Research (BX000813)

78 Supervised dimension reduction using Bayesian Hierarchical Modeling: a simulation study and application to ambient air pollutants

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Introduction: Risk associated with air pollution has typically been evaluated at an individual pollutant level. Researchers understand that the presence of multiple pollutants may have interactive and grouped effects not currently captured in epidemiologic research. Utilizing health outcomes data, we have developed a novel mixture classification and modeling technique to characterize air pollution exposure in a more realistic context that accounts for the simultaneous and joint nature of the exposure. Methods: The model uses a method that informs the

grouping of mixtures based on the health outcome of interest within a Bayesian Hierarchical Modeling framework. We are interested in modeling the relative risk as a function of air pollutant mixtures thought to affect the disease outcome. In addition, we observe confounder variables at the locations of the health outcomes. We have conducted simulation studies with ground truth scenarios consisting of mixtures of pollutants X impacting an outcome Y. The pollutants X have prespecified groupings with deterministic impact on the outcome Y, so the model parameters have been evaluated for fidelity to the prescribed relationship. We have also evaluated our model's accuracy and impact using previously developed simulation data sets from National Institute of Environmental Health Sciences. Results/Impact: Our model has successfully identified groupings of variables and qualitative effects to this point. We will continue to evaluate the accuracy of the risk predictions within our simulation scenarios. This work was supported by TL1TR001451

79 Pathogenic role of SAT1 variants in monogenic lupus

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Background Genetic susceptibility of SLE in general is attributed to the overall risk of multiple common variants that each confers a small effect. However, in few cases, highly penetrant single gene variants have been reported as monogenic forms of SLE. To explore novel risk variants, we carried out whole-exome sequencing to identify underlying monogenic causes from two multiplex families that each family has two boys with childhood onset lupus nephritis. Methods We sequenced the whole exome of lupus patients and their parents using the Illumina's instrument Hiseq2000. We conducted variant calling and annotation using the Genome Analysis Toolkit GATK and ANNOVAR, respectively. Our findings of exome-seq was confirmed using the Sanger sequencing. Results Using bioinformatics, we focused only on potential loss-of-function variants. In addition, by using the recessive inheritance model and allele frequency < 1% in population as filter, we identified potentially pathogenic variants from the SAT1 gene on chromosome X but not in previously known SLE-associated genes. In each family, we identified an exonic variant in an X-linked gene SAT1. These two variants presumably lead to the loss-of-function of SAT1. Both variants are inherited in the X-linked recessive pattern and they are extremely rare in the population (absent in > 200,000 individuals). In one family, the SAT1 frameshift mutation was transmitted from the mother to the two sons affected with SLE but not to the unaffected son. Conclusions We identified SAT1 as a novel gene associated with monogenic lupus. SAT1 encodes the spermidine/spermine-N1-acetyltransferase (SSAT), a rate-limiting enzyme that regulates the catabolism of polyamine. We hypothesize that loss-of-function SAT1 variants may cause dysregulated polyamine homeostasis which confers risk of SLE.

80 Structural evaluation of resistance mechanism in N. gonorrhoeae against extended-spectrum cephalosporins

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Increasing antibiotic resistance of *Neisseria gonorrhoeae*, the causative agent of gonorrhea, against currently used extended spectrum cephalosporins (ESCs) has become a major threat to human health throughout the world and a better understanding of its resistance mechanism is needed to develop new counter measures against the resistant strains. A major mechanism of cephalosporin resistance in *N. gonorrhoeae* is mutations in the *penA* gene, which encodes penicillin-binding protein 2 (PBP2). In order to understand the molecular mechanism underpinning cephalosporin resistance, we have investigated PBP2 from the cephalosporin sensitive strain FA19 (wild type), the reduced susceptibility strain 35/02 ($Ceph^{I}$) and resistant strain H041 ($Ceph^{R}$). The rate of acylation decreases by >12,000 fold for cefixime in resistant strain H041. This decrease in acylation rate confers resistance against ESCs. We have solved the crystal structures of PBP2 from FA19, 35/02 and H041 strains. Along with these, structures of PBP2-FA19 in complex with cefixime and ceftriaxone have also been determined. Our structure showed the first PBP-acyl complex, where an intermediate stage has been trapped with complete acylation, but there was no elimination of the leaving group. Comparison of *apo* and complex structures of FA19 PBP2 suggests acylation proceeds through twisting and rolling of a β strand in the active site region. Mutations in 35/02 and H041 cause significant structural differences when compared to PBP2-FA19, which are mainly confined near to the active site region. The mutations appear to increase the rigidity of structure. One of these, a G545S mutation, appears to restrict the β3 twisting by stabilizing Thr498, thus impeding formation of the oxyanion hole. Other mutations may also restrict the conformational changes required during acylation. Overall, our data suggests that ligand binding in PBP2 from ESCs intermediate-susceptible and resistant strains is constrained and formation of a productive acyl-enzyme intermediate with cephalosporins is This work was supported by NIH

81 Palmitic acid diet-induced steatohepatitis model in adult zebrafish

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Abstract Withheld from Publication

82 Autologous Regulatory T Cell Transplantation Enhances Bone Repair in a Mouse Model of Osteogenesis Imperfecta

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Abstract Withheld from Publication

83 Management of acute pancreatitis in pediatric patients: Five year experience following NASPGHAN guidelines

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Introduction: Acute pancreatitis is an emerging problem in pediatrics with an incidence of 2-13 per 100,000 children. Nearly 25% of children with acute pancreatitis develop severe disease. The objective of our study is to assess the quality of management of pediatric patients with acute pancreatitis. Methods: The electronic medical records of patients admitted with a diagnosis of acute pancreatitis using the international classification of disease 9 and 10 codes from February 1, 2013 to February 28, 2018 were reviewed. Demographic data, clinical signs of organ failure, imaging studies, fluid management, pain control and length of stay was recorded for analysis. Results: A total of 63 children from single institute were included for analysis with mean age of 13 years (range 1.6-21), 43 (68%) children were white and 36

(57%) were females. Fifty-seven (90%) children underwent imaging, of which (60%) were computerized tomography scan of the abdomen. More than half (54%) of imaging studies suggested pancreatitis with the most common finding being pancreatic edema (90%). Only 6 (18%) of the imaging studies showed pancreatic fluid collection. Eleven (17%) children developed tachycardia, 5 (8%) had persistent tachycardia that did not respond to fluid boluses and 6 (10%) did not receive fluid resuscitation during first 48 hours of presentation. Twenty-seven (44%) children received a total fluid intake < 1.5 times maintenance and 31 (51%) children between 1.5 to 2.0 maintenance. Only 8 (13%) children were placed on nil per os for more than 24 hours. Average length of stay was 5.5 days (range 1-51). Conclusion: This study suggests possible overuse of high-cost imaging and inadequate fluid intake during hospital admission. There is a promising trend away from diet restriction for treatment of acute pancreatitis in our study group. More information regarding other institutional practices is warranted to improve the care of pediatric patients

84 Subcortical Envelope Representations But Not Age Predict Speech-In-Noise Recognition

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Understanding speech in a crowded environment requires precise neural encoding of the timing information of sound, and this can decline as we age. Such temporal representations depend on synchronous neural firing, and individual variation in neural synchrony is thought to underlie individual differences in speech-in-noise perception. Envelope processing is a type of auditory temporal processing and is assessed by measuring physiological responses to the modulation frequency of amplitude modulated (AM) sounds. Listeners with better envelope processing have more robust subcortical representations of the sound envelope and stronger neural synchrony. We hypothesize that the strength and synchrony of subcortical envelope coding predicts listeners' speech-in-noise perception. Envelope following responses (EFRs) were measured in response to AM tones with modulation frequencies of 80 Hz. Modulation depths were 100%, 68%, and 39%. Participants were 22 younger (age 18-30) and 35 older (age 56-90+) normal-hearing adults. EFRs were analyzed in three ways. Autocorrelation coefficients quantified temporal regularity in the time domain, spectral power measured response strength at the modulation frequency, and phase-locking value (PLV) calculated phase consistency across trials and reflects neural synchrony. QuickSIN speech tests assessed speech-in-noise perception. Regression analyses evaluated whether EFR metrics predicted speech-in-noise performance at low signal-to-noise ratios (SNR). All EFR metrics decreased with decreasing modulation depth and QuickSIN scores decreased with decreasing SNR. Consistent with previous studies, there were no age group differences. EFR PLV at all modulation depths predicted QuickSIN scores at 0 dB SNR. Autocorrelation coefficients and spectral power at the shallowest modulation depth (38%) predicted QuickSIN scores at 0 dB SNR. Consistent with our hypothesis, robust envelope encoding was important for speech understanding. Surprisingly, despite well-known age-related neural synchrony deficits in the auditory nerve, subcortical temporal envelope encoding is preserved in older adults. These findings suggest that individual differences and not age per se drive these effects. This work was supported by NIH/NIDCD R01DC014467, NIH/NIDCD P50 DC00422, NIH/NIDCD T32 DC014435. The project also received support from the South Carolina Clinical and Translational Research (SCTR) Institute with an academic home at the Medical University of South Carolina, NIH/NCRR Grant number UL1RR029882.

85 Space Diffusion Syndrome: ATP Synthase as a potential drug Target to ameliorate the health of Astronauts.

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Abstract Withheld from Publication

86 Novel Doxorubicin-resistant Angiosarcoma Cell Line Demonstrates Resistance to Multiple Anti-tumorigenic Treatments In Vivo

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Intro: Angiosarcoma is a vascular sarcoma arising from soft tissues in various anatomic locations that has a predisposition to development of resistance to systemic chemotherapies like doxorubicin and paclitaxel. This resistance poses a significant issue clinically as they are primary adjuncts to surgery for which no alternative treatments have been proven effective. We present a novel doxorubicin resistant (DR) human angiosarcoma cell line that is also resistant to an anti-tumorigenic humanized monoclonal antibody (mAb) to Secreted Frizzled Related Protein2 (SFRP2), a known promoter of angiogenesis and tumor growth. The hSFRP2 mAb has demonstrated a 43% reduction in wild type (WT) angiosarcoma tumor mass in previous studies. Methods: We cultured SVR-CRL 2280 mouse angiosarcoma (SVR) tumor cells and determined doxorubicin IC50. We exposed SVR tumor cells in vitro to increasing amounts of doxorubicin over several passages at concentrations ranging from 0.01uM to 10uM. We performed an in vivo experiment (n=15) to confirm WT SVR sensitivity to doxorubicin. Another in vivo experiment (n=30) was performed injecting all mice with DR angiosarcoma and treating groups (n=10) with hSFRP2 mAb, doxorubicin or IgG1 control mAb, omalizumab. Results: Cell proliferation assays comparing WT angiosarcoma (doxorubicin-sensitive) to DR angiosarcoma demonstrated clear resistance patterns with direct correlation of DR tumor cell growth with increasing concentrations of doxorubicin. DR tumor growth was greatest (126%) at the highest doxorubicin concentration (10uM). In contrast the WT growth dropped below 60% by 0.1uM with only 1% surviving at 10uM of doxorubicin. The in vivo treatment study revealed continued doxorubicin resistance of SVR with no tumor growth inhibition in both doxorubicin and hSFRP2 mAb treatment groups. Conclusions: We present a novel angiosarcoma cell line demonstrating multi-drug resistance that will provide a model for continued investigation of novel therapies on DR angiosarcoma. Further analysis of resistant angiosarcoma is necessary to provide alternative treatments. This work was supported by T32 CA193201

87 Which Electrode Position is Best for Closed-Loop Transcutaneous Auricular Vagus Nerve Stimulation (taVNS) to Enhance Oromotor Learning Development of Impaired Infants.

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INTRODUCTION/RATIONALE: Feeding difficulty due to oromotor dyscoordination is a primary concern for infants who are born preterm or suffer hypoxic ischemic encephalopathy (HIE). Vagal Nerve Stimulation (VNS) can increase neural plasticity, and when paired with rehabilitation, can enhance motor learning. Recently, we demonstrated that non-invasive VNS can be accomplished via electrical stimulation

of the auricular branch of the vagus nerve using a new method called transcutaneous auricular vagus nerve stimulation (taVNS). Our goal is to develop a closed-loop automatic system that pairs taVNS with muscle activation from sucking, using electromyography (EMG) as a trigger. This system may allow better suck and stimulus pairing that is also less labor-intensive. METHODS: These investigations were designed to test the best location for reference electrode placement and the fidelity of stimulation paired with sucking. We compared 3 different EMG electrode placements (A, B, C) to optimize the specificity and sensitivity of the automated system in 2 pre-term neonates enrolled in the larger pilot trial. Triggered stimulation was delivered using a left ear electrode at 0.1 mA below perceptual threshold, 25Hz frequency, 500□s pulse width, for a 3.5 second train. The primary outcomes of this study were specificity (stimulations correctly paired to a visual suck) and sensitivity (visual sucks that triggered or occurred during stimulation). RESULTS: Locations A, B, and C had a mean specificity of 49.3±31.8 (n=3), 37.9±13.4 (n=7), and 58.3±18.5 (n=6), respectfully. Locations A, B, and C had a mean sensitivity of 77±15.9 (n=3), 82±13.8 (n=7), and 75.2±16.2 (n=6), respectively. Electrode placement C was feasible and better tolerated. CONCLUSION: EMG electrode position C was the most efficient with 58% of stimulation trains correctly pairing with visual sucks while maintaining good sensitivity to visual sucks. Using EMG in a closed-loop taVNS system is a safe and effective way to trigger taVNS stimuli in infants. This work was supported by NM4R

88 Vagus Nerve Stimulation Effects in an AAV6 Î±-Synuclein Rat Model of Parkinson's Disease

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Parkinson's disease (PD) is a progressive neurodegenerative disease that results in motor dysfunction and is characterized by a loss of substantia nigra dopaminergic neurons (SN-DA). In order to study this disease and its underlying mechanisms, different models have been developed to mimic progressive degeneration caused by PD. One such model is the adeno-associated virus (AAV) mediated overexpression of human α-synuclein, a protein that aggregates and is a pathological hallmark of PD. Vagus nerve stimulation (VNS) is FDA-approved for treatment-resistant epilepsy and depression. VNS delivers electrical stimulation to the left cervical vagus nerve trunk, activating locus coeruleus norepinephrine neurons (LC-NE), leading to increased excitability of LC target regions in the CNS. Our previous work has shown that VNS increased locomotion, increased tyrosine hydroxylase (TH)-positive neurons in the SN and LC, decreased α-synuclein density in SN-DA neurons, and decreased neuroinflammation in both the SN and LC of a double lesion PD rat model. We hypothesize that VNS on animals with adeno-associated virus type 6 (AAV6) α-synuclein vector unilaterally injected into the SN will alleviate PD like pathology such as increased TH positive neurons and decreased neuroinflammation in both the SN and LC. Starting two weeks after the unilateral injection of AAV6-asynuclein into the right SN, rats received VNS twice a day, every other day for 4 weeks. Motor activity was assessed during each PM session of VNS, and weekly the rats' performance on the cylinder and ladder tasks were assessed. α-syn rats had reduced motor activity, reduced nigrostriatal TH-ir, and increased neuroinflammation. However, following chronic VNS, α-syn rats demonstrated reduced aggregation of α-syn in the SN, as well as an attenuation of TH-positive cell loss within the SN and TH-ir within the dorsal striatum. Data from this study will further our understanding of the potential VNS has in animal models of PD. This work was supported by This work is supported by 2P20GM103542-06 (HAB) and MUSC Barmore Foundation (Boger)

89 Transcutaneous Auricular Vagal Nerve Stimulation (taVNS) Paired with Feeding Coordination in Infants with Brain Injury

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Abstract Withheld from Publication

90 The Effects of Brain Stimulation on Social Skills Training in Autistic Adolescents

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Autism is a developmental disorder that is increasingly prevalent. This project investigated whether transcranial direct current stimulation could augment the effects of social skills training on autistic subjects. Autistic adolescents underwent social skills training, called PEERS. Half of the participants received active tDCS, and half received sham tDCS. In order to assess the impact of PEERS training and/or tDCS on the subjects, participants completed a face-object dot probe task, in which a face and an object were presented on the left and right of the screen. The images would then disappear and an asterisk would appear in one of the two locations where the images were presented. Subjects indicated left or right via key press. Their reaction times to different types of trials were measured (e.g. congruent, where the asterisk appeared where the face had been, and incongruent, where the asterisk appeared where the object had been). fMRI was conducted during this task. The data here reflect brain activation in response to the asterisk. During the face-congruent trials, both sham and active tDCS groups showed activation in the occipital lobe. More interestingly, participants who received sham tDCS showed greater activation in parietal regions than did participants who received active tDCS in face- compared to object-congruent trials. One explanation for this finding is that participants who received sham tDCS, who were presumably looking at the object, needed to shift their attention towards where the face had been more than participants who received active tDCS. This result makes sense since the parietal lobe plays a role in visual attention-switching mechanisms. Ongoing analyses will help elucidate the cognitive mechanisms underlying this pattern of brain activation and thus provide further evidence for or against this idea. This work was supported by NIH/NICHD Grant Number P2CHD0886844 R25 GM113278

91 Effect of Novel SET-targeting Compounds on SET/PP2A Association

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FTY720 is a sphingosine derivative drug with FDA approval for the treatment of multiple sclerosis. Studies show that this drug inhibits SET in a similar fashion as ceramide. Ceramide is important in biological processes such as apoptosis. Ceramide is known to aid in the suppression of tumorigenesis through increasing the activity of a tumor suppressor protein called protein phosphatase 2A (PP2A). PP2A is known to be downregulated in adenocarcinoma, which leads to a decrease in tumor suppressor activity from this molecule. A primary regulator of PP2A is Inhibitor 2 of PP2A (I2PP2A/SET) that attenuates the function of PP2A by binding to the PP2A holoenzyme. Ceramide increases PP2A activity by directly binding to SET protein on specific residues of lysine and tyrosine, and preventing the binding of SET to PP2A, leading to PP2A activation and tumor suppression. We hypothesize that treatment with FTY720 will decrease the association between SET/PP2A, and

that small compounds with similar chemical structures will produce similar effects as FTY720 on decreasing SET/PP2A interactions. We utilized a proximity ligation assay (PLA) in which protein-protein interactions (SET-PP2A) are examined using antibodies that recognize these two proteins. Lung adenocarcinoma cells were incubated in the presence or absence of 5 μM FTY720 and the SET/PP2A interaction was observed by fluorescence confocal microscopy. Exposure to FTY720 produced 53.94 less PLA signal per single cell than the control ($p = .0014$), suggesting less SET/PP2A association and increased PP2A activity. This confirms the hypothesis that treatment with this drug will decrease SET/PP2A interaction. Future studies will use this assay to screen the functionality of novel SET-targeting compounds as part of a drug discovery and development effort to identify novel compounds which are stronger in inhibiting SET-PP2A interaction to enhance tumor suppressor PP2A function in lung cancers.

92 Importance of antibody-dependent cell-mediated cytotoxicity to Age Related Macular Degeneration

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Introduction: Dry age-related macular degeneration (AMD) is the leading cause of central blindness for Americans over the age of 50. AMD has been associated with inadequate control of complement activation and antibody (Ab) deposition. IgGs can directly activate the complement system leading to complement-dependent cytotoxicity (CDC); or, IgGs can bind to their specific receptors (Fcy-receptors; FcyR) to trigger Ab-dependent cell-mediated cytotoxicity (ADCC). Bruch's membrane (BrM), basal laminar infoldings (BLI) and mitochondria in the retinal pigment epithelium (RPE) are altered in response to cigarette smoke exposure (CSE), a complement inflammatory initiator. Here we analyzed these structures in transmission electron microscope (TEM) images of CSE mice in which the entry point for ADCC (FcyR-/-) was eliminated; results were compared to historic data from alternative pathway (AP) of complement-deficient mice (fB-/-). Methods: Wildtype and FcyR-/- mice on a C57BL/6J background were exposed to cigarette smoke or filtered air for 6 months. The effects were analyzed using behavioral and histological outcomes. Results: Wildtype CSE mice exhibited a significant reduction in contrast sensitivity measurements. This observation was concomitant with an increase in thickness, an increase in the volume between the foldings and hence a decrease in the basal lamina folding density. In addition, the shape of the mitochondria was found to be elongated and larger, and their localization was changed towards the center of the RPE. FcyR-/- mice were protected from developing these CSE-mediated functional and structural alterations. Likewise, fB-/- mice showed little damage due to CSE. Conclusion: The data presented here suggest an interplay between complement activation involving the AP and ADCC in ocular pathology due to smoke. Understanding the pathways that play a role in the disease pathogenesis of AMD is essential for developing therapeutic approaches.

93 Just Say Know: Rethinking Drug Prevention Programs

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Introduction: Substance use during adolescence can have a number of negative consequences including increased risk of substance use and mental health problems and interference in healthy brain development. School-based prevention programs are an optimal environment for educating youth about substance use. Objective: Just Say Know is a locally-developed, science-based, interactive substance prevention program that advances MUSC's goal to build healthy communities by educating youth about the development of addiction and influencing their decisions about substance use. Methods: The Just Say Know program was given to 1,594 middle and high school students across South Carolina (2016-2018). Students engaged with the facilitator in an interactive, hour-long session covering brain basics, how substances affect brain systems, and why adolescent brains are more susceptible to addiction. Students completed an 8-item pre- and post-knowledge-based test to measure learning outcomes, along with feedback questions about the presentation and their attitudes toward substance use. Results: Test performance increased by 74% from pre- to post-test, with middle schoolers showing greater increases than high schoolers. Ninety-two percent (92%) of respondents indicated that the presentation may influence how they approach substances in the future and 86% thought the presentation was worth their time. Discussion: Results suggest that the research-based prevention program, Just Say Know, is effective in increasing adolescents' knowledge of the deleterious effects of substance use on brain development, has the potential to affect youths' use of substances, and is well-received by students. As the program relies on scientifically-accurate information about alcohol and drug use, it complements existing science curricula in schools and therefore may be a more appropriate element to include in lesson plans. Further research is needed to replicate these findings and follow up on likelihood of future substance use initiation. This work was supported by The Just Say Know Community Outreach program is funded through generous donors and solely relies on philanthropic gifts to the MUSC Foundation CDAP Fund.

94 Factors affecting health status in community-residing older adults in low-income communities in the tri-county area: A qualitative study

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Introduction/Rationale: The US Census Bureau (2002) reported that individuals of low socioeconomic status were more likely to have limited access to healthcare. The purpose of this preliminary study was to explore self-generated factors that affect quality of life and limit access to health care among older adults living in low income community housing. Methods: Participants were 21 older adults age 60 and over. 60-minute focus groups were conducted every other week over a span of three months. Each focus group was centralized around one specific topic related to aging and health. While the discussions were being facilitated by a therapist, notes were being recorded in real time. After each focus group, notes were analyzed for words that focus group participants repeated or placed emphasis on. Results: From the total sample average age was 70. Majority were White (76%) and Female (80%). Words that participants tended to repeat or place emphasis on included trust, emotional, vulnerable, control, anxiety, depression, death/dying, and loneliness. The majority reported inadequate access to healthcare services, and living in conditions that were unstable and stress-inducing. Conclusion: The preliminary results suggest that perceptions of vulnerability, increase verbal report of depression, anxiety, and loneliness may be linked to factors such as housing, lack of health insurance, distance from hospital, high cost of medications and lower socioeconomic status. The oldest (age 75+, 33%) reported worsening of quality of life and physical health and dealing with obstacles that were impacting their access to care, most particularly the distance from the hospital. Younger residents considered their physical and mental health and overall quality of life fair, but high cost of

their medications, poor insurance coverage, and low satisfaction with their living conditions were anxiety inducing. Knowledge of patient perspectives may allow providers to address barriers to care that perpetuate health disparities.

95 Microgravity regulation of p62 gene expression and proteasome activity in preosteoclast cells

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A major challenge for the National Aeronautics and Space Administration (NASA) astronauts' mission is the accelerated decrease in bone mineral density (BMD) under microgravity (μXg) conditions in space. About 1-2% of BMD lost per month occurs in space due to low-gravity, which increases risk of bone fractures and fragile bone condition similar to osteoporosis. Osteoclasts are the primary bone resorbing cells. RANKL-RANK receptor signaling is critical for multinucleated osteoclast (OCL) differentiation. Proteasomes are responsible for the degradation and recycling of proteins tagged with ubiquitin in eukaryotic cells. SQSTM1/p62 (sequestosome1) is a scaffold protein, which plays an important role in proteasome activity. We hypothesize that μXg regulates p62 expression and proteasome activity in preosteoclast cells. We demonstrated that μXg upregulates the p62 mRNA expression and proteasome inhibitor (MG132) suppresses p62 expression. In addition, proteasome inhibitor abolished p62 protein expression in preosteoclast cells under normal and μXg conditions. However, proteasome inhibitor has no effect on TRAF-6 adaptor protein under μXg conditions. We identified that proteasome activity is elevated under μXg conditions and proteasome inhibitor suppressed the elevated proteasome activity under μXg. Furthermore, proteasome inhibitor suppresses RANK receptor expression under normal and μXg conditions. In conclusion, μXg modulates proteasome activity and RANK receptor signaling in preosteoclast cells. Therefore, our results suggest that targeting proteasome activity could have therapeutic implications for bone loss in space environment. This work was supported by Palmetto Academy

96 Development of Wearable Stimulation App to Increase Hand Functional Recovery in Patients with Neurologic Disorder

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Abstract Withheld from Publication

97 The development of a cognitive rehabilitation task for mice

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Cognitive impairment, which is a consequence of many neurodegenerative diseases and stroke, impacts millions of Americans. Cognitive rehabilitation is a non-pharmacological intervention designed to influence both cognitive and non-cognitive outcomes; however, there is lack of cognitive rehabilitation tasks for animal models. Hence, the purpose of this study is to develop a cognitive rehabilitation task for mice. We developed the 'activity box', which has an open field and enclosed dark compartment, connected by a mouse door. The mice use natural instincts to escape to the dark compartment. A problem-solving task was created by placing various obstacles in front of the mouse door. This study included 3 groups of C57BL6 mice. The 'baseline' group performed the tasks several times to work out the methodology and obtain average baseline escape latencies for each obstacle. The 'repeat' group performed the task repeatedly to determine a learning curve and to create a complex rehabilitation task by combining obstacles. Finally, the 'validation' group performed the task once to validate the baseline escape latencies for the second group and the complex task escape latency for the third groups. Our data demonstrate that the activity box is reliable and reproducible. The complex task may be a good task for rehabilitation due to the ability of the animals to gradually improve the escape latency with repetition and retain the improved latency over time. In the future, we will stain the sections of the brains with c-fos and Arc, which are immediate genes that are expressed during learning, from animals to determine areas of the brain involved in performing the activity box. This work was supported by National Institute of Health NINDS (R01NS099595), the Alzheimer's Association (AARGD-16-440893), and the National Institutes of Health NHLBI (R25 HL092611)

98 Hematopoietic Stem Cell-derived Osteoblasts in the Microenvironment Enhance Osteosarcoma Tumorigenicity

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Osteosarcoma (OS) is the most common primary malignant bone sarcoma but mechanisms underlying progression remain elusive. We demonstrate that conditioned media (CM) from osteoblasts (Obs) from long bones of mice, significantly increased the proliferation, migration and invasion of OS cell lines (MOS/J and K7M2), indicating a role of these Obs in progression of OS. While it is widely believed that mesenchymal stromal cells (MSC) are a source for Obs, we have previously reported that hematopoietic stem cells (HSC) can also give rise to Obs. Further, in order to establish relative contribution of Obs in OS, we used a unique transgenic model in which HSC-derived cells are GFP+ while MSC-derived ones are RFP+. Using this model we re-established presence of HSC-derived Obs in long bone of mice, which expressed osteogenic markers (RUNX-2, ALP and osteocalcin) and had the ability to mineralize. Importantly, we noticed that there was an increase in migration and invasion of OS cells when treated with the CM from HSC-derived Obs as compared to CM from MSC-derived Obs. Co-culture experiments established an increase in migration and invasion of OS cells in the presence of HSC-derived Obs. Additionally, priming OS cells with CM from HSC- and MSC-derived Obs for 7 days also resulted in enhanced migration and invasion in OS cells that were treated with HSC-derived Obs CM. In vivo injections for lung metastases indicated a larger number of metastatic nodules when OS cells were co-injected with HSC-derived Obs as compared to OS cells alone, or those co-injected with MSC-derived Obs. Thus, we conclude that a HSC-derived Obs population in long bone of mice has the potential to contribute towards the OS microenvironment leading to enhanced tumorigenesis than that observed by MSC-derived Obs. Thus, targeting these cells in the microenvironment might prove to be more useful in arresting OS. This work was supported by This work is supported by a pilot project from MUSC COBRE in Lipidomics and Pathobiology (MM), by American Cancer Society Institutional Research Grant #IRG-97-219-11 from the American Cancer Society (MM), by R01AR066094 (MM) from NIAMS and by the Department of Pathology and Laboratory Medicine.

99 CRISPR-Cas9 generated allelic series of rat mutations confirms Tox3 as a breast cancer susceptibility gene

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The continuing increase of breast cancer incidence necessitates a greater understanding of the mechanisms that affect susceptibility. Estrogen Receptor-positive breast cancer (ER+) is the most common subtype and accounts for 70% of all cases. Multiple genome-wide association studies (GWAS) have identified low-penetrance variants on chromosomal band 16q12.1 associated with susceptibility to ER+ breast cancer. The polymorphisms associated with risk exist within a noncoding region of DNA near the gene TOX3, and have been shown to affect its expression. TOX3 encodes a transcription factor that is highly expressed in the luminal breast epithelium, and low TOX3 levels are further associated with breast cancer risk. To model the effect of TOX3 downregulation, we used CRISPR-Cas9 to create an allelic series of rat mutants with deletions in the region orthologous to the human 16q12.1 locus. The 5 different rat lines show various levels of reduced mammary Tox3 transcript levels. Complete knockout results in pleiotropic effects, rendering heterozygote knockouts more useful for susceptibility studies. Through chemically-induced carcinogenesis, we found that mammary tumor multiplicity significantly increased in lines with reduced Tox3 expression compared to wild type rats. These resulting tumors histologically resemble human adenocarcinoma, as they are of luminal epithelial origin and express estrogen and progesterone receptors. Preliminary data indicates that tumors of heterozygotes produced less Tox3 transcript than tumors of wild type rats. An increased number of terminal end buds in developing mammary glands was also observed in heterozygotes. Taken together, we hypothesize that downregulation of Tox3 expression deregulates ER+ signaling in the luminal progenitor cells, subsequently increasing breast cancer risk. Our findings demonstrate that CRISPR-Cas9-generated rat mutants confirm TOX3 as a breast cancer susceptibility gene. This work was supported by Supported in part by pilot research funding, Hollings Cancer Center's Cancer Center Support Grant P30 CA138313 at the Medical University of South Carolina (to BMGS). Supported in part by the Biorepository and Genomics Core Shared Resources, Hollings Cancer Center, Medical University of South Carolina (P30 CA138313). Supported by funds from the Department of Pathology and Laboratory Medicine, and the Center for Genomics Medicine at MUSC (to BMGS). Supported by generous donations from the James Island Youth Soccer Club (James Island, SC), Parents of Stiles Point Elementary School (James Island, SC) and the Liberty Twp fire fighters (Liberty, OH). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

100 Dealing with glioblastoma in preclinical models using single agent HDAC inhibitor

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PURPOSE/INTRODUCTION: When it comes to different types of cancer glioblastoma is one that is still out of reach of treating with success. Even with aggressive therapies including chemotherapy, radiotherapy or surgical intervention, glioblastoma is still a death sentence. Other therapies such as immunotherapies remain experimental within clinical practice. Using a naturally occurring agent diallyl trisulfide (DATS), this study looked to validate the effect on human glioblastoma within a pre-clinical model. Methods: Ex vivo slice culture, in vivo line derived orthotopic xenograft and patient-derived orthotopic xenograft (PDX) animal models of GB were utilized to assess efficacy of treatment with DATS. Results: After 72-h treatments of 25 micrometer DATS exhibited cell death in ex vivo human glioblastoma slice culture. Treatment of patient-derived orthotopic xenograft models (PDX) as well as U87MG orthotopic xenograft models (U87MGOX) with daily intraperitoneal injections of DATS for 14 days. MRI's were used on treated mice with DATS (10mg/kg) presented a decrease tumor size at 5 weeks when compared to mice that were treated with saline U87MGOX and PDX controls. Reduced gross tumor volume with decreased proliferation and decreased angiogenesis was showed by using hematoxylin (H&E) staining. Western blotting showed an association between DATS and the increase in histone acetylation (Ac-Histone H3/H4) and activated caspase-3 in this preclinical model. Hepatic function was not negatively impacted by DATS after a histological assessment and enzyme assays was implemented. CONCLUSION:DATS could possibly be an accepted and effective therapeutic agent in inducing apoptosis in human glioblastoma cells and preventing tumor growth.

101 Building Family Centered Practice in Vietnam: Validation and Translation of Occupation-Based Pediatric Assessments

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Cerebral Palsy (CP) is the most common childhood motor disability globally, with prevalence rates between 1.5 and 4 of every 1,000 births. There are approximately 500,000 children in Vietnam with CP and unfortunately, they have reduced access to appropriate therapeutic services. Traditionally, Vietnamese therapists do not use pre- or post-assessments and therapy involves limited options. The lack of individualized and targeted therapy has led theÂ Vietnamese Ministry of Health to seek new rehabilitation models for children with CP. The ABILHAND-Kids is a recommended assessment for children with CP and measures manual ability in real-world activities. Our aims include 1) cultural adaptation and validation of the Vietnamese ABILHAND-Kids and 2) training of Vietnamese clinicians to use assessment to guide goal setting and intervention planning. This prospective study involved data collection on the Vietnamese ABILHAND-Kids from clinicians from Hanoi and Ho Chi Minh City hospitals. Analysis of ABILHAND-Kids instrument (n=44) showed good person separation reliability of 0.90, Cronbach alpha (KR-20) of 0.95 and separated the sample into 4.27 strata. All items fit the Rasch measurement model showing item difficulty hierarchy of less complex items (e.g. put on hat) as easy items and more complex items (e.g. fold clothes) as difficult items. For Aim 2, we will conduct a workshop in Vietnam in December 2018. Vietnamese therapists (n=42) will use ABILHAND-Kids to create an individualized item hierarchy for children with CP to guide goal setting and targeted intervention. Effectiveness of training will be determined by observing therapists during hands-on portions of the workshop using a skills checklist. A 5-question survey will provide data on therapist's perceptions of using assessment to guide clinical decision making. This study has the potential to change the way Vietnamese therapists measure therapy outcomes for children with CP by validating new assessments and ensuring the accurate use of measures. This work was supported by Humanity and Inclusion

102 Culturally Competent?: Student Perspectives on Academic Preparation for Working with Diverse and Underserved Communities

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Research has demonstrated that patients have better outcomes when health care providers are able to provide culturally competent care (Suarez-Balcazar et al., 2009). Given the growing diversity of the U.S. population, the ability to promote better health outcomes and reduce health disparities is vital (Escarce and Kapur, 2006). The aim of this educational research study was to examine the perceived preparation of occupational therapy students for working with culturally diverse and underserved communities as compared to other health professions students. It was hypothesized that occupational therapy students would report higher rates of perceived preparation for serving diverse and underserved communities as compared to other health professions students. An online survey was distributed to students in all academic programs at the Medical University of South Carolina. The survey assessed students' previous experiences with these populations, as well as their confidence, attitudes, and self-perceived skills to work with them. Data was collected through the voluntary online survey and focus group discussions. The responses of occupational therapy students were compared to students from other health professions programs. tudy data results and analysis will be shared at MUSC Student Research Day. We anticipate that this research will demonstrate the need for further healthcare education and training in serving diverse and underserved communities. Future studies should determine the best approaches for how to implement this education and training. This work was supported by MUSC Department of Occupational Therapy

103 Identifying motor delays in infants with congenital heart defects: clinical utility of the STEP assessment

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Infants with Congenital Heart Defects (CHD) are at risk for developmental delays and over half do not receive early intervention services prior to 4 years. Infants with CHD are fragile, demonstrate poor endurance, and tolerate only minimal handling, but still need developmental assessment for delays as early as possible with a quick screening tool. The Specific Test of Early Infant Motor Performance (STEP) has been shown to predict motor development outcomes in preterm infants, but it has not been used with infants with CHD. Aim 1: To determine if infants with CHD can tolerate the STEP assessment. We hypothesize infants would demonstrate no significant change in heart rate (HR) and oxygen saturation (O2Sat) during, before, and after administration of the STEP. Aim 2: To determine clinical utility of the STEP assessment when used in the MUSC nurseries with preterm and high-risk infants. Design: This prospective cohort study enrolled full-term infants with CHD. STEP assessment was administered between term and 3-months. We monitored HR and O2Sats for 5 minutes before, during, and after STEP administration and analyzed this data using repeated measures ANOVA. Three MUSC therapists experienced in the use of the STEP answered questionnaires on clinical utility after administration to 18 preterm and high-risk infants and data analyzed using descriptive statistics. Results: We have enrolled n=4 CHD infants to date with both single and 2-ventricle physiology. There were no significant changes in CHD infants' HR and O2Sats before, during, and after STEP assessment ($p>0.50$). Average time to administer ranged from 5-15 min. One therapist reported taking up to 30min. with a medically fragile infant. The STEP was easy to learn, administer, and score. Use of the STEP to screen infants with CHD may lead to earlier identification of motor delays and initiation of targeted therapy. This work was supported by South Carolina Clinical & Translational Research Institute UL1 TR000062

104 Knowledge and Delays in Diagnosis of Oropharyngeal Neoplasms

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Oropharyngeal squamous cell carcinoma (OPSCC) incidence has risen dramatically in recent decades, primarily due to the prevalence of human papillomavirus (HPV)-associated OPSCC. The objective of this pilot study is to determine potential factors that contribute to late-stage diagnosis and treatment of HPV+ and HPV- oropharyngeal tumors. This study assessed health literacy, sociodemographic characteristics, HPV knowledge, symptom and diagnostic timeline, and alcohol and tobacco use in patients treated at the Medical University of South Carolina. These variables were compared to the patient's stage of cancer at diagnosis using the AJCC TNM System in an attempt to identify factors that contribute to advanced stage presentation. Data from a total of 82 patients were obtained, 52 via retrospective chart review and 30 prospective patients surveyed in the Head and Neck Tumor Center. There are 71 males and 11 females. The mean age is 61.93 [33.80]. Among the 55 subjects with a history of tobacco use, the average pack year is 27.3 [0.15, 80.00]. Among the 59 subjects with a history of alcohol, the average ounce consumed per week is 9.32 [0.6, 49.0]. The mean health literacy score is 34.13, indicating that all patients surveyed had adequate functional health literacy [24, 36]. The most common tumor stages were II (n=22) and IVA (n=26). This study also suggests a lack of HPV knowledge in the public, although HPV+ cancer patients were more knowledgeable than HPV- patients. Although none of the variables currently have a significant correlation to stage of cancer, potential associations were observed between specific variables and advanced stage of cancer, such as: HPV- tumor status, lower household income, and increased time to treatment initiation. Data collection for this study is ongoing at its current phase, and more patients will be recruited in an attempt to determine potential significant relationships. This work was supported by MUSC Summer Health Professional Research Program (SHP)

105 Interpersonal Trauma and Stress Processing in Youth

Elizabeth Evans, Casey Calhoun, Ph.D., Kathleen Crum, Ph.D., Christopher Sege, Ph.D., , Carla Danielson, Medicine, Institute of Psychiatry, MUSC.

Relationships between childhood interpersonal trauma (IPT) and stress processing remain unclear. Presented here is a preliminary analysis of data collected by MUSC's CHARM study, led by Dr. Carla Kmett Danielson. Multimodal analysis was used to investigate variation in functioning of distinct, yet interconnected neurobiological stress response systems among 3rd-, 6th- and 9th-graders, with and without history of IPT, under various stressful conditions. Youth were recruited from the Charleston area (N=75). Participants were categorized as having experienced any IPT (N=31) or no IPT (N=44) based on interview. To manipulate predictable and unpredictable stress, participants viewed images in an MRI scanner. Images were either emotionally negative or neutral, and presented after a countdown or unpredictably. Functional amygdala activity throughout the task was extracted. To manipulate social stress, participants were asked to give a speech about why they should be selected for a TV show. Baseline and Stressor cortisol measurements were collected, and Cortisol Reactivity was defined as the increase from Baseline to Stressor. To manipulate sustained stress, an error-monitoring task was administered alongside EEG

recording. A negative deflection in the EEG, known as error-related negativity (ERN), is typically observed when a participant makes an error. ERN was quantified as the difference in EEG activity between error and correct trials (ΔERN). Predictable/Unpredictable Stress: 3rd- and 9th-graders with IPT showed reduced amygdala activity compared to age-matched counterparts without IPT. The reverse was observed in 6th-graders. Social Stress: 3rd-graders with IPT had lower cortisol reactivity than 3rd-graders without IPT. Sustained Stress: 9th-graders with IPT demonstrated lower ΔERN than 9th-graders without IPT. For IPT-exposed youth, 6th grade may reflect a unique transitional period characterized by increased stress-related activation of subcortical regions (e.g., amygdala); whereas during earlier and later stages of puberty (i.e., when neurobiological development is more stable), IPT-exposed youth may experience blunting of stress responses. This work was supported by DART NIH grant R25 DA020537 R01 MH 112209-02 (PI: Danielson)

106 Relationship Between Perceived Social Support and Outcome in Concurrent Treatment of PTSD and Substance Use Disorders Using Prolonged Exposure

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Concurrent treatment of substance use disorder and Prolonged exposure (COPE) integrates the treatment of substance use disorder (SUD) and post-traumatic stress disorder (PTSD). The in vivo experiences included in COPE often encourage strengthening of social systems and interpersonal relationships. As perceived social support has been shown to improve health outcomes, the current study describes the relationship between perceived low and high social support with participant characteristics and treatment outcomes. Military veterans randomized to COPE or cognitive behavioral therapy for SUD were divided into groups of low (n=35) and high (n=46) perceived social support based on the Interpersonal Support Evaluation List (ISEL). We examined differences between participants with low and high perceived social support on measures of depression, anxiety, PTSD symptomatology, and suicidal behavior using two sample t-tests. Participants receiving COPE will be analyzed longitudinally to determine if those with low perceived social support exhibit significantly greater gains in outcome at a more rapid pace compared to their counterparts high in perceived social support. Results from the two sample t-tests showed that participants with low perceived social support evidenced higher scores on the beck depression inventory, state-trait anxiety inventory, and PTSD checklist-Military compared to those with higher perceived social support($p<0.05$). A trend towards significance was observed among participants with low perceived social support indicating they reported greater current suicidal thoughts($p=0.051$). No statistically significant differences were observed on any substance use outcome, lifetime suicidal thoughts and attempts, or recent suicide attempts. In summary, participants low in perceived social support evidenced significantly worse depression, and greater anxiety and PTSD symptomatology and greater current suicidal thoughts, although this latter finding was N.S. Results from the longitudinal analyses are pending. Findings from this study may support the importance of therapeutic activities to enhance perceived social support among patients being treated concurrently for PTSD and SUD. This work was supported by NIH grant R25 DA020537 and NIDA grant R01 DA030143 (SEB)

107 Health Needs Assessment of Homeless Youth in Charleston, South Carolina

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About 1.6 million youth are homeless annually in the US. In 2017, approximately 3916 youth were homeless in South Carolina. Charleston county ranks third highest in South Carolina for homelessness. Homeless youth confront numerous factors that interact with their physical and mental health, and homelessness increases risks for poor health outcomes in young people. The purpose of this study was to determine health challenges, healthcare utilization patterns, and associated social determinants of health experienced by homeless youth in Charleston, SC. Structured interviews were conducted by trained interviewers at community sites identified as gathering places for homeless youth. Participants were individuals under the age of 26 who reported unstable housing, food, and/or financial support. Primary outcome measures were self-reported indicators of health status and healthcare utilization. Secondary outcome measures were self-reported social determinants of health. Preliminary results are available for 32 survey participants, among whom 46.9% were male, 34.4% were female, and 18.8% were gender nonconforming. 41.4% were uninsured and 62.5% reported insufficient food access. Most (76.7%) reported having a mental and/or developmental challenge and 38.7% reported a physical health challenge. Having an ongoing mental or developmental health challenge was associated with insufficient food access ($p=.015$). Insufficient food access was reported by 78% of participants with mental and developmental health challenges compared to only 28% of participants with no such health challenge. Most respondents (73.3%) had utilized the ER in the last 12 months, 41.4% had been to the ER at least twice and 29% had spent at least one night in the hospital. Homeless youth in Charleston, SC experience significant health challenges and have high cost healthcare utilization patterns. Resources directed at addressing the health of this vulnerable population are needed to improve their health status and decrease associated costs. This work was supported by MUSC College of Medicine, Department of Family Medicine, and College of Charleston.

108 Uptake of postpartum long-acting reversible contraception among women with Emergency Medicaid

Marissa Bass, Angela Dempsey, Medicine, OB/Gyn, MUSC.

Introduction: To compare women with Emergency Medicaid who received postpartum LARC after delivery with all others. Methods: We recruited postpartum women with Emergency Medicaid from three hospitals in South Carolina between November 2016 and May 2017. All sites offered no-cost IUDs and implants through study or grant funding, regardless of study participation. Researchers collected data on demographics, contraceptive counseling, and contraceptive choice through patient interviews and chart abstraction. We describe the frequency of participant characteristics and compared LARC users to others (excluding those who underwent sterilization) using Chi-Square tests through SPSS (version 23). Results: Among 207 women in our sample, most were Hispanic (87%), under 35 (86%), and unmarried (70%). The index pregnancy was unintended in 51.6% of women. Forty-four percent chose LARC (28.2% implant, 15.8% IUD). There was a significant relationship between parity (two or more children) and whether or not a participant chose a LARC ($p=0.02$). Women who became pregnant 'too soon' or 'later than they wanted' were more likely to choose LARC compared to women who became pregnant 'at about the right time' ($p=0.03$). Intent to breastfeed did not differ between the groups but women who were counseled that Nexplanon is safe in breastfeeding were more likely to choose LARC than others ($p=0.03$). Other demographic characteristics and counseling content did not differ between the groups. Conclusions: Uptake was high among postpartum women with Emergency Medicaid and availability of no-cost LARC. Mistimed pregnancy, parity, and specific breast-feeding safety messages were associated with increased LARC use.

109 Textbooks: There's an App for That!

Sydney Mitchell, Charlotte Fletcher, Kirby Hazel, Amanda Giles, Health Professions, Department of Health Professions, MUSC.

Introduction: Technological advances within the last decade have greatly impacted many aspects of education. With mobile devices on the rise, higher education students express a desire for program-specific mobile applications (apps) that are interactive, easy to access, and include videos and pictures (Sandholzer, Rurik, Deutsch, & Frese, 2014). Purpose: The purpose of this study was to investigate student perceptions on replacing traditional textbooks with mobile apps before and after use of two mobile apps in an occupational therapy lab. Hypotheses: Students' attitudes and perceptions about apps replacing traditional textbooks will positively change after exposure to using an app as a required text in an occupational therapy lab. Methods: Occupational therapy students at MUSC and UTHSC used mobile apps, MOBI and GONI, as a required text in a musculoskeletal lab. Student perceptions were collected before and after using the apps through a survey via REDCap software. Results: Quantitative results from an independent t-test using SPSS indicated that there is a statistically significant difference between the mean preference for using a mobile textbook before using MOBI or GONI and after ($t = -8.261$, $p < .001$). Prior to app exposure in the classroom, students reported a weak preference (neutral to disagree) for mobile apps as textbooks. After app exposure students agreed that they prefer to purchase apps over traditional textbooks. Thematic content analysis of student perceptions revealed a shift in themes before and after exposure to the apps. Discussion: Prior to exposure to apps as textbooks, students might not be fully aware of the beneficial features that an app can offer to learning such as interactive and accessible content. This has great implications as it can influence student learning and textbook development. This work was supported by MUSC Department of Health Professions Interdiv/Interdepartmental/Intercollege Seed Grant, MUSC Changing What's Possible through Innovation and Technology Grant, MUSC College of Health Professions, MUSC Office of Instructional Technology and Faculty Resources

110 BOLD-signal changes in brains of Parkinson's Disease patients with Freezing of Gait

Gustavo Carmen Lopez, Daniel Lench, Danielle Helms., Gonzalo Revuelta, Medicine, Neurology, MUSC.

Abstract: Freezing of gait (FOG) is a debilitating condition that reduces or halts forward progression of gait despite the intention to walk and has been described as a sensation of having the feet glued to the floor. FOG affects up to 80% of Parkinson's Disease (PD) patients in advanced stages and has been associated with higher risk for falls, reduced mobility, and diminished quality of life. Currently, dopaminergic and rehabilitation offer limited therapeutic effect for the treatment of FOG, and the use of transcranial magnetic stimulation (TMS) in cortical regions for neuromodulation may offer a novel therapeutic approach to this condition. Preliminary data of thirteen FOG+ subjects are presented to determine TMS-evoked BOLD response in the Supplementary motor area (SMA) and other subcortical regions of interest that are part of the locomotor network responsible for gait. Significant increases in BOLD-signal were observed in the left SMA and the left cerebellum when TMS pulses were used over the SMA bilaterally. Additionally, the left cerebellum BOLD-signal and UPDRS-3 scores had a positive correlation reflecting how increased left cerebellar activity in FOG+ patients may be associated with worse movement ratings.

111 Utilizing Artificial Intelligence to Determine Bone Mineral Density via Chest CT

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Purpose: To validate the efficacy of a novel artificial intelligence (AI) algorithm inÂ determiningÂ bone mineral density (BMD) from chest CT compared to dual-energy X-ray absorptiometry (DEXA). Materials and Methods: In this IRB-approved study, we analyzed data of 66 patients (57 female, mean age 66.2 years) who underwent both DEXA and chest CT (median time between scans: 1.3 years). From DEXA studies, t-scores for L1-L4 vertebrae were recorded. Patients were then grouped based on their t-scores into normal, osteopenic, orÂ osteoporotic. An AI algorithm based on wavelet features, AdaBoost, and local geometry constraints independently localized thoracic vertebrae from chest-CT studies and automatically computed average HU values with kVp-dependent spectral correction. Pearsons correlation evaluated the correlation between t-scores and HU values. Mann-Whitney_U test compared HU values of normal and osteoporotic patients. Results: Overall, DEXA t-score and AI results showed good correlation ($r=0.5507$; $p<0.001$). In normal control patients, osteopenic, and osteoporotic groups, the mean DEXA t-scores were 0.776, -1.538, and -3.267, respectively. In these same groups, the mean HU values, as determined by the chest-CT AI, were 145, 135, and 100, respectively. Using these AI-derived HU values, a significant difference was found between the normal control patients and osteoporotic groups ($p=0.045$). Conclusion: Our resultsÂ show thatÂ this novel AI prototype can successfully determine BMD in good correlation with DEXA. Combined with AI algorithms directed at evaluating cardiac and lung diseases, this prototype could enable comprehensive preventative care based on a single low-dose chest CT. This work was supported by Medical University of South Carolina - College of Medicine Dean's Office - Summer Research Funding Program, MUSC - Radiology, Division of Cardiovascular Imaging.

112 The Effect of Aging on Olfactory Dysfunction

Jonathan Hill, Tina Storck MS, Tegan Noonan BS, Zachary Soler MD, Nicholas Rowan MD, and Lois Matthews MS, Rodney Schlosser MD, Medicine, Otolaryngology- Head and Neck Sugery, MUSC.

The aim of this study was to determine how age affects the quantifiable aspects of olfaction and if self-reported olfactory questionnaire answers can be used to accurately screen for olfactory loss. A standard protocol for olfactory testing with Sniffin' Sticks was used to determine threshold, discrimination, and identification of 158 patients between the ages of 21 and 93. Subjects also completed the Questionnaire on Olfactory Dysfunction - Negative Statements(QOD-NS) and the sense of smell visual analogue scale(VAS). Results showed steady declines in threshold and discrimination abilities starting around age 50 with identification declining beginning around age 40. Of the three components of olfaction, discrimination had the most negative impact on quality life as measure by the QOD-NS(-.346) and the VAS(-.411) which was followed closely by identification(QOD-NS: -.344, VAS: -.385) with threshold a distant third(-.323 QOD-NS, -.270 VAS). Receiver operator characteristics curves showed that the QOD-NS(.623) was a poor predictor of olfactory dysfunction while VAS(.731) was a fair predictor of olfactory dysfunction. All components of olfaction decline gradually starting in the 40's(discrimination) or 50's(threshold and identification) with discrimination having the largest impact on quality of life. Self reported questionnaires are only, at best, fair predictors of olfactory dysfunction. This work was supported by NIH Training Grant - T32 DC014435

113 Design of a Patient Navigation Intervention to Enhance Receipt of Surgery in African American Adults with Early Stage Non-Small Cell Lung Cancer

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African Americans (AAs) with lung cancer are less likely to receive surgery and more likely to die of lung cancer than European Americans. This paper describes the design of a national 22-site, two-arm, stratified cluster-randomized trial of a patient navigation intervention to increase receipt of lung-directed therapy with curative intent (LDTCI; surgery or stereotactic body radiation therapy) among AAs with early stage non-small cell lung cancer (NSCLC). In patient navigation, a navigator helps patients identify resources to address barriers in the complex cancer care delivery system to help ensure timely diagnosis and treatment. This is the first national, multi-site study to test the effect of patient navigation intervention on receipt of LDTCI among AAs with early stage NSCLC. It is hypothesized that participants in the 12 sites randomized to receive the navigation intervention will show higher rates of receipt of LDTCI than those in the 10 sites randomized to usual care. To date, 97 participants have been recruited into the patient navigation intervention arm (median age 65 years). Most participants had a high school education or less, earned <$15,000 annually, and were unmarried, unemployed, retired, or receiving disability. The three most frequently-reported barriers by participants in the patient navigation intervention arm were fear about cancer diagnosis or cancer treatment, transportation issues, and health communication difficulties. Effective patient navigation may help eradicate potential barriers to care, particularly among patients living alone. Future studies could test generalizability of the patient navigation intervention with other racial/ethnic groups of early-stage lung cancer patients. This work was supported by IRRAAN - NIH/NIMHD 5R01MD005892-04, NIH/NCI 5P20CA157071-04 South Carolina Cancer Health Equity Consortium (SC CHEC): Summer Undergraduate Research Training Program - NIH/NCI R25 CA193088

114 Employing Artificial Intelligence to Predict Hematocrit Values from Non-Contrast CT Imaging Data - Towards Fully Automated CT-derived Myocardial Extracellular Volume Fraction Quantification

James Durden, Maximilian J. Bauer, Marly van Assen, Carlo N. De Cecco, Marco Scarabello, Lewis P. Griffith, Akos Varga-Szemes, Uwe Schoepf, Medicine, Radiology Department, MUSC.

Abstract Withheld from Publication

115 Developing a Predictive Model for Premature Babies <30 Weeks Gestational Age Requiring Gastrostomy Tubes at MUSC

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Introduction: Some premature infants require gastrostomy tubes (GT) prior to discharge for oral feeding. Our aim is to develop a predictive model for infants born <30 weeks gestational age (GA) who will require G-tubes for oral feeding in order to initiate the process of GT placement earlier, therefore shortening hospital stays and improving neurodevelopmental outcomes for the infants. Methods: Data from Epic records were collected and entered into a Redcap database. Categorical variables collected include: demographics, maternal drug use, baby receiving mother's milk, respiratory support type, and presence of a patent ductus arteriosus (PDA), necrotizing enterocolitis (NEC), and intraventricular hemorrhage (IVH). Continuous variables collected include: GA at birth, birth weight, FiO2/respiratory support type at 30 days, 32wk postmenstrual age (PMA), and 36wk PMA, ventilator days up to 36wk PMA, PMA at last day of respiratory support, PMA at onset of oral feeding, and rapidity of advance in oral bottle feeding. Results: We identified 329 infants <30wk at birth from 2015-2016. Of these, 47 (14%) received GTs before discharge. Babies who received GTs were discharged much later than babies who did not receive GTs. Babies who received GTs did not advance oral feeding as well. Respiratory status was a key player because oral feeding cannot be attempted until later. Based on initial univariate analysis, promising independent predictors for inclusion in the model are IVH, PDA, NEC, high ventilatory support required at different timepoints, GA at birth, birth weight, number of ventilatory support days, and advancement of PO feeding once begun. Conclusions: Once a predictive model is completed, the model will then be tested on a validation cohort of patients from 2017. Finally, this will be implemented clinically and, if effective, this model has potential to improve clinical outcomes in children requiring G-tubes and reduce hospital costs. This work was supported by MUSC College of Medicine Dean's Office, MUSC Department of Pediatrics

116 Super resolution imaging of mitochondria in polycystic kidneys

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Abstract Withheld from Publication

117 Evaluating the Prevalence of Social Communication Disorder in Children at risk for Autism Spectrum Disorder

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Background Since the DSM5 was released in 2013, concerns have been raised about the relationship between Social Communication Disorder (SCD) and Autism Spectrum Disorder (ASD). In the present study, we examined rates of DSM-5 SCD symptoms and diagnoses in youth at risk for ASD. We also compared how participants with and without diagnoses of ASD scored on the Children's Communication Checklist (CCC) in order to explore differences in social communication and pragmatic language as this might inform diagnosis of SCD. Method Data for this study come from an epidemiological study examining the prevalence of ASD. Diagnostic evaluations were performed by doctoral level clinicians on 292 participants who had previously screened at risk for ASD via the Social Communication Questionnaire-Lifetime Version (SCQ). Assessments included measures of autism symptoms, cognitive and adaptive skills, and behavioral checklists, including the CCC. The CCC was completed to measure communication and language issues common to both ASD and SCD. Results Out of 292 youth at risk for ASD, only 1 met diagnostic criteria for SCD. While 20 participants met all 4 clinical criteria for SCD, 19 of these (95%) also met criteria for DSM-5 ASD, effectively ruling out a diagnosis of SCD. Analyses of the CCC scores indicated that participants with ASD also experienced impairment in scales measuring pragmatic communication (the hallmark feature of SCD) as well as impairment in the social relations and interests. scales. Conclusions Results indicate that while we do see children meeting SCD criteria, they were almost entirely children with autism, suggesting that SCD may not represent a unique diagnosis. This is important to continue to investigate because it is

unclear if different therapies and interventions are needed for individuals with SCD vs ASD and a diagnosis of autism opens the door to therapies, education, funding, and a huge established community. This work was supported by Autism Speaks

118 Maternal HIV Diagnosis Timing and Use of Guideline-Based Antiretroviral Therapies on Infant Outcomes

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Objectives: The primary aim was to evaluate differences in antiretroviral therapy (ART) use in pregnant women living with HIV (WLWH) according to timing of maternal HIV infection, including perinatal (PHIV). The secondary aim was to evaluate the effects of guideline-based maternal ART, including mono-, dual, and combination antiretrovirals (mARV, dARV, cART), on preterm delivery (PTD). Methods: Data were obtained from the state Department of Health (SCDHEC) for WLWH delivering from 2004-2014. Perinatal outcomes were compared according to timing of maternal HIV diagnosis and maternal use of mARV, dARV, cART, and no ART. Bivariate outcomes were compared using Ï‡2 or Fischer's exact tests. Continuous variables were compared using Wilcoxon Rank Sum Tests or Kruskal-Wallis tests. Results: 663 WLWH delivered 885 infants. 26 (3%) of infants were born to PHIV WLWH, 683 (77%) to WLWH diagnosed before pregnancy, and 185 (21%) to WLWH diagnosed during pregnancy. PTD was less likely among PHIV-exposed infants (4% vs. 24% vs. 16%, P = 0.006). PHIV mothers were more likely to use cART (88% vs. 65% vs. 54%, P = 0.001). PTD rates were similar among infants exposed to any ART (mARV 21% vs. dARV 20% vs. cART 21%, P = 0.93), while infants not exposed to ART had higher PTD rates (38% vs. 31%, P = 0.02). Conclusion: PTD was not increased by maternal PHIV or ART exposure. HIV-exposed infants not exposed to ART had higher PTD rates. These findings support maternal ART use for improved infant outcomes and challenge previous reports of worsened perinatal outcomes among PHIV WLWH.

119 Arthroscopic Primary Labral Reconstruction Reduces Risk of Conversion to Total Hip Arthroplasty in Patients with Femoroacetabular Impingement, Irreparable Labral Tears, and Severe Chondral Defects

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Abstract Withheld from Publication

120 Shift Handoff Interruption Analysis in an Urban Academic Medical Center Emergency Department Setting

Bryce Robbins, Nolan Bagnal, Steven Saef MD, Diann Krywko MD, Kyle Embertson, MD, Medicine, Emergency Medicine, MUSC.

Background: According to a report written by the Institute of Medicine in 2001, 'it is in inadequate handoffs that safety often fails first^1.' Handoffs slow down care and decrease safety^1. Communication is essential during sign out, and miscommunication is the leading cause of serious medical errors^2. Therefore, it is crucial to decrease sources of miscommunication, one being interruptions. Given the high acuity, volume, and elevated pace, the Emergency Department (ED) intuitively might lend itself to more frequent interruptions. The goal of this study was to collect data on the demographics of interruptions in this ED with ultimate goal of addressing and reducing these, decreasing communication errors, and increasing patient safety during a vulnerable time of patient care. Methods: The observational study was conducted from June to July 2018 at an academic level-1 trauma center. Random handoffs were observed by two research assistants on varying shifts, days, and times. Data was entered into REDCapâ„¢ system. Data collected included: location of patient care rounds, start and end time of handoff, type of interruptions, and interruption recipient. Results: Sixty-six handoffs were observed over the 2-month period. The most common type of interruption was phone calls, which accounted for 41% of interruptions. In-person consultations and RN to MD verbal interactions accounted for 24% and 21 % respectively. The remaining 14% of interruptions were due to EMS encodes, ECG review per protocol, patient care and visitor interactions. Conclusion: Phone calls proved to be the most common source of interruptions during ED handoffs, followed by in-person consultations and nurse to physician interactions. Care should be made to decrease all interruptions to decrease the risk of error due to miscommunication. Future studies will be necessary to investigate solutions to decreasing interruptions during ED handoffs and thus decreasing miscommunication and facilitating improved patient care.

121 Changes in Left Ventricular Mass, Volume and Function After Successful Alcohol Septal Ablation (ASA) in Hypertrophic Obstructive Cardiomyopathy (HOCM)

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Introduction: Alcohol septal ablation (ASA) produces a targeted infarction of the septum thereby relieving the outflow obstruction in hypertrophic obstructive cardiomyopathy (HOCM). We sought to determine the medium-term effects of ASA on LV mass, volume and function over 2-years of follow-up. Methods: 75 patients who underwent ASA between 2008-2015 at MUSC and had follow-up echocardiography were selected. Patients with LBB blocks or ventricular-paced rhythms were excluded. The following variables were obtained from the echocardiograms at 1-year and 2-year follow up: LVOT gradient to assess ASA success; septal thickness, posterior wall thickness, and LV mass index to assess LV mass; LV diastolic diameter, LVEDV and LVESV volume index to assess LV volume; EF% and LAESV index to assess LV function. Two-sample t-tests were used comparing changes in variables pre- and post-ablation. Results: 75 patients, mean age 59+/-13 (y), (M:F 32:43) (2-year:1year follow up 45:35) were included in this study. There was significant LVOT gradient reduction at rest (62 vs. 21 mmHg, $p<2*10^{-10}$) and when provoked (110 vs. 34 mmHg, $p<2*10^{-16}$) confirming the success of ASA. The LV mass decreased as evidenced by the reduced septal thickness (1.8 vs. 1.4 cm, $p<2*10^{-11}$) and reduced LV mass index (140 vs. 108 $g*m^{-2}$, $p<6*10^{-8}$). The LV volume was unaffected as evidenced by the lack of change in LV diastolic diameter (4.2 vs. 4.1 cm, p=0.80), LVEDV index (52 vs. 51 $mL*m^{-2}$, p=0.46) and LVESV, which was unchanged at 15.8 $mL*m^{-2}$. The LV systolic function based on ejection fraction was unaffected (70% vs. 69%, p=0.48), but the diastolic function improved (LAESV index 44 vs. 37 $mL*m^{-2}$, p=0.0001).. Conclusions: Successful relief of LVOT gradient with ASA produces favorable LV remodeling with reduction in LV mass and improved diastolic function with no detrimental effect on LV volume and systolic function. This work was supported by Charleston Research Institute

122 The Effect of a Physician's Years of Experience on Shift Handoff Length in an Emergency Department Setting

Nolan Bagnal, Bryce Robbins, Steven Saef MD, Diann Krywko, Kyle Embertson, Medicine, Emergency Medicine, MUSC.

Background: The delivery of health care requires handoffs, however, handoffs have been shown to decrease safety.^1 Handoff quality may be affected by several variables, including length of handoff time, with increased errors and omissions associated with increased length of handoffs.^2 Years in practice might lend itself to shorter or longer handoff times due to multiple reasons, including what information is deemed pertinent and whether or not the physician hurries through. The goal of this study was to determine if the years of experience of the physician leaving the shift affected overall length of that handoff. Methods: The observational study was conducted from June to July 2018 at an academic level-1 trauma center. Handoffs were observed by two research assistants on varying shifts and days. Data was entered into REDCap™ system. Data collected included: start and end times of handoff, demographics of healthcare professionals present during sign out, and interruptions. Interruptions were analyzed separately. Results: Sixty-six shift handoffs were observed in the two-month study period involving twenty unique attending physicians. Post graduate experience ranged from one to thirty-seven years. Handoff times increased from 7.79 minutes with no interruptions to 11.95 minutes with any frequency of interruptions. Shift handoff lengths were plotted against the years of experience, with analyses carried out for handoffs involving zero, one, and two interruptions. No correlation was found between years of attending physician experience and handoff time for any of the data sets. Conclusions: Though many factors, including length of time, affect handoffs and may lead to decreased patient safety, increased years of experience did not appear to affect shift handoff time. Further studies should be carried out to examine additional factors that determine the overall quality of a shift handoff.

123 Author-Reported Affiliations on Accepted Abstracts at the POSNA Annual Meeting

Davis Osborn, Thomas Offerle, BS, William R Barfield, PhD, James F. Mooney, III, MD, Robert Murphy, Medicine, Orthopaedics, MUSC.

Purpose: Recently, scientific publications at academic medical meetings have come under increasing scrutiny. No data has been published regarding the academic/institutional affiliations of authors of abstracts accepted at the Pediatric Orthopaedic Society of North America (POSNA) annual meeting. We sought to study the self-reported institutional affiliations, and other factors, of accepted abstracts over a 5-year period. Methods: The Electronic Programs of the POSNA Annual Meeting from 2011, 2013, 2014, 2015, and 2016 were reviewed. The total number of accepted abstracts, including main program, posters, e-posters, and specialty day, were queried. In addition, the number of authors, presenting author institutional affiliation, and the presence of a study group listed as an author were determined. Results: The total number of accepted abstracts increased sequentially over the 5-year study period (2011-188 abstracts, 2016-294 abstracts; 56% increase). The average number of authors listed per abstract remained approximately 5 throughout the study period (range 4.9-5.4). Boston Children's Hospital and Texas Scottish Rite Hospital for Children accounted for approximately 20% of all main program podium abstracts each year. The number of abstracts with a study group affiliation increased over the evaluated period (2011-4 abstracts, 2016-18 abstracts, 4.5x increase). Conclusions: The number of abstracts accepted for presentation in any form at the POSNA Annual Meeting has increased substantially recently. While the average number of authors listed on the abstract remained consistent over the review period, study groups were reported as an author more frequently. Two academic pediatric orthopaedic centers were affiliated with up to 20% of the abstracts accepted for main program presentation each year. These results demonstrate increasing utilization of multicenter databases as evidenced by an increase in the listing of a study group as an author, and document the role of certain institutions in academic processes within pediatric orthopaedic surgery.

124 Tendon Rupture Due to Implant Prominence of Volar Locking Plates

Cody Ashy, Andrew Ence MD, Andrew Leggett, William Barfield PhD, Eric Angermeier MD, Kyle Kokko, Medicine, Orthopaedics, MUSC.

Volar locking plate fixation of distal radius fractures has been associated with flexor tendon rupture (Drobetz & Kutscha-Lissberg, 2003). This study investigated whether increased prominence of volar locking plates was correlated to increased incidence of flexor tendon rupture. Our study reviewed 114 distal radius fractures, from 2014-2018, repaired using the Acu Med Acu-Loc plate. All operations were performed by either Dr. Angermeier or Dr. Kokko at the Medical University of South Carolina. For each case, AO/OTA fracture classification and Soong Plate Prominence were determined from the pre-operative and post-operative radiographs. Patient cases were followed longitudinally in clinic. In July of 2018, all patients responded to a five-question phone survey to determine if their finger function or tendon integrity was compromised. Our hypothesis was that the increased plate prominence of the Acu-Loc plate would not be correlated to increased tendon rupture incidence or inability to perform finger functions. Our findings support our hypothesis that plate prominence and fracture classification were not significantly different between patients' ability or inability to perform any of the five surveyed finger functions (pï€¾0.05). Our data contradict previous findings that the Acu Med Acu-Loc plate design and its increased volar prominence are correlated with increased incidence of tendon rupture (Soong, Earp, Bishop, Leung, & Blazar 2011).

125 Myelination of Human Spiral Ganglion Neurons

Annemarie Lam, Bradley A. Schulte, PhD, Hainan Lang, Medicine, Pathology and Laboratory Medicine, MUSC.

Loss of spiral ganglion neurons (SGNs) is one of the most common pathological changes seen in age-related hearing loss (presbyacusis). In animal models of hearing loss, degeneration of myelin around SGNs is correlated with loss of auditory nerve activity. However, this relationship is difficult to study in the human ear because of the limited knowledge on the myelination status of human auditory nerve and SGNs, as well as the scarce availability of human temporal bone samples. In this study, we examined the myelination of SGN somas in human temporal bones using quantitative immunohistochemical methods. Ten human temporal bones from donors ranging from 39 to 91 years of age were sectioned and subjected to immunohistochemistry using antibodies against myelin basic protein (MBP) and class III beta-tubulin (TUJ1). Cell counting for TUJ1+ cells demonstrated no significant difference in density of SGN soma within the Rosenthal's canal. In eight of the ten donors, encasement of the SGN soma by a thin MBP+ myelin sheath was observed in at least one turn of the cochlea. In the three donors with the greatest number of MBP+ myelin sheaths, double-staining with MBP and TUJ1 showed highly variable amounts of myelination ranging from 0-4% in the basal turn, 3-25% in the middle-basal turn, and 0-15% in the middle-apical turn. Although infrequent and variable, myelination of SGN soma was observed in human temporal bones. Future studies on how myelination of human SGN soma changes with age and hearing function may help shed light on the role myelination plays in human presbyacusis. This work was supported by NIDCD T32 DC 14435-3

126 Comparison of BPE and Mammographic Breast Density Between Patients with Cancer and with Negative/Benign MRI

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Women in the United States have a 1 in 8 chance of receiving a breast cancer diagnosis. Accurate and consistent screening is critical for finding cancer and preventing death from cancer. The objective of this study was to compare background parenchymal enhancement (BPE) and breast density using magnetic resonance imaging (MRI) and digital mammography (DM) in patients with breast cancer and those with negative or benign MRI findings. Reports from the breast imaging reporting software (PenRad) were taken from 10/1/2011 to 4/30/2018. There were 1067 patients diagnosed with breast cancer and 1451 patients with one or more breast MRI exams. Males, patients who did not have mammograms within 1 year of MRI, and patients with bilateral breast implants were excluded. 363 new cancer patients who had breast MRI performed within 2 months of cancer diagnosis (cancer group) and randomly selected 375 patients with negative or benign MRI results (benign group) were included in the study. BPE differed significantly between the benign and cancer groups, with proportionally more cancer patients in higher BPE categories, ï‡2 = .17, $p < .001$. Breast density, measured both in MRI and DM, did not differ between the benign and cancer groups. There was a significant correlation between the breast density, measured both in MRI and DM, and BPE in which higher density was associated with higher BPE, in both groups, and for all subjects, $p < .001$. BPE was higher in breast cancer patients compared to benign patients. BPE was positively associated with breast density in all patients. Cancer patients did not have increased breast density compared to benign patients. This work was supported by MUSC SHP

127 Driving high reliability with adjunct CLABSI prevention bundles in pediatric hematology/oncology patients

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Background: Pediatric hematology/oncology patients are at high risk of central line-associated bloodstream infection (CLABSI) due high device utilization and their immunocompromised state. The attributable cost and mortality related to CLABSI is quite significant particularly in immunocompromised children. Methods: For the daily care and oral care bundles, chart audits were conducted in the electronic health record to monitor compliance with all bundle elements. Data was collected for each individual bundle element, and we calculated all-or-none bundle compliance on a weekly basis. This information was shared weekly with nursing and physician leadership on the pediatric hematology/oncology unit. The cleaning of high touch surfaces in patient rooms was monitored via a GloGerm process. GloGerm was placed on high touch surfaces in patient rooms (e.g., door handles, soap dispensers) and evaluated after a routine or discharge clean utilizing a black light in that particular room. GloGerm data was collected on a monthly basis and shared with environmental services (EVS) leadership. Results: As additional feedback was provided, initially on a weekly basis and then on a daily basis, an increase was seen in compliance to individual bundle elements as well as all-or-none compliance. Overall compliance with the daily care bundle was approximately 50%. There remains significant room for opportunity with the oral care bundle. For the cleaning of high touch surfaces, a significant improvement was seen in the percentage of surfaces cleaned Conclusions: Providing consistent, specific, and timely feedback to nursing and physician leadership on the pediatric hematology/oncology unit assisted with increasing compliance to adjunct CLABSI prevention bundles. Increasing compliance to these bundles requires leadership commitment and reinforcement at every level. Additionally, it is critical to frame all communication regarding these bundles to nursing, physician, and EVS staff around the overall goal of preventing harm to our patients. This work was supported by College of Medicine Dean's Office, MUSC Department of Pediatrics

128 Characterizing the Effect of Predator Odor Exposure in C57BL/6J Mice

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Previous clinical studies identify stress as one of the leading causes of relapse during a period of abstinence. Several studies conducted in this laboratory show that exposure to a predator odor can induce reinstatement of alcohol seeking behavior in mice. This effect is seen more prominently in mice with a previous history of chronic exposure to predator odor. The overall goal of this study is to evaluate the effects of predator odor exposure, specifically TMT (a component of fox feces), in order to describe subsequent behavior and determine if some animals are more or less sensitive to stress. Subjects exposed to a predator odor should show more signs of distress than control subjects, with some degree of variability in their response to stress. The first study evaluated the effects of TMT exposure, while the second study evaluated the behavioral response of these mice while exposed to the predator odor. In Experiment 1, 100 C57BL/6J mice (50/sex) were separated in groups that either received TMT exposure alone, in combination with a pharmacological stressor (Yohimbine), or a control exposure. Following this 5-day exposure period, mice were evaluated for anxiety-related behaviors using an open field and a marble burying test. In Experiment 2, 72 C57BL/6J mice (36/sex) were also separated in groups that were exposed to TMT alone, in combination with Yohimbine, or a control exposure. During the 5 days of exposure, we videotaped the mice and cataloged stress behaviors at several time points during the 15-min exposure period. Following exposure, we performed a novelty suppressed feeding test and a sucrose preference test. Preliminary results show that while chronic stress did not cause an overt change in several measures such as body weight, we did see behavioral differences between groups in grooming and roof climbing during exposure. This work was supported by Supported by DART NIH grant R25 DA020537, U01 AA020929, U01 AA014095, and P50 AA010761, and VA Medical Research (BX000813).

129 Effects of Cigarette Smoke Exposure on the Mechanical Strength of Femur Fracture Healing

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INTRODUCTION: Cigarette smoking is a significant modifiable risk factor associated with the development of nonunion after bone fracture. However, the mechanisms by which cigarette smoking impairs fracture healing are poorly understood. The aim of this study was to determine how cigarette smoke exposure might differentially affect the two bone healing pathways (intramembranous vs endochondral ossification) through mechanical analysis of fracture union. METHODS: Sprague-Dawley rats (n=23) underwent bilateral femur fractures designed to concurrently study two bone healing pathways, which were induced via intramedullary nail or plate fixation. Twelve animals underwent one month of cigarette smoke exposure both before and after surgery. Femoral stiffness and yield force at three and six months postoperatively were biomechanically measured from four point bending. ESULTS: Six-month smoke exposed animals that underwent

intramedullary nail fixation exhibited a nearly 35% decrease in femoral stiffness compared to controls (p=0.049), but no significant difference in yield force (p>0.05). Intramedullary nail fixation at 3-month time point resulted in too few fracture unions for statistical analysis. By contrast, no differences were found between the control and smoke exposed plated femurs at three or six months. DISCUSSION AND CONCLUSION: Cigarette smoke exposure appears to preferentially impair the acquisition of mechanical stiffness in fractures healed via endochondral ossification at 6 months following intramedullary fixation, whereas the acquisition of stiffness via intramembranous ossification following plate fixation is relatively unimpaired. Decreased stiffness at six month and the observation of a higher nonunion rate in the smoke exposed nailed femurs may result from a failure to convert cartilage callus to bone through endochondral ossification. The observation of similar yield force in the same group may be due to the continued presence of the cartilage callus in the smoke exposed animals acting to stabilize the bone.

130 Medical Imaging in Esophageal Crohn's Disease: A Rare Cause of Dysphagia

Andrew Westberry, John Hughes, MD, Meryle Eklund, MD, Medicine, Department of Radiology, MUSC.

This case report exhibits medical imaging modalities used in the diagnosis of a 28-year-old male who presented at MUSC with a history of Crohn's ileocolitis and recent onset dysphagia. Based on the patient's history and imaging findings, a diagnosis of esophageal Crohn's disease was made. Esophageal Crohn's disease is a rare manifestation of Crohn's disease, and it characteristically presents with aphthous ulcers, pseudomembrane formation, and esophageal stricture on fluoroscopy. The patient in this case report has undergone immunotherapy treatment, as well as esophageal dilatation and stent placement, methods typically used in the treatment of esophageal Crohn's disease. This case report highlights the presentation, radiologic findings, and treatment for esophageal Crohn's disease.

131 Treating Lung Cancer with Oncolytic Virus Understanding the efficacy of myxoma virus against NSCLC derivative A9-F1

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Lung cancer has the highest incidence rate and kills more people each year than colon, breast, and prostate cancers combined. Current methods to treat this disease do not dramatically alter long term survival rates, leaving opportunities for new treatments to improve patient outcomes. We approach this topic by observing the efficacy of oncolytic virotherapy (OV) against murine non-small cell lung cancer (NSCLC) Lewis lung carcinoma (LLC) and a phenotypic derivative LLC-A9-F1 (A9-F1). Our studies have shown complete tumor eradication of the A9-F1 cell line when treated with myxoma virus, whereas the same treatment in the parental LLC cell line had no effect. We believe the this was due to an increase in indirect oncolytic activity. In comparing direct oncolytics between the LLC and A9-F1 cells our results show no differences when analyzed by MTT, cell viability, or morphological examination. The amount and rate of myxoma virus production was also identical as examined by single step growth curve. We then began assessing indirect OV by first examining the general response to type 1 and 2 interferons by MTT assay, showing no difference. Next, we looked for a specific defect in T-cell checkpoint inhibitor PD-L1 with the A9-F1 showing decreased expression in both western blot and flow cytometry. Our data supports a more robust cell mediated response against the A9-F1 cell line as likely for the differences seen in treatment of murine NSCLC with myxoma virus. This work was supported by Summer Health Professionals Research Program MUSC department of Microbiology and Immunology

132 Cardiac Myeloid Sarcoma: A Rare Mediastinal Mass

Courtney Wiley, Joseph Kovacich, Meryle Eklund, Medicine, Radiology, MUSC.

This case examines the radiological feature of a 45yo male who presented with a two-week history of left-sided chest pain and shortness of breath shortly after being diagnosed with pancreatic and liver lesions. Radiological imaging and cytology of pleural fluid confirmed a diagnosis of cardiac myeloid sarcoma. The tumor was located on the tricuspid valve causing severe narrowing of the right ventricular outflow tract and extending into the myocardium. These masses, also called granulocytic sarcomas, represent a rare complication occurring in association with acute myeloid leukemia (AML). They are extramedullary tumors consisting of granulocyte precursor cells. The patient underwent chemotherapy, and the cardiac mass subsequently decreased in size and metabolic activity. However, the current status of his condition is unknown. The purpose of this report is to recognize a rare manifestation of cardiac malignancy and highlight radiological findings associated with myeloid sarcoma.

133 Freezing of Gait on Dopamine Treatment affects Quality of Life in Parkinson's disease patients

Katherine Teague, Gonzalo Revuelta, Medicine, Department of Neurology, MUSC.

Abstract Withheld from Publication

134 Unilateral Cochlear Nerve Aplasia with a Variant Trigeminal Nerve V3 Origin: A Case Report

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The increased use of noninvasive MRI for the evaluation of sensorineural hearing loss has increased the rate of detection of cochlear nerve (CN) deficiency. Nearly 18% of sensorineural hearing losses can now be attributed to cranial nerve deficiency. MRI is relied on for pre-operative assessment prior to cochlear implant placement. CN deficiency refers to hypoplasia or aplasia of the cochlea nerve, which can present unilaterally or bilaterally. The nerves may be abnormal due to an interruption of normal embryonic development or as a result of post-developmental neural degeneration. CN deficiency has been seen in association with inner ear malformation, internal auditory canal (IAC) stenosis, and with normal IAC morphology. IAC stenosis on imaging can indicate CN aplasia. Heavily T2-weighted MRI of the IAC relies upon signal from the CSF creating contrast relative to the nerve roots traversing the cistern. The paucity of CSF in a narrowed IAC makes distinguishing CN hypoplasia and aplasia difficult. The CN transmits signal from the cochlea to the auditory center in the brain. The cells that will form the eighth cranial nerve emerge by the 4th week of fetal development. These cells separate from the otic vesicle to form the statoacoustic ganglion, which later forms the cochlear division of the nerve. The neurons extend in opposite directions towards the brainstem and the organ of Corti during the first trimester. During the second trimester, the cochlea and cochlear nerve mature further. The

fetus demonstrates the earliest responses to sound during the 25th to 27th weeks of development. This case demonstrates the utility of MRI for detection of unilateral cochlear nerve aplasia and an unusual aberrant origin of the mandibular branch of the trigeminal nerve in an infant who failed a newborn screening hearing exam.

135 Genetic Analysis of Leber Congenital Amaurosis and Early Onset Retinal Dystrophy in Costa Rican Children: A High Prevalence of Biallelic RPE65 mutations

Andre Bourg, Bailey Glen PhD, Joaquin Martinez MD, Ramses Badilla MD, Daynna Wolff PhD, Iya Znoyko PhD, R. Porras PhD, Robert Wilson PhD, Gary Hardiman PhD, M., Mae Millicent W. Peterseim MD, Medicine, Ophthalmology, MUSC.

Abstract Withheld from Publication

136 Determining the importance of stereochemistry in the design of peptide siRNA-carriers for oral cancer therapy

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Abstract Withheld from Publication

137 Effect of Tele-Consenting on Consent Quality and Decision Making in a Population of African Americans with and without Systemic Lupus Erythematosus

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Introduction: Incorporating telemedicine technologies into research design and implementation can ease the burden of study participation. One such burden for patients with systemic lupus erythematosus (SLE) is travel, which limits access to healthcare and research opportunities. Tele-consenting with two-way video allows improved patient access. The purpose of this work is to ensure that this technology does not adversely impact participants' comprehension of the research they are volunteering for or unduly coerce their participation in comparison to the traditional in-person informed consent process. Methods: Using a randomized controlled trial design, we are testing the impact of tele-consent via Doxy.me (a lightweight telehealth platform) on participants' consent comprehension using a modified version of the Quality of Informed Consent questionnaire and the Decision Making Control Index to assess independent participant agency. Additionally, health literacy is being assessed via the Short Assessment of Health Literacy - English Version as a modifying variable. The sample for this study includes patients and controls from the ongoing observational Microbiome Effects on Lupus (MEL) study. During recruitment or visit scheduling the tele-consenting aim is explained to potential participants as an additional, optional, part of the larger study. The MEL study enrolls African American SLE patients and healthy controls who are 18 years or older and do not have any major gastrointestinal comorbidities. Results: This work is ongoing. Presently 7 participants have undergone consent type randomization and have completed assessments. Three were assigned to tele-consenting, whereas four have undergone standard, in-person consenting procedures. The enrollment goal for this study is n=50. Conclusions: Tele-consent and two-way video calls could prove to be valuable methods for minimally invasive trials to reduce the burden of participation. However, it is important to explore the context in which, and in what population(s), this technology is most appropriate.

138 Modulating intracellular complement to reduce inflammation post ischemia reperfusion injury

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Abstract Withheld from Publication

139 Effect of scan substrates on accuracy of 7 intraoral digital impression systems using human maxilla model

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Objective: With increasing technological advancements of and incorporation of intraoral scanners (IOS) into dental offices as replacements or adjuncts to physical impressions, continued evaluation of device accuracy is warranted. This study aimed to determine how the accuracy of digital impressions was affected by four common dental substrates using seven prevalent IOS systems to scan the complete arch of a human maxilla. Materials and Methods: Seven digital intraoral impression systems were used to scan a freshly harvested human maxilla. The maxilla contained several teeth restored with amalgam and composite, as well as unrestored teeth characterized by enamel. Also, three teeth were prepared for full coverage restorations to expose natural dentin. An industrial grade metrology software program that allowed 3D overlay and dimensional computation compared deviations of the full arch and its substrates on the test model from the reference model. Results: Substrates were significantly different from each other when considering scan data as a whole, as well as when comparing IOS devices individually. Only PlanScan failed to reveal trueness differences between the different substrates, while only Emerald revealed precision differences between the substrates. When looking at the scan data by substrate, significant differences were found between IOS devices. Conclusions: Substrate type did impact the overall accuracy of intraoral scans with dentin being the most accurate and enamel being the least accurate. The four substrates being scanned did impact the trueness of all IOS devices. IOS devices also significantly impacted the overall accuracy of the four substrates being scanned.

140 Molecular Mechanism of Transglutaminase in Controlling Collagen Fiber Morphology in Periodontal Disease

Dylan Brown, Amy Bradshaw, Dental Medicine, Medicine, MUSC.

Abstract Withheld from Publication

141 Accuracy of Optical Surface Scanning of Intraoral Mucosal Tissue and Surfaces

Roy Faulks, , Zachary Evans, Dental Medicine, Assistant Professor - Department of Stomatology, Division of Periodontics, MUSC.

Abstract Withheld from Publication

142 Developing a novel bipedal device and paradigm to investigate the neural circuits involved in lower extremity movement

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Background Walking is an essential component of quality of life, however, several neurologic diseases interfere with this behavior. Although the principles of walking are well established, it has remained technically difficult to examine the neural correlates of this behavior. We sought to develop an MR-compatible bipedal device that can reliably measure the circuits engaged by bipedal movement. We tested the hypothesis that unilateral foot movement would result in elevated activity in the contralateral motor cortex and ipsilateral cerebellum, consistent with models of motor control. Methods We developed an MR compatible device that has independent foot pedals, quantifies torque and enables foot motion with limited head movement, all without inducing artifacts. Then we developed a software paradigm to display foot movement. Following pilot testing, 10 healthy subjects were recruited. Participants completed gait assessments and an fMRI using the new device. Neuroimaging data was collected while participants performed left, right, and alternating foot movements. Data were motion corrected, aligned to anatomy, transformed into standard space and smoothed. Estimates of motion were examined. Task events were convolved with a conventional hemodynamic response to determine areas of the brain activated during foot movement (SPM12, $p<0.001$; $pFWE<0.01$). Results Preliminary analysis (n=8) demonstrated that, as a group, foot movement generated significant activity in the contralateral motor and ipsilateral cerebellar cortex. This pattern was present in all individuals during foot motion. Average head motion during the task was 0.09mm (range:0.07-0.13). Conclusions This is the first demonstration of an MRI compatible, bipedal device and foot movement paradigm that can be performed without compromising data quality (i.e. excessive motion). Additionally, we demonstrated that we can reliably (and specifically) isolate activity in the contralateral motor cortex and ipsilateral cerebellum in healthy controls during movement. These data will serve as a foundation for future studies in patients with ambulatory disabilities.

143 Complement Peptide C3a Induces Mitochondrial Dysfunction and Respiration-Linked Cell Death in Candida Glabrata

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Abstract Withheld from Publication

144 Compliance Rates of Physician-Prescribed Deep Vein Thrombosis Prophylactic Mechanical Devices in Orthopaedic Patients

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Introduction: Mechanical venous thromboembolism prophylaxis devices such as sequential compression devices (SCDs) and foot pumps have been shown to significantly reduce risk of deep vein thrombosis (DVT) and pulmonary embolism (PE) in hospitalized patients. However, optimal prevention is dependent on correct usage of these devices by staff and patients. We sought to characterize the compliance rate for usage of mechanical DVT prophylaxis devices an inpatient orthopaedic surgery population. Methods: All patients admitted to the orthopaedic service were observed on 3 sperate occasions throughout the course of each day. Patients who were unable to use these devices were excluded from the study. The study was not made known to nursing and house staff to avoid observer effect. Non-compliant patients were asked by the observer reasons for not wearing the devices and then had the devices replaced to ensure patient safety. Chi-square statistical analyses of time of day, service, prior observation, and device type were conducted. Results: Data was gathered on 109 patients over 304 observations over a 3-week period. Approximately 99% of patients had devices documented as having been prescribed at time of observation. Overall compliance in this patient group was observed to be 59.3%. Most common patient-reported reasons for the 40.7% non-compliance were: the devices were interfering with ambulation, unknown reason, that other staff removed the device without replacing, or that the devices were uncomfortable. Prior observations over the course of the study did not significantly affect compliance rates, nor did age, gender, or type of device. Conclusion: Over forty percent non-compliance rate with prescribed therapy would be considered disastrous for most medical therapies. Improved compliance should be sought out through active interventions. Interventions such as regular compliance checks, nursing and patient education, device timers and alarms, and battery-powered devices have been discussed with our team and staff.

145 Twin beam dual-energy vs single-energy on a novel PET-dual energy CT: Phantom study and clinical validation.

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Objectives: To assess the quantitative image quality and radiation dose of twin beam dual-energy (TBDE) and single-energy technique at different kV levels on a novel PET-DECT scanner. Methods and Materials A chest phantom was scanned with a PET-DECT scanner (Biograph mCT Flow, Siemens Healthineers) in single-energy (SE) and dual-energy (DE) mode [slice thickness 3 mm, pitch 0.6 (SE) and 0.3 (DE)]. Phantom SE acquisitions from 70kV to 140kV and 120kV DE acquisition were performed. 13 patients underwent TBDE protocol (120 kV/140mAs, slice thickness 3mm, pitch 0.3) for primary lung cancer staging. TBDE dataset was used to generate linearly-blended (TB-LB) and noise-optimized virtual monoenergetic images at 50keV (TB-50keV) using filtered-back projection (FBP) and iterative reconstruction (IR). Contrast-to-noise ratio (CNR) was calculated and iodine CNR was normalized by radiation dose (CTDI) for all protocols using a figure-of-merit (FOM). Results TB-50keV datasets achieved the highest CNR and FOM compared to other datasets at each reconstruction. TB-50keV dataset reconstructed with IR 5 obtained the highest CNR, accounting for a 2-fold increase compared to FBP. TB-DE acquisition showed a CTDI of 6.7mGy, lower than 100kV (8.3mGy) and 120kV (14.2mGy). Patient data matched phantom result, TB-50keV achieved the highest CNR (5.39±1.61), yet with a 40% reduction in CTDI (9.7±1.8 mGy) compared with SE120kV protocol. ConclusionTB-50keV achieved higher CNR and FOM values compared to SE dataset ≥100 kV at a lower radiation dose. IR technique significantly improves DE and SE datasets CNR.

Thus, TB-50keV dataset with IR reconstruction can significantly improve the objective image quality of a PET-DECT acquisition. This work was supported by Siemens Healthineers grant

146 Use of Daily Goals Sheets on a Medicine Ward to Facilitate Nurse-Physician Communication

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Communication between physicians and nurses is vital to the effective provision of healthcare services. While interprofessional rounds have gained popularity as a means to improve communication, there are many barriers to requiring nursing staff to be physically present for rounds with physician teams. Daily goals sheets have been used in many critical care settings as an alternative method to facilitate communication between nurses and physicians. Rounding sheets have proven to be successful in improving subjective measures of communication in intensive care units, but little research has been done to determine the efficacy of this intervention in lower acuity settings. The current study consisted of a two-week pilot period utilizing a previously validated rounding tool on two internal medicine wards at the Ralph H. Johnson VAMC in Charleston, SC. Subjective ratings of communication were assessed through pre- and post-intervention surveys sent electronically to all nurses, residents, and attendings working on the VAMC wards during the month of August 2018. Survey results showed a non-significant trend towards improved communication metrics during the trial period. Based on feedback from survey respondents and discussions with nurse educators and attending physicians, minor modifications will be made to the process, and daily goals sheets will continue to be utilized at the VAMC.

147 Retrospective assessment of texture analysis parameters in abdominal lesions

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Objective: To assess low density renal lesions on Non-contrast CT images (NCT) by using qualitative and quantitative methods in differentiating renal cell carcinomas (RCC) from benign cysts. Methods: A review of pre-operative imaging of all resected RCC at MUSC identified 21 of 116 RCC measured less than 20 Hounsfield Units (HU) on NCT imaging. 20 confirmed benign cysts randomly identified from the same patients also measuring less than 20 HU were compared. All lesions were analyzed with commercial software for intra-lesion kurtosis, skewness, entropy, uniformity, mean positive pixels (MPP), and uniformity of positive pixels (UPP). Kruskal-Wallis test was applied for significance and ROC curves created for the quantitative data. Images of 41 lesions were randomized for visible classification as heterogeneous or homogenous by 3 blinded readers with sensitivity/specificity recorded. Results: Qualitative assessment of low density renal lesions had moderate performance in using heterogeneity and homogeneity to differentiate between RCC and benign cysts. Quantitative assessment revealed kurtosis, MPP, and UPP as significant. MPP had the highest performance. 2 RCCs had a lower MPP than the cut-off of 20, but their mean MPP was still higher than the cysts. Interestingly, the difference in MPP values between RCCs with densities below 20 HUD and RCCs with densities 20 HUD and above were not significantly different, showing MPP as an accurate predictor for RCCs at all densities. Conclusion: Quantitative assessment methods have potential in differentiating renal lesions measuring less than 20 HU on NCT. While some quantitative metrics have similar performance as visual assessment, MPP may perform better than visual assessment. Further analysis may show the potential of MPP as a reliable predictor of RCC at densities above 20 HU. This study was designed as a foundation in conducting more comprehensive studies. More data should be assessed before generalizing the results of this study. This work was supported by Summer Health Professionals Research Program

148 Impact of leveraging technology in the ambulatory care setting in a Veterans affairs medical center

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Introduction: According to The Joint Commission, leveraging medical technology can improve the quality and safety of care provided by healthcare organizations. At the Ralph H. Johnson Veterans Affairs Medical Center (RHJ VAMC), the pharmacy department implemented two technologies toÂ improve ambulatory clinic workflow: home telehealth access and glucometer downloading. The goal of both programs is to reduce manual provider time spent collecting vitals during patient visits in addition to making more data available when assessing patient outcomes. Methods: This study is a descriptive analysis of healthcare providers at the RHJ VAMC who utilized the technologies implemented in the ambulatory care setting. Fifteen (15) pharmacists who practice in either a primary care area or specialty care area were sent the home telehealth program (HTP) survey. Eighteen (18) healthcare providers including dieticians, nurse practitioners, and pharmacists were sent the glucometer downloading program (GDP) survey. Respondents were asked to quantify their use of the programs, as well as rate their opinion using the Likert-scale and give feedback using open-ended questions. Results: The HTP survey was answered by 85% (12/15) of pharmacists contacted. On average, 58% (7/12) said they access HTP between 6-10 times per week, with 75% (8/12) agreeing that the HTP program has met their expectations. The GDP survey was answered by 50% (9/18) of healthcare providers contacted. On average, 44% (4/9) of respondents said they use the GDP more than 10 times per week, with 67% (6/9) indicating the program has positively impacted their clinic workflow. Conclusion: It can be concluded that healthcare providers generally agree leveraging technology improves efficiency in the ambulatory care setting. The survey results provide necessary evidence to justify future technology implementation that can potentially improve the quality and safety of care provided to Veterans at RHJ VAMC.

149 Satisfaction With Telehealth Pharmacy Precepting in an Interprofessional Clinical Practice Setting.

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Purpose Utilizing telehealth provides opportunities for professionals to collaborate in an environment where interprofessional teamwork might otherwise be limited. This study evaluated the use of and satisfaction with telehealth precepting in a clinical pharmacy practice setting. Methods A survey was distributed to student volunteers in various MUSC professional programs. Sixty surveys were completed and collected from January 2016 to May 2017 at the East Cooper Community Outreach Clinic. Those students volunteering for multiple clinic days were instructed to develop an identifier for use on future surveys since they were given the opportunity to fill out the survey each time. Ten categories assessing the quality of communication and connection were rated on a scale of 1 (very dissatisfied) to 5 (very satisfied). Students were also instructed to indicate if telehealth improved patient care, whether they would use it in the future, and if they preferred telehealth or an onsite preceptor. Results The majority of the students connected with a pharmacist via telehealth for 15 minutes or less

for each session and waited less than 2 minutes to connect. Overall satisfaction for telehealth device use in the clinical pharmacy setting was high (median=5 [IQR=4-5]). Satisfaction scores suggested that using mobile units experienced less technical disruptions compared to those using laptops. All students agreed that access to a pharmacist via telehealth improved patient care and indicated that they would utilize telehealth again. When asked if they preferred interacting with a preceptor via telehealth or an onsite preceptor, 66.7% of students preferred telehealth. Conclusion The setting was an interprofessional clinic with clinical tele-precepting provided by a PharmD. The Telehealth mobile unit allowed feasible access to the PharmD, improved interprofessional training and care, which led to a perceived benefit to the level of care provided to patients. This work was supported by South Carolina Telehealth Alliance

150 Difference in First and Second Swallows During Modified Barium Swallow Studies

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Abstract Withheld from Publication

151 Breast Cancer Survivors' Unmet Needs after Completion of Cancer Treatment including Radiation Therapy

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Abstract Purpose: To identify short- and long-term unmet needs of breast cancer survivors after receiving radiation therapy. Methods: A qualitative descriptive study was undertaken within a radiation therapy academic practice. Patients who received radiation treatment for unilateral breast cancer with minimum 6 months follow-up and no disease progression were eligible, and randomly selected for participation in this study. Semi-structured interviews were conducted, framed by the five domains of the Survivor Unmet Needs Survey (SUNS) (emotional health, access and continuity of care, relationships, financial concerns, and information needs) and analyzed using an iterative inductive and deductive process. Results: Of 24 survivors invited, 16 women and 1 man agreed to interview. Median time since completion of radiotherapy for breast cancer was approximately 3.5 years (range, 0.5-11years). Six had mastectomy, 8 chemotherapy, and 13 endocrine therapy. The dominant themes emerged from the emotional and information needs domains: 1) the struggle with adapting to body image changes; 2) unexpected impact of radiation dermatitis; and 3) the need for educational tools for symptom self-management. Conclusions: Healthcare providers should assess the information needs of breast cancer patients. Enhanced patient education for radiation dermatitis and support for change in body image emerged as topics on which future efforts should focus. Symptom self-management assessment tools are needed to address patients' confidence in managing acute, intermediate and long-term side effects of radiation therapy. This work was supported by Funding for this study was backed by the Jill Teston Grant, established at University of Florida Proton Therapy Institute to support breast cancer research.

152 Care-coordination Approach to Learning Lupus Self-Management (CALLS)

Ashley White, Trevor Faith, Dr. Ramesh Ramakrishnan, Dr. Jim Oates, Edith Williams, Graduate Studies, Assistant Professor, MUSC.

Introduction: Systemic lupus erythematosus (SLE or lupus) is a chronic autoimmune disease with acute periodic flare-ups of symptoms impacting any organ system and resulting in potentially life-threatening complications. Annual costs associated with SLE are estimated to be $10,000-$50,000 more than those for patients without SLE. Major cost drivers include inpatient hospitalizations, high disease activity and damage, and poor physical and mental health. The Care-coordination Approach to Learning Lupus Self-Management (CALLS) study is a double-arm, pre-post pilot program designed to examine whether modeling and reinforcement from a lay patient navigator improves disease self-management, indicators of disease activity, health related quality of life and 30-day readmission in SLE inpatient admissions. Methods: The target population for this study are SLE inpatient admissions at the Medical University of South Carolina (MUSC). They are approached by the patient navigator about participating in the study on a rolling basis. Target recruitment is 40 patients. Consenting patients are randomized into two groups (20 intervention and 20 control). Intervention participants complete questionnaires and 12 weekly phone sessions, and controls complete questionnaires only. Questionnaires are collected at baseline, mid-intervention (6 weeks post-enrollment) and post-intervention (12 weeks post-enrollment). Data is entered into REDCap, and phone sessions are audio recorded and uploaded into MUSC Box Cloud. Results: Mid-intervention data from 23 participants includes measures of health literacy, lupus self-efficacy, patient activation, disease activity and health utilization. Compared with controls, intervention participants had a notable decrease in severe flares and overall disease activity. Conclusions: Based on our midpoint findings, having a lay patient navigator encouraging patients to engage in activities that promote the learning of disease self-management skills appears to improve disease activity. We will continue to recruit participants, and follow up these promising trends with the analysis of post-intervention data to elucidate other trends over time. This work was supported by This project was supported by the South Carolina Clinical & Translational Research (SCTR) Institute, with an academic home at the Medical University of South Carolina CTSA, NIH/NCATS Grant Number UL1TR001450. The contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH or NCATS.

154 Utility of EEG in predicting recovery after stroke

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Abstract Withheld from Publication

155 Regulation of the Cell-cell Junction Associated RNAi Machinery in Colon Cancer

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Colon cancer is the third most common type of cancer in the United States. Loss of epithelial tissue integrity is widely observed in colon tumors. Cell-cell junctions are essential for maintaining tissue integrity. The Adherens Junction (AJ) is a cell-cell junction complex composed of E-cadherin and the catenin family of proteins. A component of the complex named PLEKHA7 has been identified to tether the cytoskeleton to the adherens junctions specifically at the apical mature junctions of polarized epithelial cells. We have revealed that

PLEKHA7 recruits the core components of the RNAi machinery, such as AGO2, DGCR8 and DROSHA at the adherens junctions. Loss of PLEKHA7 results in compromised epithelial integrity and disrupts the function of the associated RNAi machinery, resulting in abnormal cell behavior. We hypothesize that PLEKHA7 acts as a as a sensor of epithelial homeostasis by regulating a junction-associated RNAi machinery. To examine this, we generated 3D cultures of Caco2 colon epithelial cells on Matrigel and verified co-localization of PLEKHA7 with RNAi proteins at the apical surface of the colonic spheroids. Importantly, PLEKHA7 depletion results in enlarged and multilayered spheroids, as opposed to the single-layered control ones, a hallmark of pro-tumorigenic transformation. Prolonged wound and fibrosis is are key precursors to colon cancer by extensive deposition of collagen-consisting extracellular matrix (ECM). Thus we are also examining 2D and 3D Caco2 cultures on Collagen I and in wound-scratch assays, to investigate the effects on PLEKHA7 and any changes in the junction-associated RNAi machinery. Examination of normal human colon tissues confirmed co-localization of PLEKHA7 and of the core RNAi components at the apical surface of colon crypts. However, this localization is disrupted or lost in colon tumor samples from patients. Our data point towards a novel putative tumor suppressor mechanism, of which we are currently investigating its modes of regulation. This work was supported by SC BioCRAFT Concern Foundation

156 A Logic Ensemble Model for Identification of Interactions Associated with Continuous Disease Phenotypes

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Many diseases have complex etiologies arising from interactions among genetic and environmental factors. If an increase in disease severity is due to interactions between factors, identification of the risk factors associated with the disease outcome can be difficult to detect using traditional statistical methods. For example, using a traditional regression approach, interactions should be selected a priori, and sufficient data must be available in order to develop a model including interactions and their associated main effects. Also, if attempting to evaluate all possible interactions, the number of terms grows exponentially. In contrast, decision tree methods do not require identification of interactions a priori, and they can handle large numbers of variables. Logic regression is a decision tree method designed to find interactions among binary variables using Boolean logic. Due to the variability in the underlying algorithm used by logic regression models, ensemble adaptations have been developed to construct multiple logic regression trees and identify the most important interactions. The primary focus of these models has primarily been on binary outcomes, but for some diseases, there is an interest in predicting continuous measures of severity. The logicFS package in R can be used to find the primary interactions for a continuous outcome; however, it does not address how to handle the complement of a Boolean interaction, which becomes relevant when the outcome is continuous. We propose continuous logicforest, a package that constructs an ensemble of logic regression trees while incorporating the idea of addressing complements of interactions. We have run simulations to test the ability of logicforest to find known interactions under a variety of conditions, and to compare its performance to that of logicFS. We apply our approach to data examining the association between lung function and genetic and patient factors in patients with cystic fibrosis.

157 Geographic Distribution and Risk of Upper Urothelial Carcinomas in Croatia, 2001-2011

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Introduction/Rationale: Strong associations exist between Balkan endemic nephropathy (BEN) and upper urothelial carcinomas (UUCs). However, the common etiology remains unclear and there are no studies to date that visualize UUC risks in Croatia. In Croatia, 14 villages in the southwestern part of Brod-Posavina County are considered endemic for BEN. The aim of this ecological study is to be the first to map cancer risks and describe the case distribution of UUCs in Croatia at the county level during 2001-2011. Methods: A total of 608 incident cases from the Croatian National Cancer Registry were analyzed. Indirect standardization was employed to compute standardized incidence ratios (SIRs). Results: Counties with SIRs greater than 1 were concentrated around the agricultural region of Slavonia and the coastal region of Dalmatia. However, only Brod-Posavina County and Vukovar-Srijem County had a statistically significant risk of UUC development, where there were 390% and 210% more UUC cases observed than expected, respectively. Unique to Brod-Posavina County, females were at higher risk (SIR 4.96; 95% CI 3.59-6.34) of developing UUCs than males (SIR 3.03; 95% CI 2.04-4.01) when compared to their Croatian counterparts. Although Brod-Posavina County only made up 3.7% of the total Croatian population (as of 2011), it had the highest frequency of incident UUC cases after the capital City of Zagreb. No elevated cancer risks were noted in the City of Zagreb, even after stratifying by sex. Conclusions: Our findings suggest that Brod-Posavina County had the highest cancer risk for UUCs, especially among females, when compared to Croatia during 2001-2011. Given that a majority of BEN patients develop associated UUCs, concurrent screening programs for UUCs and BEN should be considered not only in endemic areas of BEN but also the surrounding rural areas and amongst at-risk groups such as those undergoing hemodialysis, who frequently develop UUCs. This work was supported by The research reported here was not funded. This study was the product of a Masters of Public Health (MPH) student internship in Croatia and capstone project.

158 Modeling Birth Outcomes and Food Security: A comparison of skew-normal and skew-t regression models in frequentist and Bayesian frameworks

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In many applications of classical linear regression, the distribution of residuals exibits non-normal qualities such as skewness or heavy tails, making the assumption of normal error terms difficult to justify. The common statistical suggestion in these cases is to implement a transformation of the response variable, but this can result in a loss of interpretability. The skew-elliptical family is a broad class of probability distributions that contain the normal distribution as a special case and allow for flexible modeling when data exhibit skewness. We examine the properties of skew-normal and skew-t models from both a Bayesian and frequentist perspective, and investigate the computational tools available for fitting these models. Finally, we apply skew-normal and skew-t models to data from the Nurture study, a cohort of mothers who gave birth between 2013 and 2016. Skewed-normal residuals are observed when modeling birth weight for gestational age z-score as a function of food security status during pregnancy in these data. The results of models under several different prior structures and using different available methods of estimation are compared with respect to the impact of food security during pregnancy on birth outcomes. We also extend these results to the multivariate case when modeling infant weight longitudinally over the first year of life.

159 Modeling Space-Time Variation in Mild Cognitive Impairment and Alzheimer's Disease Incidence

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Alzheimer's disease (AD) is a neurological disorder with substantial deleterious effects on cognitive processing, social interaction and psychological and physical health. Identifying spatial and temporal variation in the incidence of AD is a promising approach related to characterizing etiologic factors of the disease. Further, there is a recognized link suggesting that mild cognitive impairment (MCI) is a precursor to AD. Thus, the aims of this research are to provide a modeled description of the space-time variation in the incidence of AD and MCI, to explore the existence of a possible dependency between the incidence of AD and MCI, and to explore the possibility that AD and MCI incidence varies on the basis of patient sex on a geographic level. In order to accomplish these goals, we fit a variety of hierarchical Bayesian space-time models to MCI and AD incidence counts collected at the county level in South Carolina (SC) between 2007 and 2017. These models allowed us to obtain spatially and temporally smoothed estimates of MCI and AD relative risk (RR), and the specification of these models were varied such that we could deduce the effect different parameterizations of spatial and temporal dependencies had on the models' relative goodness of fit (GOF) to the data as subset by patient sex. We found a significant increase in MCI risk over time in SC beginning in the year 2012, that accounting for frequent zero-valued MCI and AD counts in the SC counties improved our models' GOF across all sex subsets of the data, that the benefit of including a shared spatially correlated component between the AD and MCI RR estimates varied on the basis of patient sex, and finally that including preceding MCI risk information directly into the estimates of AD was advantageous in terms of improved model GOF to the data. This work was supported by This project was supported by the South Carolina Clinical & Translational Research (SCTR) Institute, with an academic home at the Medical University of South Carolina, NIH/NCATS Grant Numbers TL1 TR001451 & UL1 TR001450.

160 Development of a Peptide-Derived Orally-Active Kappa Opioid Agonist as a Novel Analgesic

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Kappa-opioid agonists are efficacious in peripheral pain models but suffer from centrally-mediated effects. Derivatives of the tetra-peptide D-Phe-D-Phe-D-Nle-D-Arg-NH2, such as CR665, exhibit high peripheral to central nervous system (CNS) selectivity in analgesic models when administered intraveneously (i.v.); however, they are inactive when administered orally. Application of the JT Pharmaceuticals non-natural amino acid technology to CR665 produced derivatives that exhibit peripheral analgesic activity when dosed orally but do not promote CNS-based effects. Lead compound JT09 demonstrated an agonist selectivity for kappa over mu or delta opioid receptors of >33,400 fold with a peripheral versus central selectivity of 900-fold. To assess pain modulation, a rat writhing model of peripheral pain and a hotplate model of CNS-mediated pain were performed. Results indicate that JT09 is as efficacious as morphine in alleviating peripheral pain, while failing to produce undesired CNS-mediated effects. In an operant self-administration procedure where rats pressed a lever to receive an intravenous drug infusion, JT09 failed to maintain lever responding, indicating no abuse liability. In contrast, highly salient rewards readily maintained operant responding. Additionally, JT09 did not promote other CNS-mediated effects associated with opioids (sedation, tolerance, addiction). Thus, we propose that JT09 has potential for development as a novel analgesic. JT09 is currently being investigated in the ProNeura platform, which is a subdural implant that allows for continuous drug administration for up to 12 months. Future plans include the study of JT09 in models of myocardial infarction, spinal anesthesia, and neuropathic pain. Additionally, we plan to assess JT09 for anti-emetic, anti-pruritic, anti-edematous effects. This work was supported by NIH grants DA-036398, NS-090629 and MH-65099 to Thomas A. Dix and a grant from SCE&G to Tyler C. Beck. The authors confirm that this article content has no conflicts of interest.

161 SPARC Produced by Bone-Marrow Derived Cells Contributes to Myocardial Fibrosis

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Myocardial fibrosis and the associated increases in left ventricle stiffness result from chronic pressure-overload (PO) placed on the heart. The cellular mechanisms that drive myocardial fibrosis are incompletely defined. Cardiac fibroblasts are generally considered the primary cell type that produce fibrillar collagen matrix in the heart. However, the contribution of bone-marrow derived cells, recruited to the myocardium in response to PO, clearly localize with sites of fibrillar collagen deposition. Secreted protein acidic and rich in cysteine (SPARC) is a secreted, matricellular protein that is required for insoluble collagen accumulation and the increase in myocardial stiffness characteristic of murine PO. Furthermore, in PO hearts, the time course of expansion of the myocardial macrophage population was associated with increases in insoluble collagen deposition and with increases in muscle stiffness. Importantly, greater numbers of myocardial macrophages coincided with increases in SPARC but did not coincide with increases in mRNA encoding collagen I. Bone-marrow transplant experiments supported the hypothesis that SPARC produced by infiltrating cells to the myocardium contribute to SPARC-dependent increases in fibrillar collagen. We conclude that myocardial macrophages are critical contributors to the time-dependent increases in SPARC in PO myocardium. We propose that increases in extracellular SPARC produced by infiltrating bone-marrow derived cells enhance post synthetic collagen processing, insoluble collagen deposition, and myocardial stiffness and contribute to the development of cardiac fibrosis. This work was supported by Cardiovascular training grant: T32HL007260 VA Merit Award: CX001608

162 A Novel Platform for N-Glycoprotein Cancer Biomarker Discovery from Biological Samples by Mass Spectrometry Imaging of Antibody Arrays

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The vast majority of biomarkers used in the detection of cancer are glycoproteins, and recent reports have indicated that the N-glycan component of the glycoprotein can act as a better marker of cancer than the protein component. However, accurate glycoprotein biomarker assays are lacking, and there is a need for higher throughput biomarker discovery. Here we propose a novel method for N-glycoprotein biomarker discovery using antibody microarrays coupled with MALDI Imaging Mass Spectrometry. This technique allows us to specifically capture glycoproteins and then detect all the N-linked glycans on a specific protein with high mass accuracy. Preliminary data has illustrated that this platform can be used to capture glycoproteins out of human serum, which is a truly complex biological mixture. We have

successfully captured proteins alpha-1-antitrypsin and immunoglobulin G from 1.0uL of human serum (normal and cirrhotic) diluted into buffer with no additional sample preparation needed. A well-characterized increase in one immunoglobulin G N-glycan was observed in the cirrhotic sample, which indicates that this platform has exciting potential for detecting disease-associated N-glycan changes in a protein-specific manner. This platform can then be used as a biomarker discovery tool for deadly diseases such as cancer. This work was supported by SCTR grants TL1 TR001451 & UL1 TR001450 NIH grant R21CA225474-01

163 Knot Specification for Imputation of Missing Longitudinal Variables

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Biological measures, such as HbA1c level or blood pressure, in clinical trials can be important prognostic variables for outcome prediction. They are often collected repeatedly over time, which increases the potential for missing data since they may not be collected consistently over time for all subjects in the trial. Therefore, imputation of missing data is necessary. Fully characterizing the relationship of the patient and the biologic measurement has importance, as these measures could be useful for describing the ongoing condition of a subject. Splines of various knots are suggested as a method for imputation of missing measurements of a continuous variable, as splines capture the functional component of the variable. Choosing the appropriate number of knots for a spline is instrumental to correctly imputing the missing values, because too few knots could cause the model to have a poor fit and too many knots could cause the model to over fit the data. Missing data from a continuous biologic variable were imputed using splines of 0 to 6 knots. Summary measures and their interactions were used as predictors in a multinomial model of an outcome measure. The interaction terms of the summary statistics became statistically significant after imputation. Some interaction terms were more dependent on the number of knots used during imputation, while others had more consistent results between imputation methods. This highlights the importance of knot specification in this type of imputation methodology.

164 Hypothesis Testing Framework for Dichotomization

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Dichotomization of a continuous predictor to discriminate a binary outcome is widely-used in clinical settings. Dichotomized variables provide clinicians with easily interpretable decision rules for diagnosis and prognosis among many other benefits. Despite its ubiquitous use, dichotomization of continuous predictors is heavily criticized by the statistical community for resulting in too much information loss. In the event that dichotomizing a continuous predictor is necessary, the current methods available for choosing a cut-point from the data fail to address questions of the appropriateness of the continuous variable for dichotomization. Here we provide a modification to the current information loss paradigm which quantifies the information loss associated with estimating the relationship between a continuous predictor and a binary outcome using either the continuous or dichotomized form of the predictor. Additionally, we develop a hypothesis testing framework for ascertaining the appropriateness of dichotomizing a continuous variable to discriminate a binary outcome and conduct simulations to evaluate the proposed framework and the impact of varying parameters of the associated test statistic.

165 The Role of HSC-Derived Osteogenic Progenitors in Fracture Repair

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Musculoskeletal extremity injuries are a major cause of morbidity in US populations, including Veterans and seniors. Long bone fracture repair requires osteogenic progenitor cells capable of producing mature osteocytes that supply the cellular and granular components of remodeling bone. Cellular therapies that have been advanced for fracture repair have principally utilized a cell type not believed to be hematopoietic in origin. Our previously published work demonstrates that murine hematopoietic stem cells (HSC) are a novel source of osteogenic progenitor cells. We intend to build on this finding by showing that human HSCs can be a source of mature osteocytes in vivo. Our preliminary data demonstrate the osteogenic potential of human bone marrow-derived adherent cells and implicate IGF2 as a novel pro-osteogenic factor in these cells. We hypothesize that HSC-derived osteogenic progenitor cells are capable of differentiating into mature osteocytes, participating in fracture repair, and that their osteogenic potential is enhanced by treatment with exogenous IGF2. We demonstrate enhanced mineralization of human bone marrow-derived adherent cells treated with IGF2. This enhanced mineralization is secondary to IGF2-induced activation of mitogenic AKT and MAPK signaling. Current studies are ongoing to assess the direct effect of IGF2 signaling on osteogenic differentiation through activation of RUNX2, the master transcriptional regulator of osteogenesis. We are also testing the osteogenic potential of human HSC-derived cells in a xenograft model of fracture repair. The presence of mature human-derived osteocytes will be assessed after repair of non-stabilized tibial fracture in NOD/SCID mice humanized by irradiation and transplant of human CD34+ bone marrow-derived HSCs. Together, these data will demonstrate the ability of hematopoietic cells to differentiate into mature osteocytes and contribute to fracture repair. This work was supported by VA MERIT 2I01BX000333-08A1

166 DPP-4-Cleaved SDF-1b Diminishes Migration and Osteogenic Differentiation Capacities of Bone Marrow Mesenchymal Stem Cells

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Mechanisms for age-related bone loss are poorly understood. In part it can be attributed to a decline in bone marrow mesenchymal stem cell (BMSC) osteogenic potential. Stromal cell derived factor-1 (SDF-1/CXCL12) is a chemokine responsible for activation of osteogenic differentiation pathways in BMSCs. Dipeptidyl peptidase-4 (DPP4) is a proteolytic enzyme that cleaves the two N-terminal amino acids Lysine and Proline from SDF-1. Intact SDF-1 has a very short half-life, and is cleaved by DPP4 within minutes of its release. SDF-1 cleaved by DPP- 4 enzyme is referred to as SDF-1(3-67) for the a splice variant, or SDF- 1(3-72) for the b splice variant. Both cleaved isoforms have been thought to be inactive, and reported to have no activity through CXCR4, the primary receptor for SDF-1. However, we propose the DPP4 cleaved isoforms are not inactive but possess a separate bioactivity. We tested the effect of both intact and DPP4-cleaved SDF-1b on inducing osteogenesis, adipogenesis, and migration in BMSCs. To be able to measure the difference in concentration between intact and

cleaved SDF-1, we developed an antibody specific for cleaved SDF-1. We report the first known biological effects for DPP-4 cleaved SDF-1(3-67 and 3-72) to be inhibition of osteogenesis and migration of BMSCs. Using the Alizarin Red osteogenic assay, we show that SDF-1 significantly increased BMSCs osteogenesis when added with sitagliptin (a DPP4 enzyme inhibitor), while cleaved SDF-1 significantly decreased osteogensis relative to controls. In terms of migration, cleaved SDF-1 inhibits BMSCs migration to SDF-1-gradients. Further, in young human BMSCs treated with DPP4. Cleaved SDF-1 there is an increase in expression of the antiosteogenic miRNA 29b-1-5p, which is up-regulated in aged human BMSCs. In contrast intact SDF-1 reduces the expression of miRNA 29b-1-5p in BMSCs from aged humans. These results add to our understanding regarding roles of SDF-1 and its metabolites in bone homeostasis with age. This work was supported by

167 Podocyte Development and Function Depends on Primary Cilia and the Exocyst Complex

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Background: Diseases affecting podocytes are leading causes of ESRD. Until recently, podocytes were thought not to have primary cilia, as cilia are not seen on adult podocytes; however, in 2010, primary cilia were reported on developing podocytes. In 2014, a mutation in ciliary protein IFT139 was found in patients with FSGS, suggesting cilia involvement in GN. Our mRNA profiling of injured podocytes showed downregulation of the highly-conserved eight-protein exocyst trafficking complex. We previously showed that the exocyst is necessary for ciliogenesis in kidney tubule cells, zebrafish, and mice. Exocyst members were also shown to be mutated in families with ciliopathies affecting the kidney. Thus, we hypothesized that the exocyst is critical for podocyte development/function. Methods: To test this, we generated podocyte-specific Exoc5 knockout (KO) mice, by crossing Podocin-Cre and Exoc5 fl/fl mice, and studied patients in the Nephrotic Syndrome Study Network (NEPTUNE). Results: Podocyte-specific Exoc5 KO mice showed massive proteinuria and died within 5 weeks of birth. Importantly, isolated glomeruli stained with acetylated alpha tubulin showed primary cilia in wild-type, but not Exoc5 KO, mouse glomeruli. Histological analysis showed severe defects with increased fibrosis, proteinaceous casts, effaced podocytes, and slit diaphragm loss in Exoc5 KO mice; while IF showed significant mislocalization of slit diaphragm proteins Neph1 and Nephrin. Exoc5 phenocopied Cdc42, an exocyst regulator, podocyte-specific KO mice reported by others. Mapping and Western blot analyses showed upregulation of the canonical and non-canonical arms of the TGFβ pathway, including ERK and SMAD3 activation, in Exoc5 knockdown podocytes, and Exoc5 KO glomeruli. We next examined copy number variation (CNV) data derived from genome-wide SNP arrays from 256 patients with nephrotic syndrome enrolled in NEPTUNE. This dataset identified CNV that were greater than 100kb, overlapped a gene, and were ultra-rare or absent in control populations. Within, we identified two patients with qualifying CNV affecting exocyst This work was supported by Funding from VA and NIH

168 Using Survivors' Voices to Guide the Identification and Care of Trafficked Persons by U.S. Healthcare Professionals: A Systematic Review

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Background: Evidence suggests that survivors of human trafficking in the U.S. frequently seek healthcare. However, there is little knowledge of their experiences with the healthcare system, including reasons for seeking assistance, interactions with professionals, and barriers experienced when attempting to obtain high-quality care. Methods: A systematic review of the literature was conducted to examine empirical data on survivors' perspectives about their health, the health consequences of trafficking, and their interactions with healthcare professionals within the U.S. healthcare system. Four databases were searched for studies that collected data directly from trafficked persons about U.S. healthcare experiences, that were published in a peer-reviewed journal within the past 10 years and that were written in the English language. Of the 1,605 articles initially identified, 8 met all inclusion criteria. Results: Data from 420 participants in the 8 studies demonstrated a wide range of physical and mental health complaints ranging from trauma to genitourinary issues, from substance use to chronic disease; 50-98% of survivors reported seeking healthcare services in diverse medical settings during the period of exploitation. Barriers to care occurred at the trafficker, survivor, healthcare professional and healthcare system levels. While some barriers are not easily modifiable by individual practitioners (e.g. Medicaid policies; trafficker refusal to allow survivor to seek care), others are potentially modifiable by changes in the behaviors of professionals. A trauma-informed, rights-based approach to care would address many of these issues. Conclusions: Healthcare professionals have the opportunity to identify trafficked persons and offer assistance. Trauma-informed, rights-based practices are recommended to build trust, understand survivor needs and create feasible treatment plans. This work was supported by RWJF Future of Nursing Scholars Program

169 Uncoupling of p97 ATPase activity has a dominant negative effect on protein extraction from chromatin

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Abstract Withheld from Publication

170 Predictors of improved naming ability in chronic stroke survivors after intensive aphasia therapy

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Introduction: Stroke is one of the leading causes of long-term disability. Aphasia, a language disorder that most commonly results from stroke, can affect all aspects of communication, including comprehension and expression, across the modalities of speaking, listening, reading, and writing. Although results from many studies indicate that aphasia treatment is effective, patient factors that promote a positive response to treatment are relatively unknown. Accordingly, this study sought to identify behavioral, neuroanatomical, and demographic factors that predict positive outcomes following six weeks of behavioral aphasia therapy. Methods: This study is ongoing; data from 31 participants (9 F; age M=60.5, SD=11.5; months post-stroke M=56.5, SD=53.2) is included here. Participants completed 30 sessions of standard speech-language therapy over six weeks. At baseline, high resolution (1mm3) T1 and T2 MRI scans were obtained for the purpose of neuroimaging analysis. The Philadelphia Naming Test (PNT) was used as a primary treatment outcome measure. Variables used to predict naming outcomes included demographic factors (stroke age, months post-onset of stroke, education, stroke severity), baseline cognitive-linguistic scores (matrix reasoning, auditory-verbal comprehension, repetition ability, spontaneous speech, naming/word finding, semantic

processing, overall aphasia severity), proportional damage to select neuroanatomical regions of interest (ROIs) in the language network, and overall brain health (measured using the Fazekas scale). Results: Mean number of PNT items named correctly significantly improved after the six weeks of treatment, t(29)=3.7, p=0.001. A forward stepwise regression that included all predictor variables revealed that leukoaraiosis severity, initial stroke severity and semantic processing abilities were the top predictors of treatment outcomes, accounting for 71% of the variance. Conclusion: These results suggest that the integrity of baseline semantic abilities, as well as baseline stroke severity and brain health, are crucial for making progress during aphasia treatment. Findings will be discussed with regard to models of aphasia recovery, with implications for future treatment This work was supported by NIH NIDCD T32 DC014435, NIH NIDCD P50 DC014664

171 Implicit Bias in Elementary Education Disciplinary Practices

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Introduction: Detentions and out-of-school suspensions are standard practices of discipline in the educational system, despite evidence that they are largely ineffective in deterring disruptive and maladaptive behaviors. Previous studies have indicated that implicit biases may lead to disciplinary disparities between white students and ethnic and racial minorities. Methods: Participants were 4521 children (mean age=10.0 years) drawn from a representative nationwide sample of participants in the Adolescent Brain Cognitive Development (ABCD) Study. The participant's primary caregiver reported the participant's race/ethnicity and whether the participant received a disciplinary action of suspension or detention within the last year, including the reason (e.g., fighting, talking back to a teacher, truancy). Results: African American participants were more likely to have received disciplinary action of detention or out-of-school suspension when compared to white participants (16.0% vs. 3.0%) and were more likely to have been disciplined for physical fighting (8.6% vs. 1.0%) and oppositional/defiant behaviors to school officials (7.1% vs. 0.6%, all p values < .001). There were no significant differences among other behaviors that led to school disciplinary action between white participants and participants of ethnic or racial minorities. Conclusion: African American students are disciplined with out-of-school suspensions and detentions over four times more often than white students. African American students were more likely to receive disciplinary action for subjective behaviors that are more prone to bias, indicating that the behaviors of African American students may be interpreted more as socially constructed offenses rather than true deviance of behavior that warrants detention or out-of-school suspension. This work was supported by U01 DA041093 (ABCD Study) R25 DA020537 (DART Program)

172 High Flow Nasal Cannula: Too Much Flow for the Floor?

Madeleine Genereux, Morgan Sims, MD, Ian Kane, Medicine, Pediatrics, MUSC.

High Flow Nasal Cannula: Too Much Flow for the Floor? Background: High flow nasal cannula (HFNC) has been increasingly used in the pediatric population despite a lack of large randomized controlled trials. Currently there is insufficient evidence to determine its effectiveness for treating infants with bronchiolitis, though smaller studies have demonstrated that HFNC is both effective and well tolerated. The objective of this retrospective cohort study is to evaluate outcomes including adverse events of patients with bronchiolitis admitted to our step down unit on HFNC compared with those patients admitted to our general wards unit with standard nasal cannula oxygen or without respiratory support. In doing so, our goal is to establish HFNC as an effective early intervention for patients with bronchiolitis that can be safely administered in the floor setting. Because children starting on HFNC at our institution may be admitted to the ICU or a stepdown unit, we also hope to establish whether clinical gestalt can be used to accurately identify pediatric patients with bronchiolitis who are at low risk of intubation. Methods/Results: This IRB approved, single-center retrospective cohort study evaluates the demographics, clinical variables, and outcomes of pediatric patients aged 30 days-2 years who were admitted with a diagnosis of bronchiolitis to the stepdown unit on HFNC. Data analysis is currently underway. Our primary outcome is the incidence of an adverse event (MET, code, intubation, death). Additional analysis will be performed to evaluate whether certain presenting factors such as initial respiratory rate, initial need for respiratory support, albuterol administration in the emergency department, viral process or infiltrate on chest x-ray, need for IV fluids, day of illness, and RSV status have any impact on outcomes after admission. We anticipate having our results completed by early November in time for the Research Day.

173 Uses of Point-of-Care ultrasound (POCUS) in a Rural Hospital in Western Uganda and How it Changes Patient Management

Danika Brodak, Brad Presley, MD Kyle Embertson, MD, Lacey MenkinSmith, Medicine, Emergency Department, MUSC.

Introduction: Point-of-Care Ultrasound (POCUS) has become an increasingly utilized imaging modality due to its safety, efficacy, and recent technological advances. Given POCUS' potential advantages, it may be a suitable alternative for medical professionals practicing in resource-limited settings (RLS). Despite POCUS' potential benefits in these settings, few studies exist which investigate the use of ultrasound in RLS or if, and to what extent, POCUS changes patient management. Our study will: 1) investigate how often the use of POCUS in a rural Ugandan hospital alters clinician management and 2) quantify the number and types of scans done in order to determine the most common reasons for POCUS in this setting. Methods: The study was conducted during August 2018 at Masindi Kitara Medical Center (MKMC) in rural Uganda. Local clinicians identified patients in the general ward or outpatient clinic for ultrasound examination. Images were obtained by U.S. emergency medicine residents trained in POCUS and quality assured by board-certified emergency medicine physicians certified in ultrasound. Local clinicians who ordered the ultrasound completed a survey which assessed: 1) the indication for the ultrasound 2) ultrasound study type, 3) pre- and post-ultrasound diagnosis, 4) whether the ultrasound changed patient management, and 5) how management changed. Results: A total of 58 ultrasound studies were obtained of which patient management was altered 37.9% of the time. Out of the total number of scans, nineteen were obstetrical scans, seventeen were abdominal scans, ten were gynecologic exams, nine were cardiac/pulmonary exams, two were soft tissue exams, and one assessed for a deep vein thrombosis (DVT). Conclusion: Our study suggests that POCUS changed patient management in over one third of cases and that the most common applications of POCUS focused on obstetric and abdominal complaints. These findings convey the importance of POCUS in the medical workup of patients in RLS.

174 Heme Oxygenase 1 Targeting by a Cytotoxic Isoflavone as a Determinant of Lung Cancer Sensitivity.

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ME-344 is a second generation isoflavone in preclinical and early clinical testing. The drug has unusual cytotoxicity through targeting mitochondrial bioenergetics, but lung cancer cells can be categorized as either naturally sensitive or resistant to the drug. Drug treatment of lung cancer cells induced apoptosis via caspase 3 activation, associated with hydrogen peroxide and hydroxyl radical release, initiating a robust Nrf2 signaling response and inhibition of heme oxygenase 1 (HO-1; IC50 = 17.6 nM). We synthesized clickable ME-344 compound (M2F) to identify protein targets and confirmed the interaction of the drug with HO-1 by proteomics. ME-344 time-dependently decreased HO-1 enzyme activity in sensitive cells and through specific binding altered its structure (tryptophan fluorescence, hypochromic shift). In sensitive cells, ME-344 increased HO-1 translocation from rough endoplasmic reticulum to mitochondria. This did not occur in either drug resistant or primary lung fibroblasts, where basal levels of HO-1 were lower. Lung cancer biopsies had higher levels of Nrf2 and HO-1 compared to normal tissues. There are no HO-1 inhibitors in clinical trial and our data identify ME-344 interference in redox homeostasis as a cause of cytotoxicity and supporting its clinical development.

175 Smoking-induced Emphysema in the uPARAP-null Mouse

Sarah Stephenson, Carole Wilson, Medicine, Medicine, MUSC.

Chronic obstructive pulmonary disease (COPD) is the third leading cause of mortality in the US. One of the leading risk factors for COPD is cigarette smoking, which causes a rapid decline in lung function due to extracellular matrix destruction. Although elastin is a major target for degradation in smoking-induced emphysema, collagen also undergoes changes in expression and remodeling in the course of the disease. Lung mesenchymal cells express a transmembrane endocytic receptor, urokinase plasminogen activator receptor-associated protein (uPARAP), that, through binding of both intact and partially degraded collagens, contributes to their turnover. Our previous work showed that mice lacking uPARAP have increased collagen content in the lung at baseline and in fibrosis, resulting in stiffer lungs compared to WT, and cells isolated from knockout (KO) lungs internalize less collagen than WT. We sought to determine if changes in collagen metabolism alter the sequelae of emphysema in the uPARAP-null mouse. Age-matched male WT and KO mice were exposed to cigarette smoke for 6 months, then sacrificed for collection of lung tissue. Emphysema status was assessed by measuring lung mechanics in live mice and by calculating the mean linear intercept (MLI) in tissue sections to determine the extent of alveolar dilation. Lungs from aged KO mice retained the higher elastance (stiffness) we previously saw in young mice compared to WTs, regardless of smoking. While MLI values increased significantly with smoke exposure in WT lungs, as expected, there was a less dramatic elevation in these values in KO mice, suggestive of some protection from emphysema. In addition, in the KOs, smoke exposure did not provoke as significant a change in collagen expression or content in the lung as in WT, possibly due to negative feedback regulation. We are currently evaluating elastase-induced emphysema in these mice as an acute model of the disease.

176 Survival and Apoptotic Functions of PDI are Redox Dependent

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Protein Disulfide Isomerase (PDI), a multifaceted endoplasmic reticulum (ER) resident chaperone/isomerase, plays a pivotal role in protein folding through isomerase and chaperone activity. PDI is elevated in human and murine models potentially as a protective adaptation to Cigarette Smoke (CS)-exposure. We have shown previously the presence of heavily oxidized and sulfenilated levels of PDI in the lungs of murine smokers (murine model of COPD), gradually increasing with age, which was further proved to be caused by the post translational modification of the cysteine residues in the active site of PDI inflicted by CS radicals. In separate studies, mass spectrometric analysis further confirmed that single cysteine residues within each of the catalytic sites of PDI had a mass increase [+305.3 Da] consistent with S-glutathionylation when human recombinant PDI (hPDI) was treated with PABA/NO, which is among a series of prodrugs that incorporate diazeniumdiolate anions that release nitric oxide (NO) in a kinetically favorable manner resulting in nitrosative stress in cells. The CS induced oxidation of PDI (PDI oxy) inhibits its enzymatic activity and results in the accumulation of unfolded/misfolded protein leading to ER stress. PDI oxy is not degraded efficiently; accumulated in the cells and by its gain of function through interacting with new partners has been shown to acquire redox signaling and pro-apoptotic properties. Based on this knowledge, we hereby aim to study the proapoptotic functions of PDI oxy hypothesizing the ability of PDI oxy to cause an increase in mitochondrial permeability, depolarization and release of cytochrome c along with the execution of apoptotic programs, without concomitant exposure of the whole cell proteome to CS.

177 Investigation into the Role of Serotonylation in the Cardiac Micro-Environment

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According to the World Health Organization, cardiovascular disease claimed over 8 million lives in 2016. Cardiac fibrosis is a long-term consequence of cardiovascular diseases associated with aging characterized by increased deposition of extracellular matrix (ECM) proteins, especially collagen. Hence, there is an urgent need for basic research to provide new strategies to treat these diseases. Quantification of the collagen volume fraction (CVF) between cardiac biopsies from diagnosed relative control (RC) and heart failure (HF) patients demonstrate a significant increase in collagen deposition in HF patients (RC mean=0.773, n=16, SD=0.202, HF mean=1.475, n= 10, SD=0.847, $p<0.03$), suggesting that there is a key mechanism leading to increased matrix assembly with disease progression. A potential mechanism affecting the deposition of collagen is serotonylation mediated by transglutaminase (TG2), an enzyme expressed by fibroblasts. A requirement for our study is a platform for recapitulating the cardiac microenvironment to model ECM assembly. We have two specific aims:1) Characterize ECM deposition by cardiac fibroblasts in 2D culture as compared to 3D culture and 2) investigate the functional role of serotonylation in ECM deposition. We hypothesize that a 3D culture system will better recapitulate abnormal ECM deposition seen in HF than the current 2D system. Current 2D culture system restricts tension to the x and y-axis, while tissues experience x, y, and z. Our data show that cardiac fibroblasts (HCF) cultured in a 3D scaffold are a suitable model for the study of serotonylation post-translational modification on ECM, as HCF demonstrated robust levels of procollagen secretion and improved fibroblastic cell morphology comparatively. Cultures were analyzed using western blot and immunocytochemistry, while cardiac biopsies were analyzed using immunohistochemistry. Our established 3D culture system will be used to characterize the function of TG2 and serotonylation on ECM assembly by HCF with an aim of controlling fibrotic ECM assembly. This work was supported by NIH R25 GM113278 VA Merit award: CX001608 NIH RO1: HL123478-01

178 The Immune Profile of Circulating Fibroblast Precursors in High Fat Diet fed Mice

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According to the CDC, approximately 93.3 million American adults between the ages of 20 and 59 were either overweight or obese between the years of 2015-2016. The microenvironment of hypertrophic adipose tissue has the capability of being tumorigenic due to DNA damage from local low grade inflammation. In this study, we sought to evaluate the role that circulating fibroblast precursors (CFPs) play in modulating the immune response in mammary gland adipose tissue (MGAT) from C57BL/6 mice on a high fat diet (HFD, 60% kcal from fat). CFPs are of the hematopoietic stem cell - monocyte lineage and home to inflammatory sites while expressing CD45, the pan-leukocyte marker, along with discoidin domain receptor 2 (DDR2), which binds to collagen. We hypothesize that in hypertrophic adipose tissue, CFPs act similarly to M1 macrophages by activating T cells and stimulating immune activation. To evaluate bone marrow-derived CFPs when exposed to the adipose tissue environment, we incubated whole bone marrow isolates from control mice in MGAT- conditioned media (MGAT-CM) from normal diet -fed (ND) mice, HFD- fed mice, or media alone for 48 hours. Following incubation, bone marrow isolates were analyzed using flow cytometry. In our preliminary experiment, we found that bone marrow isolates incubated in MGAT-CM from HFD-fed mice were characterized by an increased population of CD45+DDR2+ cells within the CD11b+ population, relative to cells incubated in MGAT-CM from ND fed mice ($p=0.0445$). Within the CFP population, we found a trend towards an increased population of BM isolates expressing CD86, a marker for activated macrophages, in the HFD-fed condition relative to the ND-fed condition. From these findings, we conclude that an increased population of bone marrow isolates differentiate into CFPs when introduced to MGAT-CM from HFD-fed mice and characteristics associated with activated macrophages. This work was supported by R25 GM113278 I01BX000333-08A1

179 NDST-1 Expression as a Candidate for Preferential Viral Binding of Myxoma to the Basal Epithelium

Erica Flores, Eric Bartee, Graduate Studies, Microbiology & Immunology, MUSC.

Myxoma virus (MYXV) is a member of the Poxviridae which are characterized by their large, double-stranded DNA genome and the restriction of their replication to the cytoplasm. Despite a fully sequenced genome and numerous in vitro studies, many of the molecular interactions governing the poxviral replication cycle remain poorly understood. In particular, the determinants of poxviral binding, and how these determinants influence pathogenesis in vivo are still unclear. The prevailing hypothesis is that binding of poxviral particles is based on electrostatic charge, where the positively charged viral coat proteins adhere to the negatively charged extracellular matrix (ECM) of host cells. This hypothesis, however, predicts a largely non-specific infection pattern for poxviruses which is in conflict with their observed dermal tropism. To explain this dichotomy, we hypothesized that proteins which contributed to the negative charge of the ECM, but whose expression was restricted to the epidermis might contribute to poxviral pathogenesis. One such candidate protein is NDST-1, an enzyme which is both: necessary for the specific patterning and attachment of negatively charged sulfate groups to heparin sulfate found on glycoproteins on the ECM, and highly expressed in the basal epithelium. In order to explore this idea, we deleted NDST1 from murine skin cells using CRISPR/Cas9 and asked how the loss of this protein influenced poxviral binding and subsequent infection. Our results indicated that loss of NDST1-/-did not alter overall cellular phenotypes or growth properties in vitro, but did result in a sharp decrease in sulfation. This decreased sulfation correlated with a reduction in poxviral binding, a correspondingly reduced infection rate, and a reduced ability to spread cell to cell. This data supports a model in which the dermal tropism of poxviruses is influenced by the expression patterns of the NDST1 protein. This work was supported by R21 NIAID (R21AI123803) R01 NIAID (R01CA194090)

180 The role of mitochondria ROS in podocyte damage during salt-sensitive hypertension

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Salt-sensitive (SS) hypertension is defined as blood pressure elevation in response to an increase in salt intake; the mechanism of its development is unclear, and there are no specific treatments available for the SS subjects. A hallmark of SS hypertension is an early onset of proteinuria, which results from loss of epithelial cells of the glomerular filtration barrier – podocytes. Cell culture studies show that mitochondria abnormalities may contribute to podocyte loss and development of proteinuria. The goal of this study was to test the role of mitochondria in podocyte damage during SS hypertension. Hypertension was induced in Dahl SS rats by a high salt diet challenge (HS, 4% NaCl, 21 days); control group was maintained on the low salt diet (0.4% NaC, LS). At the end of the protocol blood pressure was measured using the IITC tail cuff system, kidney flush via abdominal aorta was performed, tissues were collected, glomeruli were isolated by differential sieving and then loaded with MitoPY1 (10 μM, 30 min), a novel mitochondria-targeting reactive oxygen species (ROS) indicator; next, glomerular podocytes were imaged with a Zeiss 880 confocal microscope. We observed elevated blood pressure (178±8 vs 157±5 mmHg, n=7 per group) and a trend for renal hypertrophy in the HS group compared to controls. Higher baseline production in the mitochondria of podocytes as well as more fragmented mitochondria were found in HS group. In addition, we detected a differential response to an acute application of H_2O_2 between the LS vs HS groups. Next, we will test mitochondria biogenesis in the podocytes, perform a detailed structural analysis of mitochondria using electron microscopy, and test a panel of mitochondrial damage markers in qPCR. Further work will be devoted to discovering molecular pathways contributing to altered mitochondria structure and function in podocytes in SS hypertension. This work was supported by NIDDK K99/R00 (to D. Ilatovskaya)

181 Blockade of the TIM-3 T cell Checkpoint Improves Oncolytic Virotherapy

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T-cell immunoglobulin and mucin-domain containing-3 (TIM-3) represents an attractive target for checkpoint-based immunotherapy of a wide variety of tumors. Similar to the interaction between Programmed Cell Death Protein 1 (PD-1) and Programmed Cell Death Protein Ligand 1 (PDL-1), blockade of TIM-3's interaction with its ligand Galectin-9 (GAL-9) has been shown to restore functionality to exhausted CD8+ T cells and slow tumor progression in vivo in multiple models. Unfortunately, TIM-3 based monotherapies are often unable to induce complete regression of established tumors and are also associated with aggressive forms of autoimmunity. In order to overcome these

obstacles, we generated a recombinant myxoma virus (vTim3) that expresses a soluble TIM-3 transgene from infected tumor cells. We hypothesize that secretion of this transgene will inhibit TIM-3's interactions with its endogenous ligands, while simultaneously restricting TIM-3 blockade to the tumor microenvironment, thus reducing toxicities. Our preliminary in vitro studies show that vTim3 has no defect in its ability to initiate infection, produce new infectious progeny, or lytically kill target cells. Interestingly, however, vTim3 does exhibit a cell-type specific defect in its ability to spread from cell to cell. Despite this inherent defect, vTim3 monotherapy was able to completely eradicate established tumors in vivo in models of both melanoma and lung cancer. These results confirm that TIM-3 represents a viable target for checkpoint-based immunotherapy, and that incorporating TIM-3 blockade into a more aggressive treatment regimen, such as oncolytic virotherapy, can significantly improve therapeutic outcomes.

182 Characterization of Pericytes from Normal and Idiopathic Pulmonary Fibrosis (IPF) Human Lungs

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Pericytes are key regulators of blood vessel development and function. However, pericytes may play additional roles in tissue homeostasis and repair through their ability to upregulate immune response genes and transdifferentiate into myofibroblasts. Accumulation of myofibroblasts is a hallmark of fibrotic diseases such as Idiopathic Pulmonary Fibrosis (IPF). To understand the role of pericytes in lung fibrosis, we isolated these cells from normal and IPF lungs to compare their properties and responses to fibrotic and inflammatory stimuli in vitro. Pericytes were selected from explanted human lung digests based on PDGFRbeta expression as we previously described for mouse cells. We found that IPF cells migrated significantly more rapidly and invaded a matrix more readily than normal pericytes. TGFbeta, a major fibrotic cytokine, caused both normal and IPF pericytes to shift to a myofibroblastic phenotype, with increased expression of collagen, alphaSMA, and fibronectin. Given that pericytes are uniquely positioned in vivo to respond to danger signals of both systemic and local origin, we stimulated pericytes with agonists having damage-associated molecular patterns (DAMPs) or pathogen-associated molecular patterns (PAMPs). Both normal and IPF lung pericytes showed increased expression of proinflammatory chemokines in response to PAMPs and DAMPs. Our results demonstrate that human lung pericytes can transition to myofibroblasts, and IPF pericytes are more invasive than normal. IPF and normal pericytes both respond to danger signals through elaboration of proinflammatory chemokines. Further understanding the biology of normal and IPF pericytes will assist in developing targeted therapeutics for treatment of fibrosis.

183 Injury Site-Targeted Complement Inhibition Improves Motor & Cognitive Recovery after Murine Ischemic Stroke

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Complement activation triggers and maintains inflammation after stroke, leading to secondary injury and worse recovery in patients. Inhibition of complement activation in several murine stroke models has been shown to reduce inflammation and improve outcomes. However, because the complement system has important homeostatic and immune functions, there are significant potential advantages to localizing complement inhibition to the area of stroke and minimizing systemic inhibition. We have characterized an immune danger sensing mechanism that occurs in the brain following ischemic stroke. The mechanism consists of natural IgM antibodies recognizing danger associated molecular patterns, or neoepitopes, that become expressed on post-ischemic cerebral tissue. Once bound, these IgM antibodies activate complement and drive secondary injury. We have isolated monoclonal IgM antibodies that recognize certain neoepitopes expressed in the post-ischemic brain, and here we utilize a single chain antibody derived from one of these monoclonal antibodies to target a complement inhibitor specifically to post-ischemic cerebral tissue. In this study, we achieved injury site-targeted complement inhibition by fusing a complement inhibitor (Crry) to a single-chain variable fragment (C2scFv) that specifically binds to neoepitopes (subset of phospholipids) expressed in the post-ischemic brain. C2scFv-Crry was administered intravenously 90 minutes after ischemia in a 1-hour middle cerebral artery occlusion (MCAO) mouse stroke model. Mice were then tested for recovery over 21 days using the neurological severity score (NSS) for symmetry and passive avoidance task for fear memory. Compared to vehicle-treated, mice that received C2-Crry had significantly higher survival over three weeks (80% vs. 20%), decreased asymmetry on NSS (1.64 vs. 3.18), and better fear memory retention in passive avoidance (>200 vs. <100 seconds). This improvement in motor and cognitive recovery can be attributed to neuroprotection by reducing inflammation and cellular death, the investigation of which is currently underway. (We acknowledge NIH and VA/MC for research support). This work was supported by Dr. Stephen Tomlinson's Lab

184 Novel Drug Delivery Strategies to Improve Delivery of Anticancer Drugs Across the Blood-Brain Barrier to Treat Glioblastoma

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Abstract Withheld from Publication

185 Combination of O6-Benzylguanine, MGMT, and CDK 4/6 inhibitor or TGF-beta inhibitor Increases TMZ-Resistivity in Glioblastoma Cells

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Abstract Withheld from Publication

186 Higher-Order Chromatin Organization of the Rat Tox3 Breast Cancer Susceptibility Locus

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Genome-Wide Association Studies (GWAS) are hypothesis free methods that identify associations between genetic regions (loci) and traits. GWAS identified regulatory variants at 16q12.1 which is strongly associated with Estrogen Receptor Positive (ER+) Breast Cancer susceptibility. The increasing-risk allele that relates to the reduction of mRNA expression is the susceptibility gene TOX3, a transcription factor. Health conditions that are related to the gene are breast cancer, restless leg syndrome, and polycystic ovary syndrome. If there are certain chromatin interactions between the Tox3 promotor regulatory regions, then TOX3 polymorphisms associated with breast cancer risk

are located at both sides of the looped structure and functionally interact to downregulate transcriptional activity, like rat Tox3. The purpose of this study was to identify chromatin interactions between the TOX3 promotor regulatory region(s) in a genetically-engineered rat model that represent African American women that have an increase breast cancer risk. The study was conducted on fresh mammary gland tissues harvested from two female Sprague Dawley (SD) rats. Chromosome Conformation Capture (3C) was performed after fixation of the tissue to preserve DNA interactions, and the region of interest/Tox3 locus interrogated using polymerase chain reaction (PCR). The 'holding' nnp1 primer was designed to target chromosome 19 and an additional primer targeting the next chunk of DNA was used to amplify the fragments containing novel ligation junctions using primers specific for a pair of DNA sequences. From various gels that were analyzed only 9 out of 23 primer sets showed positive chromatin interactions. The primer sets that showed positivity were p1.2, p1.3, p1.45, p1.47, p1.8, p1.7, p10, np3, and np11.In the conclusion to this study, the primer sets that showed positive chromatin interactions will be tested once again for future directions to find how Tox3 is associated with Estrogen Receptor Positive (ER+) Breast Cancer susceptibility.

187 Maternal Marijuana use with and without the use of Opioids and their Effects on Infant Morphine Treatment

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Background: A recent rise in the use of opioids during pregnancy in the United States has resulted in an increase in neonatal abstinence syndrome (NAS). The effects of opioid use during pregnancy on newborn behavior are well described. However, the effects of other drugs, such as marijuana, on opioid withdrawal symptoms and neonatal treatment have not been investigated. The objective of this project is to examine the effects of the combination of maternal marijuana and opioid use versus opioid use alone on NAS. Methods: We used a clinical database of 429 mothers who delivered their babies at MUSC, and compared neonatal morphine treatment among infants of mothers who used marijuana and opioids versus opioids alone. We calculated Poisson distribution values and performed a chi-square test for significance. Results: Newborns whose mothers tested positive for both opioids and THC had a 21.3% probability of needing morphine treatment with a 75.3% probability of not needing treatment. Maternal use of opioids without THC resulted in a higher probability (28.3%) of the infant needing morphine treatment and a lower probability (64.5%) of not needing treatment. In mothers who tested positive for THC and other drugs, the probability of their infant receiving morphine treatment was only 10.7%. There is statistical significant difference (p=0.038) in the morphine treatment of newborns between the two opioid using groups, and an even higher significance (p=0.00001) between the need for morphine treatment in infants only exposed to THC in utero and the opioid groups. Conclusion: Infants of opioid-using mothers experienced less withdrawal if they also used marijuana, than those infants exposed only to opioids, as measured by requiring treatment with morphine. Concomitant maternal marijuana use may lower the possibility of opioid-exposed infants experiencing severe abstinence symptoms after birth.

188 A survey assessing patient self-reported frequency and severity of medication side effects and non-adherence in organ transplant recipients

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Abstract Withheld from Publication

189 Stroke Lesions and Behavioral Patterns Correlate with Severity of Post-Stroke Limb Spasticity

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Background: We aim to assess the association between corticospinal tract (CST) lesion characteristics in the acute phase and the severity of post-stroke limb spasticity (PSLS) at 3 months in a cohort of ischemic stroke patients. The secondary aim is to investigate the correlation of spasticity, motor deficits, quality of life and depression. Early intervention is known to improve outcome. Methods: This is a prospective study enrolling first-ever ischemic stroke patients with motor deficits and following them for 3 months to assess motor recovery and spasticity development. At the baseline, demographics, brain MRI and National Institute of Health Stroke Scale (NIHSS) scores were recorded. At 3-month visit, modified Ashworth Spasticity Scale (MASS) was used to assess PSLS in biceps, wrist-flexors, finger-flexors and pronator. Modified Rankin Scale (mRS), NIHSS, the Stroke Impact Scale-16 (SIS-16) and the Patient Health-related Questionnaire-9 were recorded. MRIs were reviewed to identify the affected segments along the CST: the primary motor cortex, premotor cortex, primary sensory cortex, centrum semiovale, corona radiata, posterior limb of internal capsule and cerebral peduncle. Results: 70 patients were included. The maximum MASS score is 5 with a mean score of 1.9. There was a significant correlation (Spearman's correlation coefficient =.49, $p < .001$) between the number of lesions along CST and maximum MASS scores. There was a significant correlation (Spearman's correlation coefficient=.71, $p < .001$) between baseline NIHSS arm scores and maximum MASS score. Patients with > 1 lesion had a significantly greater degree of spasticity ($p < .01$). Additionally, patients with more severe spasticity had higher mRS and NIHSS scores and lower SIS-16 scores ($P < .01$). Conclusion: Our results suggest a strong association between the number of lesions injured along the CST and the severity of PSLS. Understanding who is at risk for developing severe PSLS is critical for appropriate care. This work was supported by SHP AHA

190 Attenuation of Fibroblast Differentiation by the Inhibition of TGF-β Signaling in a Murine Model of Thoracic Aortic Aneurysm

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Introduction: Dysregulated TGF-β signaling is associated with the development of thoracic aortic aneurysm (TAA). Previous studies demonstrated a marked shift in TGF-β signaling from a TGF-β-R1-mediated pathway to an ALK-1-mediated pathway. Additionally, fibroblasts in the aortic wall during TAA development have been shown to undergo a change in cellular phenotype. Using a murine model of TAA, we hypothesized that aortic dilatation, extracellular matrix degradation, and myofibroblast differentiation, are dependent on TGF-β signaling, and could be attenuated by sequestration of TGF-β ligands (TGF-β -1, -2, -3) using a TGF-β neutralizing antibody (TGF-β NAb). Methods and Results: After baseline aortic imaging, TAA was induced in C57BL/6 mice (n=8/group; periadventitial $CaCl_2$: 0.5M, 15 minutes). The mice were randomized to receive TGF-β NAb (Clone 1D11) or non-specific Control-Ab (MsIgG) treatment (5mg/kg x 1 injection/week in 100µl). At

terminal study (baseline, 4-, 8- weeks post-TAA induction) the descending thoracic aorta was imaged, then excised for histology and fibroblast isolation. Results demonstrated aortic dilatation was attenuated in mice treated *in vivo* with the TGF-β NAb (4-wks 138.9±4.9%, 8-weeks 121.7±4.0% vs. baseline diameter, 100%), as compared to the MsIgG-Control group (4-wks 145.2±4.1%, 8-weeks 128.5±8.3% vs. baseline diameter, 100%). Preliminary phenotypic results demonstrated that extracellular matrix remodeling showed some attenuation during TAA development in TGF-β NAb treated mice (PSR staining/collagen content). Furthermore, TGF-β NAb-treated mice showed reduced fibroblast migration and increased proliferation compared to MsIgG-treated Controls. Conclusions: These results suggest that vascular remodeling and cellular differentiation were attenuated in mice treated *in vivo* with the TGF-β NAb. This supports the hypothesis that TGF-β signaling is essential for TAA development, and that it may play a direct role in cellular and structural changes observed during TAA formation and progression. Taken together, this promotes TGF-β and its signaling pathway as potential therapeutic targets for the treatment of TAA disease. This work was supported by Division of Cardiothoracic Surgery, Medical University of South Carolina and Research Service of the Ralph H. Johnson Veterans Affairs Medical Center, Charleston, SC

191 Mechanical Regulation of microRNA Abundance

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INTRODUCTION: MicroRNA's (miRs) are small non-coding RNAs that play a critical role in fine tuning protein abundance in the cell. Previous work from this laboratory identified an inverse relationship between miR-133a abundance and aortic dilatation, such that as aortic diameter increased, miR-133a abundance in the aortic tissue decreased. Based on the Law of Laplace, it was hypothesized that elevated wall-tension was the underlying stimulus for miR-133a cellular loss. Subsequent studies demonstrated that mechanical stimulation in vivo, ex vivo, and in isolated fibroblasts, was associated with increased exosome formation, increased miR-133a packing, and increased exosomal release of the from the cell. Accordingly, the present study sought to identify other miRs whose abundance is regulated by mechanical stimulation. METHODS: Isolated primary aortic fibroblast cell lines were plated in FlexCell plates with medium containing exosome-depleted FBS and either held static (n=3, baseline control) or exposed to biaxial cyclic stretch using a FlexCell system for 18 hours (n=3, 12% stretch; mimicking cardiac pressure wave). Cell medium was collected and exosomes were precipitated. The cell layer was trypsinized and cells collected by centrifugation. Small RNAs were isolated from exosomes and cells, and miR abundance was measured, in both static and stretched experimental groups, by quantitative real-time PCR. RESULTS: Results demonstrated that increased mechanical tension was sufficient to induce the loss of miR-145a (27.8±25.1% stretched vs. 100±51.2% baseline), miR-133a (13.9±5.5% stretched vs. 77.2±5.2% baseline), and miR-29a (118±106.9% stretched vs. 148.4±0.6% baseline), while miR-1 (135.6±13.5% stretched vs. 88.6±30% baseline) did not respond to stretch. CONCLUSION: Taken together these results support the hypothesis that increased mechanical stimulation alone is sufficient to induce the loss of some cellular miRs. This suggests that the process of miR reduction is specific and regulated, and may identify therapeutic target for limiting changes in mechanically-sensitive miRs. This work was supported by American Association of Thoracic Surgeons

192 Hematopoietic Cells in Healthy and Myxomatous Mitral Valves

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The primary type of Mitral Valve Prolapse (MVP) is characterized by myxomatous degeneration of the valve leaflets. Recent studies have demonstrated an increase in inflammatory cells in human myxomatous valves as well as in mouse models for myxomatous mitral valves, but its pathogenesis remains unknown. Previous studies have discovered that epicardially derived cells (EPDCs) are crucial in the formation of normal atrioventricular valve leaflets, and when these cells are genetically deleted, it results in the formation of myxomatous valves. Sox9, an important regulator of epicardial cell migration, is conditionally deleted in the epicardium to create a murine model for mitral valve disease. Through the use of the WT1cre;Sox9fl/fl murine model, this study aims to determine whether hematopoietic cells play a role in the pathogenesis of myxomatous mitral valves and how their distribution in the mitral valve changes throughout development. Leukocytes are shown to have similar distribution patterns in both healthy and myxomatous mitral valves, while myxomatous valves have an overall higher concentration of leukocytes in the valve leaflets. Additionally, the presence of leukocytes in the parietal leaflets increase as the valves mature from embryonic day 17.5 to postnatal day 60. The moderate increase in the number of leukocytes in the valve leaflets of the WT1cre;Sox9fl/fl murine model does not seem to account for the overall increase in number of cells indicating that other cell types contribute as well. This work was supported by MUSC SHP

193 Long-term impact of acute stress on cognition, anxiety, and reinstated heroin seeking in male and female rats

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Withdrawal symptoms following substance use disorders (SUD) and post-traumatic stress disorder (PTSD) reciprocally exacerbate one another. Symptoms induced by cessation of substance use culminate as stressors and lead to persistent and compulsive relapse. Additionally, PTSD can be triggered by, and contribute to, withdrawal-induced stress responses further increasing relapse potential. We examined the effects of restraint stress paired with a neutral odor, a model to mimic PTSD in rodents, on heroin seeking, anxiety-related behaviors, and social interaction during withdrawal and relapse. A group of rats were restrained in a plastic tube that did not allow for mobility with exposure to a scent (stress), while other rats were exposed to the odor in a neutral cage without restraint (sham) for two hours. All animals underwent heroin or saline self-administration (SA), anxiety assessments, and extinction followed by non-cued and cued reinstatement testing. During SA, stress rats acquired heroin faster than sham rats indexed as days to reach criteria. Intake (mg/kg) did not differ between stress conditions, but females had higher intake than males. In subsequent analyses, data were collapsed across sex due to similar patterns of responding. Stress groups did not differ on locomotor activity in a novel environment, object recognition or compartment choice on the elevated plus maze. In a defensive burying test in which the stress-conditioned odor was presented, stress exposure resulted in higher indices of defensive behavior in stress rats. A history of heroin exposure in stress rats resulted in more time interacting with a conspecific during abstinence and greater reinstatement to heroin seeking relative to sham. Our results suggest that stress and heroin may be acting on shared mechanisms mediating approach/avoidance and defensive behaviors that increase stress reactivity during drug abstinence. Additionally, our data support the hypothesis that acute stress exacerbates the risk of increased drug taking and reinstatement. This work was supported by Honors College Summer Enrichment Grant (CofC), SURP (MUSC), P50 DA016511 Specialized Center of Research (SCOR) on Sex and Gender Factors Affecting Women's Health, R01 DA033049.

194 Burnout in Radiologists Practicing in South Carolina

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Recent studies indicate that physicians are experiencing burnout at alarming rates, and radiologists are at a higher rate compared to many other medical specialties. The objective of our study was to evaluate rates of burnout in radiologists practicing in South Carolina (SC) and related factors. Of the 395 invitations delivered, 81 survey responses were received for a 21% response rate. The median age was 46 years old (range 28-75), 94.7% were white, 83.1% were male and 89.9% were married or in a domestic partnership. The median number of children was 2 (range 0-7). The majority of respondents (68.4%, 54/79) had a household income of more than $350,000 ($X2 = 116.51$, $p < .001$). Most respondents (48.1%, 38/79) work in private practices compared to other settings, $X2 = 45.11$, $p < .001$. There was a median of 18 years (range 1-45) of experience practicing radiology. Respondents reported working a median of 50 hours per week (range 18-80), receiving 7 hours of sleep per night (range 4-9) and spending 3.25 hours per week exercising (range 0-12). Wellness programs were present in 43% of workplaces. Participants were significantly more likely to have seen a doctor in the past year (64.6%) than to not have seen a doctor (35.4%, 28/79), $p = .01$. The vast majority (88.9%) of respondents reported experiencing burnout to some degree within their career. However, 88.9% agree they have accomplished many worthwhile things within their practice of radiology. 32.1% of respondents feel detached or disinterested in their work and 9.9% report having feelings where they do not care what happens to their patients. A noticeable decrease in motivation in their career was reported by 42%. Of respondents, 56.8% reported feelings of being emotionally exhausted or drained from their work, and 44.4% agree they have experienced a loss in productivity.

195 Importance of Sleep Quality in Patients with Lupus: A Cross-Sectional Study

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Introduction: Poor sleep quality in patients with systemic lupus erythematosus (SLE), with non-restorative sleep and daytime fatigue, is common and multi-factorial in etiology. Glucocorticoids such as prednisone are commonly used to treat lupus flares, and have been shown to have a negative impact on sleep in several other rheumatic diseases. The goal of this study is to test the hypothesis that prednisone use lowers sleep quality in patients with SLE. Methods: Sleep quality was measured using the comprehensive Pittsburg Sleep Quality Index (PSQI), which has been validated for use in the general population. Patients who had given permission for research contact were asked to complete the sleep survey via REDCap in-person during their Rheumatology clinic visit or via email. PSQI results were scored using validated measures. Chi-squared testing and logistic regression models were utilized as appropriate. Results: Of the 267 patients with SLE who responded to the in-person or email request for sleep quality feedback, 107 patients completed the full PSQI. Prednisone users (42.1%) were not found to have worse sleep quality (higher PSQI scores) compared to non-users, nor were those on higher dose worse than those on lower dose prednisone (p=NS). Self-reported pain and diagnosis of obstructive sleep apnea were the most highly correlated factors for poor sleep quality ($p<0.001$ and $p=0.005$, respectively). Conclusions: PSQI scores were not significantly influenced by prednisone use or dose in this study. We did find, as expected, that pain and sleep apnea were highly significant predictors of poor sleep. Limitations include the limited sample population, in an outpatient setting more willing to complete surveys due to less SLE disease activity. Further analyses will examine the impact of additional immunosuppressants on sleep quality and help identify modifiable risk factors for poor sleep among patients with SLE. This work was supported by American College of Rheumatology National Institutes of Health NIAMS K24 AR068406 and NCRR UL1 RR029882

196 Statin-Dependent Decrease in Mitochondrial Metabolism in Cancer Cells is not Mediated by Changes in Cellular or Mitochondrial Cholesterol Content

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BACKGROUND: Statins, specific inhibitors of HMG-CoA reductase, are widely used to treat hypercholesterolemia. Statins have been reported to decrease the risk of developing certain cancers like liver, breast and lung cancer. In preliminary studies, we determined that short-term treatment with simvastatin (SIM) and lovastatin (LOV) increased mitochondrial membrane potential ($\Delta\Psi$), a readout of mitochondrial metabolism, in HepG2 cells. Here, we hypothesize that statins increase mitochondrial $\Delta\Psi$ by inhibiting oxidative phosphorylation (OXPHOS)/ATP generation, independently of cellular and mitochondrial cholesterol (CHOL) content. METHODS: Single and multiphoton confocal fluorescence microscopy assessed $\Delta\Psi$ (Tetramethylrhodamine methyl ester) and NA(P)DH in HepG2 and Huh7 human hepatocarcinoma cells and in HCC4006 lung carcinoma cells. Mitochondria were isolated from HepG2 using a Mitochondria/Cytosol Fractionation Kit (Biovision). CHOL levels were determined after lipid extraction from whole HepG2 cells and isolated mitochondria using a fluorometric assay (Amplex Red Cholesterol Assay Kit). Lactic acid was determined by a colorimetric method (Lactate Colorimetric Assay Kit). Respiration was assessed using a Seahorse XFe96 Analyzer. SIM, LOV, and ATOR were used at 10 ÂµM. RESULTS: SIM and LOV increased mitochondrial $\Delta\Psi$ by ~320% at 24 h. ATOR, a structurally unrelated statin, also hyperpolarized mitochondria in HepG2 cells. SIM and LOV also increased $\Delta\Psi$ in Huh7 and HCC4006 cells. Mitochondrial and cellular cholesterol, NAD(P)H, and lactic acid production in HepG2 cells remained unchanged after SIMV. In HepG2 cells, both SIM and LOV decreased basal respiration by ~36% and 5%, respectively, but only SIM decreased maximal respiratory capacity by 20% at 24 h. ATP in cells treated with LOV and SIM decreased by ~58% and ~63%, respectively. CONCLUSION: Statins decrease mitochondrial metabolism independently of cellular and mitochondrial cholesterol content without a compensatory increase in glycolysis. The hyperpolarizing effect of statins and the simultaneous decrease in mitochondrial metabolism suggest a potential inhibitory effect on OXPHOS/ATP synthase. This study was supported by NIH R01CA184456 and GM103542 to E.N. Maldonado.

197 Withdrawn

198 Oncolytic Myxoma virus synergizes with standard of care for treatment of glioblastoma multiforme

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Glioblastoma (GBM) is an aggressive form of brain cancer which is diagnosed in more than 20,000 adults in the United States annually. Due to the unique anatomy of the brain, current treatment options are often ineffective at providing substantial reduction in tumor burden. Because of this poor prognosis, novel treatment options for GBM are of great interest. One such novel treatment is the use of non-pathogenic viral particles, a strategy known as oncolytic virotherapy. A variety of oncolytic viruses have previously shown positive efficacy against GBM, potentially offering new treatment options for patients. One such virus is Myxoma virus (MYXV), a rabbit-specific poxvirus which has been shown to be efficacious against a variety of tumor models. While previous groups have studied the use of oncolytic MYXV as a monotherapy against GBM, there is a limited understanding of how MYXV interacts with current standards of care. We therefore tested the efficacy of MYXV combined with current treatment regimens for GBM in both established cell lines as well as patient biopsy samples. Our results show that the combination of MYXV with current standards of care results in increased killing of GBM cells compared to either treatment regime alone. This increased efficacy correlated with an increase in caspase 3 activity, implicating a role for apoptosis in promoting cellular death. These findings lay the foundation for future in vivo studies on combining MYXV with GBM standards of care.

199 Dimethylguanidinovaleric Acid is a marker of Liver Fat that Predicts Future Development of Type 2 Diabetes

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Introduction Nonalcoholic Fatty Liver Disease (NAFLD) is an emerging health concern in the US that is currently estimated to affect a third of adults. However, screening for NAFLD requires an invasive liver biopsy, or expensive imaging modalities, and is therefore not routinely performed. We aimed to identify biomarkers of NAFLD using non-targeted metabolomics in well-phenotyped human cohorts. Methods Metabolite profiling was performed on 1066 participants in the Framingham Heart Study gen 3 cohort using a Liquid Chromatography-Mass Spectrometry platform. Associations of metabolites with clinical traits was done using linear regression. Unknowns were placed into biological pathways through the use of Genome Wide Association Studies. Following identification, metabolites were tuned to a high throughput targeted metabolomics platform, and follow up studies were performed in multiple additional clinical cohorts. Results An unknown metabolite with a mass to charge ratio of 202.1185 was the top hit for CT defined liver fat. This association remained significant after adjustment for multiple clinical covariates, including age, sex, smoking, alcohol consumption, HDL, Triglycerides, HOMA-IR, hypertension, and BMI ($P=1.16*10^{-10}$). Multiple Single Nucleotide Polymorphisms in the AGXT2 gene were significantly associated to the unknown ($p<5*10^{-8}$). A poorly described product of the enzyme produced by this gene, alpha-Keto-delta- (NGNG-dimethylguanidino)valeric acid (DMGV), was unambiguously identified as the unknown following structural elucidation and synthesis of a chemical standard. In follow up studies, DMGV was validated as a biomarker of NAFLD in a hospital-based case-control cohort of patients with Biopsy-proven Nonalcoholic Steatohepatitis. Further, DMGV was associated with future development of type two diabetes in three human populations even after adjustment for traditional risk factors such as age, sex, BMI, and fasting glucose. Conclusions DMGV is associated with NAFLD and predicts type 2 diabetes. Further studies are required to determine whether DMGV will serve as a useful screening tool for cardiometabolic risk. This study was supported by NIH grants K23DK99422 (to KC) and R01HL098280, U01DK048489, R01DK081572, U24DK112340 and DK 108159 (to REG).

200 Characterization of Immune Subsets in Osteoarthritis Patients

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Osteoarthritis (OA) is a leading cause of morbidity affecting 54 million Americans per year at an annual cost of 304 billion dollars to the US healthcare system. The burden of disease continues to rise with the growing aging population. Osteoarthritis is characterized as a disease of joint wear and tear. Mounting evidence suggests a role for aberrant activation of immunity to contribute to progression of disease. We hypothesized that OA patients have differential immune cell profiles between peripheral and synovial compartments as a potential indication that in situ immunity is affected by OA or vice versa. To test our hypothesis, we collected peripheral blood mononuclear cells (PBMCs) and autologous-matched synovial fluid samples from 18 patients undergoing total joint replacement for categorically advanced OA. Though total live cell in synovial fluid (SF) was significantly reduced compared to PBMC, we used FACS analysis to phenotype T cell and myeloid populations. Analysis revealed that T cell ratios by percentage did not significantly change between the periphery and SF, but transcription factor analysis showed that CD4+ T cells in the synovium were shifted toward increases in both regulatory and Th1 lineages. Importantly, percentage of CD11b+ cells that comprised CD45+ group was markedly increased as analysis moved from the periphery to the synovium, indicating an increase in site-specific immune composition of cells of the myeloid lineage. Further characterization suggested that CD45/CD11b/CD14+/CD15- cells upregulated HLADR expression in the affected synovium and in several samples these cells increased expression of CD68. Our data indicate that the affected joint space in OA patients harbors phenotypically distinct T cell and myeloid lineage populations when compared against autologous-matched peripheral immunity. How such cellular populations are developed by the synovial environment and whether these cells actively contribute to progression of disease is an area of interest for the field.

201 miR-510 mediated negative regulation of Cav1 as a mechanism driving breast cancer disparity

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In South Carolina, mortality differences between African American (AA) and Caucasian American (CA) breast cancer patients are amongst the highest in the country. Caveolin-1 (Cav1) loss in the stromal compartment is a novel biomarker for predicting poor clinical outcome in all subtypes of human breast cancer, including the more lethal triple negative subtype which is significantly more common in AA women. The loss of stromal Cav1 is well established as a marker of poor outcome in women with breast cancer; however, the mechanism of loss is unknown. Our research has shown that Cav1 is a direct target of microRNA 510 (miR-510). This research was undertaken to investigate

whether exosome-mediated transfer of miR-510 from the breast epithelium promotes tumorigenesis through the negative regulation of Cav1 expression in the stroma. Our studies have shown that miR-510 levels are significantly elevated in human breast tumor samples compared to matched non-tumor samples. In this study, we performed co-culture experiments with MDA-MB- 231 breast tumor epithelial cells in transwell inserts (upper chamber) and WPMY1 fibroblasts in the well of the plate (lower chamber). After 48 hours, we collected the stromal cells and the media from the lower chamber. We isolated miRNA and protein from the stromal cells and showed by qPCR that mIR-510 was elevated after co-culture with miR-510 expressing epithelial cells. We showed that miR-510 was functionally active as we also observed a decrease in Cav1 protein levels in the isolated stromal cells by western blot. We performed microRNA extraction from exosomes isolated from the co-culture media and quantified miR-510 expression via qPCR. We observed that miR-510 was not present in the exosomes, suggesting that either they may be moving from epithelial cells to stromal cells in an exosome-independent manner. This is currently under investigation. This work was supported by NIH/NCI 1P20CA157066-01A1

202 PCBP1 promotes effector T cell functions via repression of regulatory T cell gene programs

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The balance within the immune system between effector and regulatory functions is tightly controlled and, when aberrant, can lead to diverse conditions such as autoimmune disease or immune tolerance of cancers. T cells make up a major component of our adaptive immune system and have been shown to have distinct effector and regulatory phenotypes. The differentiation of naÃ¯ve T cells into either effector (TH cells) or regulatory cells (Tregs) is still poorly characterized. Previous research has focused on transcription factors and microRNAs involved in this process, but gene expression is also regulated post-transcriptionally by RNA-binding proteins (RBPs). Recently, the iron-binding RBP PCBP1 has been shown to increase the expression of pro-inflammatory cytokines by TH cells in response to increased intracellular iron levels in disease. Here, we demonstrate that PCBP1 plays an important role in promoting the differentiation and stabilizing the function of TH cells via repression of Treg cell programs. Activating T cells increases expression of PCBP1 and represses transcription of characteristic Treg genes. Indeed, mice with genetic deletion of PCBP1 in T cells exhibit increased frequencies of Treg cells and were more protected against the wasting disease colitis, due to de-repressed Treg signature genes and abrogated TH cell functions. Moreover, PCBP1-KO mice have reduced numbers of T cells with a higher proportion of Tregs, along with decreased expression of effector markers CD44, CTLA-4 and KLRG1 and increased expression of Treg signature molecules moesin and Bach2. RNA-sequencing database searches have shown that shRNA-mediated knockdown of PCBP1 results in similar changes in gene expression. Ongoing research in our lab seeks to perform in-depth analyses of the PCBP1-KO mice in order to further understand the roles of PCBP1 in T cell development. This is the first study to unveil the important roles of PCBP1 in controlling the biology of regulatory T cells. This work is supported by research grants from NIH to Z.L. (R01CA213290, R01CA188419, R01AI070603 and P01CA186866), ACS-IRG award to E.A.A. (ACS-IRG-18060981), and NIH T32 GM08716-20 to D.M.B.

203 Quadratus Lumborum versus Transversus Abdominis Plane Nerve Block: A Comparison in Regional Anesthesia Techniques

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Peripheral nerve blocks are used perioperatively to control pain and reduce the amount of general anesthesia and opioid pain medication needed for several types of surgical procedures. In abdominal surgery, the transversus abdominis plane (TAP) and quadratus lumborum (QL) block are both used to minimize pain in the skin and abdominal wall muscles that are involved. At our institution, the current standard-of-care for Enhanced Recovery After Surgery (ERAS) for laparoscopic abdominal surgery is to use the TAP block, but the QL may be superior. Our study plans to enroll 60 patients undergoing laparoscopic abdominal surgery performed by one surgeon at MUSC, randomized into two groups receiving one of the two nerve blocks. All patients will be managed using the ERAS protocol. Dermatome mapping was then performed in the post-anesthesia care unit and pain scales were taken after surgery and 24 hours after nerve block placement. Total opioid consumption was also measured at 24 hours post-block. Our goal is to demonstrate whether or not there is a significant difference between the two blocks, as determined by dermatomal area of analgesia and total opioid consumption in the 24 hour window. This work was supported by MUSC Summer Health Professionals Research Program, MUSC Department of Anesthesia and Perioperative Medicine

204 Lymphovascular Space Invasion As an Independent Predictor of Lymph Node Status at a Single Academic Institution

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Objective: The treatment of uterine cancer is largely determined by stage and prognostic factors. Lymphovascular space invasion (LVSI) is considered a risk factor for uterine cancer, but it is currently not classified as an independent predictor for lymph node status. This has been suggested but given variations in pathologic diagnosis of LVSI amongst various institutions, has been difficult to prove. Our objective was to review all uterine cancer cases at a single institution to determine if LSVI can be an independent predictor of lymph node status. This could be helpful for gynecologic oncologists when determining whether or not to perform sentinel lymph node biopsy of full pelvic and para-aortic lymphadenectomy. Methods: Eligible patients diagnosed with uterine carcinoma between 1988 and 2017 were identified from the uterine cancer database at our institution. A retrospective chart review of these patients was performed to assess differences regarding LVSI status, presence or absence of lymph node metastasis (LN metastasis), histologic type (type 1= endometrioid, type 2= clear cell, carcinosarcoma, papillary serous), and histologic grade of the type 1 cancers. Results: . 937 patients were identified whose pathology report included LVSI status and lymph node status. Of these patients, 192 (20%) had LVSI and 745 (80%) did not. Of those with LVSI, 68 (35%) had documented lymph node metastasis on final pathology, while 124 (65%) did not. Of those without LVSI, 48 (6%) had documented lymph node metastasis, while 697 (94%) did not. Conclusions: LVSI (+) patients were significantly more likely to have recurrence than LVSI (-) patients (44% vs 12%, $p<0.0001$). LVSI (+) patients were significantly more likely to have LN metastatsis than LVSI (-) patients (36% vs. 6.5%, $p<0.0001$ This work was supported by Summer Health Professionals Program Research Program

205 Does Early Cerebral Blood Flow in Asphyxiated Neonates Indicate Degree of Neural Injury?

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Aim: MRS is the best prognostic indicator for hypoxic-ischemic encephalopathy (HIE), but is difficult to obtain early after injury. We investigated whether cerebral blood flow measures of resistive indices (RI) and time average maximum velocities (TAMx) shortly after birth

would relate to later degree of neural injury by MRI in hypothermic HIE newborns. We predicted that abnormally high/low blood flow would be associated with poor outcomes. Methods: We retrospectively investigated 81 infants born between 2012 and 2018, â‰¥34 weeks gestation, treated with hypothermia, who received a transcranial Doppler ultrasound within 24 hours after birth, and MRI at 3-10 days. Cerebral blood flow measures (RI, TAMx) in anterior cerebral (ACA), middle cerebral (MCA) and basilar (BA) arteries were correlated with MRS ratios of neuronal health (N-acetylaspartate, NAA) in the basal ganglia (BG) and frontal white matter (WM). As both high and low RI and TAMx are abnormal, we divided our data into quartiles (Q) to find linear correlations between blood flow and NAA. Results: As resistance in MCA increased above normal (Q3), NAA ratios in WM decreased ($r^2 = -0.574$, $p=0.02$), reflecting a decrease in neuronal integrity. Also, as blood flow velocity in BA (Q4) increased above normal, NAA ratios decreased in BG ($r^2 = -0.550$, $p =0.012$). Conversely, as velocity in the BA approached normal (Q2), NAA ratios increased in WM ($r^2 = +0.618$, $p=0.011$) indicating greater preservation of axons. Conclusions: In this largest reported sample of cerebral blood flow in hypothermic HIE neonates, increased resistive index in the MCA and cerebral blood flow velocity in BA in the first 24h after HIE birth are associated with more injury, and worse NAA ratios. Transcranial doppler US can be performed at bedside shortly after birth, and might prove useful for earlier prognosis in neonates with HIE. This work was supported by College of Medicine Dean's Office & Department of Pediatrics

206 Id1 and Id3 are required to maintain steady state hematopoiesis by promoting sinusoidal regeneration

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Introduction: Understanding mechanisms that regulate endothelial survival and proliferation is important for improving therapies for cancer and vascular disease. Inhibitors of DNA binding (Id) genes are basic helix-loop-helix transcription factors that bind and inhibit E proteins, usually resulting in cell cycle arrest. While Id1 and Id3 are critical for embryonic vasculogenesis, their role in postnatal vascular regeneration remains unclear. Here, we show that Id1 and Id3 promote steady state regeneration of bone marrow sinusoids, a process required for normal hematopoietic function. Methods: Mx1-cre and Cdh5-cre mice were crossed with Id1 conditional (Id1fl/fl) and Id3 conventional (Id3-/-) mice to study induced Id1 deletion in bone marrow (BM) cells and endothelial cells, respectively. Quantification and functional properties of hematopoietic stem cells (HSCs) and endothelial cells were measured by flow cytometry. Deep confocal imaging was used to assess morphology of the BM vasculature. Primary endothelial cells were isolated from Cdh5-cre Id1fl/flId3-/- mice to monitor proliferative capacity in vitro. Results: Mx1-cre Id1fl/flId3-/- mice displayed decreased HSC number, increased HSC proliferation, and depletion of differentiated hematopoietic cells. BM sinusoids, detected by Endomucin+ staining, were dilated and hemorrhagic in Mx1-cre Id1fl/flId3-/- mice, suggesting endothelial origin. Cdh5-cre Id1fl/flId3-/- mice displayed similar hematopoietic defects. BM sinusoids from Cdh5-cre Id1fl/flId3-/- mice were apoptotic, and displayed proliferative defects in vitro and in vivo. Conclusion: Id1 and Id3 play vital roles in maintaining the survival and integrity of the BM vasculature and, contrariwise, loss of these genes in BM endothelial cells leads to impaired proliferative potential and deregulation of hematopoiesis. The signaling mechanisms that correspond with Id1 and Id3 induction can be harnessed for a treatment of a variety of conditions, including pulmonary hypertension and cancer. This work was supported by This project has been funded in part with Federal funds from the Frederick National Laboratory for Cancer Research, NIH, under Contract HHSN261200800001E.

207 Assessment of cognitive impairment in various causes of dizziness: Preliminary Report Using the Neuropsychological Vertigo Inventory

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Background: Patients with recurring or chronic dizziness, frequently complain of cognitive problems. Currently available questionnaires focus on the physical, functional and emotional impacts on the patient. The Neuropsychological Vertigo Inventory (NVI) is a new instrument that was recently developed, validated in French, and aims to quantify the cognitive dysfunction in dizzy patients. Objective: Quantify the average total NVI scores (English version) for the common causes of dizziness, and correlate the NVI scores with validated quality of life instruments such as the Dizziness Handicap Inventory (DHI) and the Cognitive Failure Questionnaire (CFQ). Methods: A prospective cohort of new patients, older than 18, consulting for dizziness at the MUSC multidisciplinary vestibular clinic and without known neurologic problems affecting cognitive function received a series of surveys including the NVI, CFQ and DHI. Patient demographic data was noted along with their current diagnosis. Results: Pilot results consist of 16 patients with vestibular migraine (VM), 13 with Meniere's disease (MD) and 14 with Benign Paroxysmal Positional Vertigo (BPPV). Average ages are 41.5, 56 and 62 respectively. The VM subjects were significantly younger than the other two groups. The MD group had the highest average total NVI score(71) and along with VM subjects (66) had significantly higher scores than the BPPV subjects (45, $p<0.05$). The total NVI score was highly correlated to CFQ score ($R=0.84$, $P<0.002$) and moderately correlated to the DHI ($r=0.51$, $p<0.002$). Conclusions: VM patients have higher levels of cognitive dysfunction while being significantly younger than the BPPV patients. Although considered a peripheral disorder, MD subjects have similar levels of cognitive dysfunction to vestibular migraine subjects (a central problem). The severity of cognitive dysfunction is positively correlated to other domains of quality of life. This work was supported by Interdisciplinary Research Training in Otolaryngology and Communication Sciences (T32 DC014435)

208 Novel injury-site targeted complement modulation reverses cognitive deficit 60 days after traumatic brain injury

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Traumatic injury to the brain is a major cause of disability among adults and is associated with motor and cognitive deficits that persist or manifest months-years after injury. Following insult to the brain, traumatic brain injury (TBI) is associated with robust local inflammation that accelerates neuronal loss and limits neuronal regeneration. We previously used a panel of injury-site targeted inhibitors that localize to sites of complement C3 deposition and inhibit all complement pathways (CR2Crry), the alternative pathway (CR2fH), or the membrane attach complex (CR2CD59) in the context of acute TBI. We have shown that although all inhibitors reduced acute neuronal loss and improved acute outcomes, inhibition of C3 deposition by the alternative or the common pathways was needed to prevent sub-acute and chronic inflammation and improve chronic cognitive recovery. This work investigates whether complement continues to deposit in the brain chronically after controlled cortical impact (CCI) and whether inhibition of complement chronically can also improve recovery. We demonstrate sustained complement deposition in the brain 2 months after murine TBI, and that CR2Crry administered 2 months after injury

localized to the ipsilateral brain and interrupted complement deposition for 30 days. Animals treated with CR2Crry as 3 doses every other day starting 2 months after CCI have significant improvement in cognitive performance on Barnes maze and novel object recognition tasks, and had a significant better performance on motor and cognitive tasks when combined with rehabilitation modeled by enriched environment. Consistent with these findings, animals treated with CR2Crry had significantly decreased perilesional microgliosis and an associated higher synaptic (PSD95+) and growing axonal (GAP43) density in the ipsilateral hemisphere. These findings demonstrate that complement is a significant contributor to propagating neuroinflammation chronically after TBI and local inhibition of complement 2 months after injury can still interrupt the progression of neuroinflammation and improve cognitive recovery. This work was supported by Department of Veterans Affairs

209 Self-navigated free-breathing radial whole heart magnetic resonance angiography for the assessment of thoracic aorta: Comparison with computed tomography angiography

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Objectives: To evaluate the clinical feasibility of self-navigated free-breathing 3D (SN3D) noncontrast magnetic resonance angiography (MRA) for the evaluation of thoracic aorta anatomy in patients with known thoracic aortic aneurysm (TAA). Methods: Patients with TAA (n=17, 69±9 years) underwent standard of care computed tomography angiography (CTA) and SN3D radial whole-heart MRA of the thoracic aorta on the same day. Two independent readers measured aortic cross-sectional area, circumference and diameter for both CTA and MRA images along seven specific anatomical section of the thoracic aorta. CTA and MRA measurements were compared using the Wilcoxon test and Pearson's correlation analysis on a per-level and a per-patient based approach. Intra-class coefficient (ICC) values were calculated to assess the inter-reader agreement between CTA and MRA. Results: SN3D MRA demonstrated good agreement on the level-based analysis in area, circumference and diameter when compared with CTA (all P>0.168) with the exception of the area (6.9cm2 [6.3; 8.9] vs 6.5cm2 [5.8; 8.2]; P=0.048) and diameter (31.7mm [29.8; 35.8] vs 31.0mm [28.5; 34.6]; P=0.048) measurements at the mid aortic arch level. An excellent agreement was seen between CTA and MRA in area (9.7cm2 [7.0; 12.9] vs 9.0cm2 [6.1; 11.8]; P=0.091), circumference (111.0mm [93.9; 128.0] vs 107.0mm [88.0; 124.0]; P=0.138) and diameter (35.1mm [39.8; 40.5] vs 33.7mm [27.8; 38.8]; P=0.217) on a per-patient level. These CTA and MRA measurements also showed high correlation (All ρ>0.964; P0.942). Conclusions: The SN3D MRA technique provides comparable anatomical measurements of the thoracic aorta as the gold standard CTA. Thus, SN3D MRA may have the potential to diagnose and monitor patients with TAA and avoid repeated exposure to radiation.

210 Commensal Microbiota Influence on Mesenchymal and Hematopoietic Differentiation in Osteoimmunology

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Abstract Withheld from Publication

211 Evaluation of Surgical Skill and Competency Using Intraoperative Recordings of ENT Procedures.

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Objectives: Evaluate the use of intraoperative videos as a method for measuring surgical skills and identify specific metrics otolaryngologists use to assess surgical technique. Methods: Questionnaires containing a one-minute recording of a mastoidectomy performed by attending and resident physicians at various levels of training were sent to ACGME-accredited otolaryngology and neurotology training programs. Attending and resident surgeons were asked to observe the videos and evaluate overall efficiency, specific technical attributes, and completion of surgical steps. Results: Physicians at all levels could consistently differentiate between the training levels of the recorded surgeons (e.g., attending or resident, p=0.04); they also graded the general efficiency of each video and individual technical attributes in like fashion. There were some differences in the perception of specific technical skills. Namely, senior surgeons were more likely to affirm deliberate use of suction (p<0.001) and irrigation (p<0.001) than were resident physicians. Several specific techniques were consistently linked with more senior surgeons and perceived efficiency; including, increased strokes per minute (p<0.001), visual field clearance (p=0.035), time on bone (p=0.004), use of the side of the bit (p=0.011), and suction movement (0<0.001). Conclusion: Our results validate the use of surgical videos as a tool to assess surgical skills in attending and resident physicians. Additionally, our study identifies modifiable techniques linked to increased surgical efficiency and training level. This research indicates that intraoperative videos could be used as both a tool for evaluating general surgical competency and as a means for providing specific technical feedback to guide trainee surgeons.

212 Passive Changes in Muscle Length Reduce Lower Extremity Corticomotor Response to Transcranial Magnetic Stimulation

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Introduction/Rationale: Transcranial magnetic stimulation (TMS) is a common assessment tool used to evaluate the corticomotor response in healthy and clinical populations. While the corticomotor response to TMS in the upper extremities is well characterized, it is much less studied in the lower extremities. The purpose of this study was to determine if passive changes in muscle length of the tibialis anterior (TA) and soleus (SOL) alters the corticomotor response. We hypothesized that stretching a muscle would increase the corticomotor response, possibly via activated muscle spindles. Methods: Using a double-cone coil, 10 TMS single pulses were delivered at 120% of the resting motor threshold to the neuronavigationally identified cortical representation, 'Hotspot', of the dominant TA and SOL muscles during two conditions: 1) resting muscle length/shortened and 2) when passively lengthened. Motor evoked potentials (MEPs) were recorded with surface electromyography and MEP amplitude and latencies were calculated offline. Variables were compared using Student's paired t-tests. Results: Tibialis anterior MEP amplitude (mV) was decreased (N = 8; mean SD; shortened, 0.5986 SD 0.4986; lengthened, .03350 SD 0.3187; P = 0.035) and MEP latency (msec) was increased (Shortened, 33.6 SD 1.7; lengthened 34.9 SD 1.4; P = 0.007) when the muscle was passively stretched. No changes in SOL amplitude or latency were identified (P > 0.113). However, a similar pattern of reduced amplitude and increased latency was seen. Conclusions: Passively lengthening a muscle alters the CMR, however the direction of the alteration was contrary our original hypothesis. The likely mechanism involves afferent feedback reducing the excitability of the alpha motor neuron, but further study is required. Determining how the CMR is altered in gait-specific positions may elucidate additional mechanisms of walking-specific motor control impairment in clinical populations.

213 Smoking Status is Associated with Increased Surgical Complications Following Total Shoulder Arthroplasty

Joshua Wilson, Alyssa Althoff, Sophia Traven, Shane Woolf, Harris Slone, Russell Reeves, Medicine, Orthopaedic, MUSC.

Introduction: While numerous studies have demonstrated the deleterious effects of smoking on patient outcomes following hip and knee arthroplasty, there remains a paucity of literature on the effects of smoking following total shoulder arthroplasty (TSA). The purpose of this study was to evaluate the effects of tobacco use on postoperative complications following total shoulder arthroplasty. We hypothesized that active tobacco users would have significantly greater postoperative medical and surgical complications. Methods: The ACS-NSQIP database was queried for patients who underwent total shoulder arthroplasties from 2005-2016. Patients were stratified based on tobacco use within the past year. Logistic regression was used to assess the relationship between smoking status and post-operative complications, including 1) medical complications (cardiac arrest or myocardial infarction, pulmonary complications, renal injury, urinary tract infections, venous thromboembolism, sepsis or septic shock and death) and 2) surgical complications (wound dehiscence, superficial and deep surgical site infection and unplanned return to the OR). Multivariate logistic regression was used to adjust for demographic and comorbid factors. Results: 14,465 patients were identified, of whom 10.5 % were active smokers. Smokers were more likely to be younger, female, and have lower BMIs compared to non-smokers ($p < 0.001$). Univariate analysis demonstrated smoking was not associated with postoperative medical complications ($p > 0.05$) but was associated with an increased risk of overall surgical complications (OR= 3.259, 95% CI= 1.861-5.709, $p < 0.001$). Multivariate modeling demonstrated that smoking increased the risk of wound dehiscence (OR= 4.724, 95% CI=1.166-19.141, $p= 0.030$). Discussion and Conclusions: This study demonstrated that smoking increases the risk of surgical complications, specifically wound dehiscence, following total shoulder arthroplasty. Medical complications were not significantly affected. This information can help risk-stratify patients prior to their procedure.

214 Are insured Emergency Department patients more likely to have a regular doctor than those with limited resources?

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Objective: Seek associations between payor classifications and having a regular doctor in a sample of patients at an urban, academic ED. Background: Patients without insurance or with Medicaid often lack Primary Care due to lesser ability to secure scheduled outpatient appointments. This leads many to adopt the Emergency Department (ED) as their Medical Home (MH), thereby sacrificing the benefits of longitudinal care. Since insurance is often the limiting factor, we investigated the association between payor classification and having a regular doctor in a sample of ED patients. Methods: 384 adults were administered a 22-item survey in our urban, academic ED regarding their perceptions about the benefit of ED-based treatment of Ambulatory Care Sensitive Conditions (ACSCs). We sought patient characteristics explaining their response to the item 'Do you have a regular doctor or clinic for primary care?'. We combined payor classifications into 2 groups: Insured (Commercial, Tricare, Supplemental, Medicare, Dual pay) and Limited (Self-pay, Medicaid). Surveys were administered by medical students using tablet computers. Bivariate and multivariable analyses were performed. Results: 366 patients were eligible for analysis. In bivariate analysis, patients with insurance were significantly more likely to have a regular doctor: 'Insured': 61%; 'Limited': 10%; p=<0.0001. This association persisted in multivariable analysis while controlling for age, race, gender, Perception of the ED as a MH, Presentation for treatment of an ACSC, having a cardiovascular risk factor (CVRF) and Making a weekend visit (OR 5.4; 95% CI: 3.2-9.4). Conclusions: In a sample of patients presenting to an urban, academic ED we found insured patients were more likely to have a regular doctor than patients with limited resources (Medicaid or no insurance). Future studies should evaluate novel primary care options for self-pay and Medicaid patients who treat the ED as their MH. One such option could be an ED Follow-up Office.

215 Orbital Atherectomy: An Analysis of Demographics and Outcomes Amongst Patients Undergoing Treatment at the Ralph H. Johnson VA Medical Center

Andrew Hill, Milad El-Hajj, Spenser Staub, Courtney Kramer, Valerian Fernandes, Anbukarasi Maran, Medicine, Medicine, MUSC.

Coronary catheterization is one of the most common procedures performed in the United States. Percutaneous Coronary Intervention (PCI) is often warranted, however, it is associated with worse clinical outcomes when performed on severely calcified vessels. One method of reducing calcification prior to PCI is through atherectomy with rotational atherectomy (RA) and orbital atherectomy (OA) being the most common. RA has been performed for over 20 years, but OA is a newer procedure that allows for improved ease of use and set up. Intraoperative complications associated with both procedures include bradycardia, perforation, and dissection. This study evaluated patients who underwent OA at the Ralph H. Johnson VA Medical Center from June 2016 to April 2018. Twenty-nine patients were retroactively identified during this time period through chart analysis. Primary outcomes included procedural success (residual stenosis of <50%) and major adverse cardiac events (MACE) at 30 days. Major complications were defined as cardiac death, Q wave MI, or emergent bypass surgery. Minor complications were defined as hypotension, bradycardia, dissection, perforation, and no-reflow. OA was performed in 29 patients with procedural success achieved in 100%. Major complications occurred in 0% of patients and minor in 55.2% (n=16). Most commonly patients experienced transient hypotension (n=13) or bradycardia (n=9) with atherectomy. Dissection occurred in 6.9% (n=2). Mechanical support (impella or balloon pump) was required in 24.1% (n=7) of patients before and 6.9% (n=2) as a complication of atherectomy. 48.3% (n=14) of patients required ICU stay for monitoring after procedure with 0% deceased at 30 days. No patients required pacemaker or ICD placement following atherectomy. The data collected from these procedures is a testament to the high risk profile of patients referred for complex PCI. OA is a feasible alternative to treat coronary calcium and facilitates successful PCI in patients with advanced coronary artery disease.

216 Smoking Status is Associated with Increased Complications and Readmission Following Extensor Mechanism Repair

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Objectives: Extensor mechanism injuries are disabling injuries that require prompt evaluationand treatment and complications are often devastating. While smoking has been shown to increase complications following total joint arthroplasty, this relationship has not yet been establishedin those undergoing extensor mechanism repair. The purpose of this study wasto evaluate the risk of smokingon postoperative complicationsfollowing extensor mechanism repair. Methods: The NSQIP database was used to identify patients whounderwent an extensor mechanism repair from 2005-2016. Patients were stratified by tobacco use, as either 'current' or 'non-smokers.' A multivariate

logistic regression was used to control for demographic and comorbid factorswhile assessing perioperative complications. Results: 5,208 patients were identifiedand of these, 843(16.2%) were current smokers. Smokerswere younger, male, and with lower BMIs compared to non-smokers (p=0.001, p=0.003, p=0.002, respectively). They had a higher rate of surgical complications (OR=1.605, CI=1.023-2.518), including deep surgical site infections (OR=3.270, CI= 1.025-10.432) and unplanned return to the operating room (OR=2.001, 1.240-3.227). Smokerswere more likely to be readmitted within 30 days of surgery (OR=1.778, OR=1.092-2.896). Conclusions: Tobacco use is associated with surgical, but not medical, complications following repair ofextensor mechanism injuries. These patients are at higher risk for deep infections, unplanned return to the OR, and hospital readmission. Identifying these patients preoperatively will allow surgeons to accurately counsel patients on perioperative risks. Counseling inpreoperativesmoking cessation may be importantforoptimizing patient outcomes following extensor mechanism repair.

217 Endocrine Mucin-Producing Sweat Gland Carcinoma: A Systematic Review Featuring a Case Report of the First Documented Case of Metastasis

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INTRODUCTION Endocrine Mucin-Producing Sweat Gland Carcinoma (EMPSGC) is a very rare, under-reported, low-grade cutaneous adnexal tumor, with a predilection for the eyelid. There is current debate in dermatopathology literature as to whether EMPSGC is a precursor to a more common, but still relatively rare adnexal tumor, primary cutaneous mucinous carcinoma (PCMC). Furthermore, literature also focuses on the histopathological similarities of EMPSGC to solid papillary carcinoma of the breast and the subsequent need to rule out a concurrent primary breast malignancy. EMPSGC was previously thought to be relatively benign. However, with this case report, we report the first documented case of metastatic EMPSGC in a patient with a long-standing eyelid tumor with metastasis to the parotid gland. METHODS Information concerning our case was obtained via review of electronic medical records for demographic, clinical, and pathological data. Identification of documented cases for our systematic review was done via a comprehensive search of PubMed-NCBI, Scopus, and Google Scholar. RESULTS Amongst 33 relevant publications identified, there was a total of 108 EMPSGC cases, with our case making a total of 109. Zero cases, other than our own, were said to have metastatic disease. Amongst cases with reliable data, 34.4% of EMPSGC's had histological components of invasive mucinous carcinoma. Similarly, amongst cases with original pathological diagnoses of EMPSGC, 52.6% were initially incorrect. Only upon re-examination, were they correctly diagnosed. 9 cases were evaluated for breast or GI primary cancers. 6 cases of recurrent disease were identified in patients who were followed for recurrence, over an average follow-up period of 28.1 months. No publications provided data for 2 Year Disease-free survival (DFS) or Overall Survival (OS). CONCLUSION EMPSGC has now been reported as a malignancy with evidence of metastasis and future care of patients with this carcinoma should undergo more rigorous evaluation for metastatic disease.

218 Preferences in Stapes Surgery among Elite Otologists

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Stapes surgery is considered to be a technically challenging otologic operation for the treatment of otosclerosis. There is currently no standard protocol or standardized method for this procedure, and stapes surgery practices have varied throughout its history. In order to elucidate current preferences in stapes surgery among elite otologists, a retrospective study was conducted via an emailed survey to members of the American Otological Society. With one allowed email request, 45 survey results were received from 280 members. Most otologists (32, 71%) performed 2-5 stapes surgeries a month under general anesthesia (31, 69%). Stapedotomy (32, 71.1%) was the preferred operation versus stapedectomy (9, 20%). The majority of respondents (25, 56%) used the rosette method of laser stapedotomy with manual debris removal using a pick for footplate fenestration. The preferred prosthesis was the heat-activated memory hook (23, 51%). Either the handheld potassium titanyl phosphate (KTP) laser (18, 40%) or handheld carbon dioxide (CO2) laser (15, 33%) was used. Sealing of the footplate was most often performed with either blood (15, 33%), fat (11, 24%), fascia (9, 20%), or nothing (6, 13%). Antibiotic use was variable, as 15 (33%) otologists used only pre-operative antibiotics, two (4%) used post-operative antibiotics only, and 14 (31%) used both. Fourteen (31%) did not use antibiotics. In terms of resident participation, 19 (42%) otologists allowed residents to place the prosthesis, while 13 (29%) allowed residents to crimp the prosthesis, and 12 (27%) allowed residents to laser or drill the footplate. Twelve (27%) otologists only allowed otology fellows to perform the above, while 9 (20%) only allowed residents interested in otology to perform the same. This study demonstrates both the great variability of stapes surgery preferences and need for increased resident and fellow participation in stapes surgery in the modern era.

219 Treatment Options for Acute Noise-Induced Hearing Loss: a Systematic Review and Meta-Analysis

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Introduction Noise exposure is a well-recognized cause of hearing loss. Approximately 24% of the U.S. adult population suffers from noise-induced hearing loss (NIHL). NIHL can occur in a chronic setting, such as occupational exposure, or acute setting such as military service and recreational circumstances (fireworks, music festivals, etc.). To our knowledge, no study has conducted a systematic review of pharmacological and non-pharmacologic treatments for acute NIHL. The goal of this study is to evaluate the literature in order to aid clinicians' decision-making when treating a patient with acute NIHL. Methods We conducted a systematic review and meta-analysis. The PubMed, Cochrane, and Scopus databases were independently searched by two authors using the following terms: 'acoustic trauma', 'noise-induced hearing loss', and 'treatment'. Articles of interest included treatment-naïve patients presenting after acute acoustic trauma. Results 17 studies with 1648 patients met inclusion criteria. 740 (52.6%) were male, 19 (13.5%) were female, and the remainder, 649 (46.1%), could not be ascertained. Sources of exposure included firearms, military weapons, firecrackers, music-related events, and a chemical plant explosion. Treatment modalities included steroids, vasodilators, normobaric and hyperbaric oxygen therapy, vitamins, and herbal supplements. All studies were conducted outside the United States. A meta-analysis of proportions is currently being conducted to determine whether the degree of hearing gain after treatment is significantly different among treatment arms. Conclusions After analyzing all studies meeting inclusion criteria, we found the majority of acoustic trauma was caused by firearms training in a young male population. The results from the meta-analysis will allow us to ascertain whether one treatment modality is advantageous relative to the others. Despite

limitations, such as demographics and source of noise exposure, this study offers a comprehensive analysis of the treatments utilized for acute NIHL that can guide treatment of this condition.

220 Ultra high resolution MR histology Using ROI-extraction and SNR-efficient gradient echo imaging

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A method to perform MR (magnetic resonance) histology at 25 µm isotropic in rat brains was created designing a SNR-efficient gradient echo sequence, building customized coils, and extracting tissue ROI (region of interest) using 3D-printed rat brain slicers A slice-selection and slice-spoiler free gradient echo sequence was designed with high-bandwidth hard excitation pulses, a low bandwidth readout, and simultaneous use of all three gradient sets for each pulse sequence step. Tissue was prepared for this short repetition time, long echo time pulse sequence by immersion in Gd-DO3A-butrol for longitudinal relaxation time shortening and deionized water for increased proton density and transverse relaxation time lengthening. Initial MR images of the rat brains (n = 12) were collected at 40 µm isotropic resolution with use of a custom-built copper solenoid coil. The ROI was identified and brain 3D model extracted to generate 12 3D-printed brain slicers. The slicers extracted the ROI, which was then imaged in a smaller copper solenoid coil at 25 µm isotropic. The bespoke 3D-printed rat brain slicers fully captured the intended ROI in all 12 extractions. Rat brain images at 25 µm isotropic resolution were obtained with a signal to noise ratio in magnitude data of 119(±4.0) and contrast (gray matter to white matter) to noise ratio of 76.8(±4.9) in a scan time of 23.4(±1.8) hours. Processing of phase data using quantitative susceptibility mapping methods revealed high sensitivity to tissue susceptibility and anisotropic orientation-induced effects. The novel approach to pulse sequence design and tissue processing combined with custom RF coils generated rat brain MR histology images with a higher SNR, CNR, and effective resolution than any previously published work and was done on ordinary preclinical MR scanners. This work was supported by National Institute of Neurological Disorders and Stroke Cancer Research UK

221 The Use of Structurally Augmented 3D Printed Cages in Segmental Defects of the Tibial Shaft

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Introduction Modern day management of segmental defects of the tibia shaft (SDTS) involve autologous nonvascularized grafts, autologous vascularized contralateral fibula grafts, as well as bone transport distraction osteogenesis, however single stage titanium cages with adjuvant biologics continue to demonstrate advantages. With the development of advanced additive manufacturing further modalities such as complex variable lattice structure and submicron texture may be incorporated into custom fit implants. We aim to further investigate the potential of this technology on osteoinduction, and hypothesize early bone in-growth. Methods A retrospective analysis was performed on 3 patients undergoing custom cage implantation for SDTS. All three patients were male with an average age of 60, 2 patients were diabetic, and one was a smoker. All three cases were performed in the setting of post-infection salvage. Pertinent demographic and clinical history was retrieved through the medical record. Results All three cases were uncomplicated in the post-surgical period, and early bone in-growth was demonstrated in successive follow-ups. One case was single-staged and built into a prior total ankle arthroplasty, the next was a deformity correcting intramedullary rod that became infected requiring two-stage salvage with an antibiotic spacer and subsequent custom cage implantation with Intramedullary rod supplementation, and the third case was a two-stage trauma salvage initially using an antibiotic spacer with subsequent custom cage implantation. Conclusion 3D printed custom cages were found to be a safe and efficacious option for management of SDTS, with demonstrated early bone in-growth. Considering the incorporation of advanced additive manufacturing techniques, strong implementations may be present for salvage cases.

222 Complement Modulation in Stroke: Closing the 'Reperfusion Mismatch'

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Ischemic stroke involves a biphasic pathology; a primary injury at the ischemic core and a secondary injury that occurs in the surrounding brain leading to exacerbation of neuronal loss by the immune reaction to stress and necrotic tissue. Inflammation after stroke is triggered by the expression of damage-associated molecular patterns that are recognized natural IgM antibodies (NIgM) triggering the activation of the complement system. We identified one IgM mAb that recognizes a post-translational modification of annex IV (B4-IgM) expressed on stressed cerebral parenchyma. We exploited this antigen-recognition system to deliver complement inhibition locally to the ischemic brain and suppress the initiation of inflammatory cascades by using a fusion construct of B4IgM-derived single chain antibody (scFv) and the complement inhibitor Crry. Following murine transient middle cerebral artery occlusion (MCAO), B4Crry specifically targeted the ischemic brain when administered intravenously after 1h, and transiently inhibited complement activation. Administered up to 24h after stroke, B4Crry significantly improved neurological outcome, enhanced cognitive and motor performance, and reduced tissue scarring over 30 days. We then combined B4Crry administration and tissue-plasminogen activator treatment using a microembolic model of stroke. We show that thrombolysis (t-PA) is associated with increase in local complement activity and persistent chronic neuroinflammation. Thrombolysis alone did not show improvement in cognitive deficits even when combined with rehabilitation. However, co-administering B4Crry and t-PA reduced t-PA associated hemorrhage and improved cognitive performance several weeks after injury. B4Crry also reduced chronic inflammation after stroke even with a single injection. Supporting these findings, outcomes from human stroke patients who underwent endovascular thrombectomy or t-PA thrombolysis showed significant motor improvement that was not mirrored by cognitive recovery. These findings are the first to report significant inflammation in the reperfused brain, sub-optimal cognitive recovery after stroke thrombolysis, and a new therapeutic strategy to improve safety and efficacy of reperfusion therapy. This work was supported by Department of VA

223 Development and Validation of a Multidimensional Experimental Screening Instrument to Measure Multiple Barriers Associated with Individual Dietary Practices: A Secondary Analysis of NHANES Datasets 20

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Consuming a poor diet is a known risk factor for many chronic diseases. Individuals with less apparent barriers tend to adhere to diet and lifestyle modifications more frequently than those who have more barriers. Accurately measuring dietary barriers at the individual level could inform personalized prevention interventions, particularly those aiming to prevent chronic diseases. While instruments are available to assess factors associated with diet, none are designed to simultaneously measure the multi-dimensional nature of barriers associated with dietary practices. This dissertation research was to develop a psychometrically sound instrument that can be administered by health practitioners to measure dietary barriers. First, an expert review panel established content validity for the variables, which were considered as items on the Dietary Health Status (DHS) instrument. Subsequently, an exploratory factor analysis was conducted to assess and validate the DHS instrument; and finally, relationships between DHS scores and clinical and demographic characteristics were explored among participants to test if the DHS instrument could detect differences. The 2011-2012 NHANES datasets were used in conjunction with the What We Eat in America (WWEIA) 24 hour dietary recall data in this study. A total of 3,705 participants met the study inclusion criteria. Results suggested: 1) content validity was established for a total of 170 variables representing 12 theory-based domains identified as potential dietary barriers; 2) factor analysis supported adequate construct and internal validity for the DHS instrument whole scale and its10 subscales, affirming DHS's multidimensionality; and 3) DHS total scores were strongly associated with demographic and clinical characteristics; cases with lower DHS scores were more likely to have hypertension, or diabetes which suggest the relationship between dietary barriers and indicators for chronic diseases. Results should inform the development of a comprehensive and practical screening tool that benefits practitioners to identify dietary barriers to improve the health of U.S. adults.

224 Shortened ex vivo expansion of Th17 cells enhances anti-tumor immunity

Hannah Knochelmann, Michelle Nelson, Aubrey Smith, Connor Dwyer, Megan Wyatt, Guillermo Rangel Rivera, Daniel Salas-Escabillas, Jacob Bowers, Daniel Neitzke, Mark Rubinstein, Chrystal Paulos, Graduate Studies, Microbiology & Immunology, Dermatology & Dermatologic Surgery, MUSC.

Abstract Withheld from Publication

225 TLR9 agonist, CpG, augments the function and persistence of adoptively transferred CD8+ T cells in a B cell dependent manner

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Abstract Withheld from Publication

226 STAT3 in Pancreatic Fibroblasts Promotes PDAC Tumorigenesis

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The dynamic tumor microenvironment (TME) is increasingly becoming a target for treatment of Pancreatic Adenocarcinoma (PDAC). Conventional therapies are largely ineffective due to the dense and immunosuppressive stroma associated with the disease. Within the dense stroma, cancer associated fibroblasts (CAFs) are one of the most abundant cell types and are known to be involved in immunosuppressive signaling and fibrosis. Previous studies have shown both tumor promoting and tumor suppressive functions of the stroma, suggesting that there are complex interactions between fibroblasts and tumor cells. The IL6/STAT3 pathway is aberrantly activated in many types of cancer and is associated with a poor clinical diagnosis. This pathway can drive proliferation of tumor cells while suppressing the immune response. Activation of STAT3 has also been observed in CAFs in both human PDAC samples and mouse models. We hypothesized that the STAT3 signaling axis in pancreatic CAFs contributes to the immunosuppressive and fibrotic phenotype seen with disease progression. We used Cre-LoxP technology to delete STAT3 specifically in fibroblasts in the Mist1KrasG12D/+ mouse model of pancreatic cancer. The fibroblast specific protein-1 (Fsp-Cre) transgene was combined with Stat3loxP/loxP alleles. Deletion of STAT3 in fibroblasts led to fewer incidences of pancreatic carcinoma when compared to control (Mist1KrasG12D/+;Stat3fl/fl) mice. Interestingly, we found an increase in T cell infiltration, but a decrease in immunosuppressive M2 macrophage population in the STAT3 deleted cohort. Furthermore, the STAT3 deleted cohort developed a less severe fibrotic reaction surrounding PDAC lesions. In order to elucidate the mechanisms by which STAT3 signaling could be altering the TME, we will perform in vitro studies to look at different cytokine and chemokine levels in wild-type and STAT3 deleted pancreatic CAFs. Ultimately, these preliminary results demonstrate a previously unexplored role of STAT3 signaling in fibroblasts to the contribution of PDAC progression.

227 Perfusion of Vascularized Composite Allografts with a Complement Inhibitor Protects Against Brain Death Induced Injury and IRI

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Following severe facial injury or limb loss, transplantation of vascularized composite allografts (VCA) is an accepted surgical approach for replacement/treatment. However, VCA transplantation generates a strong immunological response requiring aggressive life-long immunosuppression. Since VCA is performed in the context of non-life-threatening defects, a major concern is immunosuppressive drugs' toxicity. We've been investigating mechanisms of VCA rejection with the goal of developing complement inhibitory approaches to minimize the need for immunosuppression. Brain death and ischemia reperfusion are unavoidable sources of acute graft injury and are both linked to complement activation and worse outcomes. In an experimental paradigm incorporating the continuum of brain death and ischemia/reperfusion, we investigated the effects of pre-transplant graft treatment with CR2-Crry, a C3d-targeted complement inhibitor. VCAs were procured from brain dead (BD) or living donor BALB/c mice, perfused with UW solution containing CR2-Crry, and stored at 4°C for

6 hours before heterotopic transplantation into C57BL/6 recipients. To assess binding of CR2-Crry to grafts pre-transplant and its kinetics post-Transplant, fluorescently labeled CR2-Crry was tracked using in-vivo fluorescence imaging. CR2-Crry bound and persisted at higher levels in grafts from BD donors compared to grafts from living donors, as measured pre-transplant and 6 hours post-transplant. These data are consistent with higher levels of C3d deposition in BD vs. living donor grafts. Acute (48-hour) injury and immune cell infiltration was significantly higher in grafted muscle and skin from BD donors compared to living donors. However, CR2-Crry treatment resulted in a significant reduction in acute injury in both BD and living donor grafts. Importantly, there was an equivalent level of protection in grafts from both BD and living donors, implying that the higher levels of CR2-Crry bound in BD donor grafts protects them from their otherwise worse outcomes. Additionally, CR2-Crry treatment significantly improved survival of allografts from both BD and living donors. This work was supported by NIH/NIAID 1U01 AI132894 AHA Pre-doctoral Fellowship

228 Inhibiting GARP-TGFbeta axis enhances anti-tumor efficacy of immune checkpoint blockade therapy

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Abstract Withheld from Publication

229 Regulation of RNAi - lncRNA interactions by epithelial adherens junctions

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The adherens junctions (AJs) are essential architectural elements of epithelial tissues. Compromised junctional integrity results in pathological conditions, including cancer. We have identified a mechanism whereby the AJs' component PLEKHA7 recruits the RNAi machinery and miRNAs to maintain homeostasis of well-differentiated epithelial cells. Interestingly, RNA-CLIP and subsequent RNA-Seq analysis identified association of PLEKHA7 with numerous long non-coding RNAs (lncRNAs). While a number of lncRNAs have been implicated in several cell functions and in disease, the underlying mechanisms of their regulation are still unclear. LncRNAs can interact with the RNAi machinery in multiple ways. We hypothesize that the AJs regulate the levels and function of lncRNAs via PLEKHA7 and its associated RNAi mechanism. Examination of PLEKHA7-depleted cells by RNA-seq revealed differential expression of 49 junction-associated lncRNAs. From this set, the top upregulated lncRNA is MIR17HG, an oncogenic polycistronic host transcript of a set of miRNAs that includes miR-17, miR-18a, miR-19a, miR-19b, miR-20a, and miR-92a. Notably, the processed forms of these miRNAs also co-precipitate with PLEKHA7. In agreement with the upregulation of MIR17HG, PLEKHA7 depletion also results in increased levels of a subset of its hosted miRNAs, including miR-19a and miR-19b, which are known cancer promoters. Our current data show that PLEKHA7 suppresses the levels of the MIR17HG transcript through the junction-associated RNAi machinery and two miRNAs, miR-203a and miR-372. Furthermore, we observe extensive mis-localization or loss of PLEKHA7 in colon cancer tissues and cell lines; localization of the RNAi machinery to the junctions is also disrupted in these cells. Ectopic expression of PLEKHA7 in aggressive colon cancer cells that lack endogenous PLEKHA7 expression, suppressed MIR17HG levels, as well as anchorage independent growth. Our current data point towards a novel mechanism of lncRNA regulation that tethers epithelial architecture with aberrant cell behavior. This work was supported by ACS-IRG, TL1 TR001451 and UL1 TR001450

230 A New Enzymatic Approach to Distinguish Fucosylation Isomers of N-Linked Glycans in Tumor Tissues Using MALDI Mass Spectrometry Imaging

Connor West, Hongyan Liang, Anand Mehta, Richard Drake, Graduate Studies, Cell and Molecular Pharmacology and Experimental Therapeutics, MUSC.

Alterations in N-linked glycans are associated with many disease states and represent a growing field of potential therapeutic biomarkers. Specific structural alterations, such as core fucosylation, have been identified in many cancers. Using MALDI mass spectrometry imaging and formalin-fixed clinical tissues, we can determine the source of fucosylated glycans with spatial localization to the tumor. Determination of specific anomeric linkages and site of fucosylation (i.e., core versus outer arm) can be difficult to elucidate. Here, a dual-enzymatic approach for MALDI MSI is applied with both Endoglycosidase F3 (Endo F3), an enzyme specific for cleaving core fucosylated glycans, and recombinant Peptide-N-Glycosidase F (PNGase F) that has broader substrate cleavage. In contrast to PNGaseF, Endo F3 cleaves between the two core N-acetylglucosamine residues. On tissue, this results in a mass shift of 349 a.m.u. for core fucosylated N-glycans when compared with standard PNGaseF. Initial results in HCC tissues indicate core fucosylated glycans associated to tumor or cirrhotic regions while still demonstrating an interesting mix of core and outer arm fucosylated glycans throughout all tissue. By determining these specific linkages while preserving localization, more targeted diagnostic biomarkers of HCC and other cancers is possible. This work was supported by NCI 5R21CA2077779-02

231 Identifying ErbB3 as a potential therapeutic target for effectively treating Malignant Peripheral Nerve Sheath Tumors.

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Malignant Peripheral Nerve Sheath Tumors (MPNSTs) are Schwann cell neoplasms and the most common malignancy seen in patients suffering from Neurofibromatosis Type I (NF1). They can also arise sporadically or at sites of previous radiation therapy. The prognosis for patients with MPNSTs is abysmal with a 5-year survival rate of less than 50%. This largely reflects a lack of effective pharmacotherapies and a difficulty in targeting Ras, a protein that is hyperactivated as a result of NF1 loss and drives tumorigenesis. To identify pharmacologically targetable upstream regulators of Ras, we conducted a genome-scale shRNA dropout screen in 2 NF1-associated (T265-2c, S462) and 1 sporadic (2XSB) human MPNST cell lines. We identified 210 genes that were the top 5% most depleted genes in all three cell lines. ErbB3 was in the 95th percentile of genes potentially playing a role in tumor proliferation and/or survival. This is consistent with the literature that reports erbB3 as playing an important role in metastasis and drug resistance in melanoma. More specifically, erbB3-erbB2 heterodimers are potent oncogenic drivers due to activation of pro-survival pathways through high levels of biologically active PI3K, supporting our findings. The notion that erbB3 plays a role in MPNST pathogenesis is also consistent with results obtained from our pharmacological study in which canertinib, a pan-erbB inhibitor has led to a regression in tumor size in some human MPNST cell lines tested, but not all. Whole exome sequencing of 16 human MPNST cell lines revealed that the cell lines resistant to canertinib exhibited mutations in erbB3 as compared to cell

lines that were sensitive to the drug and wild type for erbB3. R1118Q and S1119C are two ErbB3 mutations identified in our sequence analysis. These observations suggest that targeting erbB3 may be effective for the treatment of patients with MPNSTs.

232 Investigating the molecular mechanism of cephalosporin-resistance in Neisseria gonorrhoeae

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According to the World Health Organization, 78 million cases of gonorrhea occur worldwide each year, comprising 22% of new sexually transmitted infections. If left untreated, such infections can have lasting results, including pelvic inflammatory disease or infertility. Gonorrhea is caused by *Neisseria gonorrhoeae*, a Gram negative diplococcus. Over time, *N. gonorrhoeae* has developed resistance against most antibiotics used to treat gonorrhea, leaving only extended spectrum cephalosporins (ESCs) and azithromycin as the current treatment. In recent years, new strains of *Neisseria gonorrhoeae* have emerged that exhibit resistance to ESCs, including strains H041 (isolated in Japan), 35/02 (isolated in Sweden), and F89 (isolated in France). A major factor in cephalosporin resistance is mutations in the *penA* gene, encoding penicillin-binding protein 2 (PBP2). Strain F89 exhibits a similar high level of ESC resistance as H041, but its PBP2 appears more closely related to that from intermediate-resistant strain 35/02 because only one amino acid is different, a A501P mutation. This suggests the molecular mechanism of cephalosporin resistance differs between F89 and H041. To test this, we aim to solve the crystal structure of F89. In addition, we are investigating whether protein dynamics plays a role in the resistance of H041. Toward these goals, we have expressed, purified and crystallized PBP2 derived from F89. The crystals diffracted to 8 Å and are currently being optimized to improve resolution. In tandem, we have collected a series of 3D nuclear magnetic resonance (NMR) spectra and have used these to assign approximately 30% of the protein. With assignments in hand, we will perform NMR relaxation experiments to determine the dynamic regions of the protein. Overall, our structural and protein dynamic information will provide insight into the resistance mechanisms of PBP2-F89 and PBP2-H041, with the potential of designing new therapeutics against resistant *N. gonorrhoeae*. This work was supported by National Institutes of Health (NIH) Award GM066861 (to C.D.). B.Y. was supported by the NIH training award, GM072643

233 RAGE signaling as a pharmacological target in Amyotrophic Lateral Sclerosis

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Abstract Withheld from Publication

234 Anti-tumor Synergy Between Protein Disulfide Isomerase (PDI) and HDAC Inhibitors is Driven by CHOP and ATF3

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Abstract Withheld from Publication

235 Transgenic Cas9-Expressing F344 Rat Model Provides Novel Platform for Somatic Gene Editing and Disease Modeling

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Abstract Withheld from Publication

236 Development of Inhibitors of KDM4B as a Therapeutic Strategy for Periodontal Disease

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Abstract Withheld from Publication

237 New Mutation Found in Mitral Valve Prolapse Dysregulates Wnt Signaling Through Interacting with Î2-catenin Antagonist

Lilong Guo, Katelynn Toomer, Diana Fulmer, Kelsey Moore, Janiece Glover, Rebecca Stairley, Sandra Ramos-Ortiz, Russell (Chip) Norris, Graduate Studies, Regenerative Medicine, MUSC.

Mitral Valve Prolapse (MVP) affects 1 in 40 individuals and is associated with secondary complications (e.g. arrhtyhmia's, heart failure, and sudden death). Although the genetic etiology of MVP has been known for decades, only recently have disease genes been identified. We have identified mutations in the cilia gene DZIP1 in multiple families with MVP. To initially identify the function of DZIP1 in promoting cilia function, we performed proteomics based approaches with the goal of identifying unique binding partners for DZIP1. These studies revealed a direct interaction with beta-catenin antagonist-Chibby1(Cby1). We hypothesize that Dzip1 regulates mitral valve development through Wnt signaling pathway by interacting with cby1. Genetic and epistasis experiments in mice reveal Wnt pathway convergence resulting in similar valvular phenotypes. Biochemical approaches further demonstrated biochemical interaction between Dzip1 and Cby1 and the interaction domain between Dzip1 and Cby1. In Vivo and In Vitro experiments indicate essential role of Dzip1 in maintaining beta-catenin on mitral valve development through working with Cby1. As both Dzip1 and Cby1 are ciliary genes that are vital for ciliogenesis, and loss of either of them results in enlarged mitral valve and disrupted cilia formation, our study reveals a second mechanism that Dzip1 is involved in during mitral valve development besides regulation of ciliogenesis.

238 Desert Hedgehog (Dhh) signaling through primary cilia contributes to mitral valve morphogenesis and disease

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Mitral valve prolapse (MVP) is the most common form of cardiac valve disease, affecting 1 in 40 individuals, and can lead to secondary complications such as arrhythmias, heart failure, and sudden cardiac death. Valve pathogenesis remains poorly understood, but recent discoveries by our lab have implicated primary cilia as critical for mitral valve morphogenesis and function. Primary cilia are singular

microtubule-based organelles that protrude from the cell where they respond to and transduce extracellular signals. Clinically, patients with cilia gene mutations, known as ciliopathies, have a higher incidence of cardiac valve defects. For example, patients with polycystic kidney disease have a 10-fold increase in MVP compared to the general population. In mice, deletion of the essential ciliogenesis gene, Ift88, results in the development of enlarged myxomatous mitral valves. Hedgehog (HH) signaling is a well-characterized cilia-signaling pathway, and here we demonstrate with RT-PCR that desert hedgehog (Dhh) signaling components, Patched, Smoothened, and Gli3 are expressed in valvular interstitial cells (VICs) of mitral valves, and that Smoothened translocates to the ciliary axonemes. We further show that Dhh ligand expression is restricted to the endocardium, and its deletion results in a myxomatous valve phenotype. Finally, we establish that Dhh signaling functions through a paracrine mechanism of endothelial-mesenchyme cross-talk between Dhh-secreting endocardial cells and the target responder VICs, which express HH receptors and downstream signaling components. In conclusion, these studies provide substantive biological evidence to support ciliogenesis and Dhh signaling as a potential common pathway in mitral valve development and MVP pathogenesis. This work was supported by National Heart Lung and Blood Institute: F31 HL142159; National Heart Lung and Blood Institute: T32 HL007260; National Institutes of Health: 5P20 GM103444; P30DK074038; National Heart Lung and Blood Institute: 1R01 HL131546, 1R01 HL 127692 American Heart Association: 15GRMT25080052; VA Merit Award: I01 BX000820

239 Heterogeneity of Mitochondrial Membrane Potential in Cancer Cells is Independent of the Cell Cycle and Determines Mitochondrial Maximal Hyperpolarization

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Mitochondrial membrane potential (ΔΨ) is sustained, among other factors, by metabolite flux through the Voltage dependent anion channels (VDAC), located in the outer mitochondrial membrane. VDAC regulates ΔΨ, a readout of mitochondrial metabolism. Unsynchronized cancer cells display ΔΨ heterogeneity. Free □/□-tubulin decreases VDAC conductance and high free tubulin in cancer cells decreases ΔΨ. The small molecule erastin antagonizes the inhibitory effect of tubulin on VDAC and increases ΔΨ. We found that the magnitude of erastin-induced hyperpolarization was higher for low ΔΨ than high ΔΨ cells. We hypothesized that heterogeneity of ΔΨ is independent of the cell cycle and determines the magnitude of drug-induced hyperpolarization. Our AIM was to quantitate ΔΨ in cancer cells in relation with the cell cycle and after mitochondrial hyperpolarizing agents. METHODS: Confocal fluorescence microscopy assessed ΔΨ (tetramethylrhodamine methylester and rhodamine 123) and plasma membrane potential ($DiBAC_4(3)$ and PMPI) in HepG2 and Huh7 human hepatocarcinoma cells. ΔΨ was measured in relative and absolute values. HepG2 were synchronized in G1 by serum starvation, early S by double thymidine block, and G2 by double thymidine block followed by nocodazole. RESULTS: HepG2 and Huh7 cells displayed wide spectrum of ΔΨ with a median value of 20% of maximal constitutive ΔΨ. HepG2 ΔΨ was -120 mV to -230 mV. ΔΨ variability did not correlate with plasma membrane potential differences. After synchronization in S, G1, and G2, ΔΨ remained heterogeneous. The hyperpolarizing effect of erastin, paclitaxel (decreases free tubulin), and oligomycin (inhibits complex V) was higher in low ΔΨ cells compared to high ΔΨ cells (288% vs 148%, 334% vs 141%, and 137% vs 21% increase, respectively). CONCLUSION: Heterogeneity of ΔΨ is independent of cell cycle in hepatocarcinoma cells. Constitutive ΔΨ determines the magnitude of response to hyperpolarizing agents with different mechanisms of action, suggesting a cell specific modulation of ΔΨ. This work was supported by NCI R01-CA184456, NCI R01-CA184456-S, and NIGMS R25-GM072643. Also supported in part by the Cell & Molecular Imaging Shared Resource, Hollings Cancer Center, (P30 CA138313), the SC COBRE in Oxidants, Redox Balance, and Stress Signaling (P20 GM103542) and the Shared Instrumentation Grant S10 OD018113.

240 Novel Method for Systemic Removal of Thermosensitive Liposomal Doxorubicin to Reduce Toxicities

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Background: Cancer chemotherapy is limited by insufficient drug delivery to tumor sites and unwanted side effects due to off-target accumulation. Using thermosensitive liposomal doxorubicin (TSL-Dox) a drug delivery system that rapidly releases the contained drug in response to hyperthermia, ~10-30x local delivery compared to the unencapsulated drug can be achieved. The goal of this study was to demonstrate the ability to rapidly remove the drug not released in the targeted tissues by filtration in an extracorporeal circuit (ECC) with a novel device. Methods: Catheters were implanted into the jugular vein and carotid artery to anesthetized Norway brown rats. Following recovery, TSL-Dox was infused into anesthetized Norway brown rats (7mg/kg). 15 min after the infusion was completed, an ECC was established. Blood from systemic circulation was removed through the arterial catheter at 0.35ml/min, passed through a custom-designed heating element for 5-10 seconds at 42ÂºC for complete release of the drug from TSL, followed by filtration of the released drug by passing through a custom-made activated carbon filter before being returned to the animal. ECC was performed for 1 hour. Blood was drawn at baseline, immediately post infusion of TSL-Dox, and then every 20 min till ECC was completed. TSL pharmacokinetics was measured in 4 control animals without filtration. Results: 20% and 29% of the infused dose were removed from systemic circulation within 40 and 60 min of ECC. The activated carbon filter efficacy was between 90% (start of ECC) and 60% (end of ECC). Conclusion: The proposed method can rapidly remove TSL encapsulated chemotherapy from the systemic circulation, potentially reducing systemic toxicities by removing the drug that is not delivered to targeted tissues or enabling the administration of a higher dose. This work was supported by NIH grant R01CA181664, SCTR 1618

241 Tamoxifen and Trifluoperazine as a Treatment Option for Malignant Peripheral Nerve Sheath Tumors

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Abstract Withheld from Publication

242 Diffusion Anisotropy of the Extra-Axonal Environment is Linked to Axon Alignment

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Rationale: Diffusion MRI (dMRI) provides the unique opportunity to study brain microstructure in vivo. Idealizations, however, are necessary in practice to obtain specific measures. Evidence has shown that water confined to the intra-axonal compartment can be reasonably well

approximated by impermeable thin cylinders, although the diffusion behavior of the extra-axonal environment is less well understood. Here, water diffusion is complicated by the presence of glial cells and the complex geometric restrictions imposed by axonal fibers. A better understanding of the complex water diffusion dynamics in the extra-axonal environment may aid in the study of neurological diseases that are known to affect components of the extra-axonal environment (e.g. microglia, oligodendrocytes). Methods We propose a method that combines dMRI data for weak and strong diffusion weightings to infer the diffusional anisotropy of the extra-axonal environment (i.e., the dependence of diffusion on the direction of measurement). dMRI data from one healthy adult (30 yrs.) were acquired for 4 diffusion-weighting strengths with b = 0, 1000, 2000 and 6000 s/mm^2 and 30, 30 and 256 diffusion encoding directions, respectively. Results: For a physically plausible intra-axonal diffusivity D_a = 2 μm^2/ms, we show that extra-axonal water diffusion anisotropy strongly correlates with intra-axonal diffusion anisotropy (r^2 = 0.79) and that it takes on large values in voxels with highly aligned axons (mean$\pm$sd = 0.33$\pm$0.13). Conclusion: Contrary to current belief, the anisotropy of the extra-axonal environment is substantial with an average value of 0.33. This suggests that treating the extra-axonal compartment using an isotropic model may not be an accurate representation of its water diffusion dynamics. Furthermore, the anisotropy of the extra-axonal environment is strongly linked to the anisotropy of the intra-axonal space, suggesting that the geometric alignment of axonal fibers is important for both intra-axonal and extra-axonal water diffusion. This work was supported by: NIH T32 DC0014435 (Trainee EM), NIH DC014021 and The Litwin foundation (JAH)

243 Food for thought: The impact of FGF23 on axonal integrity and neural network architecture.

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Recent evidence suggests that elevated fibroblast growth factor23 (FGF23) is associated with vascular calcification and ischemic heart disease. FGF23 is an osteocyte-derived phosphaturic hormone that acts primarily on the kidneys and whose excessive levels lead to vascular calcification through the following cascade: FGF23 downregulates luminal sodium phosphate co-transporters, decreases renal reabsorption of phosphate in the proximal tubule, and inhibits calcitriol production, leading to secondary hyperparathyroidism, which in turn stimulates calcium and phosphate release from the bones. Excessive levels of circulating calcium and phosphate then culminate in vascular calcification. Chronic kidney disease (CKD) is the most common cause of elevated FGF23. However, high phosphate diet, typically due to the consumption of processed, preserved foods, may lead to elevated FGF23 in individuals without CKD. Elevated levels of FGF23 have now been implicated in adverse cardiac outcomes in the general population without CKD, although the relationship between FGF23 and brain integrity in this cohort has hitherto not been investigated. In this study, we aimed to determine the association between FGF23, and white matter integrity in a cohort of 50 participants with varying degrees of cardiovascular (CV) risk burden and normal kidney function, using high resolution structural human brain connectomes constructed from MRI diffusion images. We observed that increased FGF23 in participants with elevated CV risk factors was associated with axonal loss in the frontal lobe, leading to a fragmentation of white matter network organization. We suggest a synergistic interaction of CV risk factors and FGF23 as a potentially novel determinant of brain health, and a potential determinant of recovery after stroke. This work was supported by AHA

244 The role of FABP7 upregulation in models of amyotrophic lateral sclerosis

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Abstract Withheld from Publication

245 Cone Snail Venomics - Evolution-Driven Drug Design

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Venom components have gained increasing interest in the biomedical sciences because of their ability to modulate neuromuscular, cardiovascular, and central nervous systems. Cone snail venom is a complex mixture of disulfide-constrained peptides (conotoxins), hormone-like peptides, and enzyme proteins, 'weaponized' to immobilize their prey. Contributing to the venom complexity is 1. A wide, dynamic range in component size, 2. Hyper-variability of each component by post-translational modification, and 3. Many potential molecular targets to pursue. This complex nature has resulted in an evolution-driven source of active drug leads with receptor specificity for multiple therapeutic targets. While this makes cone snail venom a favorable resource for drug development and design, it also poses challenges in venom characterization. Venomic approaches have emerged to overcome these obstacles and accomplish high-throughput peptide identification. Venomics is the study of the venom peptidome using transcriptomic sequences from venom-producing glands/ducts. This requires sequencing RNA from the cone snail venom duct and de novo assembly of a transcriptome database to provide a snapshot of the gene expression in the venom duct. The database is used to identify peptide sequences and sites of modification from LC-MS/MS analyses of injected venom. Using this technique, we performed the largest intraspecies venom comparison of cone snails with 27 individual specimen of Conus purpurascens. This analysis yielded new peptides, including an insulin-like peptide (Conoinsulin-P) that exhibits sequence homology to fish and human insulin. Ongoing studies aim to assess the bioactivity of these novel venom peptides. This work was supported by National Institute of Standards and Technology

246 An ectonucleotidase CD73 can modulate Porphyromonas gingivalis intracellular growth and survival in the gingival epithelium

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Abstract Withheld from Publication

247 Optimizing bone wound healing using BMP2: The addition of a novel nanofiber scaffold

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Bone is a highly vascularized and resilient organ with innate healing abilities, however some bone injuries overwhelm these attributes and require intervention, such as bone tissue engineering strategies. Combining biomaterials and growth factors, such as bone morphogenetic protein 2 (BMP2), is one of the most commonly used tissue engineering strategies. In the present study, a novel poly-n-acetyl glucosamine (pGlcNAc, trade name Talymed) scaffold was utilized in addition to the commonly used acellular collagen sponge (ACS) BMP2 delivery system in a murine calvarial defect model to investigate whether the innate properties of Talymed can reduce negative outcomes associated with BMP2 treatment. Comparison of murine calvarial defect healing between ACS with and without Talymed revealed that there was no measurable healing benefit for the combined treatment. Healing was most effective utilizing the traditional acellular collagen sponge with a reduced dose of BMP2. The results of this investigation lead to the conclusion that excessive dosing of BMP2 may be responsible for the negative clinical side effects observed with this bone tissue engineering strategy. Rather than augmenting the currently used acellular collagen sponge (ACS) BMP2 bone wound healing strategy with an additional anti-inflammatory scaffold, reducing the dose of BMP2 used in the traditional delivery system results in optimal healing without the published negative side effects of BMP2 treatment. This work was supported by the AO Foundation [S-16-108C (JC)]; NIH/NIDCR [5T32DE017551]; [F31DE026684 to ELD]; NIH/NIGM [P30GM10331]; and research support towards this study was received from Medtronic Sofamore Danek USA and Marine Polymer Technologies Inc. This study utilized the facilities and resources of the MUSC Center for Oral Health Research (COHR).

248 Establishment of a novel placental barrier model of pre-eclampsia complicated by diabetes

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Women with diabetes have a 4-fold increased risk of developing pre-eclampsia (PE) compared to the general population. Mechanisms for PE development are not well understood; however, abnormal placentation has been implicated. Trophoblast cells form the placental barrier that separates the maternal and fetal circulations. We hypothesize that in pregnancy complicated by diabetes, the placental barrier may be compromised, leading to maternal systemic endothelial dysfunction. In this study, we sought to establish a model of placental barrier injury by exposing a monolayer of cultured trophoblasts to modified lipoproteins (which accumulate in vascular tissues of patients with diabetes) and/or high glucose. Human trophoblasts were cultured on semi-permeable transwell inserts (0.4 Âµm pores). Transepithelial electrical resistance (TEER) was measured every other day to assess barrier integrity. TEER levels reached a plateau 12-14 days after initial seeding. Cells were subsequently exposed to 'highly-oxidized, glycated' low-density lipoprotein (HOG-LDL) vs native-LDL (N-LDL) (200 Âµg/ml protein, 0-24 hrs) on either their apical or basolateral surfaces, in each case in the presence of normal vs high glucose. HOG-LDL exposure on either surface significantly decreased TEER. High glucose alone did not elicit significant effects, nor did it amplify the HOG-LDL effect. Cell supernatant (both sides) and cell protein were collected. Compared to N-LDL or untreated control, HOG-LDL compromised the integrity of the trophoblast barrier, verified by disruption of zona occludens-1 (ZO-1). Following treatment with HOG-LDL on either side of the cell monolayer, soluble endoglin (sEng) levels were increased in media from the apical side of the cell monolayer. We conclude that extravasated, modified LDL may be involved in placental barrier injury, contributing to the high risk of PE development in women with diabetes. This cell model has potential to be a valuable tool for the evaluation of novel therapeutics for placental barrier dysfunction in PE.

249 ADAMTS5 is coupled with mechanical load during mandibular condylar development

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Abstract Withheld from Publication)

250 Mental Imagery Encoding Models Reveal Key Signatures of Inference in an Internal Generative Model

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Whenever you picture the face of a friend or imagine your dream home, you are using the same parts of your brain that you use to see. How does the same system manage to both accurately analyze the world around it and synthesize visual experiences without any external input at all? We approach this problem by extending the well-established theory that the human visual system embodies a probabilistic model of the visual world. That is, just as visual features co-occur with one another in the real world with a certain probability (the features 'tree' and 'green' have a high probability of co-occurring), so do the patterns of activity that encode those features in the brain. With this joint probability distribution at its disposal, the brain can not only infer the cause of a given activity pattern on the retina (vision), but can also generate the probable visual consequence of an assumed or remembered cause (imagery). The formulation of this model predicts that the encoding of imagined stimuli in low-level visual areas resembles the encoding of seen stimuli in higher areas. To test this prediction we developed imagery encoding models-a novel tool that reveals how the features of imagined stimuli are encoded in brain activity. We estimated imagery encoding models from brain activity measured while subjects imagined complex visual stimuli, and then compared these to visual encoding models estimated from a matched viewing experiment. Consistent with our proposal, imagery encoding models revealed changes in spatial frequency tuning and receptive field properties that made early visual areas during imagery more functionally similar to higher visual areas during vision. Our results provide new evidence for an internal generative model of the visual world, while demonstrating that vision is just one of many possible forms of inference that this putative internal model may support. This work was supported by NIH R01 EY023384

251 The role of aversion in cocaine addiction

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Over 90% of Americans have had some exposure to drugs of abuse, but only 15-32% of individuals exposed to the major classes of abused drugs go on to become addicted, with the rest presumably being able to stop on their own. Much basic research has been directed at

understanding individual animals who have already progressed into addiction-like behaviors, with relatively less study of what protective factors may help prevent acquisition of drug use in the first place. Although cocaine's aversive responses are relatively less widely acknowledged than its rewarding effects, they are experimentally robust. Particularly elegant experiments by Ettenberg and his group have shown that single doses of cocaine produce an initial rewarding phase followed by an aversive crash about 15' later that is sufficient to condition a net aversion to cocaine, that in most (but not all) animals, is strong enough to overcome cocaine's rewarding effects. In our lab, we found that the aversive effects of cocaine were more individually variable, and much better predictors of cocaine-seeking, than the rewarding effects. We have shown that cocaine avoidance is protective of drug acquisition on self-administration, but is also highly predictive of reinstatement. In recent years, our lab and others have demonstrated that cocaine avoidance depends critically on the rostromedial tegmental nucleus (RMTg) and its afferents. The RMTg is a major GABAergic midbrain input to midbrain dopamine (DA) neurons that plays major roles in avoidance. We have thus shown that there are individual differences in RMTg neurons firing rate that correlate with cocaine-conditioned avoidance behavior. Indeed, compared to low cocaine avoiders, high avoider animals have similar RMTg inhibition during the rewarding phase of the drug (5' post injection), but have significantly higher RMTg firing rates during its aversive phase (15' post-infusion).

252 Dysmyelination and Disruption of the Nodes of Ranvier in Aged Auditory Nerve

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Hearing loss is a well-documented hallmark of aging. Loss of cochlear neurons and their processes have been seen in cochleas of aged animal and human ears. Myelin sheaths and nodes of Ranvier are necessary for rapid conduction of signals from the auditory nerve (AN) to the brain. Loss/dysfunction of nodal components, in addition to demyelination, have been associated with contributing to the neurological symptoms in diseases such as Guillain-Barré syndrome and multiple sclerosis. The relationship with aging and the myelinating glia and nodes of Ranvier in the ANs have yet to be elucidated. Here we test the hypothesis that pathophysiological alterations of myelin and nodes of Ranvier occur in aged ANs and these changes contribute to age-related auditory function declines. Ultrastructural analyses of aging ANs showed dysmyelination, as evidenced by myelin whorls and increased presence of non-compact lamellae and Schmidt-Lanterman incisures along AN fibers compared to control. Axo-glial connections in aged paranode regions were also disrupted, with terminal myelin loops detaching from the axolemma and increased assembly of large, electron-dense circular occlusions within the terminal loop heads. Node of Ranvier lengths significantly increased and widths decreased in aged ANs compared to young-adult. Differential expression analysis revealed that 23 out of 30 (77%) node-related genes, significantly decreased with aging. Importantly, genes that decreased in expression included that of ion channels necessary for saltatory conduction. In addition, auditory brainstem response wave I thresholds were increased in aged mice compared to young-adults. Our study revealed that dysmyelination and nodal structural aberrations are pervasive in aged mouse ANs. Studies to investigate the functional consequences of this dysmyelination in aged mice by analyzing specific components of the AN response are ongoing, in addition to the characterization of myelination and nodes of Ranvier in aged ANs of human temporal bones. This work was supported by NIH R01 DC7506, NIH R01 DC014467, and NIH P50 DC0422.

253 Equivalence of Maximum Likelihood Estimates of Parameters from Complete Distributions using Two Common Approaches for Limit of Detection Data

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Introduction: When measurements fall below a known limit of detection, different approaches have been suggested for estimating parameters from the underlying complete distribution. We propose that methods utilizing truncated distributions yield estimates equivalent to those obtained by approaches that treat the data points as censored. Method: A theoretical relationship paralleling the maximum likelihood estimation approaches for parameters from any left truncated distribution and any distribution with left censored observations is provided. We conducted a simulation study and data application to illustrate the equivalence of the left truncation (LT) and left censoring (LC) approaches using an underlying normal distribution. A simulation study is presented with various sample sizes and percentages of below lower limit of detection observations from a normal distribution with a mean of 5 and variance of 4. The data application is a toxicology study of polybrominated diphenyl ether 153 measurements from participants with systemic lupus erythematosus (SLE) and controls. Results: In the simulated scenarios, the two approaches produced similar parameter estimates. For example, when 30% of 500 observations were below a lower limit of detection, the means and variances were estimated within 0.1% to 0.3%, respectively (LT: estimated mean of 4.998, estimated variance of 3.990; LC: estimated mean of 4.997, estimated variance of 3.996). In SLE participants, the parameter estimates were nearly identical (LT: estimated mean of 0.035 ng/g, estimated variance of 0.003 ng/g; LC: estimated mean of 0.036 ng/g, estimated variance of 0.004 ng/g). Conclusion: Left truncation and left censoring approaches for computing maximum likelihood estimates of parameters from underlying complete distributions are equivalent.

254 Porphyromonas gingivalis Nucleoside-Diphosphate-Kinase Phosphorylates Heat Shock Protein-27 on Serine Residues to Inhibit Programmed Cell Death

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Oral pathogen, Porphyromonas gingivalis, successfully colonizes human primary gingival epithelial cells (GECs) and renders GECs resistant to cell-death. A multi-functional effector of P. gingivalis and homolog of Nucleoside-diphosphate-kinase (Ndk) plays a critical extracellular and intracellular role in inhibiting apoptosis for long-term survival in GECs. Recently, P. gingivalis was shown to increase phosphorylation of HSP27 in cancer epithelial cells; however, the molecular mechanism and biological significance of phospho-HSP27 during infection has never been characterized. Using GST-rNDK pull-down analyzed by Mass Spectrometry, we identified host HSP27 as a strong binder of P. gingivalis-Ndk. Therefore, we hypothesize that P. gingivalis-Ndk can phosphorylate HSP27 for inhibition of host cell apoptosis and successful microbial persistence in GECs. Methods: We employed P. gingivalis-Ndk protein constructs and an isogenic P. gingivalis ndk-deficient-mutant in this study. Results were examined using Fluorescent Microscopy, Western Blotting, and in-vitro phosphorylation assays. Results: We examined the biological importance of this putative interaction and found a significant increase of phospho-HSP27 in P. gingivalis-infected GECs compared to ndk-deficient-infected and uninfected GECs. In-vitro phosphorylation assays reveal HSP27 is directly phosphorylated on serines-78/82 by P. gingivalis-Ndk in a dose-dependent manner. Moreover, phospho-HSP27 is significantly increased by transfection of GFP-tagged-Ndk into uninfected GECs and shows a high co-localization rate (0.92) with HSP27. Furthermore, siRNA down-regulation of HSP27

significantly increased staurosporine-induced apoptosis of GECs. This apoptotic phenotype was abrogated by transfection of recombinant P. gingivalis-Ndk into GECs. Finally, the ndk-deficient-mutant strain was unable to inhibit staurosporine-induced Cytochrome C release/Caspase-9 activation. Conclusions: We demonstrate for the first time the phosphorylation of HSP27 by a bacterial effector - P. gingivalis-Ndk - which confers an anti-apoptotic phenotype to GECs. This suggests HSP27 is a major target for P. gingivalis' induction of host cell-survival, which may translate to identifying targeted therapies to disrupt the successful establishment of P. gingivalis in oral mucosa. This work was supported by NIH/NIDCR RO1DE016593, T90DE021990, T32DE017551, F31DE026065

255 Structural and functional analysis of an essential cell cycle regulator reveals a novel mechanism of action

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Abstract Withheld from Publication

256 Pharmacological inhibition of HUNK by staurosporine synergizes with lapatinib in a HER2 inhibitor resistant HER2+ breast cancer model.

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Recent work suggests that the protein kinase HUNK is a novel promoter of HER2-positive (HER2+) breast cancer tumorigenesis and resistance to HER2 inhibitors. Because HUNK's kinase activity has been shown to enhance HER2-mediated mammary tumorigenesis, kinase inhibitors that target HUNK may be potentially therapeutic in the treatment of HER2+ breast cancers. We have demonstrated for the first time that a broad-spectrum kinase inhibitor, staurosporine (STU), targets HUNK's kinase activity and strongly impairs viability in HER2+ mammary and breast cancer cells that express high levels of HUNK. We also show that STU synergizes with the HER2 inhibitor lapatinib in a HER2+ breast cancer cell model that is resistant to HER2 inhibitors. We find that co-treatment of STU and lapatinib results in a greater suppression of cell viability, colony formation, and primary mammosphere formation compared to either inhibitor alone. The synergistic effects of STU and lapatinib against the HER2+ resistant breast cancer cells were also observed in vivo. We found that mice receiving combination treatment of STU and lapatinib showed a significant impairment in mammary tumor growth compared to mice receiving vehicle or either inhibitor alone. Collectively, these studies suggest that pharmacological inhibition of HUNK may synergize with HER2 inhibitors to be a novel therapeutic strategy for the treatment of HER2 inhibitor resistant breast cancers. This work was supported by R01CA187305 R01CA187305-S1 R25GM072643

257 Identifying Immunological Basis for Bladder Cancer Sex Bias

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Abstract Withheld from Publication

258 Targeting RAS Dimerization Domain by RAS specific monobody inhibits tumorigenesis in vivo

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RAS genes are the most commonly mutated oncogenes in human cancers. However, despite tremendous efforts over the past several decades, RAS-specific inhibitors remain elusive. Thus, targeting RAS remains a highly sought after goal of cancer research. Previously, we reported a new approach to inhibit RAS-dependent signaling and transformation *in vitro* through targeting the α4-β6-α5 dimerization interface with a novel RAS specific monobody, termed NS1 (Spencer-Smith, et. al., Nature Chemical Biology, 2016). Expression of NS1 inhibits oncogenic K-RAS and H-RAS signaling and transformation but is ineffective against N-RAS due to isoform-specific differences that prevent NS1 binding. Here, we evaluated the efficacy of targeting RAS dimerization as an approach to inhibit tumor formation *in vivo*. Using a doxycycline (DOX) regulated NS1 expression system, we demonstrate that DOX-induced NS1 inhibited oncogenic K-RAS driven, but not N-RAS driven, anchorage-independent cell growth as well as tumor formation in athymic nude mice. Analysis of the effects of NS1 on RAS-mediated signaling in 2D vs 3D conditions reveals specific differences in the effects of NS1 under these different growth conditions. Finally, our results highlight the potential therapeutic efficacy of targeting the α4-α5 region to inhibit RAS-driven tumorigenesis *in vivo*. This work was supported by VA Merit Award, NIH RO1

259 Targeting GARP/TGFbeta complex for cancer immunotherapy

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Abstract Withheld from Publication

260 PI3K delta inhibition propagates CD8+ T cells with potent antitumor immunity

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Abstract Withheld from Publication

261 Stromal Platelet Derived Growth Factor Receptor-Beta (PDGFRβ) Signaling: A Novel Therapeutic Target for Breast Cancer Brain Metastasis (BCBM)

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Stromal platelet derived growth factor receptor-beta (PDGFRB) has emerged as an actionable mediator of breast tumor-stromal communication. As a receptor tyrosine kinase, PDGFRB is activated by its cognate ligand, PDGF-B, which is released by neighboring tumor epithelium and endothelium. However, how PDGF signaling mediates breast cancer initiation, progression, and metastasis remains unclear. To investigate this pathway during breast cancer progression, we developed a mouse model of stromal-specific PDGFRB activation using the Fsp-cre transgene previously published by our group (hereafter 'PDGFRB mutant'). A mammary tumor cell line expressing high levels of PDGF-B was injected either by tail vein or intracranially to evaluate metastatic seeding and distant tumor growth. Following tail vein injection, we observed a 50% incidence of brain metastases in the PDGFRB mutant mice while no brain lesions were seen in control animals. Not surprisingly, larger tumors formed in the brains of PDGFRB mutant mice when these cells were injected intracranially. Importantly, mammary tumor cells expressing low PDGF-B did not exhibit the same increase in brain metastases in mutant mice. Our pre-clinical data suggests that primary breast tumors expressing high PDGF-B could preferentially metastasize to the brain. To test this in patients, we analyzed PDGF-B protein expression in a tissue microarray comprised of both HER2-positive and triple negative breast cancer (TNBC) patient primary tumors. While high PDGF-B did not correlate with site-independent metastatic recurrence, it was prognostic of brain metastasis, mirroring our mouse data. These findings suggest high primary tumor PDGF-B expression defines a subset of breast cancer patients predisposed to brain metastases. These patients may benefit from therapeutic intervention of PDGFRB signaling. Combined, our findings (1) advocate that primary tumor expression of PDGF-B is a novel prognostic biomarker for the development of BCBM and (2) support clinical trial evaluation of PDGFR inhibitors for the prevention and treatment of BCBM.

262 The interaction of AVP and ANP in Inner Medullary Collecting Duct

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High salt (HS) diet in salt-sensitive individuals may lead to development of the salt-sensitive hypertension (SS) and associated renal complications. Atrial natriuretic peptide (ANP) is known to play a role in SS hypertension, lowering blood pressure (BP) by stimulating renal sodium and water excretion; it exerts significant effects in the inner medullary collecting duct (IMCD) system. Moreover, IMCD is a major site for urea reabsorption, the key player in the urine concentrating mechanism. Arginine-Vasopressin (AVP), the anti-diuretic hormone, increases urea permeability in the IMCD, maintaining the hyperosmotic conditions in interstitium, and facilitates conditions for water reabsorption. We hypothesized that ANP may work to inhibit AVP-induced urea transport in IMCD. We compared wild type Dahl Salt Sensitive (SS^{WT}) rats to SS rats lacking the *Nppa* gene which encodes ANP ($SS^{Nppa-/-}$); the rats were fed a HS diet (4% NaCl) for 21 days, while others were kept on a low salt (LS) diet, 0.4% (NaCl). BP was monitored throughout the study, and urine samples were collected in metabolic cages on days 0 and 21. At the end of the protocol, animals were sacrificed and tissues were harvested; urine and plasma samples were analyzed to estimate electrolyte homeostasis. The western blot revealed that there was no compensatory overexpression of the ANP receptors (NPRA) in $SS^{Nppa-/-}$rats on LS compared to WT controls on the same diet. Expression of AVP receptors (AVP2R) was significantly reduced in $SS^{Nppa-/-}$ on both diets compared to SS controls. Furthermore, $SS^{Nppa-/-}$ rats exhibited reduced urinary Na, urea and osmoles excretion, and diuresis, and showed lower urine concentrating ability. These data suggest that the lack of ANP in SS rats leads to stimulation of AVP-mediated urea reabsorption. Understanding of ANP/AVP/urea interaction can help find new targets for medications to promote natriuresis and urine concentrating ability.

263 Nuclear histone deacetylase 5 overexpression in the nucleus accumbens reduces heroin-seeking behaviors

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Drug-induced signaling in striatal MSNs triggers an epigenetic mechanism involving transient dephosphorylation and partial nuclear accumulation of the activity-dependent chromatin-remodeling enzyme, histone deacetylase 5 (HDAC5). Nuclear HDAC5 in the nucleus accumbens (NAc) limits the development of multiple addiction-related behaviors, including reinstatement of cocaine seeking in self-administering animals. However, there remain a number of important unanswered questions: (1) does nuclear HDAC5 limit seeking of other abused drug classes (heroin) (2) and/or non-drug rewards (sucrose), and (3) in which cell type(s) does nuclear HDAC5 function to suppress drug-seeking? We infused an adeno-associated virus that expressed a nuclear-localized form of HDAC5 (i.e. HDAC5-3SA) in the adult rat NAc. Three weeks later, rats self-administered heroin until stable, underwent 7d of withdrawal, then had extinction training until extinction criteria were met. Cue- and heroin-induced reinstatement were then tested. We also tested new rats in a similar paradigm using sucrose as the reward. To determine in which MSN cell type(s) HDAC5 limits drug seeking, we generated and expressed a cre-dependent, AAV2-DIO-HDAC5-3SA virus in the NAc of D1-cre or D2-cre BAC transgenic rats. The rats were then run through the same heroin SA paradigms. We find that nuclear HDAC5 (3SA) in the NAc reduces context-induced, cue-induced, and heroin-induced drug-seeking behavior. In contrast, there were no effects on extinction or reinstatement of food seeking. Interestingly, HDAC5-3SA overexpressed exclusively in D1R-MSNs selectively reduced cue-induced drug-seeking, while HDAC5-3SA in D2R-MSNs selectively reduced heroin-induced drug-seeking. Similar to the effects of nuclear HDAC5 on cocaine seeking behavior, our data demonstrate that HDAC5 limits relapse-like heroin seeking. However, natural reward taking and seeking behaviors are not affected. These new findings suggest that enhancing HDAC5 nuclear function in the NAc in both D1R- and D2R-MSNs during drug taking could be engaging separate epigenetic mechanisms, and simultaneously targeting these mechanisms could have therapeutic value. This work was supported by R01 DA032708

264 Haptoglobin concentration, pregnancy and preeclampsia in women with Type 1 diabetes

Clare Kelly, Jeremy Y. Yu, Alicia J. Jenkins, Alison Nankervis, Kristian F. Hanssen, Tore Henriksen, Satish K. Garg, Samar M. Hammad, Christopher E. Aston, Timothy Lyons, Medicine, Endocrinology, MUSC.

Abstract Withheld from Publication

265 Establishment of a Cigarette Smoke-Exposure Protocol for the Study of Fracture Healing in a Bilateral Femur Fracture Model

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INTRODUCTION: Fractures that fail to heal (nonunions) are a result of impaired healing via one of the two bone healing pathways: intramembranous and endochondral ossification. Clinically, patients who smoke cigarettes are at increased risk of developing a nonunion. We sought to establish a smoke-exposure protocol for the study of fracture healing in the Sprague-Dawley rat. METHODS: Sprague-Dawley rats (n=46) were randomized to control or smoke-exposure arms. To study the two fracture healing pathways, animals underwent bilateral femur fracture with one side fixed via an intramedullary nail and the contralateral side fixed by compression plating. Half of the animals (n=26) were subjected to daily cigarette smoke preoperatively and postoperatively. To verify that this exposure was clinically-relevant, serum cotinine levels were assessed via ELISA. To monitor the physiologic effects of cigarette smoke on growth and nutrition, weight, food consumption, and serum transthyretin were monitored. RESULTS: Smoke-exposed animals received an average total particulate matter exposure of 200.6 ± 73.0 mg/m3, without any difference in average exposures between animals. Serum cotinine levels were 155 ± 34ng/ml at 20 hours and were 368 ± 82ng/mL immediately following smoke exposure. All animals exhibited radiographic evidence of fracture healing postoperatively without impaired gait. Animals exhibited a loss of body weight after 10 days of cigarette smoke exposure. This difference persisted compared with control animals following one month of smoking cessation. The decrement in body weight was accompanied by a decrease in food consumption in the smoke-exposed animals. Blood samples were assessed via ELISA for transthyretin levels. Neither surgery nor smoke exposure had an impact on transthyretin levels. DISCUSSION: This study represents the establishment of a smoke-exposure protocol in a bilateral femur fracture rodent model. Exposures were reliably produced and resulted in a clinically-relevant exposure. This model may facilitate determination of appropriate treatment modalities in cigarette-smoking patients.

266 The novel role of Fli-1 in regulation of pericyte pyroptosis

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Pericytes are vascular mural cells and are embedded in the basement membrane of the microvasculature. Disruption of pericyte viability and endothelial cell (EC) interactions leads to microvascular hyper-permeability. The mechanisms of pericyte loss in sepsis are largely unknown. Friend leukemia virus integration 1 (Fli-1) is a key regulator of inflammatory responses and viability in endothelial cells. In this study, we examined the hypothesis that Fli-1 regulates pericyte loss via pyroptosis in vivo and in vitro. Wild type and Foxd1-derived pericyte specific Fli-1 knockout mice were subjected to CLP. We observed that CLP-induced sepsis led to lung and renal pericyte loss and reduced lung pericyte density and pericyte/ EC coverage. Up-regulated Fli-1 mRNA and protein levels were found in lung pericytes from CLP mice in vivo and in LPS-stimulated lung pericytes in vitro. Knockout of Fli-1 in Foxd1-derived pericytes prevented CLP-induced pericyte loss, vascular leak and improved survival. Disrupted Fli-1 expression by siRNA inhibited LPS-induced inflammatory cytokines and chemokines in cultured lung pericytes. Pyroptosis, an inflammatory form of programmed cell death, is dependent on caspases 1 and 11 and is accompanied by the release of pro-inflammatory cytokines. We demonstrated that CLP induced pericyte loss via pyroptosis, but not apoptosis nor necrosis, which was mitigated in pericyte Fli-1 knockout mice. Knockdown of Fli-1 by siRNA blocked bacterial outer membrane vesicles-induced pericyte pyroptosis in vitro. Moreover, Fli-1 regulated pyroptosis marker caspase-1 expression by directly binding to its promoter regions. In summary, elevated Fli-1 induces lung pericyte loss and microvascular dysfunction in CLP-induced sepsis via regulation of pericyte pyroptosis, EC hyper-permeability, inflammation, and survival in sepsis. Our findings suggest that Fli-1 is a key regulator of pericyte /EC dysfunction, and a novel therapeutic target for treatment of sepsis. This work was supported by NIH 1R01GM113995 NIH 1K23HL135263-01A1 NIH UL1TR001450

267 Specific Gut Bacterium Alters Commensal Microbiota Immunomodulatory Actions Regulating Skeletal Development

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Abstract Withheld from Publication

268 Diagnostic and Treatment Challenges for immigrants and refugees with psychotic posttraumatic stress disorder (PTSD)

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Introduction: Emerging evidence for a subtype of PTSD named psychotic PTSD in civilians, veterans, and immigrants and refugees. Methodology: A medical librarian searched combination terms in various databases, such as PubMed, SCOPUS and others. The first two authors independently scored the literature using an appraisal tool. Results: There was a heterogeneity amongst the primary studies including study designs, rating scales and country of origin. Conclusion: Despite numerous challenges, the authors will present on current phenomenology of psychotic PTSD in refugees and immigrants as well as will propose diagnostic and treatment management for this distinct population. Lastly, the authors will discuss limitations with this systematic review. This work is timely given current national topic on immigrants and refugees. The audience will learn current literature on psychotic PTSD in this population along with future considerations. This work was supported by R25 DA020537

269 Development of Vitamin K analogs as therapeutics for medication-resistant epilepsy.

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Abstract Withheld from Publication

270 Behavioral and Synaptic Characterization of a Mouse Model of Syndromic Autism

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Numerous genetic variants associated with MEF2C are linked to risk for a syndromic form of autism, termed MEF2C Haploinsufficiency Syndrome (MHS). These genetic variants range from point mutations within the MEF2C gene to chromosomal deletions of the 5q14.3 locus. The MHS patients have severe social and communication deficits, repetitive behaviors and stereotypies, intellectual disabilities, abnormal pain responses, and epilepsy. Therefore, we set out to create a mouse model of MHS. Previously, we showed that conditional embryonic deletion of Mef2c in Emx1-lineage populations (forebrain excitatory neurons) produces mice with numerous behavioral phenotypes with potential relevance to multiple human neurodevelopmental disorders, including autism and SCZ (Harrington et al., 2016. eLife). However, this genetic manipulation does not reflect MHS patients genetic makeup. Therefore, we generated global Mef2c heterozygous (+/-) mice and behaviorally tested the offspring to explore autistic-like behaviors. Interestingly, the Mef2c+/- (MHS) mice display profound social and communication deficits, hyperactivity, and reduced pain sensitivity. Furthermore, we find changes in cortical synaptic transmission. Together, our data supports that our mouse model of MHS may be a good animal model for studying brain and behavioral dysfunction in MHS and for testing candidate therapeutics for MHS symptoms. This work was supported by NICHD, NIMH, NARSAD

271 Age-Related Spatial Hearing Difficulty Predicted by the White-Matter Integrity of the Auditory 'Where' Pathway

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Interaural differences in the intensity and timing of audible speech provide important information for detecting, locating, and selecting a talker from among others in noisy listening environments. Older listeners typically experience more difficulty in such 'cocktail party' scenarios, associated in part with declining interaural information processing. The neural mechanisms that underlie auditory spatial perception in young normal-hearing adults are fairly well understood. However, how these mechanisms change with age and affect spatial perception in older adults requires further investigation. We examined normal-hearing younger and older listeners to determine the extent to which age-related differences in the integrity of interhemispheric white-matter tracts of the corpus callosum predicted age-group differences in the identification of spoken digits spatially cued by interaural timing differences and speech-in-noise when interaural timing provided no spatial information. Replicating previous work, younger listeners identified more spatially-cued speech than older listeners, but non-spatial speech-in-noise identification did not differ between age-groups. Younger listeners exhibited better white mater integrity in callosal tracts connecting left and right orbito-frontal, superior-frontal, anterior-frontal, motor, superior-parietal, posterior-parietal, and occipital cortices, but the integrity of tracts connecting left and right temporal cortices did not differ between age groups. Greater white-matter integrity in tracts connecting left and right superior-frontal, anterior-frontal, and posterior-parietal cortices -areas associated with auditory spatial perception - predicted better spatially-cued speech identification, but not non-spatial speech-in-noise identification. In contrast, the white-matter integrity of tracts connecting left and right motor cortex predicted identification of spatially-cued speech and non-spatial speech-in-noise. The integrity of interhemispheric white-matter connecting cortical areas important for spatial hearing is important for preserving interaural timing information used in spatial perception. As white-matter integrity declines with age, so too does auditory spatial perception. Further, white matter associating motor cortices plays an important role in speech processing, consistent with literature showing motor cortex involvement in speech perception. This work was supported by NIH/NIDCD (R01 DC014467, R01 DC017619, P50 DC00422, and T32 DC014435)

272 Generation of a new mouse to model pancreatic cancer-induced cachexia.

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Of all cancers, pancreatic cancer causes the third most fatalities, and incidence rates of this devastating disease continue to rise. Further, pancreatic cancer presents with the highest incidence of cachexia, a syndrome of weight loss due to depletion of skeletal muscle and adipose tissue. Clinically, cachexia is associated with increased mortality, poor quality of life, poor treatment responses, and increased treatment complications. Although clearly the best way to prevent cachexia is to address the cancer, pancreatic cancer has proven challenging to treat, with a dismal 9% 5-year survival rate. We believe effective anti-cachexia therapy will improve the care of pancreatic cancer patients, but the development of these therapies will require animal models that accurately recapitulate the etiology of pancreatic cancer-induced cachexia. To improve on the current, non-pancreas tumor xenograft models of cachexia, we generated a genetically engineered mouse model (GEMM) of pancreatic cancer, where induction of Kras and loss of the tumor suppressor Pten occurs in the pancreas of postnatal mice, which we refer to as the KPP model. KPP mice progressively lose skeletal muscle and adipose mass as a result of their cancer. We find that KPP mice exhibit histologic features of pancreatic ductal adenocarcinoma and reach endpoint criteria at an average of 107 days of age. Beginning at approximately 75 days of age, KPP mice undergo progressive loss of existing skeletal muscle mass, resulting in decreased muscle function. We also find that muscle loss from KPP mice exhibits a gene expression signature that closely aligns with the gene expression signature in muscle from cachectic pancreatic cancer patients. In summary, we expect KPP mice to serve as a useful model to elucidate the underlying mechanisms of muscle loss in pancreatic cancer-induced cachexia and to evaluate potential anti-cachexia therapies. This work was supported by American Cancer Society PF-15-156-01-CSM (EET) NIH R01 CA180057 (DCG) NIH R21 AR071021 (DCG)

273 A Global Analysis of Receptor Tyrosine Kinase Action in Malignant Peripheral Nerve Sheath Tumors Identifies Key Therapeutic Targets

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Malignant peripheral nerve sheath tumors (MPNSTs) are aggressive, soft tissue sarcomas of Schwann cell-origin that carry an extremely poor prognosis due to a lack of effective chemotherapeutic regimens and pose many surgical challenges. Dysregulated growth factor signaling via multiple receptor tyrosine kinases (RTKs) has been suggested to contribute to the pathogenesis of these tumors. Therefore, we globally assessed the phosphorylation status of 49 out of 58 human RTKs using a human phospho-receptor tyrosine kinase array in four human MPNST cell lines. These cell lines were then challenged with inhibitors specifically targeting the relevant phosphorylated RTKs. Cell viability

was assessed 72 hours after inhibitor treatment. Even though 32 RTKs were phosphorylated in lysates derived from MPNST cultures, only 3 independent monotherapies potently inhibited MPNST proliferation namely, picropodophyllin (an IGF1R inhibitor), canertinib (a pan-erbB inhibitor), and lestaurtinib (a pan-Trk and JAK/Stat inhibitor). Interestingly, combinatorial treatment at lower drug concentrations (canertinib + picropodophyllin or canertinib + lestaurtinib) synergistically inhibited cell proliferation compared to the monotherapy at higher drug concentration. Canertinib and lestaurtinib were then tested in preclinical mouse experiments and found to drastically reduce in vivo tumor growth in Xenografts. Canertinib did not inhibit in vivo tumor growth, lestaurtinib resulted in a modest reduction in tumor growth, but combinatorial treatment resulted in significant tumor shrinkage. Cell-based and immunohistochemistry assays revealed cytostatic effects on tumor cell growth with each monotherapy and cytotoxic effects, via apoptosis, were observed with combinatorial treatment. Collectively, these data indicate that multiple, yet to be defined, RTKs promote MPNST tumor growth and combined inhibition of specific receptors may be a viable chemotherapeutic regimen for patients suffering from these aggressive neoplasms. This work was supported by P30 CA138313, R25 GM113278

274 Endoplasmic Reticulum Stress Contributes to Mitochondrial Exhaustion of CD8 T cells

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Tumor antigen-specific T cells rapidly lose energy and effector function in tumors. The cellular mechanisms by which energy loss and inhibition of effector function occur in tumor infiltrating lymphocytes (TILs) are ill-defined, and methods to identify tumor-antigen-specific TILs that experience such stress are unknown. Processes upstream of the mitochondria guide cell-intrinsic energy depletion. We hypothesized that a mechanism of T cell-intrinsic energy consumption was the process of oxidative protein folding and disulfide-bond formation that takes place in the endoplasmic reticulum (ER) guided by protein kinase R-like endoplasmic reticulum kinase (PERK) and downstream PERK axis target ER oxidoreductase 1 (ERO1a). To test this hypothesis, we created TCR transgenic mice with a T cell-specific PERK gene deletion (OT-1-Lckcre-PERKf/f, PERK KO). We found that PERK KO, PERK or ERO1a pharmacologically inhibited T cells maintained reserve energy and exhibited a protein profile consistent with reduced oxidative stress. These T cell groups displayed superior tumor control compared to T effectors. We identified a biomarker of ER-induced mitochondrial exhaustion in T cells as mitochondrial reactive oxygen species (mtROS), and found that PD-1+ tumor antigen-specific CD8 TILs express mtROS. In vivo treatment with a PERK inhibitor abrogated mtROS in PD-1+ CD8 TILs and bolstered CD8 TIL viability. Combination therapy enabled 100% survival and 71% tumor clearance in a sarcoma mouse model. Our data identify the ER as a regulator of T cell energetics and indicate that ER elements are effective targets to improve cancer immunotherapy. This work was supported by K12 CA157688, ACS IRG-97-219-14, ACS IRG-16-185-17

275 Importance of the enzymatic activity of CD26 expressed on tumor-specific Th17 cells for adoptive cell therapy

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Adoptive T-cell immunotherapy (ACT), an exciting breakthrough in cancer treatment, utilizes patients' own tumor-specific T-cells to fight their cancer. However, not all T cells are equal in their tumor-fighting ability. We have recently discovered that CD4+ T cells that express dipeptidylpeptidase 4, or CD26, possess enhanced antitumor properties in three different aggressive models. We sought to determine whether the CD26 protein is necessary for the observed enhanced anti-tumor efficacy, or if it is just a marker of an excellent memory cell population. B16F10 melanoma tumors were subcutaneously injected on either wild-type (WT) mice or CD26-/- mice. Prior to ACT, the mice were given drinking water +/- 75 mg/kg daily dose of sitagliptin, an inhibitor of CD26 enzymatic activity. CD26+ Th17 cells isolated and expanded from transgenic mice expressing the TRP-1 T cell receptor that recognizes tyrosinase were adoptively transferred into the tumor-bearing mice, and tumor burden was measured for 128 days, during which sitagliptin treatment was constant. Survival +/- sitagliptin in WT mice was not significantly different. In the absence of host CD26, the Th17 cells drastically decreased tumor burden and increased survival (8/10 responders; survival of WT vs CD26-/- p=0.016, WT+sitagliptin vs. CD26-/- p=0.008, Mantel-Cox Logrank test). In sitagliptin-treated CD26-/- mice, the anti-tumor effect of the Th17 cells was diminished and 9/10 mice lost control of their tumor by day 78 post-treatment (survival of CD26-/- vs. CD26-/- +sitagliptin p=0.005, Mantel-Cox Logrank test). The results of this study indicate that CD26 enzymatic activity is important for the ability of Th17 cells to produce an anti-tumor response, and confirms that host CD26 plays a role as well. Further studies utilizing CD26-/- TYRP donor cells to ensure the specificity of the sitagliptin-mediated effects are planned. This work will help define the role of CD26 in T cells utilized for adoptive cell therapy. This work was supported by R01 CA175061 R01 CA208514 R50 CA233168

276 A prospective observational analysis of near visual acuity in pseudophakic children

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There is currently a clear understanding regarding how implantation of an Intraocular lens (IOL) affects visual acuity in adults following cataract surgery. However, there is a lack of research exploring the outcomes this procedure has amongst the pediatric population. Within the past few years, IOL technology has made several important advances. The multifocal lens was developed in order to combat the inevitable acquisition of presbyopia in patients following implantation of a monofocal IOL. While the target outcomes regarding presbyopia were accomplished, recent studies have begun to shed light on the negative factors of multifocal lenses, especially when contemplating their use in children. The current study aims to observe near visual acuity outcomes following the implantation of a monofocal lens in children, in order to determine if a multifocal lens even needs to be considered during the patient consultation. The study design is composed of a study and control group. The study group includes children that are pseudophakic, while the control group includes children who are phakic and with good vision. While near vision data is the focus of the study, other parameters are also being recorded. More in-depth analysis of the data will be performed once the target sample size is met. Based on current preliminary observations, the study group has been observed to retain a near visual acuity of at least 20/40 following the implantation of the monofocal artificial lens. A more comparative analysis of data will further illuminate on previous findings in order to determine whether near vision is actually being preserved in the study population.

277 The prevalence and progression of hearing loss in children with concussion

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Introduction: The main goal of this study is to determine whether there is a significant association between concussion and hearing loss in the pediatric population. Concussion has known implications on vestibular dysfunction, as well as focus and learning. There is also a known association between hearing loss and head injuries with skull trauma. However, hearing loss in the post-concussive state is yet to be fully explored. In our study, we aim to characterize the prevalence, type, and progression of hearing loss after concussion in children. Methods: We utilized the AudGenDB, a dedicated pediatric audiological database, to identify children with a diagnosis of concussion. We next calculated the overall prevalence of conductive and of sensorineural hearing loss in children with or without a diagnosis of concussion. Further analysis will compare audiograms before and after a diagnosis of concussion, as well as after any subsequent concussions to determine the severity and the progression of hearing loss over time. Results: Thus far, we have identified around 2,900 children with concussions and available audiograms. We have found that children in our population with a diagnosis of concussion have a significantly higher rate of being diagnosed with conductive hearing loss ($p < 0.0001$) and sensorineural hearing loss ($p = 0.003$). Conclusions: In our initial findings, there are significantly increased rates of both conductive and sensorineural hearing loss in children with a diagnosis of concussion. Continuing analysis will further characterize the nature of this association and possible progression of hearing loss over time. This research may have important implications on clinical decision-making, especially in the pediatric population, and hearing loss may deserve inclusion as part of the sequelae of concussion. Understanding the relation between concussions and hearing loss could help with the management of concussions in children, and aid in return-to-play and return-to-learn decisions.

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