Health Sciences Research Day

Thursday, November 11, 2010
Acuff Gallery
Acuff Auditorium
Bryant Auditorium

Sponsored by
MU School of Medicine
MU Sinclair School of Nursing
MU School of Health Professions
Truman Veterans Hospital
MU Institute for Clinical and Translational Science

Supported by
School of Medicine Research Council
Office of Medical Research

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*The Office of Continuing Education, School of Medicine, University of Missouri is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The Office of Continuing Education, School of Medicine, University of Missouri designates this educational activity for a maximum of 1.0 AMA PRA Category 1 Credit.™ Physicians should only claim credit commensurate with the extent of their participation in the activity.

University of Missouri Sinclair School of Nursing is an approved provider of continuing nursing education by the Missouri Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation. Up to 1.0 Contact Hours will be awarded. MONA Provider Approval Number 713-XII.

Schedule of Events

9 – 11 am

Poster Session: Category I
Acuff Gallery
Undergraduate, Medical, Nursing, and Health Professions Students

9:30 – 10:30 am

NIH Presentation
Acuff Auditorium
"**Training Opportunities Through NIH Mechanisms"**
Neeraj Agarwal, PhD
Director, Glaucoma and Optic Neuropathies Program and
NEI Training Officer, NIH National Eye Institute

Noon to 1 pm

Keynote Speaker
Acuff Auditorium
"Personalized Medicine in the DNA Century:
Lessons from Childhood Leukemia"
William Carroll, MD
Director of the New York University Cancer Institute and Julie and Edward J. Minskoff Professor of Pediatrics at NYU School of Medicine,
Continuing education credit is available.*

1 – 3 pm

Poster Session: Category II
Acuff Gallery
(Postdoctoral Research Fellows, Medical Fellows and Residents, Graduate Students)

3 – 3:20 pm

Reception
Bryant Auditorium

3:20 – 5 pm

Awards Ceremony
Bryant Auditorium

3:20 – 4 pm

Dorsett L. Spurgeon, MD, Distinguished Medical Research Award Presentation and Recipient Remarks. The award will be presented by Harold Williamson Jr., MD, vice chancellor, University of Missouri Health System

4 – 4:15 pm

Deans' Awards Presentations, by: Robert Churchill, MD, School of Medicine dean; Judith Miller, PhD, Sinclair School of Nursing Dean; and Richard Oliver, PhD, School of Health Professions dean

4:15 – 5 pm

Presentation of Poster Awards, by Danny Schust, MD, Research Council chair

Richelle J. Koopman, MD, MS

2010 Dorsett L. Spurgeon, MD
Distinguished Medical Research Award Recipient

Preparation and Path to Research
Dr. Koopman completed her undergraduate degree at the University of Pennsylvania with majors in Psychology and Biologic Basis of Behavior. She completed medical school at the University of Pittsburgh and a residency in family medicine at University of Pittsburgh Medical Center – St. Margaret's Family Medicine Residency. She and her husband Peter then spent five years in full time rural practice in the Florida panhandle in a town of 2,500 people with a 20-bed hospital. This experience in rural practice was as educational as any degree, teaching much about the needs of patients, the way we deliver primary care, and the coordination of our health care system. Practicing in this rural location also gave Dr. Koopman a desire to have an impact on new knowledge and the way that we deliver care. This prompted a move to Charleston, S.C., to enter a two-year fellowship in academic family medicine that focused on research training. During this research fellowship in the Department of Family Medicine at Medical University of South Carolina, Dr. Koopman completed a masters' degree in clinical research with the Department of Biostatistics, Bioinformatics, and Epidemiology.

Undiagnosed Diabetes and Diabetes Risk
As an assistant professor in the Medical University of South Carolina's Department of Family Medicine, Dr. Koopman used existing data to examine questions about diabetes, pre-diabetes, and insulin resistance. From 2004 to 2006, she was principal investigator on an R21 from NIDDK "Undiagnosed Diabetes: Predictors and Comorbidities." One of her publications, "Changes in Age at Diagnosis of Type 2 Diabetes in the United States, 1988-2000" gained national and international press as it documented a six-year decrease in the age of diagnosis of diabetes in the U.S. in the span of just over a decade.

Dr. Koopman also developed a risk assessment score to determine which patients are at highest risk and would most benefit from screening for diabetes. Her "Tool to Assess likelihood of fasting Glucose ImpairmenT (TAG-IT)" paper describes the development and validation of this risk score. The risk score was publicized by *Reuters Health*, appeared in numerous medical news sources such as *American Medical News*, as well as health- and non-health-related publications. Dr. Koopman received inquiries about the risk score from as far away as Argentina and New Zealand, as well as in the U.S. from the director of state epidemiology for Texas.

Using Health Information Technology to Improve Care
Since coming to MU in 2007, Dr. Koopman's research focus has changed slightly, moving from diabetes into the influence of Electronic Health Records (EHR), and Personal Health Records on patient health and medical care. She completed a pilot qualitative evaluation of the use of internet health resources among patients with diabetes with varying levels of health literacy. This work was funded by an award from MU's Interdisciplinary Center on Aging and the RAND Corporation/Hartford Foundation. She successfully leveraged this pilot study as preliminary work for a career development award application. This five-year K08 award from the Agency for Healthcare Research and Quality will help her investigate "Patient Readiness to Use Internet Health Resources." This research also leverages the experience of her mentor, Dr. David Mehr, in evaluating health IT applications, his current AHRQ R18 "Using HIT to Improve Ambulatory Chronic Disease Care", and the MU-Cerner partnership and their developing electronic health resources.

She is the principal author of a paper under review that examines the impact of the Condition Summary Screen for Diabetes that was jointly developed by MU and Cerner. For this research, she and her team partnered with MU's Information Experience Lab staff to conduct a usability study with internal medicine and family medicine physicians. The study demonstrated that the Diabetes Condition Summary could streamline physicians' clinical information-gathering process by saving physicians over five minutes and 50 mouse clicks for each patient with diabetes. This research was funded by Dr. Mehr's grant from AHRQ. Cerner highlighted the results in its "Cerner Quarterly," and a Cerner Vice President said "We now routinely check the number of mouse clicks for our projects going forward" due to the dramatic results of this study. This tool will likely help to improve the EMR user experience for all MU physicians, as well as Cerner clients worldwide, and may also improve patient care and safety through its succinct presentation of accurate clinical data.

At MU, Dr. Koopman has also collaborated with the research team at Tiger Place. This combination of clinical and engineering expertise is endeavoring to use passive sensing technology to detect falls, cognitive decline, and early illness in elders in the Tiger Place assisted living facility. Dr. Koopman is co-investigator with MU Sinclair School of Nursing Principal Investigator Dr. Marilyn Rantz on her NIA R21 "Using Passive Sensing Technology for Early Illness Detection." Dr. Marge Skubic of MU's School of Engineering joins them as a co-investigator for this work.

National and International Impact

To date, Dr. Koopman has 37 peer-reviewed research articles published or in press. She has served for four years on the Society of Teachers of Family Medicine (STFM) Research Committee. STFM is the international organization of academic family physicians, and its Research Committee is responsible for research programming at its national meeting. Three times she has been awarded one of six extended time slots, from hundreds of submitted abstracts, to present her research to an international audience at the North American Primary Care Research Group Annual Meeting. She is currently serving on the Editorial Board of *Family Medicine*, and she was the guest editor for a special issue of *Family Medicine* on health information technology published in May 2010. She has served as STFM's liaison to the American Academy of Family Physician's (AAFP) Commission on Science. This Commission guides the AAFP in its contribution to, endorsement, and adoption of Clinical Guidelines, helping to guide the standards of care for nearly 100,000 family physicians in the United States.

Dr. Koopman has also had the opportunity to influence the national research agenda by serving on several federal grant review panels. Over the past five years, she has served six times on NIDDK's Special Emphasis Panel reviewing grant applications for "Translational Research in Diabetes." She also served on two CDC review panels reviewing grants for "Prevention of Diabetes." This year she served on three AHRQ review panels, one for a very high profile RFA for demonstration projects testing innovations in "Medical Safety and Liability," and two as an ad hoc reviewer for AHRQ's "Healthcare Technology and Decision Science" Study Section.

Ongoing Work

Dr. Koopman is in the second year of her AHRQ-funded K08 award. She is developing a scale that will measure patient readiness to use internet health resources, which comprises not only computer and internet skills and abilities, but also motivations, risk perception, and concerns about privacy and security. After validation, it is hoped that this scale will help researchers and developers of internet and mobile health resources answer the question, "Who is going to use this resource?" The dedicated time for research and career development afforded by this award, combined with the rich and diverse expertise of MU collaborators, and the strong support of her department, medical school, and university will allow her to continue to ask and answer questions that can influence medical care. She hopes to clarify and quantify the impact of technology resources for patients with chronic conditions. Dr. Koopman's continued national activities will add to that impact, and also hopefully bring recognition to her department and to the University.

Neeraj Agarwal, PhD

Program Director & Training Officer
NEI, Division of Extramural Research

Neeraj Agarwal, PhD, is director of the Glaucoma and Optic Neuropathies Program and training officer at the NEI Division of Extramural Research.

Dr. Agarwal earned his doctorate degree in biochemistry in 1975 from The Postgraduate Institute of Medical Education and Research in Chandigarh, India. During his post-doctoral training in membrane transport at the University of Southern California School of Medicine and the Yale School of Medicine, he selected nul and over-expressor mutants of the Na/H Antiporter to establish the role of internal pH in regulation of cell growth.

He went on to serve as assistant professor in the Department of Pathology at The University of Texas Health Science Center at San Antonio, where he shifted his studies to focus on retinal degeneration. Before joining the NIH in 2007, Dr. Agarwal served as associate professor in the Department of Cell Biology & Genetics at the of University of North Texas Health Science Center in Fort Worth, Texas, where his research focused on mechanisms of visual cell loss (apoptosis) using cultured retinal cells as models for retinal degenerations and glaucoma and neuroprotection. He was also involved in neuroprotection studies pertaining to the treatment of optic neuropathies including glaucoma.

Dr. Agarwal has published over 90 publications in peer-reviewed journals pertaining to retinal degeneration, optic neuropathies, and neuroprotection.

William Carroll, MD

Director of the New York University Cancer Institute and Julie and Edward J. Minskoff Professor of Pediatrics at NY School of Medicine

William Carroll, MD, is director of the New York University Cancer Institute and Julie and Edward J. Minskoff Professor of Pediatrics at NYU School of Medicine. He received his medical degree in 1978 from the University of California, Irvine, School of Medicine. He completed a residency in pediatrics at Children's Hospital Medical Center in Cincinnati followed by fellowships in pediatric hematology and oncology at Stanford University Hospital.

Dr. Carroll has extensive experience in all aspects of the care of children with cancer and blood diseases and his research interests include acute leukemia, neuroblastoma, apoptotic pathways in cancer cells and microarray analysis of childhood cancer. He has a particular interest in the treatment of children with leukemia and directs clinical trials for patients with acute lymphoblastic leukemia, the most common form of childhood cancer.

Dr. Carroll is head of the Children's Oncology Group Acute Lymphoblastic Leukemia Disease Committee and is responsible for developing and directing clinical research in North America for children with acute lymphoblastic leukemia.

2010 Research Day Poster Judges

Greg Alexander, PhD, MHA, RN
Sinclair School of Nursing

Ulus Atasoy, MD
Surgery, School of Medicine

Marybeth Brown, PT, PhD
Physical Therapy, School of Health Professions

David Chang, MD
Otolaryngology, School of Medicine

Nancy Cheak-Zamora, PhD
Health Science Program, School of Health Professions

Vicki Conn, PhD, RN, FAAN
Sinclair School of Nursing

Carol Crooks, MD
Physical Medicine & Rehabilitation, School of Medicine

Erin Dannecker, PhD
Physical Therapy, School of Health Professions

Susan Deutscher, PhD
Biochemistry, School of Medicine

William Durante, PhD
Medical Pharmacology & Physiology, School of Medicine

Moses Hdeib, MD, PhD
Diagnostic Medical Ultrasound
School of Health Professions

Salman Hyder, PhD
Biomedical Sciences, College of Veterinary Medicine

Julie Kapp, MPH, PhD
Family and Community Medicine, School of Medicine

Martin Katz, PhD
Ophthalmology, School of Medicine

Richelle J. Koopman, MD, MS
Family and Community Medicine, School of Medicine

Mark Lee, PhD
Radiology, School of Medicine

Heather Leidy, PhD
Nutrition & Exercise Physiology, School of Medicine

Joe LeMaster, MD, MPH
Family & Community Medicine, School of Medicine

Kevin Marberry, MD
Orthopaedic Surgery, School of Medicine

Luis Martinez-Lemus, PhD
Medical Pharmacology & Physiology,
School of Medicine

Ravi Nistala, MD, MS
Internal Medicine, School of Medicine

Debra Oliver, PhD
Family & Community Medicine, School of Medicine

Kalyan Pasupathy, PhD
Health Management & Informatics, School of Medicine

Charlotte Phillips, PhD
Biochemistry, School of Medicine

Lorraine Phillips, PhD, RN, FNP-BC
Sinclair School of Nursing

Lakshmi Pulakat, PhD
Internal Medicine, School of Medicine

Archana Ramaswamy, MD
Surgery, School of Medicine

Todd Ruppar, PhD, RN, GCNS-BC
Sinclair School of Nursing

Enid Schatz, PhD
Occupational Therapy, School of Health Professions

Danny Schust, MD
Obstetrics, Gynecology & Women's Health,
School of Medicine

Cheryl Shigaki, PhD
Health Psychology, School of Health Professions

M. Sharon Stack, PhD
Pathology & Anatomical Sciences, School of Medicine

Emma Teixeiro Pernas, PhD
Molecular Microbiology & Immunology,
School of Medicine

Mahesh Thakkar, PhD
Neurology, School of Medicine

Amie VanMorlan, MD
Child Health, School of Medicine

Cuihua Zhang, MD, PhD
Internal Medicine, School of Medicine

John Whited, MD
Associate Chief of Staff, Research
Harry S Truman Memorial Veterans' Hospital

Category I
Clinical

Acuff Gallery 9:00 – 11:00 a.m.

POSTER 1
Sheldon Cook (Undergraduate), Sponsored by Shawn Christ, PhD, Department of Psychological Sciences and Kristina Aldridge, PhD, Department of Pathology and Anatomical Sciences, "ANALYSIS OF THE CEREBELLUM IN INDIVIDUALS WITH AUTISM SPECTRUM DISORDER USING MAGNETIC RESONANCE IMAGING"

POSTER 2
Andrew L Franklin (M3), Lauren Kirkpatrick (M3), Mayank Mittal (R1), Abdillahi Abdinoor (R2), Sponsored by Emily Coberly, MD, Department of Internal Medicine, "PRIMARY AMYLOIDOSIS – A CASE REPORT AND FUTURE INVESTIGATIONS"

POSTER 3
Adam Harrold (M2), Krystal Purnell (MPH Student), Sponsored by Dr. Joseph LeMaster, MD, MPH, Department of Family and Community Medicine, "COALITION CAPACITY ASSESSMENT OF COLUMBIA COALITIONS FOR A HEALTHIER COLUMBIA (A QUALITATIVE ASSESSMENT)"

POSTER 4
Brian Hilliard (M2), Shriniwas Gautam (Graduate Student), Sponsored by Stanton Hudson, and Karen Edison, MD, Center for Health Policy, "CARING FOR DIVERSE POPULATIONS: FURTHER STEPS TOWARDS INCREASING CULTURAL HUMILITY IN THE UMHS PRIMARY CATCHMENT AREA"

POSTER 5
Jesse Hirner (Undergraduate), Ferris M. Pfeiffer, PhD (Research Associate), Sponsored by Theodore J. Choma, MD, Department of Orthopaedic Surgery, "ASSESMENT OF CEMENT AUGMENTATION AND SCREW TRAJECTORY ON PEDICLE SCREW FIXATION IN OSTEOPOROTIC VERTEBRAE"

POSTER 6
Tyler Jenkins (M2), Michael Khazzam, MD, Gregory J. Della Rocca, MD, PhD, Allison M Wade, MD, Yvonne M. Murtha, MD, Sponsored by (Brett D. Crist, MD), Department of Orthopaedic Surgery, "FUNCTIONAL OUTCOMES OF PATIENTS UNDERGOING ANTEROLATERAL VERSUS ANTEROMEDIAL APPROACHES OF THE ANKLE FOR PILON FRACTURES"

POSTER 7
Aneel K. Jiwanlal (M2), Sponsored by Brett D. Crist, MD, Department of Orthopaedic Surgery, "ORTHOPAEDIC TRAUMA AND AN AGING POPULATION: A RETROSPECTIVE REVIEW OF FACTORS INFLUENCING OUTCOMES"

POSTER 8
Irene Mannering (M4), Whitney Hovenic, MD (PGY-3), Sponsored by John Viator, PhD, Department of Biological Engineering and Ronald Wheeland, MD, Department of Dermatology, "MEASUREMENT OF MECHANICAL PROPERTIES IN AGING SKIN"

POSTER 9
Jeffrey L. Milles (M1), Gregory J. Della Rocca, MD, PhD, FACS, Brett D. Crist, MD, FACS, Linda K. Anderson, RN, Sponsored by Gregory J. Della Rocca, MD, PhD, FACS, Department of Orthopaedic Surgery, "OUTCOMES IN PATIENTS SUSTAINING COMPLEX PERIARTICULAR FRACTURE-DISLOCATIONS OF THE ELBOW"

POSTER 10
Douglas M. Overbey (M3), Tam K. Dao, PhD, Sponsored by Raja R. Gopaldas, MD, Department of Cardiothoracic Surgery, "THE IMPACT OF 'JULY EFFECT' ON 'FAILURE TO RESCUE:' DO PATIENTS WHO UNDERGO CORONARY ARTERY BYPASS GRAFTING AT TEACHING HOSPITALS FACE A SELECTIVE DISADVANTAGE?"

POSTER 11
Matthew Roberts (M1), Alexandre Stoyanov, PhD (Postdoctoral Fellow), Sponsored by Randie Little, PhD, Department of Pathology and Anatomical Sciences, "DEVELOPMENT OF HUMAN C-PEPTIDE LC-MS ISOTOPE-DILUTION ASSAY: OPTIMIZATION OF C-PEPTIDE ISOLATION FROM BIOLOGICAL FLUIDS AND WITH ION EXCHANGE CHROMATOGRAPHY"

POSTER 12
Nicholas P. Ruthmann (M2), Sponsored by Aneesh Tosh, MD, Department of Child Health, "PREVALENCE OF VITAMIN D DEFICIENCY AND INSULIN RESISTANCE AMONG OVERWEIGHT CHILDREN AND ADOLESCENTS: A DATABASE STUDY"

POSTER 13
Nicole Shen (M2), Michael Nicholl, MD, Sponsored by Paul Dale, MD, Ellis Fischel Cancer Center, "TEN YEAR REVIEW OF MELANOMA WITH REGRESSION"

POSTER 14
Drew Shinneman (M2), Sponsored by Carol Crooks, MD, Department of Physical Medicine and Rehabilitation, "IS OUR CURRENT VIEW OF GUILLAIN-BARRÉ SYNDROME RECOVERY AND TREATMENT INCOMPLETE?"

POSTER 15
Ryan B Siebert (M4), Allen Missoi, MD, Sponsored by Michael Aro, MD, Department of Radiology, “METASTATIC CHOLANGIOCARCINOMA PRESENTING AS PSEUDO-MIRIZZI SYNDROME: A CASE REPORT”

POSTER 16
Erin Smallmon (Undergraduate), Sponsored by Kristina Aldridge PhD, Departments of Pathology and Anatomical Sciences and Biological Sciences, “INTRACRANIAL AND WHOLE BRAIN VOLUMES IN INFANTS WITH SAGITTAL CRANIOSYNOSTOSIS”

POSTER 17
Jeremy L. Stanek (M2), Jane A. Emerson, MD, Fred A. Murdock, Jr., PhD, Greg Petroski, PhD, Sponsored by Jane A Emerson, MD, Department of Physical Medicine and Rehabilitation, “RETROSPECTIVE ASSESSMENT OF EARLY GROWTH CHARACTERISTICS IN CEREBRAL PALSY SUBTYPES”

POSTER 18
Sandra Tye, MS (M2), Luke Lenci (M2), Ramesh Khanna, MD, Sponsored by James D. Campbell, PhD, Department of Family and Community Medicine, “THE EXPERIENCE OF INITIATING AND BEING ON DIALYSIS AMONG THE ELDERLY”

POSTER 19
Kathryn M. Watson (M2), Spencer L. Eagan, MD, Jerome L. Gorski, MD, Sponsored by Arshad R. Muzaffar, MD, Department of Plastic Surgery, “MIDLINE FACIAL MICROSOMIA: A CASE REPORT”

POSTER 20
Danielle Zimmerman (M2), Fred Murdock, PhD, Sadie Shank, MHS/CCC-SLP, Sponsored by Christopher Wolf, DO, Department of Physical Medicine and Rehabilitation, Howard A. Rusk Rehabilitation Center, “PREVALENCE OF DYSPHAGIA IN TRAUMATIC BRAIN INJURY”

Category I
Basic
Acuff Gallery 9:00 – 11:00 a.m.

POSTER 21
Christina Anderson (Undergraduate), Jie Ning (Research Specialist), M. Sharon Stack, PhD, Sponsored by Matthew J. Ravosa, PhD, Department of Pathology and Anatomical Sciences, "DEVELOPMENT AND FUNCTION OF THE MANDIBULAR SYMPHYSIS IN MAMMALS"

POSTER 22
Jordan Austin (Undergraduate), Cheryl Hill (Postdoctoral Fellow), Cortaiga Gant (Undergraduate), Sponsored by Kristina Aldridge, PhD, Department of Pathology and Anatomical Sciences, "PATTERNS OF BRAIN GROWTH IN ONE FGFR2 MOUSE MODEL FOR APERT SYNDROME"

POSTER 23
Sara Bartlett (Undergraduate), Sponsored by Carol Ward, PhD, Department of Pathology and Anatomical Science, "SECOND RIB CURVATURE IN APES AND HUMANS AND IMPLICATIONS FOR THE EVOLUTION OF THORACIC SHAPE IN EARLY HOMININS"

POSTER 24
Lydia Beck (M1), Sponsored by Suzanne E. Fenton, PhD*, National Institute of Environmental Health Sciences, and Michael J. Rovetto, PhD, Department of Medical Pharmacology and Physiology, "NOVEL METHODS IN MAMMARY GLAND EVALUATION"

POSTER 25
Joedd Biggs (M1), Kristen Taylor, PhD, Sponsored by Charles Caldwell, MD, PhD, Department of Pathology and Anatomical Science, "RT-PCR ON MAGNETICALLY SORTED B-CELL SUBSETS FROM PEDIATRIC BONE MARROW"

POSTER 26
Gregory Blair (M2), Chunyang Zhang (Research Specialist), Rong Hu (Graduate Student), Fanjun Meng (Research Specialist), Mayland Chang, PhD, Shahriar Mobashery, PhD, Jiankun Cui, MD, Sponsored by Zezong Gu, MD, PhD, Department of Pathology and Anatomical Sciences, "MATRIX METALLOPROTEINASE PROTEOLYSIS AFTER STROKE: A SURROGATE INDICATOR FOR EARLY DIAGNOSIS AND VALIDATION OF TREATMENT"

POSTER 27
Kelly A. Bowers (Undergraduate), Sponsored by Carol V. Ward, PhD, Department of Pathology and Anatomical Sciences, "ESTIMATING RADIAL CURVATURE IN FRAGMENTARY HOMININ FOSSILS: A COMPARATIVE STUDY IN APES AND HUMANS"

POSTER 28
Kevin Bradshaw (MU Undergraduate), Rishi Sharma (Postdoctoral fellow), Sponsored by Mahesh Thakkar, PhD, University of Missouri Department of Neurology, Harry S Truman Memorial Veterans' Hospital, "BINGE DRINKING CAUSES SLEEP DISRUPTIONS: A LIKELIHOOD OF HANGOVER"

POSTER 29
David deRoode (Undergraduate), Rishi Sharma (Postdoctoral Fellow), Shafi A.K. Lodhi (Undergraduate)Suzanne Forman (Undergraduate), Sponsored by Mahesh Thakkar, PhD, University of Missouri Department of Neurology, Harry S Truman Memorial Veterans' Hospital, "SLEEP DEPRIVATION CAUSES EPIGENETIC CHANGES IN THE BASAL FOREBRAIN"

POSTER 30
Lyndsay Dickson (Undergraduate), Ashley Lawrence (Undergraduate), Jodie Walker (Undergraduate), Sponsored by Moses Hdeib, MD, RDMS, RDCS, RVT, School of Health Professions, "WHAT IS THE PREVALENCE OF A BICORNUATE UTERUS AND THE IMPACT IT HAS ON REPRODUCTION?"

POSTER 31
Christine Eidson (Undergraduate), Sarah Higdon (Undergraduate), James Woody (Laboratory Technician), Sponsored by Mark W. Lee, Jr., PhD, Department of Radiology and Chemistry International Institute of Nano and Molecular Medicine, "DEVELOPMENT OF HIGH THROUGHPUT TISSUE ANALYSIS LABORATORY"

POSTER 32
Suzanne Forman (Undergraduate), Rishi Sharma (Postdoctoral Fellow), David deRoode (Undergraduate), Sponsored by Mahesh Thakkar, PhD, University of Missouri Department of Neurology, Harry S Truman Memorial Veterans' Hospital, "GETTING OVER A HANGOVER: HOW DO WAKE PROMOTING NEURONS IN THE BASAL FOREBRAIN AFFECT ETHANOL INDUCED SLEEP?"

POSTER 33
Cortaiga Gant (Undergraduate), Sponsored by Kristina Aldridge PhD, Department of Pathology and Anatomical Sciences, "BRAIN PHENOTYPES IN A MOUSE MODEL FOR APERT SYNDROME"

POSTER 34
Autumn Han (M2), (Lynda Bennett, PhD), Sponsored by Charles Caldwell, MD, PhD, Department of Pathology and Anatomical Sciences, "AFFECTS OF THE INHIBITION OF MICRORNA REGULATORY MACHINERY IN LYMPHOMA CELLS"

POSTER 35
Sarah Higdon (Undergraduate), Christine Eidson (Undergraduate), James Woody (Laboratory Technician), Sponsored by Mark W. Lee, PhD, Department of Radiology, International Institute of Nano and Molecular Medicine, "DEVELOPMENT OF BIOSPECIMEN SAMPLE PREPARATION TECHNIQUES FOR MOLECULAR IMAGING USING ULTRA-HIGH RESOLUTION MASS SPECTROMETRY"

POSTER 36
JanCarla Holman (Undergraduate), Megan Scheufele (Undergraduate), Janell Stormo (Undergraduate), Sponsored by Moses Hdeib, MD, RDMS, RDCS, RVT, School of Health Professions, "CAN ULTRASOUND LOCATE FOREIGN BODIES UNDER THE SKIN?"

POSTER 37
Kim Ingersoll (M2), Yueying Liu (Lab Supervisor), Sponsored by M. Sharon Stack, PhD, Department of Pathology and Anatomical Sciences, "DO ULTRASTRUCTURAL CHANGES IN AGED PERITONEUM CONTRIBUTE TO OVARIAN CANCER METASTASIS?"

POSTER 38
Mahir Khan (Undergraduate), E. Matthew Morris (Graduate Student), Grace Uptergrove (Research Specialist), John Thyfault, PhD, Sponsored by Jamal Ibdah, MD, PhD, Department of Internal Medicine – Division of Gastroenterology and Hepatology, "PGC-1α OVEREXPRESSION IN PRIMARY HEPATOCYTES INCREASES FATTY ACID OXIDATION AND MITOCHONDRIAL CONTENT"

POSTER 39
Elizabeth A. Killion (M3), Ajay Sharma, PhD, Jonathan C.K. Tovey, MD, Ashish Tandon, PhD, Rangan Gupta, PhD, Sponsored by Rajiv R. Mohan, PhD, University of Missouri Department of Ophthalmology, Harry S Truman Veterans' Memorial Hospital, "GENE TRANSFER TECHNOLOGY: A TOOL FOR STUDYING GENE FUNCTION AND ROLE IN CORNEAL PATHOGENESIS"

POSTER 40
Charles Krueger (Undergraduate), Guido Lastra, MD (Endocrinology Fellow), Sonal Dhuper, MD (Medical Resident), Sponsored by James Sowers, MD, Department of Endocrinology, "BETA CELL DYSFUNCTION, OXIDATIVE STRESS AND S6K1 ACTIVATION IN PANCREAS IN THE ZUCKER OBESE RAT MODEL"

POSTER 41
James Langworthy (M1), Kristen Taylor, PhD, Sponsored by Charles W. Caldwell, MD, PhD, Department of Pathology and Anatomical Sciences, "THE ROLE OF DNA METHYLATION ON GENE EXPRESSION IN ACUTE LYMPHOBLASTIC LEUKEMIA"

POSTER 42
Shafi A.K. Lodhi (Undergraduate), Rishi Sharma (Postdoctoral Fellow), David DeRoode (MU Student), Suzanne Forman (MU Student), Sponsored by Mahesh Thakkar, PhD, University of Missouri Department of Neurology, Harry S Truman Memorial Veterans' Hospital, "CHRONIC ETHANOL EXPOSURE ALTERS EPIGENETIC MECHANISM IN THE BASAL FOREBRAIN"

POSTER 43
Daniel A. Lyons (M2), Sponsored by Jeffrey Coughenour, MD, Department of Surgery, Division of Acute Care Surgery, "FISCAL IMPACT OF STANDARDIZED SURGEON PREFERENCE CARDS FOR AN ACUTE CARE SURGERY PROGRAM"

POSTER 44
Amanda Michael (M4), Rishi Sharma (Postdoctoral Fellow), Sponsored by Mahesh Thakkar, PhD, University of Missouri Department of Neurology, Harry S Truman Memorial Veterans' Hospital, "PROTRACTED ACTIVATION OF THE BASAL FOREBRAIN CHOLINERGIC NEURONS AFTER BINGE ETHANOL EXPOSURE"

POSTER 45
Arwa Mohammad (Undergraduate), Wenwen Sheng (Postdoctoral Fellow), Sponsored by Grace Sun, PhD, Department of Biochemistry, "GREEN TEA EPIGALLOCATECHIN-3-GALLATE (EGCG) INHIBITS CYTOKINE-INDUCED NITRIC OXIDE AND SECRETORY PHOSPHOLIPASE A2-IIA IN GLIAL CELLS"

POSTER 46
Zachary Panfili (M2), Javad Habibi, PhD, Melvin R. Hayden, MD, Ravi Nistala MD, Alan Parrish, PhD, James R Sowers, MD, Roger Tilmon, BS, Sponsored by Adam Whaley-Connell, DO, Department of Internal Medicine, Harry S Truman VA Medical Center, "ANG II CONTRIBUTES PROXIMAL TUBULE REMODELING IN TRANSGENIC REN2 RATS"

POSTER 47
Rebecca J. Skiljan (Undergraduate Student), Ian George (Graduate Student), Henry Tsai (Graduate Student), Sponsored by Casey Holliday, PhD, Department of Pathology and Anatomical Sciences, "A 3D VIRTUAL ATLAS OF THE HEAD ANATOMY OF *ALLIGATOR MISSISSIPPIENSIS"*

POSTER 48

Susan D. Sowers (Undergraduate), Sarika V. Bagree (Undergraduate), Melvin R. Hayden, MD, Sponsored by James R. Sowers, MD, Department of Internal Medicine, Division of Endocrinology Diabetes and Metabolism, Diabetes and Cardiovascular Disease Research Center, Department of Medical Pharmacology and Physiology, Harry S Truman VA Medical, "RETINAL REDOX STRESS AND ULTRASTRUCTURAL REMODELING IN METABOLIC SYNDROME AND DIABETIC RETINOPATHY"

POSTER 49

Joshua G. Thweatt (Undergraduate), Ashley S. Hammond (Graduate), Sponsored by Carol Ward, PhD, Department of Pathology and Anatomical Sciences, "HIP STRUCTURE AND LOCOMOTION IN AMBULATORY AND CURSORIAL CARNIVORES REINVESTIGATED"

Category II
Clinical

Acuff Gallery 1:00 – 3:00 p.m.

POSTER 50
Abdillahi Abdi Abdinoor, MD (PYG2), Dedri Markita Ivory MD (PGY5-Postdoctoral Fellow), Celso Velazquez MD, Sponsored by Chokkalingam Siva, MD, Department of Internal Medicine - Division of Immunology and Rheumatology, "SCREENING FOR MALE OSTEOPOROSIS AT AN ACADEMIC MEDICAL CENTER: RETROSPECTIVE ANALYSIS OF DXA USAGE PATTERNS OVER 5 YEARS"

POSTER 51
Elizabeth Arnett (MOTS), Sarah Haffner (MOTS), Amanda Hurt (MOTS), Kelly Watkins (MOTS), Sponsored by Lea Ann Lowery, MEd, OTR/L, Department of Occupational Therapy, "EVALUATION THE EFFECTIVENESS OF A COGNITIVE APPROACH FOR TEACHING DOMESTIC CHORES TO ADOLESCENTS AND ADULTS WITH AUTISM"

POSTER 52
Mohammad Bahador, MD (Resident), Waseem Khaliq,MD (Resident), Mark S Musselman, MD, James Egner, MD, Ikechukwu Uzoaru, MD, Sponsored by Michael Richards, MD, Department of Radiology, "RARE CASE OF CLEAR CELL SARCOMA IN A YOUNG FEMALE"

POSTER 53
Farshad Bahador, MD (Resident),H R Latfi, MD, Stanley Grossman, MD, Umesh Oza, MD, Ali Ozhand, MD, MPH, Landis K Griffeth, MD, Sponsored by Amolak Singh, MD, Department of Radiology, "COMPARISON OF DIFFERENT STRATEGIES IN PARATHYROID SCINTIGRAPHY IMAGING"

POSTER 54
Farshad Bahador, MD (Resident), Waseem Khaliq MD(Resident), W. Chaudhry, MD, David L. Graham, MD, Ikechukwu Uzoaru, MD, Sponsored by Michael Richards, MD, Department of Radiology, "EWING'S SARCOMA IN A 52 YEAR-OLD WOMEN WITH LEG PAIN"

POSTER 55
Farshad Bahador, MD (Resident), Thomas Kim, MD, Sponsored by Humera Ahsan, MD, Department of Radiology, "ATYPICAL PRESENTATION OF POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME IN A PATIENT WITH SEPSIS"

POSTER 56
Farshad Bahador, MD (Resident), H R Latfi, MD, Stanley Grossman, MD, Umesh Oza, MD, Ali Ozhand, MD, MPH, Landis K Griffeth, MD, Sponsored by Amolak Singh, MD, Department of Radiology, "COMPARISON OF DIFFERENT STRATEGIES IN PARATHYROID SCINTIGRAPHY IMAGING IN THE SETTING OF MULTI-GLAND HYPERPARATHYROIDISM"

POSTER 57
Leryn J. Boyle, MS, Catherine R. Mikus, MS, Meghan L. Ruebel, MS, Paul J. Fadel, PhD, Tom R. Thomas, PhD, M. Harold Laughlin, PhD, Sponsored by John P. Thyfault, PhD, Department of Nutrition and Exercise Physiology, Internal Medicine, Harry S Truman Memorial Veterans' Hospital, "EFFECTS OF STATINS ON METABOLIC ADAPTATIONS TO AEROBIC EXERCISE TRAINING: PRELIMINARY FINDINGS"

POSTER 58
Gretchen K. M. Carlisle, RN, BSN, MEd (Doctoral Student), Charlotte A. McKenney, RN, BSN, Jessa R. Love, PhD, Sponsored by Rebecca A. Johnson, PhD, RN, FAAN, MU Sinclair School of Nursing, College of Veterinary Medicine, "THE EFFECTS OF THE INTERACTION OF ANIMALS WITH CHILDREN DIAGNOSED WITH AUTISM SPECTRUM DISORDER AND THEIR FAMILIES"

POSTER 59
Abhishek Choudhary (Fellow), Jessica Winn (Resident), Murtaza Arif (Fellow), Nicholas M. Szary (Fellow), Ajitender Grewal, MD, Ghassan M. Hammoud, MD, Matthew L. Bechtold, MD, Sponsored by Jamal A. Ibdah, MD, PhD, Department of Internal Medicine, Division of Gastroenterology, "TWO-STAGE VS. SINGLE-STAGE MANAGEMENT OF PATIENTS WITH CHOLEDOCHOLITHIASIS: META ANALYSIS OF RANDOMIZED CONTROLLED TRIALS"

POSTER 60
Doug Clem, MHS, RDCS, RVT (PhD Candidate), Sharlette Anderson, MHS, RDCS, RVT, RDMS, Joe Donaldson, PhD, Sponsored by Moses Hdeib, MD, RDCS, RVT, RDMS, School of Health Professions, "AN EXPLORATORY STUDY OF SPATIAL ABILITY AND STUDENT ACHIEVEMENT IN SONOGRAPHY"

POSTER 61
Ryan Davis (MOTS), Brittany Dillon (MOTS), Christy Pierce (MOTS), Suzanne Voelker (MOTS), Sponsored by Giulianne Krug, MA, OTR/L, Department of Occupational Therapy, "THE EFFECTIVENESS OF BILATERAL VERSUS UNILATERAL TASK RETRAINING USING THE SAEBOFLEX DEVICE IN INDIVIDUALS WITH SUBACUTE AND CHRONIC STROKE"

POSTER 62
Shekhar H. Deo, PhD (Post Doctoral Fellow), Colin N. Young, PhD, Seth T. Fairfax (Doctoral Student), Sponsored by Paul J. Fadel, PhD, Department of Medical Pharmacology and Physiology, and Dalton Cardiovascular Research Center, "SELECTIVE ATTENUATION OF CAROTID-CARDIAC RESPONSES TO HYPERTENSION AT THE ONSET OF STATIC HANDGRIP IN HUMANS"

POSTER 63
Laurel A. Despins PhD(c), APRN, Sponsored by Bonnie Wakefield PhD, RN, FAAN, Sinclair School of Nursing, "EFFECT OF A PRIMED GOAL OF PATIENT SAFETY ON PATIENT RISK DETECTION"

POSTER 64
Kathleen K. Ellis (PhD Student), Sponsored by Tina Bloom, PhD, RN, Sinclair School of Nursing, "EXPERIENCES OF LOW-INCOME RURAL PREGNANT MISSOURI WOMEN AS THEY NAVIGATE THE HEALTH CARE SYSTEM"

POSTER 65
Seth T. Fairfax (Doctoral Student), Colin N. Young, PhD, Sponsored by Paul J. Fadel, PhD, Department of Medical Pharmacology and Physiology, "COUPLING OF SPONTANEOUS CHANGES IN MUSCLE SYMPATHETIC NERVE ACTIVITY TO BLOOD PRESSURE IN HUMANS: POTENTIAL INFLUENCE OF AGE"

POSTER 66
Patricia S. Groves RN (Doctoral Candidate), Sponsored by Bonnie Wakefield RN, PhD, Sinclair School of Nursing, "EXPLORING THE INTERSECTION BETWEEN SAFETY CULTURE AND HOSPITAL NURSING PRACTICE"

POSTER 67
Rukhsana Gul (Postdoctoral Fellow), Vincent G. DeMarco, PhD, Shannon Arnold (Lab Tech), Adam Whaley-Connell, DO, James R. Sowers, MD, Sponsored by Lakshmi Pulakat, PhD, University of Missouri Department of Internal Medicine, Center for Diabetes and Cardiovascular Research Harry S Truman Veterans' Hospital, "NEBIVOLOL, A BETA ADRENERGIC RECEPTOR ANTAGONIST BLOCKS ANGIOTENSIN II-MEDIATED SIGNALING IN HEART"

POSTER 68
Brittany Hanson (MOTS), Erin Kaufman (MOTS), Sponsored by Guy McCormack, PhD, OTR/L, FAOTA, Department of Occupational Therapy, "USING NEUROFEEDBACK TRAINING IN CHILDREN WITH AUTISM SPECTRUM DISORDER"

POSTER 69
Cortney Held (MOTS), Paige Rakes (MOTS), Sponsored by Guy McCormack, PhD, OTR/L, FAOTA, School of Health Professions, "OLDER ADULTS AND *POSIT SCIENCE*: THE EFFECTIVENESS OF A COGNITIVE TRAINING PROGRAM ON ATTENTION AND REACTION TIME"

POSTER 70
Areum Kim (Doctoral Student), Shekhar H. Deo (Post Doctoral Fellow), James P. Fisher, PhD, Sponsored by Paul J. Fadel, PhD, Department of Medical Pharmacology and Physiology, and Dalton Cardiovascular Research Center, "ALTERATIONS IN CAROTID BAROREFLEX CONTROL OF ARTERIAL BLOOD PRESSURE DURING THE MENSTRUAL CYCLE IN YOUNG WOMEN"

POSTER 71
Sheila A. Leander, RN, MSN (Doctoral Candidate), Patricia E. Freed, MSN, EdD, CNE, Lee SmithBattle, RN, DNSc, Nina Westhus, RN, PhD, Sponsored by Deborah Finfgeld-Connett, PhD, APRN, BC, Sinclair School of Nursing, "THERAPEUTIC LETTERS: EFFECTS ON NURSING STUDENTS AND RECIPIENTS"

POSTER 72
Kevin W. Lollar, MD, Sponsored by C. W. David Chang, MD, Department of Otolaryngology – Head & Neck Surgery, "SOLITARY FIBROUS TUMORS OF THE NASAL CAVITY"

POSTER 73
Jonathan C. Mills, MD (PGY-3), Keith J. Basler (M2), Sponsored by Eliav Gov-Ari, MD, Department of Otolaryngology – Head and Neck Surgery, "PREDICTORS OF TONSILLECTOMY AFTER PREVIOUS ADENOIDECTOMY FOR UPPER AIRWAY OBSTRUCTION"

POSTER 74
Heather Monrad (MOTS), Lauren Oakley (MOTS), Kyslea Reid (MOTS), Sponsored by Diane Smith, PhD, OTR/L, FAOTA and Crystal Gateley, MA, OTR/L, Department of Occupational Therapy, "HEALTH LITERACY IN TWO OUTPATIENT CLINICS"

POSTER 75
Douglas J. Oberlin (Master's Student), Catherine R. Mikus (Doctoral Student), Sponsored by John P. Thyfault, Departments of Nutrition and Exercise Physiology and Internal Medicine, Harry S Truman Memorial VA Hospital, "PHYSICAL INACTIVITY RAPIDLY ALTERS GLYCEMIC CONTROL IN YOUNG, LEAN, PREVIOUSLY ACTIVE VOLUNTEERS"

POSTER 76
Jamie Odem, MD (PGY-2), Jessica Kozel, MD, Derek Ellingson, DO, Sponsored by Shellaine Frazier, DO, Department of Pathology and Anatomical Sciences, "PAPILLARY THYROID CARCINOMA ARISING FROM A MATURE TERATOMA IN A CRYPTORCHID TESTIS: A CASE REPORT"

POSTER 77
Young S. Paik, MD (Resident Physician), Jason A. Showmaker, MD (Resident Physician), Sponsored by Eliav Gov-Ari, MD and CW David Chang, MD, Department of Otolaryngology-Head & Neck Surgery, "PATIENT SATISFACTION AND ANXIETY WITH INFORMED CONSENT DELIVERED THROUGH INFORMATIONAL VIDEO COMPARED TO THE TRADITIONAL PHYSICIAN INTERVIEW"

POSTER 78
Lindsay N. Parsons, BS, MPH (Graduate Student), Patrick H. Short, BA (GIS Specialist), Sponsored by Jane A. McElroy, PhD, Department of Family and Community Medicine, "GEOGRAPHIC DISTRIBUTION OF SHOW ME HEALTHY WOMEN PROVIDERS AND BREAST CANCER INCIDENCE AND MORTALITY IN MISSOURI COUNTIES"

POSTER 79
Naveen Rajpurohit (PGY-2), Nadish Garg, MD, Abhishek Choudhary, MD, Sponsored by Kul Aggarwal, MD, Department of Internal Medicine - Division of Cardiology, "IMMEDIATE VERSUS DELAYED PERCUTANEOUS CORONARY INTERVENTION FOR PATIENTS WITH NON-ST ELEVATION-ACUTE CORONARY SYNDROME: A META-ANALYSIS OF RANDOMISED TRIALS"

POSTER 80
Kristi Sappington (MOTS), Alissa Zimmerman (MOTS), (Diane L. Smith, Ph.D. OTR/L, FAOTA), Sponsored by Crystal Gateley, MA, OTR/L, Department of Occupational Therapy, "HEALTH LITERACY IN A REHABILITATION SETTING"

POSTER 81
Zonggao Shi (Postdoctoral Fellow), Sponsored by M. Sharon Stack, PhD, Department of Pathology and Anatomical Sciences, "MICRORNA MIR-146A EXPRESSION IN ORAL CANCER TISSUES"

POSTER 82
Mette Soendergaard (Graduate Student), Xiuli Zhang (Postdoctoral Fellow), Maura Bates (Doctoral Student), Thomas P. Quinn, PhD, Sponsored by Susan L. Deutscher, PhD, Department of Biochemistry, "EVALUATION OF [$^{99m}TC(CO)_3$]-LABELED ERBB-2-TARGETING PEPTIDES FOR BREAST CARCINOMA IMAGING"

POSTER 83
Brittney Stevenson (MOTS), Jenna Haddock (MOTS), Sponsored by Enid Schatz, PhD, Department of Occupational Therapy, "GENDER, AGING & ACTIVITY IN RURAL SOUTH AFRICA"

POSTER 84
Sofia Syed, MD (R2), Sponsored by Uzma Khan, MD, Department of Internal Medicine, Division of Endocrinology, "ASSESMENT OF QUALITY OF CARE FOR TYPE 2 DIABETES"

POSTER 85
Lauro C. Vianna (Post Doctoral Fellow), Colin N. Young, PhD, Catherine R. Mikus (Doctoral Student)John P. Thyfault, PhD, Sponsored by Paul J. Fadel, PhD, Department of Medical Pharmacology and Physiology, Dalton Cardiovascular Research Center, "INSULIN-MEDIATED INCREASES IN ARTERIAL BAROREFLEX CONTROL OF MUSCLE SYMPATHETIC NERVE ACTIVITY FOLLOWING MEAL INTAKE IN HUMANS"

POSTER 86
Michael Waggoner, DO (PGY-2), Ashish Tandon, PhD, Jonathan C.K. Tovey, MD, Ajay Sharma, PhD, Vanessa Lopez, MD, John W. Cowden, MD, Frank G. Rieger III, MD, Chuck W. Hamm, COT, CRA, OCT-C, Sponsored by Rajiv R. Mohan, PhD, University of Missouri Department of Ophthalmology, Mason Eye Institute, Harry S Truman VA Hospital, "SAHA: FDA APPROVED HISTONE DEACETYLASE INHIBITOR DEMONSTRATES EXCEPTIONALLY HIGH INHIBITION OF CORNEAL HAZE FOLLOWING PRK SURGERY IN RABBIT MODEL"

POSTER 87
Jessica Winn (R1), Abhishek Choudhary (Postdoctoral Fellow), Murtaza Arif (Postdoctoral Fellow), Nicholas M. Szary (Postdoctoral Fellow), Lakshmi Chauhan (R2), Ajitender Grewal, MD, Ghassan M. Hammoud, MD, Matthew L. Bechtold, MD, Sponsored by Jamal A. Ibdah, MD, PhD, Department of Internal Medicine - Division of Gastroenterology, "OUTCOME OF MEDICAL VERSUS SURGICAL THERAPIES FOR GASTROESOPHAGEAL REFLUX DISEASE: META ANALYSIS OF RANDOMIZED CONTROLLED TRIALS"

POSTER 88
Dali Zheng (Postdoctoral Fellow), Sponsored by Michael X Wang, MD, PhD, Department of Pathology and Anatomical Sciences, "PLASMA miRNAS AS NOVEL BIOMARKERS FOR BREAST CANCER DETECTION"

Category II
Basic

Acuff Gallery 1:00 – 3:00 p.m.

POSTER 89
James R. Austgen (Postdoctoral Fellow), Heather A. Dantzler (Research Specialist), Sponsored by David D. Kline, PhD, Department of Biomedical Sciences and the Dalton Cardiovascular Research Center, "HYDROGEN SULFIDE (H_2S) AUGMENTS SYNAPTIC NEUROTRANSMISSION IN THE NUCLEUS OF THE SOLITARY TRACT (NTS)"

POSTER 90
Haley Beier (MOTS), Elizabeth Wilson (MOTS), Sponsored by Meenakshi Iyer, PhD, OTR/L, Department of Occupational Therapy, "THE EFFECTS OF TDCS ON INDIVIDUALS WITH COMPROMISED COGNITION: A REVIEW OF THE LITERATURE"

POSTER 91
Lana Bruney (Doctoral Candidate), Yueying Liu (Lab Manager), Ania Slusarz, PhD, Sponsored by M. Sharon Stack, PhD, Departments of Medical Pharmacology and Physiology, and Pathology and Anatomical Sciences, "INTEGRIN-LINKED KINASE: A POTENTIAL PLAYER IN OVARIAN CANCER METASTASIS"

POSTER 92
Victoria Calzada (Graduate Student), Xiuli Zhang (Postdoctoral Fellow), Pablo Cabral, PhD, Marcelo Fernandez, DVM, Juan Pablo Gambini, MD, PhD, Sponsored by Thomas Quinn, PhD, Department of Biochemistry, "^{177}Lu RADIOLABELED PEPTIDES FOR BREAST CANCER THERAPY"

POSTER 93
Jason Cascio (Graduate Student), Cara Haymaker (Graduate Student), Sponsored by Habib Zaghouani, PhD, Department of Molecular Microbiology and Immunology, "REVERSAL OF CNS AUTOIMMUNITY BY INDUCTION OF ORAL TOLERANCE TO BRAIN ANTIGENS MEDIATED BY ANTIGEN PRESENTING CELLS OF THE LAMINA PROPRIA"

POSTER 94
Jing Chen (Graduate Student), Sang-Myeong Lee (Post Doctoral Student), Deyu Fang, PhD, Sponsored by Ulus Atasoy, MD, Department of Otolaryngology-Head and Neck Surgery, Department of Molecular Microbiology and Immunology, Department of Surgery-Administration, "THE THERAPEUTIC ROLE OF RESVERATROL IN ALLERGIC LUNG INFLAMMATION"

POSTER 95
Lauren Chronister (MOTS), Sarah White (MOTS), Sponsored by Meena Iyer, OTD, Department of Occupational Therapy, "SELECTIVE REVIEW OF TDCS AND COGNITIVE TRAINING STUDIES ENHANCING COGNITIVE PERFORMANCE IN HEALTH AND DISEASE"

POSTER 96
Kimberly A. Congdon (Graduate Student), Sponsored by Matthew J. Ravosa, PhD, Department of Pathology and Anatomical Sciences, "INTERSPECIFIC AND ONTOGENETIC VARIATION IN GREAT APE PEDAL PHALANGEAL CURVATURE"

POSTER 97
Garrett M. Dahm (Doctoral Student), Matthew M. Gubin (Doctoral Student), Cristiana Stellato, MD, PhD (Professor, Johns Hopkins), Joseph D. Magee, MD (Research Associate), Xi Fang, PhD (Post Doc, Johns Hopkins), Jinshui Fan, PhD (Post Doc, Johns Hopkins), Vincenzo Casolaro, MD, PhD (Professor, Johns Hopkins), Danielle M. Tarter, PhD, Jing Chen (Doctoral Student), Glenn A. Jackson, DVM, Craig L. Franklin, DVM, PhD, Sponsored by Ulus Atasoy, MD, Departments of Surgery, Child Health, Molecular Microbiology and Immunology, "COORDINATE REGULATION OF *GATA3* AND CD4+ T-HELPER 2 (TH2) CYTOKINE GENE EXPRESSION BY THE RNA-BINDING PROTEIN HUR"

POSTER 98
Ian George, M.S. (Graduate Student), Jong-In P. Kim (Undergraduate Student), Sponsored by Casey Holiday, PhD, Department of Pathology and Anatomical Sciences, "TRIGEMINAL NERVE MORPHOLOGY IN THE AMERICAN ALLIGATOR: IMPLICATIONS FOR INFERING SENSORY POTENTIAL IN EXTINCT SPECIES"

POSTER 99
Matthew M. Gubin (Doctoral Student), Robert Calaluce (Senior Research Specialist), J. Wade Davis, PhD, Joseph D. Magee (Research Associate), Connie S. Strouse (Undergraduate), Daniel P. Shaw, DVM, PhD, Timothy Hoffman, PhD, Tammy L. Rold (Research Specialist), Sponsored by Ulus Atasoy, MD, Department of Surgery, Molecular Microbiology and Immunology and Child Health, "OVEREXPRESSION OF THE RNA-BINDING PROTEIN HUR IMPAIRS TUMOR GROWTH IN TRIPLE NEGATIVE BREAST CANCER ASSOCIATED WITH DEFICIENT ANGIOGENESIS"

POSTER 100
Rangan Gupta, PhD (Postdoctoral Fellow), Ashish Tandon, PhD, Jonathan C.K. Tovey, MD, Ajay Sharma, PhD, Sponsored by Rajiv R. Mohan, PhD, University of Missouri Department of Ophthalmology Harry S Truman Veterans Memorial Hospital, "SMAD-SIGNALING INHIBITION: POTENTIAL FOR DEVELOPING NEWER TREATMENTS FOR CORNEAL FIBROSIS"

POSTER 101
Chady H. Hakim (Graduate Student), Sponsored by Dongsheng Duan, PhD, Department of Molecular Microbiology and Immunology, “ABSENCE OF DYSTROPHIN ALTERS THE PASSIVE PROPERTIES OF THE EXTENSOR DIGITORUM LONGUS MUSCLE IN MICE”

POSTER 102
Ashley S. Hammond (Doctoral Student), J. Michael Plavcan, PhD, Sponsored by Carol V. Ward, PhD, Department of Pathology and Anatomical Sciences, “3D ANALYSIS OF PRIMATE HINDLIMB JOINTS: RECONSTRUCTING POSITIONAL ABILITIES IN EXTINCT PRIMATES”

POSTER 103
Cara L Haymaker (Graduate Student), Jason A Cascio (Graduate Student), Sponsored by Habib Zaghouani, PhD, Department of Molecular Microbiology and Immunology, “THYMIC MYELOID AND LYMPHOID CELLS DERIVE FROM DISTINCT DN1 PROGENITORS”

POSTER 104
Cheryl A. Hill, PhD (Postdoctoral Research Fellow), Sponsored by Kristina Aldridge, PhD, Department of Pathology and Anatomical Sciences, “RELATIONSHIP BETWEEN OTITIS MEDIA AND TEMPORAL BONE PNEUMATIZATION”

POSTER 105
Christine Hoeman (Graduate Student), Sponsored by Habib Zaghouani, PhD, Department of Molecular Microbiology & Immunology, “DON’T BE SUCH A BABY! OR THE EFFECTS OF THE ENVIRONMENT AND T CELLS ON NEONATAL IMMUNITY”

POSTER 106
Russell T. Hogg (Postdoctoral Lecturer), Laurie R. Godfrey, PhD, Gary T. Schwartz, PhD, Timothy G. Bromage, PhD, Sponsored by Matthew J. Ravosa, PhD, Department of Pathology and Anatomical Sciences, “METABOLIC RHYTHMS IN HAPLORHINE AND STREPSIRRHINE PRIMATES”

POSTER 107
Lei Hua (PhD student), Sponsored by Yang Gong, MD, PhD, Department of Health Management and Informatics, “REPORTING QUALITY AND SYSTEM DESIGN CONCERNS OF VOLUNTARY MEDICAL INCIDENT REPORTING SYSTEMS: A LITERATURE REVIEW”

POSTER 108
Taryn James (Graduate Student), Sponsored by Shivendra Shukla, PhD, Department of Medical Pharmacology and Physiology, “ACUTE (BINGE) ADMINISTRATION OF ETHANOL CAUSES HISTONE H3 PHOSPHORYLATION AT SER-10, SER- 28 & GENE EXPRESSION IN RAT LIVER IN VIVO”

POSTER 109
E. Matthew Morris (Graduate Student), Grace Uptergrove (Senior Research Specialist), Lauren Koch, PhD, Stephen Britton, PhD, Jamal A. Ibdah, MD, PhD, Sponsored by (John Thyfault, PhD), Department of Internal Medicine – Division of Gastroenterology and Hepatology, "INTRINSIC HIGH AEROBIC CAPACITY PROTECTS AGAINST LIPID INDUCED HEPATIC INSULIN RESISTANCE"

POSTER 110
Kathryn Riesenberg (M2), Cara Kuhn (M2), Sponsored by Sharlette Anderson, MHS, RDMS, RVT, RDCS, School of Health Professions, "EMERGENCY SONOGRAPHY: THE USE OF FOCUSED ASSESSMENT WITH SONOGRAPHY FOR TRAUMA IN MID-AMERICAN TRAUMA CENTERS"

POSTER 111
Amy E. Schwindt (Graduate Student), Sponsored by George E. Davis, MD, PhD, Department of Medical Pharmacology and Physiology, "CHARACTERIZATION OF PERICYTE INVASIVE RESPONSES AND PERICYTE-INDUCED VASCULAR MORPHOGENESIS IN 3D MATRICES: DISTINCTIONS WITH VASCULAR SMOOTH MUSCLE CELLS"

POSTER 112
Young-Jin Seo (Postdoctoral Fellow), Celeste Blake (Research Specialist), Sponsored by Bumsuk Hahm, PhD, Departments of Surgery and Molecular Microbiology & Immunology, "SPHINGOSINE ANALOG AAL-R ENHANCES DENDRITIC CELL RESPONSES UPON TLR7 LIGATION"

POSTER 113
Ajay Sharma, PhD (Postdoctoral Fellow), Ashish Tandon, PhD, Jonathan CK. Tovey, MD, Rangan Gupta, PhD, J. David Robertson, PhD, Jennifer A. Fortune, PhD, Alexander M. Klibanov, PhD, John W. Cowden, MD, Sponsored by Rajiv R. Mohan, PhD, University of Missouri Department of Ophthalmology, Harry S Truman Veterans Memorial Hospital, "N/P RATIO IN THE PEI2-GNP-DNA COMPLEX AFFECTS TRANSGENE DELIVERY IN THE HUMAN CORNEA *IN VITRO"*

POSTER 114
Rishi Sharma (Postdoctoral fellow), Amanda Michael (Medical Student), David deRoode (MU student), Shafi Lodhi (MU student), Sponsored by Mahesh Thakkar, PhD, University of Missouri Department of Neurology, Harry S Truman Memorial Veteran's Hospital, "NICOTINE REDUCES ADENOSINE RELEASE IN THE LATERAL HYPOTHALAMUS: A POSSIBLE MECHANISM OF ITS ADDICTION"

POSTER 115
Anna Ślusarz (Postdoctoral Fellow), Yueying Liu (Senior Research Scientist), Sponsored by M. Sharon Stack, PhD, Department of Pathology and Anatomical Sciences, "MODELING PERITONEAL METASTASES OF OVARIAN CANCER"

POSTER 116
Ashish Tandon, PhD (Postdoctoral Fellow), Jonathan C.K. Tovey, MD, Rangan Gupta, PhD, Ajay Sharma, PhD, John W. Cowden, MD, Gregory Schultz, PhD, Sponsored by Rajiv R. Mohan, PhD, University of Missouri Department of Ophthalmology, Harry S Truman Veterans Memorial Hospital, "AAV5-MEDIATED TARGETED DECORIN GENE THERAPY: EFFECTIVE AND SAFE FOR CORNEAL FIBROSIS"

POSTER 117
Steven Taylor (Graduate Student), Kailyn Brown (Graduate Student), Rickey Monroe (Graduate Student), Sponsored by Moses Hdeib, MD, PhD, RDMS, RDCS, RVT, School of Health Professions, "ULTRASOUND ASSISSTED LIPOSUCTION"

POSTER 118
Jonathan Tovey, MD (Postdoctoral Fellow), Ashish Tandon, PhD, Ajay Sharma, PhD, Rangan Gupta, PhD, John W. Cowden, MD, Gregory Schultz, PhD, Sponsored by Rajiv R. Mohan, PhD, University of Missouri Department of Ophthalmology, Harry S. Truman Veterans Memorial Hospital, "TISSUE-SELECTIVE CONTROLLED DECORIN GENE DELIVERY IN THE RABBIT CORNEA SIGNIFICANTLY RETARDS CORNEAL ANGIOGENESIS IN VIVO"

POSTER 119
Henry P. Tsai (Life Sciences Fellow), Sponsored by Casey M. Holliday, PhD, Department of Pathology and Anatomical Sciences, "ANATOMY, HISTOLOGY, AND ONTOGENY OF THE SESAMOID CARTILAGE IN THE JAW MUSCLES OF THE AMERICAN ALLIGATOR (*ALLIGATOR MISSISSIPPIENSIS*)"

POSTER 120
Wei Wang (Graduate Student), Deborah L. Chance (Research Assistant Professor), Sponsored by (Thomas P. Mawhinney, PhD), Department of Biochemistry, "LECTIN AFFINITY BINDING OF PSEUDONONAS AERUGINOSA WITH POLYACRYLAMIDE NEOGLYCOCONJUGATES"

POSTER 121
Samantha Welsh (First Year Executive MHA Student), Sponsored by Les Hall, MD, Dean's Office, School of Medicine, "HEALTH POLICIES FOR PULMONARY TUBERCULOSIS: WHAT WORKS?"

POSTER 122
Darice Westphal (Master's Student), Gregory Blomquist, PhD, Sponsored by Carol Ward, PhD, Department of Pathology and Anatomical Sciences, "POPULATION HISTORY AT THE MICROSCALE: CRANIOMETRICS OF CAYO SANTIAGO MACAQUES"

POSTER 123
Aaron Witte (Graduate Student), Sponsored by Erin Dannecker, PhD, ATC, School of Health Professions, Department of Physical Therapy, “CHANGES IN MUSCLE FORCE PRODUCTION AND PAIN: IS THERE A RELATIONSHIP?”

POSTER 124
Xiuli Zhang (Postdoctoral Fellow), Juan P. Gambini, MD, PhD, Pablo Cabral, PhD, Said Figueroa, BS, Lixin Ma, PhD, Eduardo Savio, PhD, Susan L. Deutscher, PhD, Omar Alonso, PhD, Sponsored by Thomas P. Quinn, PhD, Biochemistry, “EVALUATION OF [^{99M}Tc] GLUCARATE AS A BREAST CANCER IMAGING AGENT: BENCH TO BEDSIDE”

POSTER 1

ANALYSIS OF THE CEREBELLUM IN INDIVIDUALS WITH AUTISM SPECTRUM DISORDER USING MAGNETIC RESONANCE IMAGING

Sheldon Cook (Undergraduate)

(Shawn Christ, PhD)
Department of Psychological Sciences

(Kristina Aldridge, PhD)
Department of Pathology and Anatomical Sciences

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that affects approximately 1 of every 150 people in the US population. Individuals with ASD have been shown to display deficits in motor coordination, suggesting structural changes in the cerebellum relative to typically-developing individuals. In fact, previous studies have shown individuals with ASD to have increased volume of the cerebellum. The purpose of this study is to examine the cerebellum in adolescents with ASD to determine whether there are differences in the component structures of the cerebellum.

Magnetic resonance images were acquired from a sample of male adolecents with ASD and age-matched control individuals (13-21 years). We collected volumes of the whole cerebellum, cerebellar gray matter (CGM) and cerebellar white matter (CWM). Results show slight increases in CGM and CWM in ASD, though overall cerebellar volume was not significantly different. Our results show that there are differences in the volumes of the component structures of the cerebellum. These differences may provide the structural basis for deficits in motor coordination observed in individuals with ASD.

POSTER 2

PRIMARY AMYLOIDOSIS – A CASE REPORT AND FUTURE INVESTIGATIONS

Andrew L Franklin (M3)

Lauren Kirkpatrick (M3)

Mayank Mittal (R1)

Abdillahi Abdinoor (R2)

(Emily Coberly, MD)
Department of Internal Medicine

Primary amyloidosis is an uncommon and devastating disease characterized by extracellular tissue deposition of insoluble amyloid fibrillar monoclonal light chains. The disease primarily affects the heart and kidneys and rarely presents with primary hepatic involvement. We report a case of a previously healthy 54-year-old patient with primary systemic amyloidosis presenting as liver failure. The patient was transferred from an outside hospital with a 6-week history of anasarca, ascites, jaundice, and tender hepatomegaly. At the time of admission, renal function and echocardiogram were normal. Extensive laboratory and radiology studies ruled out viral, drug, and cancerous causes of liver failure. Liver and bone marrow biopsy stained with congo red demonstrated apple-green birefringence under polarized light, and additional immunological studies confirmed primary systemic amyloidosis involving the liver and bone marrow. Due to systemic involvement the patient was not a candidate for liver transplant and he elected to return home on palliative care. Currently, life-extending therapies for this disease are limited although successful treatment with liver transplantation has been documented in rare cases. Given the infrequent incidence, devastating impact, and variety of presentations, it is necessary to analyze each case in an effort to achieve better outcomes such as earlier diagnosis, shorter hospital stays, and improved pain control at end of life.

POSTER 3

COALITION CAPACITY ASSESSMENT OF COLUMBIA COALITIONS FOR A HEALTHIER COLUMBIA (A QUALITATIVE ASSESSMENT)

Adam Harrold (M2)

Krystal Purnell (MPH Student)

(Dr. Joseph LeMaster, MD, MPH)
Department of Family and Community Medicine

Introduction: Obesity is one of the leading public health concerns in the United States in adults and children. This qualitative study focused on five coalitions involved in addressing this issue in Columbia, MO. The coalitions are Playgrounds Without Borders Community Steering Committee, Columbia Action Network, Healthy Environment Policy Initiative, Grow Healthy Columbia/Boone County Partnership, and Move More Eat Smart.

Methods: Eligible coalition members were identified who attended at least two coalition meetings. Of 91 eligible, 60 participated (65.9% yield). Since some individuals participated in multiple coalitions, there were 128 total possible surveys, 100 were collected (78.1% yield). The data was collected via personal interviews with participants using the Coalition Capacity Assessment quantitative survey (Transtria LLC, St. Louis MO). We followed up responses to items that individuals scored as "0" or "1" (on a Likert scale for "strongly disagree" or "disagree," respectively) using a structured interview qualitative approach. Median survey scales scores were compared across coalition using non-parametric analyses. We used a grounded theory approach to analyze qualitative data to identify emergent themes.

Results: Quantitative results suggest widely varying assessments of the different coalitions on a number of parameters. Qualitative themes suggested that these differences likely arose from the unique structure and function of each coalition, with varying perceived effectiveness by its members.

Discussion: The CDC suggests the need for strategies of obesity prevention that effectively target environment and policies to promote physical activity and a healthy diet. Potential strategies for community-based participatory research coalitions will be suggested in the presentation.

POSTER 4

CARING FOR DIVERSE POPULATIONS: FURTHER STEPS TOWARDS INCREASING CULTURAL HUMILITY IN THE UMHS PRIMARY CATCHMENT AREA

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Shriniwas Gautam (Graduate Student)
(Stanton Hudson)
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Center for Health Policy

ABSTRACT: Cultural humility has long been identified as key to effectively working in diverse populations. Recent studies have demonstrated the importance of cultural humility in health care provider education. Over the past several decades, Missouri has become more and more of a 'melting pot'. Karen Edison and the Center for Health Policy are leading an effort to provide an educational resource for health and public policy stakeholders working with varied populations in Missouri. Currently, there is no centrally located and synthesized information available that would allow community workers to gain a better understanding of the populations they serve. In addition, a comprehensive resource educating health care providers in cultural humility is not available at the University of Missouri. By utilizing data on the populations UMHS serves and resources on cultural humility education, this research project set out to explore possibilities for combining information and resources into a reliable, functional database that can be accessed to improve the healthcare delivery, communication, and education within Missouri communities. Furthermore, continued collection and analysis of qualitative data from numerous cultures and quantitative data on health status and socioeconomic demographics will be vital to this program's future.

POSTER 5

ASSESMENT OF CEMENT AUGMENTATION AND SCREW TRAJECTORY ON PEDICLE SCREW FIXATION IN OSTEOPOROTIC VERTEBRAE

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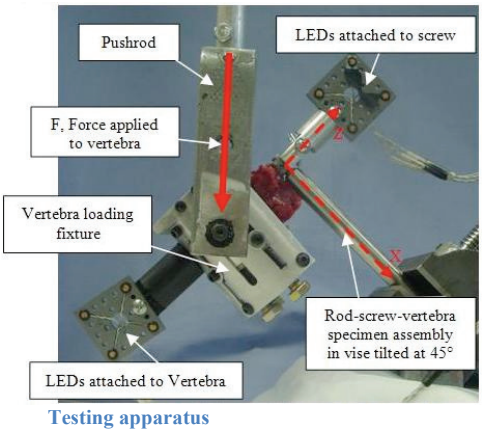
Introduction

Internal fixation of osteoporotic spines for fracture or deformity is currently difficult, owing to failure at the bone-implant interface. This study aims to ascertain whether pedicle screw trajectory and pedicle cortex retention can independently significantly affect fixation strength in osteoporotic vertebrae.

Materials and Methods

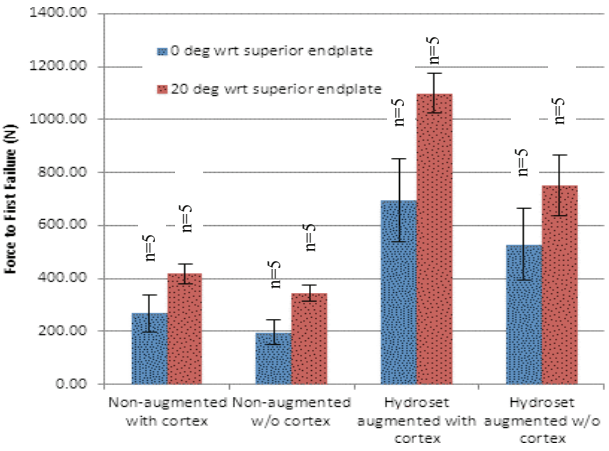
Pedicle screws were inserted at angles of 0° and 20° to the superior vertebral endplate in human osteoporotic thoracolumbar vertebrae. Screws in each group were augmented with calcium phosphate bone cement. A combined flexion moment and pull-out load was applied to simulate physiologic demands on screw purchase, and displacements were measured using an optical tracking system.



Testing apparatus

Results

Initial failure load was significantly higher ($p<0.05$) with cement augmentation. Screw insertion at a 20° angle to the superior endplate independently increased ($p<0.05$) initial failure load. Retention of the dorsal vertebral cortex independently significantly increased ($p<0.05$) initial failure load.



Effects of cement augmentation, screw angulation, and cortex retention

Discussion

Our protocol and apparatus produced screw failure that demonstrated a combination of toggle-migration and pullout similar to that seen clinically. Cement augmentation and angulation of pedicle screws toward the superior endplate can both independently improve internal fixation in osteoporotic vertebrae.

Acknowledgements

This study is supported by MU grant #00029187.

POSTER 6

FUNCTIONAL OUTCOMES OF PATIENTS UNDERGOING ANTEROLATERAL VERSUS ANTEROMEDIAL APPROACHES OF THE ANKLE FOR PILON FRACTURES

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Department of Orthopaedic Surgery

Introduction:

Pilon fractures of the distal tibia remain a treatment challenge to orthopedists. Careful preoperative planning is crucial to achieving desirable clinical outcomes, but currently the literature does not reach a consensus on which surgical approach is optimal. This study examines functional outcomes of two of the most common surgical approaches for pilon fractures, the traditional anteromedial approach and the more recently described anterolateral approach. The anterolateral approach is thought to produce better outcomes because of the greater amount of visualization into the articular surface and greater soft tissue coverage for the implant.

Materials and Methods:

82 potential subjects were identified to have been treated for Pilon fractures between August 2005 and July 2009 at a level 1 trauma center. Of these patients 39 agreed to be subjects in our study and were asked to fill out the Musculoskeletal Functional Assessment (MFA) and Foot Function Index (FFI) by a telephone interview. This data was then analyzed according to guidelines for each survey. Both scales are assessed on a 0-100 scale with 100 being maximum dysfunction and 0 being minimum dysfunction.

Results:

	AL (23)	AM (14)	AM & AL (2)
Total MFA Score	35.26	32.64	40
FFI Total Score	45.56	42.13	57.15
Time From Surgery to Survey (Days)	1197.09	1293.64	1223
Average Fracture Classification	C2-C3	B3-C1	C2-C3

Conclusion:

The outcomes of the two different approaches did not produce a statistically different outcome (p-values of .9270 for MFA comparison and .9170 for FFI comparison). Yet the significantly higher fracture classification of the anterolateral approach patients (C2-C3 compared to B3-C1) should have produced worse clinical outcomes. Therefore we conclude that the anterolateral approach produces favorable long-term functional outcomes of patients with pilon fractures.

POSTER 7

ORTHOPAEDIC TRAUMA AND AN AGING POPULATION: A RETROSPECTIVE REVIEW OF FACTORS INFLUENCING OUTCOMES

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Introduction: Orthopaedic trauma outcomes are largely dependent upon mechanism of injury. However, elderly patients often sustain lower energy trauma, but have worse outcomes. Studies have shown that elderly patients are more likely to have longer lengths of stay, spend more time in ICU, and that preexisting medical comorbidities significantly increase mortality. The purpose of this study is to investigate if age is associated with outcomes in trauma patients at the University of Missouri.

Methods: After IRB approval, a retrospective review of orthopaedic trauma patients from 2005-2009 was performed. Data points included demographics, medical comorbidities, injuries, surgeries, length of stay, and fracture descriptives.

Results: Patients over age 65 account for 13% of the patient population yet were responsible for 29% of total days spent in hospital. Of these days, an average 50.3% and 63.3% were spent in the ICU among patients aged 66-75 and over 75, respectively. Comorbidities varied, however, patients over 75 years had 2.28 comorbidities per-person compared to 1.09 per-person for the 18-25 age-range. The elderly population has the highest proportion of injuries that were Class 3 or Unclassified while younger populations had more level 1 trauma. Liver and splenic laceration rates were higher in younger populations, patients 18-25 and 26-35 were 0.13 and 0.16 respectively and lower in the over 75 populations at 0.04.

Discussion: This study has characterized the unique population of orthopaedic trauma in mid-Missouri with regards to age and outcomes. At the University of Missouri, elderly patients account for longer hospital and ICU stays despite sustaining lower-energy trauma.

POSTER 8

MEASUREMENT OF MECHANICAL PROPERTIES IN AGING SKIN

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(Ronald Wheeland, MD)
Department of Dermatology

Several molecular and structural changes, occurring as a result of intrinsic change and extrinsic damage, are seen in aging skin. The most pronounced transformations seen are vascular atrophy, decreased collagen and elastic fiber content, loss of hydration, as well as a disordered dermal matrix. Currently, it is difficult to easily quantify the physical changes of skin seen in aging. Collagen, elastic fibers, and mucopolysaccharides are the molecular components that define the biomechanical properties of skin. Elasticity, viscoelasticity and extensibility are variables used to determine the biomechanical properties of skin. Elasticity describes the stiffness of a material and is measured by calculating the Young's modulus. The research objective is to develop a medical device that uses applied vacuum and digital imaging correlation to evaluate skin elasticity seen with aging. This device has the potential for broader application as several other dermatologic conditions are associated with changes in the biomechanical properties of skin: scleroderma, nephrogenic fibrosing dermopathy, photodamage, topical steroid atrophy, epidermolysis bullosa, and wound healing. Ultimately, this method would provide a technique in which information about skin mechanical properties can be used to monitor progression of disease, evaluate treatment efficacy, and assist in the diagnosis of dermatologic conditions. Approximately 150 healthy dermatology patients, aged between 5 and 90 were tested. An image of the skin was taken before and after vacuum application. A software model measuring the change in distance between grid markings, seen in the before and after photos, was used to calculate the Young's modulus. The data was then plotted and age correlations were determined.

POSTER 9

OUTCOMES IN PATIENTS SUSTAINING COMPLEX PERIARTICULAR FRACTURE-DISLOCATIONS OF THE ELBOW

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Department of Orthopaedic Surgery

Purpose: Periarticular fracture-dislocations (dislocations associated with one or more fractures) of the elbow are difficult injuries to treat. They have historically been associated with poor treatment strategies which resulted in abysmal outcomes for patients. We aimed to review our management strategies for these complex injuries and patient outcomes.

Methods: After institutional review board approval, we reviewed all patients aged 16 years of age or greater that presented to MU hospital between 9/1/2005 and 5/31/2010 with a diagnosis of "terrible triad", transolecranon fracture-dislocation, or Monteggia-variant fracture-dislocation of the elbow. Records were reviewed to determine patient age, mechanism of injury, treatment method, and outcomes (elbow motion and pain scores).

Results: A total of 129 patients (10 "terrible triad", 93 transolecranon, and 26 Monteggia-variant injuries) were identified that met inclusion criteria. All patients were treated surgically for their injuries with a common algorithm that included anatomical reduction of the ulna fracture, repair or replacement of a radial head fracture (if present), lateral collateral ligament repair if necessary, and early motion. Two patients died from other simultaneous injuries and four patients had nonunions of their ulnar fractures (three had been open fractures). At an average of 7 months post-surgery, average elbow flexion-extension arc was 12-124 degrees, forearm supination was 76 degrees, and forearm pronation was 78 degrees. Average pain score was 0.75 on a scale of 0-10.

Conclusion: With meticulous surgical treatment and aggressive rehabilitation, patients sustaining complex fracture-dislocations of the elbow can expect excellent medium-term outcomes (good elbow function and minimal pain) after recovery from their injuries.

POSTER 10

THE IMPACT OF "JULY EFFECT" ON "FAILURE TO RESCUE": DO PATIENTS WHO UNDERGO CORONARY ARTERY BYPASS GRAFTING AT TEACHING HOSPITALS FACE A SELECTIVE DISADVANTAGE?

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Introduction: The new academic cycle in July is associated with the commencement of post-graduate medical education. Although this is presumed to be associated with poor patient outcomes, supportive evidence is limited for Cardiac surgery patients. We sought to determine if the new academic cycle had a direct bearing on outcomes of patients undergoing Coronary Artery Bypass Grafting.

Methods: Prospectively collected nationwide in-hospital data over a 10 year time span (1998 – 2007) was used for the study. Only patients who underwent CABG in the first and final academic 3-month quarter were included. Generalized multivariate regression was used to assess risk-adjusted mortality, total complications and "*failure to rescue" (FTOR)* - defined as death after a complication and reflective of hospital quality of care.

Results: Of the 1,056,865 CABG operations performed in the selected academic quarters, 698,942 were at teaching hospitals. The risk-adjusted mortality, complications and FTOR were higher in the beginning of the academic year [Odds ratio= 1.14, 1.04 and 1.19 respectively; $p < 0.001$ for all] irrespective of teaching status. However, teaching status lowered the mortality and aggravated the complications (OR 0.9 and OR 1.02; $p < 0.05$ for both). The July Effect thus contributed to only a 2.4% higher FTOR in teaching hospitals compared to 19% in non teaching hospitals.

Conclusion: Teaching hospitals were attributed to lowering FTOR rates and thus mortality despite higher complication rates in the beginning of the academic cycle. The July Effect is thus reflective of an overall positive change in culture of teaching hospitals.

POSTER 11

DEVELOPMENT OF HUMAN C-PEPTIDE LC-MS ISOTOPE-DILUTION ASSAY: OPTIMIZATION OF C-PEPTIDE ISOLATION FROM BIOLOGICAL FLUIDS AND WITH ION EXCHANGE CHROMATOGRAPHY.

Matthew Roberts (M1)

Alexandre Stoyanov, PhD (Postdoctoral Fellow)

(Randie Little, PhD)
Department of Pathology and Anatomical Sciences

Background: Human C-peptide is an effective marker of insulin secretion in diabetes diagnostics, as it is produced in equimolar amounts with insulin. Little metabolism of C-peptide by the liver also enables its concentrations to be three to five times higher than insulin in the plasma. Although there exists a current demand for higher sensitivity, the method of C-peptide quantitative analysis by Isotope-dilution assays allows for greater specificity as compared to current immunoassay methods

Methods: C-peptide isolation from serum was performed by a multi-step procedure (utilizing IDA techniques) of alcohol precipitation, ion exchange chromatography (IEx), and lyophilization. Analysis was done on a LC-MS system consisting of a paired Shimadzu Prominence HPLC system with a Varian Pursuit C18 reverse phase column and API 4000 MS/MS system. IEx was performed on a Hitrap™ SP column. Fragments were monitored in selected ion & multiple reaction monitoring modes.

Results: It was identified that upon passage of C-peptide through ion exchange chromatography, C-peptide levels were amplified, while background was reduced. Post-lyophilization (after IEx as well) displayed the greatest amplification of C-peptide and reduction of background.

Conclusions: The multi-step process utilizing ion exchange chromatography displayed an improvement in optimization of C-peptide isolation compared to standard IDA methods of C-peptide isolation and quantification. High optimization of C-peptide isolation by use of IEx can result in increased sensitivity as well as promote accuracy of calibrators during clinical immunoassays.

POSTER 12

PREVALENCE OF VITAMIN D DEFICIENCY AND INSULIN RESISTANCE AMONG OVERWEIGHT CHILDREN AND ADOLESCENTS: A DATABASE STUDY

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(Aneesh Tosh, MD)
Department of Child Health

Objective: To evaluate the associations among vitamin D levels, obesity, and insulin resistance in an adolescent cohort.

Methods: A cross-sectional study was conducted using 10-18 year old adolescents enrolled in the Adolescent Diabetes and Obesity Clinic (ADOBE) through University of Missouri Health Care. Low serum 25-hydroxyvitamin D (hypovitaminosis D) was categorized as normal (≥30 ng/mL), insufficient (≥20 ng/mL), and deficient (<20 ng/mL). Body Mass Index (BMI) percentiles for age and gender were used to classify obesity status as overweight (>85%) and obese (>95%). Participants were considered insulin resistant with a fasting serum insulin level >20 mc unit/mL. Spearman's rank correlation coefficients were computed and statistical significance was established ($p < 0.05$).

Results: The study included 212 adolescents. Mean age at first visit was 13.3 years, 53% were female, 55 (26%) were self-described as African-American and 131 (61%) as Caucasian. Among 143 subjects for whom initial fasting insulin levels were obtained, 59% had levels >20 mc unit/mL. Mean 25-hydroxyvitamin D among 90 subjects was 24.0 ng/mL (SD 8.6), 42 (47%) were vitamin D insufficient, and 32 (36%) were vitamin D deficient. Of the 159 subjects who had multiple BMIs reported over time, 70 (44%) demonstrated BMI reduction. Increased BMI was associated with increased fasting insulin ($r=.53$, $p=0.001$) and decreased 25-hydroxyvitamin D ($r=.52$, $p=0.049$).

Conclusions: A moderate association exists in obese adolescents and hypovitaminosis D. A similar correlation with increased resistance to insulin is present in this cohort as well.

POSTER 13

TEN YEAR REVIEW OF MELANOMA WITH REGRESSION

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(Paul Dale, MD)
Ellis Fischel Cancer Center

Melanoma with regression is seen in 10-35% of cutaneous melanomas. We retrospectively reviewed our experience with these unusual melanomas. Between the ten year period from January 1999-Janurary 1010, 192 patients (aged 23-89) presented with primary melanoma of which 11 (6%) had evidence of regression. The median age was 54 (range of 38-78) with 6 males and 5 females. Primary location was truncal in 7 patients (64%), extremity in 3 patients (27%), and head and neck in 1 patient (9%). The median Breslow depth was 0.87 mm. (range 0.37-1.8) and the median Clarks level was 3 (range 2-4), only 3 patients had tumors >1.0mm. Ulceration was present in 1/11, no angiolymphatic involvement was identified, and 8/11 had minimal to no mitotic figures. Eight patients underwent sentinel node biopsy and 1/8 (12.5%) was positive and the only node positive on completion dissection. Median followup was 17 months (range 5-103 months) with no recurrence and no melanoma related deaths. Regression in primary melanomas is rare with only 6% of our melanoma patients. A relatively high number of these patients 2/11 (18%) presented with nodal metastasis even though these patients' primary were <1mm in depth. Neither of these patients' primary exhibited poor prognostic factors such as ulceration, angiolymphatic invasion or a high mitotic index. Thorough clinical evaluation and sentinel lymph node biopsy should be considered in patients with evidence of regression of their primary to detect lymphatic metastasis and institute appropriate therapy to improve survival.

POSTER 14

IS OUR CURRENT VIEW OF GUILLAIN-BARRÉ SYNDROME RECOVERY AND TREATMENT INCOMPLETE?

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Department of Physical Medicine and Rehabilitation

Introduction/ Purpose: Guillain-Barré Syndrome (GBS) is characterized by rapid onset of ascending paralysis, followed by slower recovery. Studies demonstrate that IVIg and plasmapheresis expedite recovery, but treatment protocols are based on studies that used 6 -12 month functional outcome measures terminated at ambulation of distances less than household distances. This study looks at outcomes >1 year to determine if patients' recovery expectations are met, if recovery continues beyond 6 months, and if more sensitive measures of long-term outcome exist.

Methods: Chart review (Rusk Rehabilitation and UMHS) and phone questionnaire. Erasmus GBS Outcome Score (EGOS) was calculated.

Results: Patients ≤40, or with an EGOS score <5 tend to regain ability to walk 10m unassisted (GBS disability Score ≤2). Patients over 40 or EGOS ≥5 have variable long-term outcome. 7/8 subjects report residual effects of their GBS, yet 6/8 are satisfied with their recovery. 5/8 subjects report continuing gains in strength and endurance a year after onset. 50% of patients believe they did not begin to gain strength until 4-6 months after onset and 63% continue to recover today.

Conclusions: Recovery from severe GBS does not plateau at 6 months, and likely not at one year. Older age and higher EGOS are associated with variable outcomes. Treatment protocol studies with outcome measures greater than one year after onset are recommended using a more sensitive outcome measure to distinguish household from community distance ambulation.

POSTER 15

METASTATIC CHOLANGIOCARCINOMA PRESENTING AS PSEUDO-MIRIZZI SYNDROME: A CASE REPORT

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Department of Radiology

A rare consequence of cholelithiasis is Mirizzi Syndrome, which is the obstruction of the common hepatic duct (CHD) secondary to cystic duct stone impaction. We report a case of metastatic cholangiocarcinoma in which imaging findings mimicked Mirizzi Syndrome.

An 83-year-old female with a history of gallstones presented with nonspecific abdominal pain worsened by eating and an unintentional 15-pound weight loss. Abdominal CT revealed a markedly distended gallbladder and intrahepatic biliary ductal dilation but without a detectable stone in the cystic duct. ERCP showed a smooth, wedge-shaped filling defect in the CHD. MRCP indicated a change in caliber at the junction of the right hepatic lobe ducts and the common bile duct along with ill-defined enhancement. Cholangiographic findings suggested the presence of a mass, but brush cytology and biopsy of the ductal stricture were both negative for malignancy. However, tumor markers CEA and CA 19-9 were markedly elevated. Gastrointestinal cancer was strongly suspected despite negative pathology findings. Given the patient's advanced age, palliative endoscopic biliary stenting and laparoscopic cholecystectomy was recommended. Laparoscopy revealed a tumor of the gallbladder with diffuse peritoneal carcinomatosis. Pathology of biopsied tumors indicated metastatic cholangiocarcinoma. The patient was transitioned to palliative care.

The present case demonstrates that metastatic cholangiocarcinoma can radiographically mimic Mirizzi Syndrome. Pseudo-Mirizzi syndrome has previously been reported in cases of cholecystitis, gallbladder cancer, lymphadenopathy, and bile pseudocyst. Cancer is therefore one of a number of etiologies that should be considered when radiologic findings indicate Mirizzi syndrome.

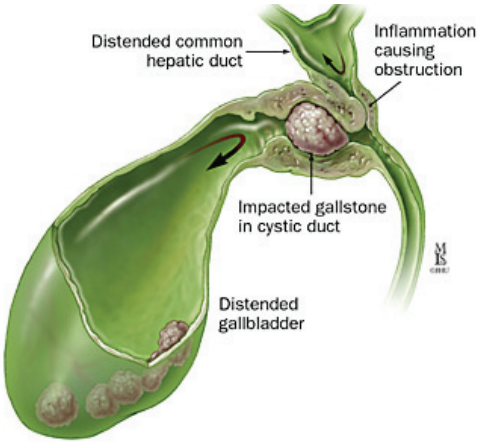

Figure 1: Graphic illustration of MirizziSyndrome

POSTER 16

INTRACRANIAL AND WHOLE BRAIN VOLUMES IN INFANTS WITH SAGITTAL CRANIOSYNOSTOSIS

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Departments of Pathology and Anatomical Sciences and Biological Sciences

Single-suture craniosynostosis occurs in approximately1 in 2000 live births and has been associated with brain dysmorphology. It has been suggested that premature fusion of cranial sutures restricts and alters brain growth by limiting the space within the cranial vault, leading to the hypothesis that cognitive deficits result from reduced intracranial volume. Here we test the hypothesis that intracranial volumes and whole brain volumes in infants diagnosed with isolated sagittal synostosis differ from those of unaffected infants. Our study sample consisted of magnetic resonance images obtained from six infants with isolated sagittal synostosis, aged 11-37 weeks, and six age-matched unaffected infants. We collected measurements of intracranial volume and whole brain volume from the MRIs using Analyze 10.0® and are statistically compared the two groups using Mann-Whitney U tests. Our results show that infants with sagittal craniosynostosis show slightly increased whole brain volumes and slight decreases in intracranial volume relative to unaffected infants. However, neither of these differences were statistically significant. These findings suggest that the skull does not significantly constrict the brain in infants with sagittal synostosis, and that the mild cognitive deficits observed in these infants do not result from restriction of brain growth by the overlying skeletal system.

POSTER 17

RETROSPECTIVE ASSESSMENT OF EARLY GROWTH CHARACTERISTICS IN CEREBRAL PALSY SUBTYPES

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Introduction: Children with quadriplegic cerebral palsy (CP) have growth rates that differ from those of healthy children, and a separate growth chart has been developed for clinical evaluation of growth in patients diagnosed with CP. It is unknown whether the growth patterns of children with hemiplegic or diplegic CP differ from patients with quadriplegic CP or from normal. The purpose of this study was to compare the growth rate of children with quadriplegic, hemiplegic, and diplegic cerebral palsy. If differences in growth rate are observed, additional research will be conducted to assess the need for new growth curves for hemiplegic and diplegic diagnostic categories.

Methods: Retrospective data on age, weight, and height were collected for each of the CP diagnostic categories from electronic medical records of 478 patients treated at the CP clinic in the Department of Physical Medicine and Rehabilitation. The data was reviewed to eliminate patients with confounding co-morbidities and to eliminate data errors. Sufficient data was available for estimation of growth rate for ages of 3-12 years. Linear mixed models were used to examine how growth varied by diagnosis.

Results: The height and weight of children with quadriplegic CP for both genders were consistently lower than children with hemiplegic or diplegic CP. There were statistically significant differences in weight gain curves among the 3 diagnoses.

Conclusions: Additional research is needed to determine if growth rates for patients with hemiplegic and diplegic CP differ from normal, and whether separate growth curves for these diagnostic categories are needed.

POSTER 18

THE EXPERIENCE OF INITIATING AND BEING ON DIALYSIS AMONG THE ELDERLY

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Chronic kidney disease (CKD) is a disease that requires extreme treatment measures to ensure survival for the patients it afflicts. These measures include dialysis and/or kidney transplantation. Since 1973, the federal government has paid for treatment of chronic kidney disease, and in 1973 only 341,000 people were receiving treatment. However, it is estimated that by 2030 the number of people receiving treatment for CKD will be 2 million. People over 80 years of age are the fastest-growing population of patients with CKD Stage 5 who are initiating dialysis currently. Despite this rapid growth in the prevalence of CKD, little is known about how dialysis affects patients psychosocially. Age alone does not measure a person's ability to survive and benefit from dialysis; thus, more information on how the elderly experience life after initiating dialysis is critical to obtain in order to guide physicians and patients in their decisions of whether or not to initiate dialysis. Therefore, we studied how elderly patients experience both the transition to dialysis and life while on dialysis by interviewing a sample of those elderly patients across mid-Missouri. We found common themes among the patients' experiences of dialysis. These data and themes can be used by physicians to improve the transition to dialysis for their patients as well as to possibly improve the patients' experiences of dialysis and quality of life while on dialysis.

POSTER 19

MIDLINE FACIAL MICROSOMIA: A CASE REPORT

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Holoprosencephaly (HPE) is a severe congenital malformation in which the facial skeleton shows aplasia or hypoplasia of the midline bones from the sphenoid and ethmoid down to the premaxillary bone. HPE was originally described in 1963 by DeMyer who, through observation of patients with this condition, established the concept that the face predicts the brain. With the advent of MRI/CT scanning, it has become evident that the face does not always predict the brain in HPE patients. We describe a patient who fits the phenotypic description of HPE, but lacks the brain findings that are typically associated.

The patient is a 9-year-old child with microcephaly, premaxillary agenesis, absence of the columella and nasal septum, flat nasal bones, telecanthus, and no radiographic or chromosomal evidence of holoprosencephaly. Despite having a facial dysmorphology consistent with holoprosencephaly, there is no radiographic or cognitive evidence of a significant brain abnormality. He is a healthy 9 year old boy who is attending regular classes and is excelling at both reading and spelling above his age appropriate level.

This case, along with others in the recent genetics literature, adds to the evidence that the face does not always predict the brain. Such cases raise the question as to whether or not these patients should be classified in the spectrum of HPE when they have a normal “encephalon”. We believe a more accurate description of these patients with midline facial dysmorphology and brains without gross intracranial anomalies would be “midline facial microsomia.”

POSTER 20

PREVALENCE OF DYSPHAGIA IN TRAUMATIC BRAIN INJURY

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Dysphagia, or impairment of swallowing, is a well documented symptom of many neurologic ailments. While anecdotal evidence suggests dysphagia is a problem for traumatic brain injury (TBI) patients, prevalence and outcomes haven't been well described. Dysphagia has been well studied in other groups such as dementia patients (1), survivors of stroke (2) and head and neck cancers (3).

Dysphagia poses similar challenges for members of all these groups. Dysphagia is associated with aspiration pneumonia, malnutrition, cognitive difficulties (4), and fever of unknown origin (2).

There is a high incidence of TBI in the US (about 140 per 100,000 people) and TBI treatment is costly and lengthy. Our project aims to find the prevalence of dysphagia among TBI patients and the effects of interventions or other factors on patient outcomes.

The following information has been collected from records of Howard A. Rusk Rehabilitation Center: age, gender, racial/ethnic group, TBI dates, admission and discharge, discharge disposition, presence and type of dysphagia, NPO order, BMI, Functional Independence Measure scores, liquid levels, and diet orders.

Patient involvement in the following interventions will be noted: oral motor exercises, trials of thickened liquids, swallowing exercises and trials, sensory procedures, neuromuscular electrical stimulation, and/or meal group participation.

Our hope is to use this data to learn more about how often dysphagia occurs in the TBI population and if there is correlation between dysphagia and age, BMI, length of stay, and discharge disposition. Additionally, our hope is to prompt further study of dysphagia therapies to help build a standard protocol for treatment.

POSTER 21

DEVELOPMENT AND FUNCTION OF THE MANDIBULAR SYMPHYSIS IN MAMMALS

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The mandibular symphysis is the midsagittal articulation between left and right dentaries that is the third jaw joint of the mammalian feeding complex. There is remarkable evolutionary diversity in symphyseal anatomy that characterizes postnatal growth. It varies from the primitive mammalian condition of smooth joint surfaces loosely connected by a fibrocartilage pad and ligaments to a more tightly bound joint with greater sutural complexity and numerous variably calcified ligaments to an ossified joint. Unfortunately, load-induced responses of jaw-joint connective tissues are incompletely documented in growing mammals. To address this gap we investigated the proportions and composition of symphyseal tissues in growing rabbits subjected to diet-induced variation in masticatory stresses. White rabbits were obtained as weanlings and raised on different diets until adulthood. Symphysis dimensions were obtained via calipers. Using microCT, tissue biomineralization was measured in the coronal plane for five joint regions. Subsequently, symphyses were fixed, decalcified and embedded, with sections from similar locations as those for microCT. Histology and immunohistochemistry of the fibrocartilage pad were employed to identify extracellular matrix composition. Rabbits raised on a tougher diet exhibit larger and more biomineralized joints. Such over-use rabbits also exhibit less intense safranin-O and type-II collagen staining indicative of lower cartilage viscoelasticity. Tough-diet rabbits also show more intense matrix-metalloproteinase staining associated with degradation of type-II collagen. Therefore, postweaning variation in symphyseal connective tissues appears due to changes in joint loads. Such analyses facilitate long-term research on adaptive plasticity in multiple tissue types and joint integrity in the same organismal model.

POSTER 22

PATTERNS OF BRAIN GROWTH IN ONE FGFR2 MOUSE MODEL FOR APERT SYNDROME

Jordan Austin (Undergraduate)

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Cortaiga Gant (Undergraduate)

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Apert syndrome is a disorder associated with craniosynostosis resulting from one of two mutations in Fibroblast Growth Factor Receptor 2 (FGFR2). Individuals with Apert syndrome demonstrate brain dysmorphology, often associated with cognitive deficits. In this study, micro magnetic resonance images of the brain of $FGFR2^{+/P253R}$ mice and their wildtype littermates were acquired at two ages, P0 (newborn) and P2 (two days old). Fifteen landmarks on the brain surface were collected to compare growth patterns in the morphological phenotypes of the brain. Patterns of growth between P0 and P2 were defined for both the mutant and wildtype mice. These growth patterns were then compared between the mutant and wildtype groups. In general, mice with the $FGFR2^{+/P253R}$ mutation demonstrate a greater magnitude of growth of the brain compared to wildtype littermates between P0 and P2. Differences in growth between mutants and wildtypes are particularly evident in the width of the cerebrum, while growth of the cerebellum is more similar in the two groups of mice. This differential growth is similar to brain dysmorphologies observed in individuals with Apert syndrome and may underlie the cognitive deficits associated with this disorder.

POSTER 23

SECOND RIB CURVATURE IN APES AND HUMANS AND IMPLICATIONS FOR THE EVOLUTION OF THORACIC SHAPE IN EARLY HOMININS.

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Thoracic form in humans is often described as "barrel-shaped" with a broad upper rib cage, a condition different from great apes, who have a "cone-shaped" thorax and narrower upper rib cage. The earliest *Australopithecus* has been described as "cone shaped," but fossil evidence for thoracic shape is limited. Still, this inference has been used to infer important aspects of early hominin biology, such as gut size and locomotor capacity. In June 2010, a new skeleton of *Australopithecus afarensis* (KSD-VP 1/1) from Korsi Dora, Ethiopia, was announced that it preserves a nearly complete second rib. Its curvature resembled those of humans more than African apes. However, it is unclear whether this reflects rib cage shape or upright bipedal posture. If Australopithecus resembles only humans, it would suggest that this curvature reflects fully upright posture. If, however, it resembles humans and lesser apes (gibbons and siamangs) who all have a broad upper thorax, it would reflect a broad upper rib cage.

We tested these hypotheses by quantifying rib curvature in 10 individuals each of lesser apes (*Hylobates*, *Symphalangus*), great apes (*Gorilla*, *Pan*, *Pongo*), humans (*Homo*), and *Australopithecus afarensis* (KSD-VP-1/1). The rib curvature index is measured as neck length divided by breadth at maximum rib curvature.

Our results demonstrate that 2nd rib curvature in Australopithecus was large, like humans and lesser apes, and more than in great apes. These results suggest that a human-like "barrel shape" rib cage may be primitive, and that human body form evolved early in our evolutionary history.

POSTER 24

NOVEL METHODS IN MAMMARY GLAND EVALUATION

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In response to the growing knowledge base on effects of environmental contaminants on mammary tissue, the National Toxicology Program (NTP) renovated their bioassay guidelines to adapt developmental chemical exposure and reproductive studies by including evaluation of mammary gland development.

The normal development of mammary tissue in the Harlan Sprague Dawley (HSD) rat is not documented. Our goal is to create an encyclopedia of mammary gland development in both male and female HSD rat offspring, starting with gestational day 15 through postnatal day 70. In addition, prenatal exposure to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin was used to demonstrate delayed mammary gland effects, and diethylstilbesterol was used to demonstrate precocious mammary gland effects in offspring.

Our findings yielded a thorough database of normal, precocious, and delayed mammary gland development in HSD male and female rats using both standard H&E staining and the mammary whole mount procedure. Methods to successfully remove mammary tissue from pups and dams were developed, and the process for histological analysis of the fetal tissues was modified, as no one has ever reported mammary gland data from HSD fetuses. The lack of information on early mammary gland development necessitated the creation of our original methods and the final result was an extensive mammary gland development guide.

This comprehensive atlas of mammary gland development will be a key component in helping the NTP and other researchers understand the extent of developmental changes following early life exposures, especially as they pertain to late life disease status.

* This project was done in conjunction with the NIEHS Summers of Discovery internship program. My mentor, Dr. Suzanne E. Fenton, is part of the NIEHS in the Cellular and Molecular Pathology Branch, and she also collaborates with the National Toxicology Program (NTP). This research was conducted in Research Triangle Park, NC in the summer of 2010. Dr. Michael J. Rovetto has agreed to be my University of Missouri faculty sponsor, although he had no part in the research project.

POSTER 25

RT-PCR ON MAGNETICALLY SORTED B-CELL SUBSETS FROM PEDIATRIC BONE MARROW

Joedd Biggs (M1)

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Acute lymphoblastic leukemia (ALL) is characterized by the uncontrolled proliferation of lymphoblasts which have been arrested in an early stage of B-cell differentiation. A key obstacle in identifying biomarkers of malignant B-cells in ALL patients has been constructing a cDNA library of normal B-lineage committed lymphoblasts from pediatric bone marrow for comparison. In order to identify unique biomarkers, a relatively quick method for isolating B cell subsets from pediatric bone marrow for RNA expression profiling is in development. B cells were magnetically sorted from bone marrow aspirate by immunophenotype into pro-B, pre-B, and immature B-cell subsets using antibodies covalently linked to paramagnetic microbeads. RNA was isolated and amplified from the subsets then probed using RT-PCR for expression of B-lineage marker (*PAX5*), myeloid-lineage marker (*MPO*), terminal deoxynucleotidyltransferase (*DNTT*), and immunoglobulin μ-heavy chain (*IGHM*) to determine the efficacy of the separation. Both *PAX5* and *IGHM* expression were directly proportional to B-cell maturity with *PAX5* expression residing between the positive (RL) and negative (U266) controls. Expression of *DNTT* was inversely related to B-cell maturity. Expression of *MPO* in all B cell subsets was higher than in RL, but parallel to the AML cell line, KG-1. The expression patterns of *PAX5*, *IGHM*, and *DNTT* were consistent with successful separation of the B-cells into pro-B, pre-B, and immature B subsets, but further validation of this method with flow cytometry is necessary.

POSTER 26

MATRIX METALLOPROTEINASE PROTEOLYSIS AFTER STROKE: A SURROGATE INDICATOR FOR EARLY DIAGNOSIS AND VALIDATION OF TREATMENT

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Matrix metalloproteinases (MMPs) are a family of endoproteaseses that have various functions from development to disease. They are also believed to play critical roles in the central nerve system for the pathogenesis of stroke. In ischemic stroke, MMP 9 is involved in neuronal apoptosis, edema, and hemorrhagic transformation. In stroke models, MMPs degrade ECM components and disrupt neurovascular integrity, resulting in blood-brain barrier (BBB) disruption and hemorrhage which further damage to the ischemic area.

There are experimental pharmacological treatments with MMP inhibitors that decrease the extent of neuronal apoptosis and hemorrhage. Recently we tested a new class of mechanism-based MMP-9 specific inhibitors SB-3CT. Our hypothesis is that MMP-9 causes proteolytic changes resulting in neurovascular damage after focal cerebral ischemia in mice. Inhibition of MMP proteolysis with SB-3CT, should result in decreased apoptosis of neurons and improved behavioral outcomes.

In two stroke paradigms in mice, we examined MMP-9 proteolysis of ECM components and the neuroprotective effects of the highly selective inhibitor, SB-3CT. SB-3CT dramatically blocks MMP-9 activity and decreases MMP-9-mediated laminin cleavage, rescuing neurons from apoptosis and ameliorating neurobehavioral outcomes. Treatment with SB-3CT attenuates brain MMP-9 activity and protects against delayed neuronal cell death in the embolus-induced permanent MCAo in mice. We conclude that MMP-9 is a highly promising drug target and that the mechanism-based MMP-9 inhibitors have significant therapeutic potential in stroke patients.

POSTER 27

ESTIMATING RADIAL CURVATURE IN FRAGMENTARY HOMININ FOSSILS: A COMPARATIVE STUDY IN APES AND HUMANS

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Forearm bone curvature has been invoked in interpretation of fossil hominin behavior. Apes have curved radii, reflecting hypertrophied forearm musculature needed for below-branch arboreal locomotion and increased leverage for pronation and flexion of the hand. As bipeds, humans have straighter radii adapted to manipulatory rather than locomotor activities. When this evolutionary transition took place, however, is poorly understood. Several radii are known from fossil hominins but they are all incomplete. If curvature could be estimated from fragmentary fossils, it would be possible to evaluate the evolution of forearm curvature in hominins.

This study tests the hypothesis that bone curvature could be estimated from proximal radii fragments. 3D polygonal models were developed from laser scan data from 10 of each *H. sapiens* and all four great ape species (*Pan troglodytes, Pan paniscus, Gorilla gorilla,* and *Pongo pygmaeus*) using Polyworks® software (Innovmetric, Inc). A plane was fit to the radial head and best fit vectors assigned to the radial neck and proximal shaft. Angles among the head and these vectors were compared to two measures of whole bone curvature.

We found no significant correlation between either measure of bone curvature and our measures of proximal radial geometry, thus proximal radii fragments cannot infer radial curvature. However, we discovered that humans have more obliquely inclined radial necks than great apes. This morphology is likely related to a different adaptation to forearm supination and elbow use in flexed postures during manipulation and provides a basis for inferring the functional adaptations of fossil hominins.

POSTER 28

BINGE DRINKING CAUSES SLEEP DISRUPTIONS: A LIKELIHOOD OF HANGOVER

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Binge drinking is highly prevalent in the society especially among college students. It is often followed by a period of "hangover" which is defined as general discomfort consisting of heterogeneous behavioral and psychological symptoms following excessive use of alcohol. Hangover is often associated with accidents, poor work performance and adverse socioeconomic consequences. Although sleepiness is a symptom of hangover, experimental evidence describing sleeping is lacking. In this study, we performed binge drinking in rats and analyzed sleep-wake behavior.

Methods: Adult male Sprague-Dawley rats were anesthetized and surgically implanted with sleep recording electrodes. After post-operative recovery and habituation with the recording set up, a 24 hr baseline sleep-wake recording was performed on day 1. On second day, alcohol binge drinking was performed by intragastric administration of ethanol (35% v/v; ~14g/kg) in three divided doses (every 8 hr) based on the animal's intoxication behavior. On third day, sleep recording was performed for 24 hr starting from 10 hr after the last dose of ethanol. Data was analyzed and expressed as percentage change in wakefulness, non-rapid eye movement (NREM or slow wave sleep) and rapid eye movement (REM) sleep.

Results: The animals spent a significantly more time in sleep as less time in wakefulness and more time in sleep during the active/dark (normal wake period of rats), 22 hr of the last dose of ethanol, as compared to baseline (N=6).

Conclusions: Our results suggest that increased sleep during the active period is an important contributing factor to the hangover following binge ethanol drinking.

POSTER 29

SLEEP DEPRIVATION CAUSES EPIGENETIC CHANGES IN THE BASAL FOREBRAIN

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Today's work pressure has lead people to curtail their sleep. However, all of the consequences of sleep deprivation are not clear. Histone acetylation is a key epigenetic mechanism responsible for controlling gene expression. Increased histone acetylation increases gene expression; reduced histone acetylation results in reduced gene expression. We hypothesized that as compared to spontaneous wakefulness, sleep deprivation may produce a significant increase in histone acetylation in the basal forebrain (BF) region. We chose the BF region because it is a critical brain region responsible for regulating various brain functions including sleep, vigilance, attention, learning and memory.

Methods: Male Sprague-Dawley rats were divided: The spontaneous wakefulness group was euthanized, two hours after dark onset, when the animals are maximally active. The sleep deprived group was kept awake for 6 hr and then euthanized. Sleep deprivation began at the onset of light period (during their normal sleep period) and was performed by "gentle handling" technique. The animals were kept awake by a slight touch of a brush or hands or introducing novel objects into the cage. Upon euthanization, the brains removed and processed for acetylated histone H3 immunohistochemistry in the BF region.

Results: Our initial results suggest that there was significant increase in the number of cells expressing acetylated histone H3 in the BF of sleep deprived animals as compared to the spontaneously awake animals.

Conclusion: Our results suggest that sleep deprivation causes increased histone acetylation in the BF. Increased histone acetylation may affect gene expression that may have long term consequences.

POSTER 30

WHAT IS THE PREVALENCE OF A BICORNUATE UTERUS AND THE IMPACT IT HAS ON REPRODUCTION?

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Ashley Lawrence (Undergraduate)

Jodie Walker (Undergraduate)

(Moses Hdeib, MD, RDMS, RDCS, RVT)
School of Health Professions

This research looks at how the presence of a bicornuate uterus may have an impact on reproduction. Our goal was to look at statistics and current publications and determine how great of an affect this anomaly had. We examined the etiology and prevalence to determine what percentage of pregnancies was affected by spontaneous abortions, preterm birth, term delivery, and live birth. Through our research we concluded that a bicornuate uterus does not have that great of an impact on reproduction as some of the other uterine anomalies.

POSTER 31

DEVELOPMENT OF HIGH THROUGHPUT TISSUE ANALYSIS LABORATORY

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Sarah Higdon (Undergraduate)

James Woody (Laboratory Technician)

(Mark W. Lee, Jr., PhD)
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Boron neutron capture therapy (BNCT) is a promising binary radiation therapy for the treatment of cancer and other diseases. In order for this therapy to succeed, non-toxic compounds carrying boron-10 must be successfully transported into tumor cells. In a second step, the tumor is irradiated with low-energy neutrons, which are captured by boron-10 and result in a nuclear fission reaction. The products of this reaction, an alpha particle and lithium nuclei, travel a distance of less than 10 micrometers in tissue. In principle this therapy is highly targeted and specific, whereby the high-LET radiation created by the boron-neutron capture reaction is contained within the volume of a single cell.

Current research within our institute is the development of compounds which selectively deliver boron-10 to tumor tissue. Biodistribution studies in small tumor-bearing animals are conducted to optimize the performance of boron agents resulting in the requirement to analyze many tissue samples for composition. To support this research, we have developed a high-throughput tissue analysis laboratory at MU. This laboratory utilizes an automated digestion microwave capable of digesting up to 120 tissue samples per hour. After digestion samples are analyzed using an automated inductively coupled plasma atomic emission spectrometer (ICP-AES) capable of measuring the elemental composition for approximately 80 percent of the periodic table. Analytical techniques have been optimized to allow for the efficient digestion and analysis of 17 different tissue types. By reducing the time required for sample analysis, we contribute significantly towards the development of this new noninvasive cancer treatment.

POSTER 32

GETTING OVER A HANGOVER: HOW DO WAKE PROMOTING NEURONS IN THE BASAL FOREBRAIN AFFECT ETHANOL INDUCED SLEEP?

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Hangover is a common clinical manifestation of heavy alcohol use. Sleepiness/drowsiness is a common symptom of hangover; however its neuroanatomical substrate is unknown. The basal forebrain (BF) cholinergic neurons play a central role in promoting wakefulness and are associated with sleep promoting effects of ethanol. Are the BF cholinergic neurons important for emerging from alcohol induced hangover/sleep?

Methods: Adult male Sprague-Dawley rats were implanted with sleep electrodes and bilateral guide cannulas above the BF region. Following post-operative recovery and habituation, the animals were intragastrically administered deionized water (10ml/Kg) on day 1 and ethanol [35% (v/v); 3 g/Kg] on day 2. The effect of alcohol on sleep (pre-lesion) was examined. On the third day, the rats were divided into control and experimental groups. The BF cholinergic neurons in the experimental rats were lesioned by bilateral microinjections of the immunotoxin, IgG-Saporin (0.28 μg/side; specific for BF cholinergic neurons). The control received artificial cerebrospinal fluid bilaterally in the BF. The animals were left undisturbed for 3 week. Subsequently, water and alcohol was administered as described above and the effect of alcohol (post-lesion) on sleep was examined. On completion, rats were euthanized, brains removed and processed for choline acetyltransferase immunohistochemistry in the BF to verify the lesion.

Results: We found that the experimental animals had a 50% reduction in the number of BF cholinergic neurons coupled with a significant increase in sleep post-lesion as compared to controls

Conclusions: Our results suggest that BF cholinergic neurons play a role in emerging from ethanol induced hangover/sleep.

POSTER 33

BRAIN PHENOTYPES IN A MOUSE MODEL FOR APERT SYNDROME

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Apert Syndrome (AS) is one of several fibroblast growth factor receptor (FGFR) related craniosynostosis syndromes. Individuals with AS display craniofacial dysmorphology and a constellation of central nervous system anomalies. In this study we present quantitative comparisons of brain phenotypes in a mouse model for Apert syndrome, the $Fgfr2^{+/S252W}$ mouse. We collected landmark coordinate data from micro magnetic resonance images of newborn (P0) $Fgfr2^{+/S252W}$ mice and their wild type littermates. Results of Euclidian Distance Matrix Analysis suggest that the brains of the mutant mice have a statistically significant greater width and height of the cerebrum than those of their wild type littermates. Results also show a significant rostro-caudal decrease in cerebral length. However, no differences were found in the shape of the cerebellum or hind brain. These results show that in addition to craniosynostosis and associated craniofacial dysmorphology, we also see clear differences in the brain at P0 in these mice. We can hypothesize that the FGFR2 S252W mutation in humans with AS would show similar brain dysmorphology at birth.

POSTER 34

AFFECTS OF THE INHIBITION OF MICRORNA REGULATORY MACHINERY IN LYMPHOMA CELLS

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Introduction: MicroRNAs influence many processes such as development, cell proliferation and differentiation and cell death. MicroRNAs are intergrated into a complex called RISC with Argonatue proteins to target mRNAs. Recent studies are finding microRNAs to have a significant role in the pathogenesis of cancer cells.

The hypothesis is inhibiting the microRNA regulatory machinery in lymphoma cell lines (CLL, ALL, and follicular lymphoma) will lead to global alterations in regions of active chromatin.

Methods: First, three lymphoma cell lines (CLL, ALL, and follicular lymphoma) were transfected with siRNA that is specific for Argonaute 2. Then the cells were harvested at 48 hours and at 72 hours. RNAs were extracted from these cells. PCR was performed on all of the samples to obtain the degree of Argonaute 2 knockdown. Then the RNAs were run under microarray and microRNA array to be analyzed for the changes of genomic expressions.

Result: PCR amplication of RNA showed 18% knockdown of Argonaute 2 at 48 hours and 50% knockdown at 72 hours in ALL cell line. No knockdown at 48 hours and 30% knockdown of Argonaute 2 at 72 hours in CLL cell line. 62% and 60% of knockdown at 48 hours and 72 hours in follicular lymphoma cell line. Microarray data revealed no significant changes in genomic expression of the active chromatins.

Conclusion: Inhibition of microRNA did not lead to significant changes in genomic expression. This could be due to incomplete knockdown of Argonaute 2 within these cells, leaving some functional microRNA behind.

POSTER 35

DEVELOPMENT OF BIOSPECIMEN SAMPLE PREPARATION TECHNIQUES FOR MOLECULAR IMAGING USING ULTRA-HIGH RESOLUTION MASS SPECTROMETRY

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Matrix assisted laser desorption ionization (MALDI) imaging is a technique which analyzes and maps the distribution of molecules in two-dimensional biospecimens, such as histological tissue sections. To-date, the classifications of molecules imaged using this technique is nearly comprehensive to those found in all tissues and include proteins, lipids, peptides, carbohydrates, nucleic acids, drugs, metabolites and other molecules. Using an imaging mass spectrometer, two-dimensional images may be produced by "staining" an optical image with an overlay of the distributions of multiple specific mass signals, elucidating the molecular architecture within the context of a biospecimen. In the future, MALDI imaging may revolutionize early-state disease diagnosis, biomarker discovery, drug development and personalized medicine.

Before imaging, a biospecimen must be coated with a uniform layer of matrix. This matrix is typically a small organic acid which strongly absorbs laser light and facilitates ionization of analytes under mild conditions. The quality of data obtained from imaging experiments depends heavily on the preparation techniques used. Currently, the most common techniques consist of manual matrix application using artistic airbrushes, or TLC sprayers. However, this process suffers from poor reproducibility.

In the present research, we are using a modified, consumer ink-jet printer to apply precise, micron-sized patterns of matrix on biospecimens. Furthermore, we have investigated the incorporation of fluorophores in the matrix application to allow visibility and measurement of the matrix pattern, as well as to act as an internal mass standard. Using this new technique, biospecimen preparation may be optimized for improved reproducibility.

POSTER 36

CAN ULTRASOUND LOCATE FOREIGN BODIES UNDER THE SKIN?

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Ultrasound has many uses in the field of diagnostic medical imaging. A practical, yet not widely utilized, application of ultrasound is locating foreign bodies in the skin. We conducted an experiment to determine the answer to the question, can ultrasound locate foreign bodies under the skin? In the experiment, we used varying sizes of foreign materials that are commonly lodged under the skin. These included wood, plastic, metal and glass. Using pigs' feet because of the similarities to human skin, we placed these foreign objects under the skin and scanned with ultrasound to see if they could be detected. Our results demonstrated that ultrasound can in fact be utilized for localization of foreign bodies under the skin.

POSTER 37

DO ULTRASTRUCTURAL CHANGES IN AGED PERITONEUM CONTRIBUTE TO OVARIAN CANCER METASTASIS?

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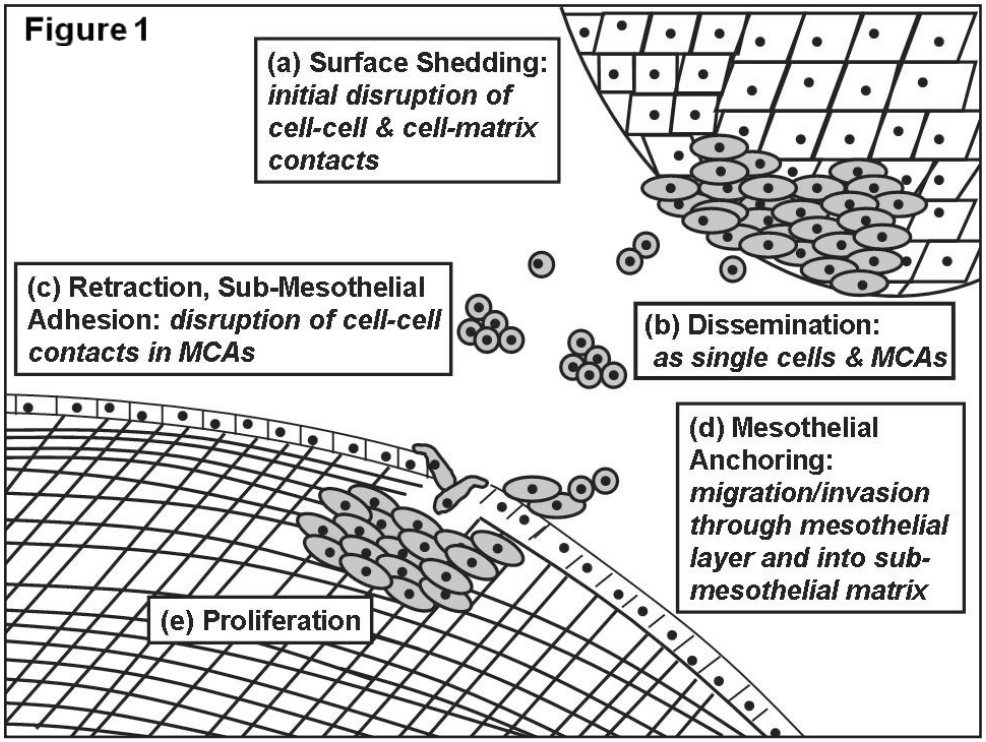
Epithelial ovarian cancer (EOC) will affect 1 in 69 women born in the United States today. Currently, 80% of women newly diagnosed with EOC already have metastatic disease, thus early intervention during the metastatic process will improve the long-term survival rates of women with EOC. Metastasis in EOC occurs through a unique process where cells are shed from a primary tumor and form multicellular aggregates (MCA) that disseminate intraperitoneally in the ascites fluid. Once the MCA reach the mesothelium, the MCA implant and disseminate [Figure 1]. EOC displays an age-specific incidence that increases and peaks in the eighth decade of life. Epithelial tumors, unlike stromal or germ cell tumors, are uncommon before the age of 40. These epidemiologic factors form the basis of the current hypothesis, that the aging of the mesothelium alters the receptivity to implantation of metastatic cells.



POSTER 38

PGC-1α OVEREXPRESSION IN PRIMARY HEPATOCYTES INCREASES FATTY ACID OXIDATION AND MITOCHONDRIAL CONTENT

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The role of peroxisome proliferator-activated receptor-γ coactivator-1α (PGC-1α) in increasing mitochondrial content and fatty acid oxidation (FAO) in skeletal muscle has been well described. Often, this increase in mitochondrial content and FAO is observed to associate with increased skeletal muscle and systemic insulin sensitivity. However, to date no studies have documented the effect of elevated PGC-1α protein expression on hepatocyte mitochondrial function and FAO. Therefore, we examined whether adenoviral PGC-1α protein overexpression would result in increased markers of mitochondrial content and FAO in primary hepatocytes. Additionally, would the increased mitochondrial content and FAO be associated with protection of hepatocyte insulin signaling following chronic exposure to lipids. We examined protein markers of mitochondrial content, FAO, and insulin signaling in primary hepatocytes isolated from the Sprague-Dawley rats transduced with PGC-1α or β-gal adenovirus. PGC-1α overexpressing (PGC o/e) primary hepatocytes were observed to have greater protein expression of the mitochondrial markers, CPS-1 and mtTFA. Also, PGCo/e hepatocytes demonstrate 2-fold higher FAO to CO_2 than β-gal controls, while no difference is observed in total FAO (acid soluble metabolite + CO_2). Finally, PGCo/e hepatocytes were observed to maintain insulin stimulated Akt phosphorylation following overnight lipid exposure, with a decrease in signaling observed in the β-gal control hepatoctyes. In conclusion, isolated primary hepatocytes overexpressing PGC-1α are observed to have higher mitochondrial content, twice the FAO to CO_2, and maintenance of insulin signaling in response to lipid exposure. These data suggest that increased hepatic mitochondrial content and FAO to CO_2 is protective of hepatic insulin action.

POSTER 39

GENE TRANSFER TECHNOLOGY: A TOOL FOR STUDYING GENE FUNCTION AND ROLE IN CORNEAL PATHOGENESIS

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Purpose: Transforming growth factor β (TGFb) is associated with many corneal pathologies, diseases and dystrophies. The function of TGFb in adult corneas cannot be studied using conventional transgenic approach because TGFb1 and TGFb2 deficient transgenic animals suffer multiple inflammatory diseases, severe developmental defects, and death by 3-4 weeks of age. This study tested the hypothesis that selective tissue-targeted gene transfer approaches will permit examination of TGFb gene function in the adult cornea without altering TGFb expression in vital organs.

Methods: Female black C57 mice were used. Animals were anesthetized with intramuscular injection of ketamine (130mg/kg) and xylazine (8.8mg/kg). Topical solution of 1% proparacaine hydrochloride was instilled to each eye for local anesthesia. Two microliters of AAV5 naked vector or expressing TGFb1 gene (titer 10^9 genomic copies/µl) was administered into the cornea. Eyes were collected at various time-points post-AAV application. Visual eye exam, stereomicroscopy, and slit-lamp biomicroscopy were used to monitor corneal health. Immunocytochemistry, western blotting and real-time PCR techniques were used to study corneal tissues.

Results: Tissue-selective targeted delivery of TGFβ1 gene via AAV5 induced haze and opacity in the mouse cornea in a time-dependent manner as evident from slit-lamp biomicroscopy and preliminary immunocytochemistry experiments. Experiments are underway to study expression of collagens, extracellular matrix proteins and signaling pathways linked to TGFβ-mediated pathologies.

Conclusions: Tissue-specific controlled gene transfer approaches are a powerful tool to study gene function and identify therapeutic targets for mechanism-based innovative therapies to treat and prevent corneal abnormalities.

POSTER 40

BETA CELL DYSFUNCTION, OXIDATIVE STRESS AND S6K1 ACTIVATION IN PANCREAS IN THE ZUCKER OBESE RAT MODEL

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Introduction: Insulin resistance and beta cell dysfunction are leading components in the pathogenesis of type 2 diabetes mellitus. Over-nutrition leads to activation of the mTOR/S6K1. S6K1 activation leads to serine phosphorylation of IRS1, triggering its proteosomal degradation and interfering with insulin metabolic signaling.

Aim of Study: We investigated the role of over-nutrition on S6K1 pathway, oxidative stress and insulin signaling in the Zucker Obese (ZO) rat, which displays severe obesity, systemic insulin resistance, glucose intolerance, and hypertension.

Methods: 9 week old male ZO and Zucker Lean (ZL) had Intravenous Glucose Tolerance Test (IVGTT)s. In pancreatic tissue we assessed NADPH oxidase activity by spectrophotometry. Expression of NADPH oxidase subunit Rac1, IRS1, Ser Phosphorlated IRS1, Akt, Phosphorylated Akt, and Tyrosine-389 Phosphorylated S6K1 were examined by Western Blot analysis. Student t testing was used.

Results: Systolic blood pressure and pancreatic NADPH oxidase activity was increased in ZO animals relative to ZL controls ($p>0.05$). During IVGTT analysis, the area under the curve (AUC) for glucose was significantly increased in ZO rats compared to ZL ($p<0.05$).The Insulin Resistance Index was calculated as $AUC_{Gluc} \times AUC_{Ins}$ $AUC_{Gluc} \times AUC_{Ins}$ and was also significantly increased in ZO compared to ZL($p<0.05$). NADPH oxidase activity and Rac-1 expression was increased in ZO. Furthermore, serine (S^{473}) phosphorylation/activation of Akt was decreased in ZO.

Conclusions: Our findings indicate that ZO animals display impaired systemic and pancreatic insulin signaling as well as elevated BP. These abnormalities occur in concert with increased oxidative stress due to enhanced activation of tissue NADPH oxidase activity.

POSTER 41

THE ROLE OF DNA METHYLATION ON GENE EXPRESSION IN ACUTE LYMPHOBLASTIC LEUKEMIA

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Epigenetic modification of the genome has more influence on gene expression than DNA sequence alone. DNA hypermethylation and deacetylation of histone complexes has been shown to down regulate expression of associated genes. These epigenetic modifications may play an important role in the pathogenesis of cancer. Demethylation agents and histone deacytlase inhibitors used to restore gene activity to previous levels could lead to development of novel anti-cancer drugs.

We treated an acute lymphoblastic leukemia cell line with a demethylating agent (5-aza) alone and in combination with a histone deacytlase inhibitor (TSA). We then measured RNA expression using a gene expression microarray. The methylation status of genes with the highest differential expression score after treatment with 5-aza alone and in combination with TSA was recorded to determine if methylation was associated with gene expression. We identified 361 genes that were up-regulated after treatment with a demethylating agent thereby suggesting that the expression of these genes is controlled by methylation. As has been previously reported, we did not observe a one to one correlation between gene methylation and gene re-expression after treatment with a demethylating agent. For example, in 27 key candidate genes only 14 showed methylation before treatment. The location of methylation within these genes was also variable with some being present in the promoter and others within the body of the gene. The variable presence and location of pre-treatment methylation suggests that drugs targeting specific epigenetic DNA modifications act in a more global manner, affecting gene expression via multiple mechanisms.

POSTER 42

CHRONIC ETHANOL EXPOSURE ALTERS EPIGENETIC MECHANISM IN THE BASAL FOREBRAIN

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One of the most commonly observed characteristics of alcohol withdrawal is insomnia. Importantly, there is a strong association between insomnia and relapse to alcoholism. In a recent study, we have shown that insomnia in ethanol dependent rats may result from reduced gene expression of proteins responsible for adenosine release and transmission in the basal forebrain (BF). Histone acetylation is an epigenetic phenomenon that promotes gene expression. Does ethanol dependence alter histone acetylation in the BF and affect gene expression? To address this issue, adult male Sprague Dawley rats were divided in two groups: an ethanol dependent group and a control group. The ethanol dependent group was intragastrically administered ethanol (35% v/v; ~9 g/kg) whereas the control group was administered sterile water (30 ml/kg) in three divided doses per day for four days. During withdrawal (after 12 hrs of the last dose of ethanol), the rats were euthanized and brains processed for acetylated histone H3 (AcHis; marker for histone acetylation) immunohistochemistry. Our result showed that there was a significant reduction in the number of cells with AcHis in the BF region of ethanol dependent rats (N=5) compared to the controls (N=5). Based on our results, we suggest that ethanol dependence leads to the reduction of histone acetylation in the BF region which may affect gene expression.

POSTER 43

FISCAL IMPACT OF STANDARDIZED SURGEON PREFERENCE CARDS FOR AN ACUTE CARE SURGERY PROGRAM

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Objectives: Increasing numbers of government and commercial payers are considering a transition to "bundled payments." A fixed amount is reimbursed for a specific diagnosis regardless of costs incurred while providing care. The sustainability of individual physician practices and health systems depends on proactive cost containment without sacrificing quality of care or patient safety. Because many acute care surgery programs receive salary or operational support from hospitals, active participation to achieve this goal is mutually beneficial. We hypothesized that creating a standardized surgeon preference card for operations common to an acute care surgery practice would reduce costs and improve reimbursement.

Methods: The average cost of equipment held and opened for five operations (laparoscopic appendectomy, laparoscopic cholecystectomy with choleangiogram, tracheostomy, inguinal hernia repair, and exploratory laparotomy) for each surgeon in the group was calculated using existing individual preference cards. A standardized card was created for each procedure, which included the equipment each surgeon felt necessary to safely perform the operation. Institutional cost and reimbursement differences were examined.

Results: Costs for 564 cases from FY 2009-2010 were examined. Using Medicare reimbursement rates for each of the five procedures, implementation of the standardized cards yielded a significant savings for 4 of the 5 operations examined.

Savings	Lap appy	Lap chole	Inguinal hernia	Exp lap	Trach
FY09-10	$258,744.93	$127,721.83	$14,247.24	$155,186.90	$101,838.15
FY10-11*	$269,094.73	$132,830.70	$14,817.13	$161,394.38	$105,911.68

*FY10-11 savings estimates presume a 4% increase in practice volume

Because of case volume and savings realized with the new cards, one surgeon would increase reimbursement by $228,137.18. Total institutional savings for fiscal year 2009-2010 would have been $657,739.05.

Conclusion: Standardized surgeon preference cards for common acute care surgery procedures significantly reduces hospital cost and positively affects reimbursement.

POSTER 44

PROTRACTED ACTIVATION OF THE BASAL FOREBRAIN CHOLINERGIC NEURONS AFTER BINGE ETHANOL EXPOSURE

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Insomnia during alcohol withdrawal is a hallmark of alcohol dependency and a major cause of relapse in recovering alcoholics. The mechanism of insomnia in this patient population is poorly understood. Cholinergic neurons in the basal forebrain (BF) play an important role in promoting wakefulness. Recently, we have shown that acute ethanol/alcohol exposure inhibits these cholinergic neurons to promote sleep. Does chronic ethanol exposure lead to the persistent activation of the BF cholinergic neurons which may lead to insomnia?

Method: Male Sprague-Dawley rats were divided into experimental and control groups. Chronic binge ethanol administration protocol was used to induce alcohol dependency in rats. The protocol in brief: Experimental rats were intragastrically administered ethanol (35% v/v; ~9 g/kg/day) in three divided doses (depending on intoxication behaviors) for four days. Control group received sterile water (30ml/kg/day) instead of ethanol. Rats were euthanized on withdrawal day 1 and day 3 during the light (inactive/sleep) period and their brains were processed for c-Fos (a neuronal activation marker) and choline acetyltransferase (ChAT; cholinergic neuronal marker) immunohistochemistry to examine the activation of cholinergic neurons in the BF.

Results: Statistical analysis (Kruskal-Wallis Test and Mann-Whitney Test) revealed a significant increase in the number of ChAT positive neurons with c-Fos immunoreactivity in the BF of ethanol dependent rats as compared to controls.

Conclusion: These results suggest that chronic binge ethanol treatment causes persistent activation of the BF cholinergic neurons during normal sleep period. Persistent activation of these neurons is likely to cause protracted insomnia associated with ethanol withdrawal.

POSTER 45

GREEN TEA EPIGALLOCATECHIN-3-GALLATE (EGCG) INHIBITS CYTOKINE-INDUCED NITRIC OXIDE AND SECRETORY PHOSPHOLIPASE A2-IIA IN GLIAL CELLS

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Glial cells, including astrocytes and microglial cells, are activated in response to injury and neurodegenerative diseases. In culture studies, astrocytes and microglial cells are capable of responding to proinflammatory cytokines and lipopolysacharides (LPS), which cause the induction of inflammatory factors, including inducible nitric oxide synthase (iNOS) and secretory phospholipase A2 (sPLA2). In our recent studies, we provided evidence for specific conditions for induction of iNOS and sPLA2-IIA in immortalized glial cell lines, including the murine BV-2 microglial cells, rat HAPI microglial cells, and rat DITNC astrocytes. Cytokine induction of iNOS and sPLA2-IIA also involved oxidative enzymes such as NADPH oxidase, which produces reactive oxygen species (ROS). In turn, ROS is involved in activation of mitogen activated protein kinases (MAPK) and the NF- κB transcriptional pathway for synthesis of iNOS and sPLA2. In this study, we used BV-2 and DITNC cell to investigate whether botanical compounds offer protective effects on cytokine-induced iNOS and sPLA2-IIA, respectively. Levels of NO were measured using the Griess reagent; and sPLA2-IIA by Western blotting. Cell morphology changes were assessed using bright field microscopy, production ROS by dihydroethidium (DHE), and the cell viability using the MTT test. Among botanical compounds tested, (-)-epigallocatechin-3-gallate (EGCG) from green tea was the most active in ameliorating cytokine-induced NO production in BV-2 cells and sPLA2-IIA induction in DITNC cells. These results provide evidence for EGCG to protect neural cells from oxidative and inflammatory responses, and support for future use of cell models in studies to screen compounds.

POSTER 46

ANG II CONTRIBUTES PROXIMAL TUBULE REMODELING IN TRANSGENIC REN2 RATS

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Abstract

Background/Aims: Activation of the renin-angiotensin system (RAS) and subsequent elevations of tissue angiotensin (Ang) II contribute to the development of proteinuria and progressive kidney disease. Recent work suggests that proximal tubule injury contributes to development of proteinuria in addition to glomerular contributions. Thereby, the aim of this study was to determine the impact that Ang II has on renal proximal tubular cell (PTC) function in a transgenic rodent model of hypertension and nephropathy, the transgenic TG(mRen2)27 rat.

Methods: Young Ren2 (R2-T) and SD (SD-T) rats were treated with an Ang type 1 receptor (AT_1R) blocker telmisartan (2mg•kg-1•day-1) or vehicle (R2-C; SD-C) for 3 weeks and glomerular and PTC structure and function were tested.

Results: R2 rats displayed increases in systolic blood pressure and proteinuria with parallel increases in NADPH oxidase and reactive oxygen species formation. R2 rats further displayed increases in podocyte foot process effacement on ultrastructural analysis with TEM and loss of the podocyte specific protein nephrin as well as proximal tubule specific megalin. There were additional findings of proximal tubule injury with increased kidney injury molecule-1, Ser^{2448} phosphorylation of mTOR, total mTOR and downstream S6K1. Findings were temporally related to tubolinterstitial fibrosis and loss of the adhesion molecule N-Cadherin. Collective findings were improved with AT_1R blockade.

Conclusions: These observations support that Ang II contributes to both glomerular and proximal tubule contributions to proteinuria as a result of NADPH oxidase-dependent oxidative stress. Further, that Ang II contributes to proximal tubule injury and tubulointerstitial fibrosis through mTOR-dependent loss of N-cadherin.

POSTER 47

A 3D VIRTUAL ATLAS OF THE HEAD ANATOMY OF *ALLIGATOR MISSISSIPPIENSIS*

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During the past decade, three-dimensional visualization methods have moved to the forefront of comparative and evolutionary anatomy. The head, being the intersection of numerous organ systems, has featured prominently in many studies. However, the complicated nature of reptile and particularly crocodilian heads has not been thoroughly illustrated using these 3D techniques. *Alligator mississippiensis* is North America's model crocodilian species and offers numerous insights into the evolution and functional anatomy of this group of reptiles, as well as their relatives such as lizards, dinosaurs, and birds.

Here, we present the foundation of an interactive, 3D, web-based anatomical atlas of *Alligator* cranial anatomy, which includes comparative data from MRI, microMRI, CT, and microCT imaging techniques, supplemented with histology and dissection. The centerpiece of the page is a virtual, "dissectible" *Alligator* skull where each individual bone can be explored in a 3D environment. One head of a large alligator was CT-scanned and MR imaged, then imported into Amira (v5.1, Visage Imaging) segmentation software. We selected and highlighted individual skull elements using their sutural boundaries and created 3D, integrated, volumetric files. These files were then converted into web-based interactive models using Adobe Acrobat 3D, WireFusion and other software packages.

This site complements several existing online archives but will offer higher quality 3D models, as well as a more interactive environment. These data will be freely available to any online visitor interested in the head anatomy of *Alligator* including researchers, students, and the general public.

POSTER 48

RETINAL REDOX STRESS AND ULTRASTRUCTURAL REMODELING IN METABOLIC SYNDROME AND DIABETIC RETINOPATHY

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Abstract

Background/ Aims: Diabetic retinopathy is the major cause of blindness in the United States in the age group from 20-74. There are four traditional metabolic pathways involved in the development of diabetic retinopathy: increased polyol pathway flux, increased advanced glycation end-product formation, activation of protein kinase C (PKC) isoforms, and increased hexosamine pathway flux. These pathways individually and synergistically contribute to redox stress resulting in retinal tissue injury culminating in microvascular retinal remodeling and diabetic retinopathy.

Methods: We investigated the ultrastructural remodeling of the blood retinal barrier (BRB) in the choroid coat layer and plexiform layers in retinas of the young 9 week old Zucker rat model of obesity and insulin resistance and the 20 week old alloxan diabetic porcine model with JEM -1400 transmission electron microscopy. Previous studies indicated that pericyte loss and dysfunction are the earliest hallmarks of diabetic retinopathy.

Results: The pertinent pathological finding in the Zucker obese metabolic model was double encasement of the pericyte between two thickened basement membranes. In the diabetic 20 week model, we observed capillary rarefaction, pericyte degeneration – apoptosis, and novel multilayering of pericyte processes.

Conclusions: *These observations suggest that there are progressive pathological ultrastructural abnormalities with increasing degrees of metabolic disease.* It is important to better understand retinal redox stress and remodeling, as this may enable researchers and clinicians to develop an earlier intervention during the prediabetes phase to prevent diabetic retinopathy.

POSTER 49

HIP STRUCTURE AND LOCOMOTION IN AMBULATORY AND CURSORIAL CARNIVORES REINVESTIGATED

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Understanding how the femoral head articulates with the acetabulum of the pelvis should allow one to infer the pattern of hip mobility in living and fossil species. In 1977, Jenkins and Camazine analyzed cineradiographic films of carnivores (cat, dog, raccoon) during locomotion. They hypothesized that raccoons, which climb trees as well as walk terrestrially, would have hip joints adapted for greater abduction, where as the nearly strictly terrestrial dogs would have more adducted hips, and cats would be intermediate. Inferences made in this study have been used extensively to infer locomotor behavior and evolution in primates, although they were not tested thoroughly due to methodological limitations at the time.

We tested the hypothesis that ambulatory carnivores (raccoons; Procyonidae) would have shallower acetabulae, lower greater trochanters, higher femoral neck-shaft angle and higher position of the fovea capitis than terrestrial ones (dogs; Canidae), and that cats (Felidae) would be intermediate. We used 3D polygonal models created from laser scan data of raccoons, felids and canids. We quantified morphology by fitting spheres, vectors and measuring articular surface areas using automated features in the CAD software package Polyworks.

Our results show differences between terrestrial canids and more ambulatory species. The articular surface distribution was a poor discriminator between groups, except for the posterosuperior quadrant. Femoral geometry, such as neckshaft angle, did not match our predictions but acetabular depth measures clearly matched our predictions for the locomotor groups. These results have implications for inferring joint mobility from bony anatomy in all mammals, including humans.

POSTER 50

SCREENING FOR MALE OSTEOPOROSIS AT AN ACADEMIC MEDICAL CENTER: RETROSPECTIVE ANALYSIS OF DXA USAGE PATTERNS OVER 5 YEARS

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Background: Recent research suggests men have higher mortality rates than women after hip fracture and men experience fractures at higher bone density values. Although the risk of osteoporotic fractures in men is increasing, there is still a perception amongst lay public, physicians and policy makers that osteoporosis is a disease of women.

Methods: IDX and Analyzer software were used to extract data on all DXA (Dual energy X-ray absorptiometry) recipients and all outpatient visits at MU (University of Missouri) for a 5 year time period (2005-2010). Electronic data on patient demographics, the date DXA was done, and the name of the requesting provider were extracted. Information on clinical indications was abstracted by reviewing DXA reports and medical records.

Results:

DEXAS BY YEAR	FEMALE	MALE	MALE %
2005	434	74	14.57%
2006	833	115	12.13%
2007	604	71	10.52%
2008	776	89	10.29%
2009	762	81	9.61%

Our results show that the percentage of male patients who are being screened for osteoporosis at MU has not increased. Data comparing gender distribution amongst all outpatients at MU and DXA recipients will be displayed. Tables on other demographics and indications for screening will also be shown.

Conclusion: The results of this study will lead to heightened awareness among MU providers who are caring for male patients at risk for osteoporosis.

POSTER 51

EVALUATION THE EFFECTIVENESS OF A COGNITIVE APPROACH FOR TEACHING DOMESTIC CHORES TO ADOLESCENTS AND ADULTS WITH AUTISM

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Abstract

Individuals with autism often have difficulty transitioning into adulthood due decreased executive functioning. One important skill which assists in the transition into adulthood is the ability to complete various domestic chores. These tasks often require executive functioning skills such as initiation, planning and organization, and problem solving which individuals with autism often have difficulty with. Currently, there is limited research on effective teaching techniques for supporting individuals with autism in the acquisition of skills needed for independent living. This study aims to determine if the Cognitive Orientation to daily Occupational Performance (CO-OP) is an effective intervention approach for improving problem solving skills. The use of this problem solving approach will be used to attempt to increase domestic chore participation in adolescents and adults with an Autism Spectrum Disorder (ASD). The recruitment process is ongoing, however currently one female participant, age 24 with an ASD diagnosis has begun the intervention process. Three goals were established in collaboration with the researchers and the participant. The primary outcome measures, the Canadian Occupational Performance Measure (COPM), and the Children Helping Out: Responsibilities, Expectations, and Supports (CHORES) will be used to determine an increase in satisfaction and participation in domestic chores. The data from the study is still being collected and will be analyzed after intervention is completed. The researchers hypothesize that the results will support the use of the CO-OP in improving problem solving skills among adolescents and adults with autism.

POSTER 52

RARE CASE OF CLEAR CELL SARCOMA IN A YOUNG FEMALE

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Clear Cell Sarcoma of Tendon and Aponeuroses (CCTA), also known as Melanoma of soft tissue is a rare and highly malignant soft tissue neoplasm which mostly occurs in young adults

A 26-year-old female presented with pain and thickened soft tissue in the popliteal fossa at the posterior aspect of the left knee. Ultrasonography demonstrated a cystic mass with irregular wall and internal debris representing a complex popliteal cyst. Further work-up with MRI demonstrated a cystic mass lateral to the semimembranosus muscle tendon. Excisional biopsy of the mass was consistent with malignant neoplasm with plasmacytoid features. Immunoperoxidase and cytogenic studies supported the diagnosis for Clear Cell Sarcoma arising from the tendon sheath. A Positron emission tomography showed central tumor necrosis and metastasis to hemi-pelvis lymph nodes. During the late stage of chemo-radiation, the patient was hospitalized due to increased abdominal distention and pain. A computerized tomography of the abdomen demonstrated extensive intra-abdominal and retroperitoneal metastatics, peritoneal carcinomatosis, omental caking and extensive ascites. Patient opted comfort care and died later.

This case emphasizes the importance of promptly establishing a correct diagnosis in patients with persistent leg pain. It also illustrates the aggressive nature of CCTA. Despite extensive surgical excision and adjunctive chemo-radiation, adequate control of local disease was not achieved and tumor metastasized to the abdomen. CCTA is a diagnostic challenge due to its benign presentation, histopathological resemblance with malignant melanoma and a therapeutic dilemma because of its poor prognosis secondary to an aggressive nature and early metastasis.

POSTER 53

COMPARISON OF DIFFERENT STRATEGIES IN PARATHYROID SCINTIGRAPHY IMAGING

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Purpose: To retrospectively compare the various scintigraphic methods to discover the most accurate protocol for preoperative localization of single-gland disease.

Materials and Methods: Medical records of 710 patients, diagnosed with primary were reviewed. 293 patients had complete preoperative parathyroid scintigraphy with subsequent surgical resection of a single abnormal gland. Parathyroid scintigraphy at our institution utilizes ^{99m}Tc sestamibi (MIBI) and ^{123}I, and consists of early and delayed pinhole MIBI images of the neck, including MIBI-^{123}I subtraction imaging, as well as MIBI single photon emission computed tomography (SPECT) of the neck and chest. Four experienced nuclear medicine physicians, without knowledge of clinical or laboratory results or final diagnosis, reviewed seven different imaging variations in separate sessions. The imaging variations were early MIBI only (EARLY), delayed MIBI only (DELAYED), comparison of early and delayed MIBI (E-D), subtraction (SUB), all planar (PLANAR), SPECT only (SPECT), and all images (ALL).

Results: The accuracy of ALL imaging for correct localization of the abnormal parathyroid gland was 96%, 93%, 94%, and 94% for each reader. For all four readers, the accuracy of E-D, SUB, and PLANAR imaging in diagnosing the correct location of the abnormal parathyroid was not statistically significant from ALL. For all readers, the accuracy of ALL was significantly better than DELAYED and SPECT ($P < 0.001$). Accuracy of ALL was significantly better than EARLY for 3 out of 4 readers ($P < 0.05$).

Conclusion: Reviewing pinhole E-D, SUB, and PLANAR images is as accurate as ALL images for localizing the offending gland in SGD.

POSTER 54

EWING'S SARCOMA IN A 52 YEAR-OLD WOMEN WITH LEG PAIN

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Ewing's sarcoma (ES) is the second most common primary sacral tumor. ES are aggressive tumors with a tendency toward recurrence following resection and pronounced proclivity toward hematogenous metastasis to lungs and bone.

A 52-year-old woman presented with of pain in her right posterior thigh radiating to the back of the knee. A magnetic resonance imaging showed an irregularly shaped right presacral mass. A core needle biopsy revealed a small, round blue cell neoplasm suggestive of a primitive neuroectodermal tumor. Staging workup with whole body Positron emission tomography (PET) showed no other area of abnormally increased uptake of fluorodeoxyglucose. After four cycles of therapy and radiotherapy repeat pelvic MRI, CT and PET scan showed significant shrinkage of the mass and normalization of fluorodeoxyglucose uptake. Six weeks later the patient presented with acute shortness of breath and PET-CT demonstrated increased uptake within bilateral pulmonary hila suggestive of metastatic disease. A subsequent biopsy of the lung confirmed the metastatic ES.

This case report demonstrates that despite adequate control of the local disease, multimodal therapy did not appear to effect metastasis. Although the recent Inter-group study suggested that the addition of IE to traditional regimens may confer a local control benefit, the use of IE was not associated with improved event-free survival. This raises the possibility that micrometastases had pre-dated the onset of chemotherapy and even went undetected by PET scanning.

POSTER 55

ATYPICAL PRESENTATION OF POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME IN A PATIENT WITH SEPSIS

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Reversible Posterior Encephalopathy Syndrome (PRES) is characterized by confusion, drowsiness, vomiting, seizure and visual loss. This neurologic syndrome was first described in 1996. Almost half of those patients had undergone bone marrow or solid organ transplant, and were under treatment with Cyclosporin or Tacrolimus.

During the past decade its association with other co-morbidities including hypertensive encephalopathy, pre-eclamspisa/eclampsia, autoimmune diseases, post-streptococcal glomerulonephritis and Henoch-Schonlein has been shown.

A 64 year old female with septic shock admitted to ICU. 24 hours after transferring to the floor, she had sudden decline in her mental status and developed a seizure. Her mental status was back to the baseline by the following morning. A follow up MRI at 5 weeks demonstrated a complete resolution of the abnormal MRI findings.

In 2006, for the first time the occurrence of PRES in the setting of infection/sepsis/ shock, was described. This study interestingly demonstrated greater edema on brain MRI in normotensive patients. In 40% of patient with PRES due to infection/sepsis/ shock and overall in 25% of all patients, blood pressure is within normal range.

Hypertension with failed autoregulation and resulting hyperperfusion remains a popular presumed pathophysiology although, the presence of mild hypertension or the absence of hypertension especially in patients with infection/sepsis/shock raises another theory which assumes endothelial injury/vasoconstriction as the primary insult.

This syndrome has unique radiologic appearance of bilateral white matter vasogenic edema, predominantly in parietal/occipital and temporal/occipital lobes. It may rarely occur in superior frontal lobe and cerebellar hemispheres like in this case.

POSTER 56

COMPARISON OF DIFFERENT STRATEGIES IN PARATHYROID SCINTIGRAPHY IMAGING IN THE SETTING OF MULTI-GLAND HYPERPARATHYROIDISM

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Medical records of 140 patients, diagnosed with multigland primary, secondary or tertiary hyperparathyroidism were reviewed. Of those, 56 patients had complete preoperative parathyroid scintigraphy with subsequent surgical resection of abnormal glands. Parathyroid scintigraphy at our institution utilizes ^{99m}Tc sestamibi (MIBI) and ^{123}I, and consists of early and delayed pinhole MIBI images of the neck, MIBI-^{123}I subtraction imaging, and MIBI single photon computed tomography (SPECT). Four experienced nuclear medicine physician, without knowledge of clinical or laboratory results or final diagnosis, reviewed seven different imaging variations in separate sessions. The imaging variations were early MIBI only (EARLY), delayed MIBI only (DELAYED), comparison of early and delayed MIBI (E-D), subtraction (SUB), all planar (PLANAR), SPECT only (SPECT), and all images (ALL). The location of the abnormal parathyroid glands was recorded and compared with the embryologic designation of the abnormal glands assigned at the time of surgery.

Results: A total of 159 parathyroid lesions were removed from the 56 patients. The accuracy of ALL imaging for correct localization of the abnormal parathyroid gland was 86%, 76%, 76%, and 76% for each reader. For all four readers, the accuracy of Early, Delayed, E-D, SUB, SPECT and PLANAR imaging in diagnosing the correct location of the abnormal parathyroid was not statistically significant from ALL.

Conclusion: Reviewing pinhole Early, Delayed, E-D, SUB, SPECT and PLANAR images is as accurate as ALL images for localizing the offending glands in multi-gland disease.

POSTER 57

EFFECTS OF STATINS ON METABOLIC ADAPTATIONS TO AEROBIC EXERCISE TRAINING: PRELIMINARY FINDINGS

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Emerging evidence suggests statins, unlike exercise, may cause deleterious effects on skeletal muscle oxidative capacity and insulin sensitivity.

Purpose: The purpose of this study was to determine if daily statin therapy altered the ability of exercise to lower fasting plasma insulin and glucose and improve cardiorespiratory fitness.

Methods: Fifteen obese, sedentary adults with ≥ 2 MSynd risk factors were recruited and randomized into 1) exercise (Ex; treadmill 45 min $\cdot day^{-1}$, 5 day$\cdot week^{-1}$ at 65% VO_2max) or 2) statin plus exercise (St+Ex; 40 mg$\cdot day^{-1}$ simvastatin plus exercise) therapies for 12 weeks.

Results: Baseline age, body weight, and body mass index (BMI) of St+Ex and Ex were as follows: 41±2.5 and 40±4.7 yr, 98.2±7.0 and 84.7±4.0 kg, 33.6±1.6 and 30.3±1.0 kg$\cdot m^{-2}$, respectively. Body weight and BMI were unchanged in response to both therapies. Fasting insulin levels decreased significantly with Ex therapy (10.6±5.0 to 8.8±4.8 uIU$\cdot ml^{-1}$, $p<0.05$), while no difference was observed after St+Ex therapy (8.7±3.3 to 9.9±3.9 uIU$\cdot ml^{-1}$). Fasting blood glucose did not change in response to St+Ex (94.4±3.2 to 90.7±3.4 mg$\cdot dL^{-1}$) or Ex (83.7±3.6 to 85.5±3.8 mg$\cdot dL^{-1}$) therapy. Only exercise improved maximal oxygen consumption (fitness) (33.8±2.6 to 36.3±3.4 ml$\cdot kg^{-1}\cdot min^{-1}$) while no improvements were observed in response to combined St+Ex therapy (25.7±1.4 to 26.0±1.3 ml$\cdot kg^{-1}\cdot min^{-1}$).

Conclusion: Preliminary findings suggest St-therapy may have deleterious effects on the capacity for exercise training to lower fasting insulin and improve cardiorespiratory fitness in obese, sedentary subjects. Further investigation utilizing a larger study population is needed to definitively determine the scope of effects that St-therapy may have on insulin sensitivity and cardiorespiratory fitness.

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POSTER 58

THE EFFECTS OF THE INTERACTION OF ANIMALS WITH CHILDREN DIAGNOSED WITH AUTISM SPECTRUM DISORDER AND THEIR FAMILIES

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Background: The CDC estimates that one in 110 children receive a diagnosis of Autism Spectrum Disorder (ASD) annually. Pet dogs have been found to be a social catalyst and service dogs have demonstrated measurable benefits for children with ASD. Given that 39% of American households have a dog, this survey investigates the perceived benefits and barriers of having a dog in a family with a child with ASD.

Methods: A survey of parents with a child (N=22) diagnosed with ASD and health care providers (HCP's) (N=40) was completed at an Autism Conference.

Results: Sixty eight to 95% of the parents agreed that having a dog in the family of a child with ASD would be a benefit. Sixty to 83% of the HCP's agreed that having a dog would be a benefit. Fifty to 95% of the parents perceived that having a dog would be a barrier. Forty three to 93% of the HCP's perceived having a dog would be a barrier. For children with ASD who were less than eight years old, parents strongly disagreed that the dog would interfere with social interactions, be a burden, not be helpful with therapy, would put the child in danger or that the dog itself would be in danger.

Conclusion: Participants surveyed consistently reported both actual and perceived benefits to having a dog in a family with a child with ASD while disagreeing that these dogs would be a problem for the child or the family.

POSTER 59

TWO-STAGE VS. SINGLE-STAGE MANAGEMENT OF PATIENTS WITH CHOLEDOCHOLITHIASIS: META ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Background: Current management of choledocholithiasis involves two stage process involving ERCP and laparoscopic cholecystectomy (LC). An alternative single-stage laparoscopic treatment was introduced for these patients. Various randomized controlled trials (RCT's) done to compare these 2 modalities but with controversial results. Methods: MEDLINE, Cochrane Central Register of Controlled Trials & Database of Systematic Reviews, PubMed, and recent abstracts from major conference proceedings were searched (09/2010). RCT's comparing ERCP and LC versus single stage laproscopically assisted CBD stone extraction were included. The effects of both the methods were analyzed by calculating pooled estimates by using odds ratio (OR) for stone extraction efficacy, complications and cross over to other techniques. Publication bias & heterogeneity was assessed funnel plots & I^2 measure of inconsistency respectively. Results: Five trials met inclusion criteria. Trials were of adequate quality (Jadad score ≥ 2). CBD stone extraction was noted in 89.02% with two stages process where as 84.6 % in single stage laparoscopy assisted CBD stone removal. Trend of higher stone extraction, low complications and less cross over to other techniques was noted in two stage ERCP and lap cholecystectomy group but could not reach significant level (OR 1.39; 95% CI: 0.81-2.38, p=0.23; OR 0.77; 95% CI: 0.49-1.25, p=0.26; OR 0.81; 95% CI: 0.49-1.35, p=0.45) respectively. Funnel plot revealed no publication bias. Conclusions: ERCP assisted CBD stone extraction with LC results in overall better outcomes but could not reach significant levels.

POSTER 60

AN EXPLORATORY STUDY OF SPATIAL ABILITY AND STUDENT ACHIEVEMENT IN SONOGRAPHY

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Purpose: Spatial ability refers to an individual's capacity to visualize and mentally manipulate three dimensional objects. Since sonographers manually manipulate 2-D and 3-D ultrasound images to generate multi-viewed logical, sequential renderings of an anatomical structure, it can be assumed that spatial ability is central to the perception and interpretation of these medical images. However, little is known about the relation between spatial ability and sonographers' performance. This study explores this possible relationship.

Methods: Seventeen first-year sonography students were administered a spatial abilities test prior to their initial scanning lab coursework. The students' spatial ability scores were compared to their scanning competency performance scores after the first thirty hours of lab instruction and after two semesters of lab instruction.

Results: No significant relationship between the students' spatial ability scores and their scanning performance scores was found for the first thirty hours of lab instruction. However, a very strong relationship was found after two semesters of lab instruction (See figure 1).

Conclusion: This study suggests that the use of spatial ability tests for admission to ultrasound programs may improve student selection as well as assist programs in adjusting instruction and curriculum for students who demonstrate low spatial ability.

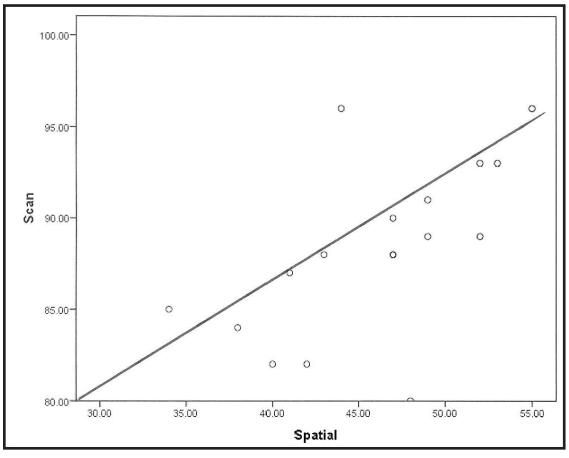

Figure 1. Regression analysis shows a strong linear relationship between the spatial and scanning test scores.

POSTER 61

THE EFFECTIVENESS OF BILATERAL VERSUS UNILATERAL TASK RETRAINING USING THE SAEBOFLEX DEVICE IN INDIVIDUALS WITH SUBACUTE AND CHRONIC STROKE

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Objective: This study compares the effectiveness of unilateral and bilateral task retraining using the SaeboFlex orthosis in individuals with upper extremity (UE) dysfunction following a cerebrovascular accident (CVA). While individually, bilateral task training and the SaeboFlex orthosis used unilaterally appear to be effective in increasing UE function after stroke, no research has been done to date to determine whether bilateral training using the SaeboFlex is more effective than unilateral training.

Design: An ABA design was used which included the Wolf Motor Function Test (WMFT), Canadian Occupational Performance Model (COPM), Range of Motion (ROM), Motor Assessment Activity Log (MAL), and Modified Ashworth Scale (MAS). The intervention consisted of two 60-minute sessions, twice a day, and six days per week, that participants completed at home for four weeks. Participants were also seen two times a week for 90-minutes in an outpatient clinic.

Results: Both unilateral and bilateral task retraining using the SaeboFlex orthosis resulted in improvements on all assessments; however, the results for both groups were not found to be statistically significant. Overall, the unilateral group has demonstrated greater improvement compared to the bilateral group to date.

Conclusion: Preliminary results of this ongoing study suggest that unilateral task retraining while using the SaeboFlex orthosis may be more beneficial in improving UE function for use in daily activities after CVA compared to bilateral task retraining using the Saeboflex. Further analysis of baseline function of both groups is necessary to ascertain the potential influence of this factor on the degree of overall improvement attained.

POSTER 62

SELECTIVE ATTENUATION OF CAROTID-CARDIAC RESPONSES TO HYPERTENSION AT THE ONSET OF STATIC HANDGRIP IN HUMANS

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Previous studies have indicated that at the onset of exercise cardiac baroreflex function is reduced in an intensity-dependent manner, which appears to be mediated by a blunted ability to buffer hypertensive challenges. However, whether cardiac baroreflex responses to a hypotensive stimulus are altered at exercise onset is unclear. To examine this, ten subjects (25±1 years) performed multiple 1-min bouts of static handgrip (HG) at 15 and 60% of maximal voluntary contraction (MVC), while breathing to a metronome set at eupneic frequency. Neck pressure (NP +40 Torr) or neck suction (NS -60 Torr) was applied for 5 s at end expiration, to simulate carotid baroreflex (CBR) hypotension and hypertension, respectively at rest, at the onset of HG (<1 s), and at ~40 s of HG. Cardiac responses to NP at the onset of exercise were maintained at both HG intensities, whereas heart rate responses to NS were blunted at exercise onset during 60% MVC HG (-16±2 rest vs. -9±3 bpm 60% MVC; $P<0.05$) but preserved at 15% MVC. The response range of the carotid-cardiac baroreflex at the onset of 60% MVC was reduced (25±1 rest vs. 18±3 bpm 60% MVC; $P<0.05$) compared to rest and 15% MVC. Heart rate responses to NP and NS applied at ~40 s of 15 and 60% MVC were similar to rest. These results suggest that carotid-cardiac responses to hypertension are selectively contributing to an impaired CBR control of heart rate at the onset of static HG in humans.

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POSTER 63

EFFECT OF A PRIMED GOAL OF PATIENT SAFETY ON PATIENT RISK DETECTION

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INTRODUCTION

The ability of intensive care unit (ICU) nurses to detect potential adverse events in critically ill patients is strongly influenced by the environment in which they function. Features of social environments, such as leadership behaviors, provide situational cues that prime goals influencing the behavior of frontline staff. Priming a goal of patient safety can influence a nurse's decision to identify a stimulus such as a monitor alarm as signal of potential patient risk rather than background noise to be ignored. Therefore, primed nurses should perform better in patient risk detection than non-primed nurses. The purpose of this study is to explore the influence of leadership behavior on patient risk detection by ICU nurses.

MATERIALS AND METHODS

A convenience sample of 30 adult ICU nurses will be divided into two groups. One group will view a video of leadership behavior, a priming stimulus to activate a goal of patient safety; the other group will not. Both groups will undergo one-interval stimulus trials that are patient risk detection tasks. The independent variable is the activation/non-activation of the goal of patient safety; the dependent variable, patient risk detection performance. Scores from the Safety Attitudes Questionnaire assess the effectiveness of the video in activating the goal of patient safety. Empirical ROCs and zROCs, the sensitivity index, d_a, and criterion location, c_2, will be compared between the two groups to assess patent risk detection performance. ANCOVA will be used to assess for the presence of co-variates. This study is in progress.

POSTER 64

EXPERIENCES OF LOW-INCOME RURAL PREGNANT MISSOURI WOMEN AS THEY NAVIGATE THE HEALTH CARE SYSTEM

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Early and adequate prenatal care is critical for the health of both the mother and her unborn child. Despite federal and state financial assistance, disparities remain in the quality and quantity of health care available to the rural poor. The purpose of this secondary analysis is to explore the barriers to health care access, including access to providers, transportation issues, and other influences on health service utilization among a sample of pregnant, low-income rural women. Methods: Pender's Health Promotion Model was used for this analysis. Pregnant women were recruited from county Women's, Infants, and Children's [WIC] programs (federally-funded nutrition programs for at-risk women and children). Qualitative interviews were recorded, transcribed, and entered into the NVIVO software program. Interviews were coded using a qualitative descriptive approach. This method was chosen to reflect most closely the meanings and interpretations that women provided regarding their experiences. Findings: Twenty-four low-income rural Missouri women were interviewed. Women faced many barriers in their search for health care. Most were unemployed, lacked insurance, and/or faced problems based on their rural location. Difficulties included access to dependable transportation, finances, access to health care providers, and the desire to avoid being a burden to others. Most women had no health insurance prior to pregnancy, leading to poor health conditions prior to conception as well as a lack of access to many birth control methods. Discussion: Interventions need to increase pregnant women's access to health care providers in rural Missouri. Access to employment and health insurance is also imperative.

POSTER 65

COUPLING OF SPONTANEOUS CHANGES IN MUSCLE SYMPATHETIC NERVE ACTIVITY TO BLOOD PRESSURE IN HUMANS: POTENTIAL INFLUENCE OF AGE

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Previous studies indicate a 5.5 second latency between a burst of muscle sympathetic nerve activity (MSNA) and the resultant peak blood pressure response, which averages up to 3 mmHg. Aging may attenuate α-adrenergic sensitivity, impair baroreflex function, and hence affect the ability to sympathetically modulate blood pressure. Yet a thorough examination of these relationships in older adults has not been performed. Purpose: To compare the relationship between spontaneous changes in MSNA to changes in blood pressure in young and older men. Methods: In 5 young and 5 older men, arterial blood pressure (finger plethysmography), heart rate (EKG) and MSNA (microneurography) were continuously measured at rest. Relationships between MSNA and diastolic blood pressure (DBP) were characterized for 15 cardiac cycles following each individual burst of MSNA. All bursts within a 10-minute period were evaluated and averaged for each individual subject to describe the latency and magnitude of DBP responses. Results: Older men had significantly higher resting MSNA burst frequency and burst incidence (35±4 young vs. 58±5 burst/100 heart beats older, $P<0.05$). Following a MSNA burst, the latency to the peak increase in DBP was approximately 7s in both groups ($P>0.05$). Similarly the magnitude of the increase in DBP rose to a similar extent (3.5±0.3 young vs. 3.5±0.4 mmHg older, $P>0.05$) in both young and older men. Conclusion: These results suggest that although resting MSNA is significantly elevated, the latency and magnitude to the peak changes in DBP following a sympathetic burst is not altered with age.

Support: NIH RO1HL093167

POSTER 66

EXPLORING THE INTERSECTION BETWEEN SAFETY CULTURE AND HOSPITAL NURSING PRACTICE

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Statement of the Problem

Patient safety is a significant problem with extensive human and healthcare costs, yet the safety-oriented actions of individual nurses within an organization have not been closely examined. The specific aim of this study is to describe the process by which hospital staff nurses (agents) keep patients safe, while constrained/enabled by sets of safety rules and resources (safety culture structures) in the organization.

Theoretical Framework

This study utilizes Structuration Theory as a theoretical framework. Structuration Theory suggests that health care organization members share patient safety values through communication and enact them in practice, (re)producing a system that constrains and enables member actions in terms of patient safety.

Subjects

Semi-structured interviews are being conducted with a minimum of ten hospital bedside nurses in medical/surgical patient care units at a Midwest academic medical center.

Methodology

This study is being conducted using grounded theory methodology. Data collection, analysis, and sampling are simultaneous and reciprocal, allowing for grounding in the data through constant comparative analysis and theoretical sampling. Sampling beyond initial participants will be based on emerging categories in the data and subsequent identification of gaps in the emergent theory. When theoretical saturation is reached, the categories will be integrated into a substantive grounded theory.

Implications

This study will provide knowledge beyond what safety culture and climate surveys provide; rather than simply describing the opinions or perceptions of organizational members, it will describe the crucial events, processes, and outcomes that impact those opinions and perceptions.

POSTER 67

NEBIVOLOL, A BETA ADRENERGIC RECEPTOR ANTAGONIST BLOCKS ANGIOTENSIN II-MEDIATED SIGNALING IN HEART

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Abstract

We recently showed that Nebivolol, a β-adrenergic receptor (AR) antagonist attenuates myocardial oxidative stress and promotes insulin metabolic signaling in 9 week old Zucker obese (ZO) insulin resistant rats. Here, we demonstrate that Nebivolol suppresses angiotensin II type I receptor (AT1R)-mediated signaling in ZO hearts as well as in HL-1 cardiomyocytes. We treated 9 week old ZO and Zucker lean rats (ZL) with Nebivolol (10 mg/kg/day) via osmotic mini pumps for a period of 21 days. Pressure volume studies of ZO rats showed abnormalities in LV diastolic function with increased static diastolic stiffness and decreased myocardial relaxation compared to age matched ZL rats, and Nebivolol blunted these effects. To investigate the cardioprotective mechanisms of Nebivolol we used a mouse cardiomyocyte HL-l cell line. Treatment of cardiomyocytes with angiotensin (Ang) II showed an increase in Ang II type 2 receptor (AT2R) protein levels and phosphorylation of Ser2448 of mammalian target of rapamycin (mTOR) and Thr389 of p70S6 kinase (S6K-1), and Nebivolol significantly reduced these effects. Moreover, a similar trend of increases in the AT2R protein levels and phosphorylation of S6K1 and mTOR was observed ZO hearts, and these effects were significantly ameliorated in ZO rats treated with Nebivolol. Increases in AT2R and reductions in S6K1 are known to mitigate maladaptive cardiac remodeling. Taken together, these results indicate that Nebivolol treatment may provide a new strategy for targeting Ang II-mediated cardiac disorders.

POSTER 68

USING NEUROFEEDBACK TRAINING IN CHILDREN WITH AUTISM SPECTRUM DISORDER

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This study aims to assess the effectiveness of neurofeedback training on improving attention and social responsiveness in children with autism spectrum disorder (ASD). Children with ASD may experience such deficits due to areas of hyperconnectivity or hypoconnectivity among cortical structures. Neurofeedback training aims to normalize connectivity in the brain, while teaching self-regulation of cortical activity which in turn regulates behavior. This study will use a single subject multiple baseline design with pre-test and post-test measures. Measurable data will be provided about the changes seen in attention and social responsiveness in three children with ASD. A total of 10 children participated in the neurofeedback training; however, only three children will be analyzed due to the completeness of their files. The expected outcome of this study is that neurofeedback training will improve attention and social responsiveness in children with ASD.

POSTER 69

OLDER ADULTS AND *POSIT SCIENCE*: THE EFFECTIVENESS OF A COGNITIVE TRAINING PROGRAM ON ATTENTION AND REACTION TIME

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Objective: The purpose of this study is to investigate and determine if the computer brain fitness program, *Posit Science*, improves attention and reaction time in older adults.

Method: This study determined the effectiveness of *Posit Science* brain fitness program on the measure of the Test of Variables of Attention (TOVA). Four participants were assigned to the *Posit Science* group. Each participant completed the *Posit Science* brain fitness program and engaged in intervention for one hour, once a day, five days a week, for eight weeks. The participants were evaluated pre-intervention and post-intervention.

Results: The researchers predict that results will show an increase in attention and reaction time in older adults.

Implications: An increase in attention and reaction time in older adults is associated with an increase in independence of activities of daily living (ADLs) and quality of life.

POSTER 70

ALTERATIONS IN CAROTID BAROREFLEX CONTROL OF ARTERIAL BLOOD PRESSURE DURING THE MENSTRUAL CYCLE IN YOUNG WOMEN

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Limited studies have suggested that menstrual cycle variations in sex hormones may influence arterial baroreflex control of heart rate (HR) and sympathetic nerve activity, however, results are equivocal. In addition, the baroreflex control of blood pressure (BP) has not been directly examined as pharmacological perturbations were mainly used to assess baroreflex function. Therefore, 5s pulses of neck suction (NS, -60 Torr) and neck pressure (NP, +40 Torr) were applied to load and unload the carotid baroreflex (CBR), respectively in young women during the early follicular (EF, day 1-5, low estrogen, low progesterone), late follicular (LF, day 10-12, high estrogen, low progesterone), and mid luteal (ML, day 20-24, high estrogen, high progesterone) menstrual cycle phases. Resting HR and BP were not different between the 3 phases. Similarly, HR responses to NP and NS were not significantly different between phases. In contrast, mean BP responses to NP were significantly greater in the ML phase (Δ17±1 vs. Δ13±1 EF; Δ13±2 LF mmHg; $P<0.05$) however, responses to NS were not significantly different between phases (EF Δ-10±2, LF Δ-10±1, and ML Δ-10±1 mmHg). These preliminary findings suggest a maintained CBR control of HR throughout the menstrual cycle whereas concomitant elevations in estrogen and progesterone selectively augment CBR-mediated BP responses to hypotension without effect on CBR responses to hypertension.

Supported by R01HL093167.

POSTER 71

THERAPEUTIC LETTERS: EFFECTS ON NURSING STUDENTS AND RECIPIENTS

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Therapeutic letter writing (TLW) is a well known strategy in counseling and therapy. However, its effectiveness as an educational tool in undergraduate nursing programs has not been studied. The authors conducted a qualitative study to examine students' and recipients' responses to writing and receiving therapeutic letters.

Students (n=74) were interviewed in focus groups. Recipients (n=16) were interviewed individually and in focus groups. Data were analyzed using qualitative description, and there was broad consensus that TLW promoted clinical learning and the development of therapeutic relationships. Study limitations include data collection from only one nursing school, assignment only added to clinical courses that permitted long-term relationships, clinical instructors were not interviewed, and data collected via focus groups could have been influenced by group dynamics, either positively or negatively.

Implications for nursing education practice include TLW as a strategy to cultivate students' relational skills and their understanding of patients' perspectives. Writing therapeutic letters is an effective way to promote student reflection on developing relationship skills in nursing care.

POSTER 72

SOLITARY FIBROUS TUMORS OF THE NASAL CAVITY

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Introduction: Solitary fibrous tumors are rare mesenchymal-derived neoplasms that are derived from serosal membranes, most commonly from pleural origin. However, a wide variety of extraplural locations have been described. Twenty-two cases originating in the nasal cavity and paranasal sinuses have been reported. We present a case report of a 49-year-old female with a solitary fibrous tumor of the left nasal cavity, as well as a review of the literature with recommendations of peri-operative management.

Methods: We present a case report of a 49-year-old female who presented with left-sided epistaxis, nasal airway obstruction, and nasal cavity mass. A current review of the literature revealed twenty-two previously reported cases.

Results: To date, twenty-three cases of solitary fibrous tumors of the nasal cavity and paranasal sinuses have been reported. The mean age of presentation was 51 years (range 30-71). 15 patients were women and 8 were men. Most patients presented with epistaxis and nasal obstruction. One case of malignancy in a 70-year-old male was reported.

Conclusion: Solitary fibrous tumors of the nasal cavity and paranasal cavities are rare entities. Immunohistochemistry is required for diagnosis because pathologic features can often mimic other soft-tissue neoplasms found in the head and neck. The vast majority of cases behave in a benign manner and complete resectability remains the most important prognostic factor.

POSTER 73

PREDICTORS OF TONSILLECTOMY AFTER PREVIOUS ADENOIDECTOMY FOR UPPER AIRWAY OBSTRUCTION

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Objective: One of the main indications for adenotonsillectomy in children is upper airway obstruction, including obstructive sleep apnea. Previous research has suggested an increased risk for requiring subsequent tonsillectomy when adenoidectomy alone is performed for upper airway obstruction. The purpose of this study is to further characterize potential risk factors for subsequent tonsillectomy in pediatric patients undergoing adenoidectomy for upper airway obstruction.

Methods: A retrospective cohort of patients undergoing adenoidectomy without tonsillectomy was examined using billing records and selected chart review. Kaplan-Meier plots and Cox regression analysis were utilized to determine the influence of age, sex, and obstructive indication on subsequent tonsillectomy. A nested case-control study with detailed chart review was then conducted for patients with upper airway obstruction to investigate potential risk factors.

Results: A total of 1307 patients under age 12 over a 15 year period were included in the cohort, 376 of these with upper airway obstruction. A total of 101 (7.7%) underwent subsequent tonsillectomy within an average of 2.2 years (range 0.3-5.3). No difference in tonsillectomy rates for obstructive versus non-obstructive indications were identified, which is contradictory to previous research. Younger age and female sex were associated with increased risk of subsequent tonsillectomy. Within the case-controlled study, the odds of tonsillectomy were increased by large tonsils and decreased by the presence of inhalant allergy.

Conclusion: Adenoidectomy without tonsillectomy may be an appropriate treatment for upper airway obstruction. Certain factors identify patients at higher risk of requiring a second procedure and should be considered during preoperative counseling.

POSTER 74

HEALTH LITERACY IN TWO OUTPATIENT CLINICS

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Health literacy is an emerging public health issue that affects all ages, races, cultures, and income levels. Furthermore, an individual's literacy skills tend to be a stronger predictor of health status than any other demographic variable. There is currently a mismatch between individuals' health literacy levels and the complexity of the healthcare system, which could lead to poorer health outcomes of the client. The purpose of this research was to determine the accessibility of two outpatient clinics at Rusk Rehabilitation and their ability to provide a health literate environment for their clients as determined by an adapted version of the *Health Literacy Environment Review* and the *Fry Readability Scale.* The evaluation addressed the areas of written materials, navigation and signage within the facilities, and the oral communication between the client and the staff. Descriptive analysis was used to identify strengths and areas for improvement in each clinic. Initial findings indicated the need for improvement in navigation and written communication as well as strengths in the area of communication between staff and clients. Occupational therapists can contribute to future research by measuring the impact of health literacy in the healthcare environment and how it affects client health outcomes. They can further serve as consultants for adaptation of the healthcare environment to better fit the needs of the client.

POSTER 75

PHYSICAL INACTIVITY RAPIDLY ALTERS GLYCEMIC CONTROL IN YOUNG, LEAN, PREVIOUSLY ACTIVE VOLUNTEERS

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Postprandial hyperglycemia is a better predictor of cardiovascular disease and all cause mortality than fasting blood glucose or hemoglobin A1c. Physical inactivity is associated with insulin resistance and cardiovascular disease. To determine whether transitioning from a high to low level of physical activity affects glycemic control, we equipped young (30 ± 1 y), lean (24 ± 1 $kg \cdot m^{-2}$), healthy, physically active (>10,000 $steps \cdot d^{-1}$) volunteers (N=10) with continuous blood glucose monitors for 3 days during separate ACTIVE (habitual physical activity) and INACTIVE (≤5,000 $steps \cdot d^{-1}$) phases (diet replicated across phases). During the INACTIVE phase, physical activity decreased 15,758 ± 1,103 to 4,334 ± 294 $steps \cdot d^{-1}$, fasting blood glucose did not change (84 ± 3 to 87 ± 1 $mg \cdot dL^{-1}$), fasting insulin increased (4 ± 1 to 6 ± 1 $\mu IU \cdot mL^{-1}$; p = 0.02), and, when blood glucose responses to all meals were pooled, the amplitude of glycemic excursions (post- minus pre-meal blood glucose; an index of glycemic control) increased at 30 (16 ± 4 to 30 ± 4 $mg \cdot dL^{-1}$; p = 0.02) and 60 min (8 ± 2 to 22 ± 5; p = 0.04) post-meal. We conclude that brief reductions in physical activity rapidly diminish glycemic control in young, lean individuals, suggesting physical inactivity may 1) play a role in the development of insulin resistance, 2) affect glycemic control prior to changes in fitness and adiposity, and 3) be a useful tool to study early events in the etiology of insulin resistance. Support: MU iCATS, T32 AR048523 (CRM), VHA CDA (JPT).

POSTER 76

PAPILLARY THYROID CARCINOMA ARISING FROM A MATURE TERATOMA IN A CRYPTORCHID TESTIS: A CASE REPORT

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Struma testis is a rare entity, and malignant transformation of a testicular teratoma to papillary thyroid carcinoma (PTC) has only once been previously described. Furthermore, sold tumor metastases to the testis are rare, with a less than 1% rate of testicular metastases from solid tumors, and there are no reports of primary thyroid carcinomas metastasizing to the testis. We report the case of a 56 year old man who was found to have a cryptorchid testis containing a mature teratoma with malignant somatic component in the form of a 1.6 centimeter PTC. The patient had metastatic PTC in the lungs which was thought to be from the testicular PTC. However, due to the possibility of an unknown thyroid primary metastasizing to the lung and in order to facilitate radioactive iodine therapy, a total thyroidectomy was performed, which revealed a 0.5 millimeter papillary microcarcinoma. This case raises the question as to which papillary carcinoma (testicular or thyroidal) led to the lung metastases, and whether the testicular tumor could be a metastasis from the thyroid. Because papillary thyroid microcarcinoma is thought to be benign and has never been reported to metastasize to the testis, it is most probable that the testicular PTC originated from the teratoma and metastasized to the lungs, while the microcarcinoma in the thyroid is most likely incidental. This case highlights that, although malignant transformation to PTC has been described in struma ovarii, it may also occur in struma testis and has the potential to metastasize to the lungs.

POSTER 77

PATIENT SATISFACTION AND ANXIETY WITH INFORMED CONSENT DELIVERED THROUGH INFORMATIONAL VIDEO COMPARED TO THE TRADITIONAL PHYSICIAN INTERVIEW

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Abstract

Objective:

1. To evaluate patient satisfaction and anxiety towards informed consent with traditional physician interview compared to combination of watching an informational video and patient-specific physician interview.

2. To discover how an informational video will affect physician time management.

Methods: This is a prospective, randomized controlled trial evaluating satisfaction and anxiety in patients being consented for tonsillectomy and adenoidectomy with the standard physician interview compared to utilizing an informational video as an adjunct. Randomization occurs into control (physician interview) versus intervention (informational video plus patient-specific physician interview) groups. Measured variables and outcomes for the study include satisfaction and anxiety levels evaluated before and immediately after the informed consent process with validated anxiety (State-Trait Anxiety Inventory, STAI) and satisfaction (Client Satisfaction Questionnaire-8, CSQ-8) questionnaires and time involved for the informed consent (total time and direct physician contact). This is a MU IRB approved office-based study.

Results: Analysis of 32 patients (17 control, 15 intervention) has not shown a statistically significant difference in anxiety or satisfaction between the two groups after informed consent, but a statistically significant difference in physician time spent ($p < 0.0001$) on the informed consent process. The intervention group had overall less direct physician time spent with the patient on informed consent compared to the control group.

Conclusion: We provide evidence that viewing an informational video with patient-specific physician interview for informed consent maintains satisfaction and anxiety levels, and reduces total direct physician time committed to the informed consent process compared to the traditional physician interview.

POSTER 78

GEOGRAPHIC DISTRIBUTION OF SHOW ME HEALTHY WOMEN PROVIDERS AND BREAST CANCER INCIDENCE AND MORTALITY IN MISSOURI COUNTIES

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Background: Breast cancer is the second most common cause of cancer death among US women. Regular mammography is the most effective method to reduce mortality. However, uninsured women face substantial barriers to receiving regular mammograms and paying for cancer treatment. The Show Me Healthy Women (SMHW) Program provides reimbursement to SMHW physicians for breast cancer screenings and treatment for their low-income patients. Enrollment in the SMHW program is voluntary. We describe the geographic distribution of SMHW providers related to breast cancer incidence and mortality rates by county.

Methods: This analysis used Geographic Information System (GIS) to combine county-level rates of in situ breast cancer incidence and mortality in Missouri with SMHW provider locations.

Findings: Of the 114 counties plus St. Louis City, 80% of the counties have at least one SMHW provider. Compared with the state breast cancer mortality rate, St. Louis City, Maries, St. Louis, and Cole Counties were statistically higher. However, St. Louis City, St. Louis and Cole counties (along with 4 other counties) had higher in situ rates, suggestive of more mammography screening behavior.

Discussion: The difference in mortality and in situ breast cancer rates, particularly in St. Louis City, St. Louis and Cole counties may be due to significantly lower screening behavior in the African-American community. Targeted outreach to this population is warranted. Although mortality rates were not statistically higher than state rates in the southeastern region of the state, in situ rates were lower than expected, which may indicate that early detection is suboptimal.

POSTER 79

IMMEDIATE VERSUS DELAYED PERCUTANEOUS CORONARY INTERVENTION FOR PATIENTS WITH NON-ST ELEVATION-ACUTE CORONARY SYNDROME: A META-ANALYSIS OF RANDOMISED TRIALS

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Background: Studies have indicated that an early invasive strategy is favorable over a selective invasive strategy for Non-ST segment elevation acute coronary syndromes (NSTE-ACS). However, there is no general consensus on precisely how early should the revascularization be performed. Randomized controlled trials (RCTs) performed to compare the outcomes of revascularization less than 24 hours of presentation (Group A) versus greater than 24 hours of presentation (Group B) for NSTE-ACS have shown conflicting results.

Methods: Based on a systematic search seven RCTs (13,762 patients) comparing the composite of death and myocardial infarctions (MI) within 30 days of revascularization were included. The effects of both methods were analyzed by calculating pooled estimates for composite of death and MI, death, MI and revascularization.

Results: The incidence of the composite of death and MI was noted be lower in group A [607/7710(7.8%)] compared to group B [822/6052(13.5%)] but this was not statistically significant (OR 0.83, 95% CI, 0.62-1.12, P=0.22). Similar results were obtained for death (OR 0.58, 95% CI, 0.24-1.39) and MI (OR 0.93, 95% CI, 0.64-1.34) separately. In group A there was a significant decrease in the incidence of repeat revascularization [405/7398(5.5%)] as compared to group B [336/5734(5.9%)] [OR 1.34, 95% CI, 1.14-1.56, P<0.0003]. Two studies showed mortality benefit in high risk (TIMI score≥5-7, GRACE score>140) patients undergoing revascularization within 24 hours.

Conclusions: Performance of coronary artery revascularization within 24 hours of presentation does not reduce death and MI in NSTE-ACS as compared to intervention after 24 hours, but does significantly reduce the rate of repeat revascularization.

POSTER 80

HEALTH LITERACY IN A REHABILITATION SETTING

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Abstract

Health literacy is defined by the World Health Organization as "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand, and use information in ways which promote and maintain good health" (Nutbeam, 1998, p.20). In a rehabilitation setting, health literacy is important in order to make informed decisions about healthcare and to communicate effectively with healthcare providers by understanding complex oral and written communication. However, communication barriers between healthcare providers and clients may occur due to a mismatch between the complexity of the communication from the healthcare provider and the patient's health literacy level. This mismatch may be exacerbated for clients with a stroke due to the secondary effects of a stroke such as cognitive deficits and expressive and receptive aphasia. For example, these clients may have difficulty understanding oral or written information such as occupational therapy home exercise programs. This research examined the effectiveness of client-provider communication in an inpatient stroke unit. These data were gathered using a modified version of *The Consumer Assessment and Healthcare Providers System (CAHPS) Item Set for Addressing Health Literacy* and analyzed using SPSS v18. Descriptive and correlational analysis revealed strengths and weaknesses of client-provider communication in a stroke rehabilitation setting For example, most healthcare providers did not use medical jargon when explaining health information to clients. These results will be used to identify strategies that could be implemented to improve the quality of client-provider communication so clients can make informed decisions about their healthcare.

POSTER 81

MICRORNA MIR-146A EXPRESSION IN ORAL CANCER TISSUES

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Recent advances in basic research have shown that the expression and function of microRNAs impact on gene expression regulation networks extensively. Ever increasing new knowledge from microRNA studies should be translated into medical practice if possible. Formalin-fixed paraffin-embedded (FFPE) human cancer tissues are a huge resource for delineating the role and potential application of microRNAs in cancer pathology. However, detecting microRNA in such cancer tissues with in situ hybridization is a challenge. The goal of this study was to demonstrate the feasibility of such approach in cancer research and practice. Based on FFPE materials, we have compared fluorescent in situ hybridization (FISH) procedures with different synthetic probes: regular custom DNA oligos vs. LNA incorporated DNA oligos complementary to mature microRNA sequence, different tracer for probes: biotin vs. Digoxigenin; different visualization: direct vs. TSA amplification; different blocking reagents for endogenous peroxidase. Finally, we performed mir-146a FISH on an oral cancer tissue microarray (TMA), which contains 40 cases of oral squamous cell carcinoma (OSCC) and 10 cases of normal epithelia from human oral cavity. Spiny cells in most normal oral squamous epithelia were positive with mir-146a, while basal cells stained negative. In OSCC tissues, a correlation of decrease in mir-146a with increase in histological grade was observed. In summary, we have established reliable in situ hybridization procedures for detecting the expression of microRNA mir-146a in paraffin-embedded oral cancer tissues; this detection is useful in studies on the participation of microRNA in oral cancer pathology, and may have prognostic or diagnostic potential.

POSTER 82

EVALUATION OF [^{99m}TC(CO)$_3$]-LABELED ERBB-2-TARGETING PEPTIDES FOR BREAST CARCINOMA IMAGING

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Objectives: The purpose of this study was to radiolabel a novel ErbB-2-avid peptide, discovered from bacteriophage display, with [99mTc(H2 O)3 (CO)3]+ and evaluate the in vitro cellular targeting and in vivo tumor imaging properties of the peptide in a mouse model of human breast cancer.

Methods: The peptide, KCCYSL, synthesized with the chelates diaminopropionic acid (DAP) or Nα-histidinyl acetic acid [(NαHis)Ac] at its amino-terminus, was radiolabeled with [99mTc(H2 O)3 (CO)3]+ The radiochemical stabilities of the peptides were assessed and in vitro binding to MDA-MB-435 human breast carcinoma cells was analyzed. Biodistributions and SPECT imaging of the radiolabeled peptides were evaluated in SCID female mice bearing human MDA-MB-435 breast tumors.

Results: 99mTc(CO)3 -DAP-GSG-KCCYSL and 99mTc(CO)3 - (NαHis)Ac-GSG-KCCYSL were stable and bound to ErbB-2- expressing MDA-MB-435 cells. *In vivo* biodistribution studies revealed that tumor uptake of 99mTc(CO)3 -DAP-GSG- KCCYSL was 1.67 ±0.16, 1.25 ±0.61, 0.88 ±0.12, 0.30 ±0.06 %ID/g at 1, 2, 4, and 24 h post injection, respectively. Tumor uptake of 99mTc(CO)3 -(NαHis)Ac-GSG-KCCYSL was 0.76 ±0.13, 0.75 ±0.40, 0.33 ±0.08, 0.16 ±0.02 %ID/g at 1, 2, 4, and 24 h post injection, respectively. SPECT/CT studies showed tumor selective uptake of both the peptides in the tumor-bearing mice. Specific uptake was confirmed by competitive receptor blocking studies.

Conclusions: 99mTc(CO)3 -DAP-GSG-KCCYSL and 99mTc(CO)3 -(NαHis)Ac-GSG-KCCYSL have the potential to be used as tumor imaging probes.

POSTER 83

GENDER, AGING & ACTIVITY IN RURAL SOUTH AFRICA

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Abstract
This study explores how older persons in rural South Africa, a context with both high HIV-prevalence and an increasing burden of non-communicable disease, define what it means to be healthy and sick. We examine how older persons perceive the meaning of being healthy or sick and who they compare their own health with. We also examine how older men and women's physical and mental health affect their daily activities and occupations. The Aging & Meaning of Health study was conducted in the MRC/Wits Rural Health and Health Transitions Unit (Agincourt). Findings from 16 semi-structured interviews (8 men, 8 women aged 50 and older) suggest that gender role differences condition values of health and illness, and how it affects activities of daily living and household roles. Gender specific interventions are necessary to adapt the environment and diminish barriers to maximize older persons' ability to perform culturally appropriate roles and age successfully.

POSTER 84

ASSESMENT OF QUALITY OF CARE FOR TYPE 2 DIABETES

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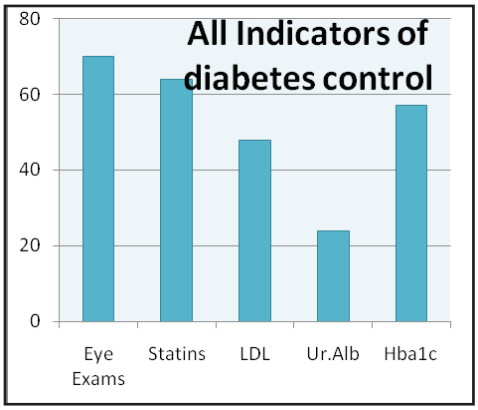
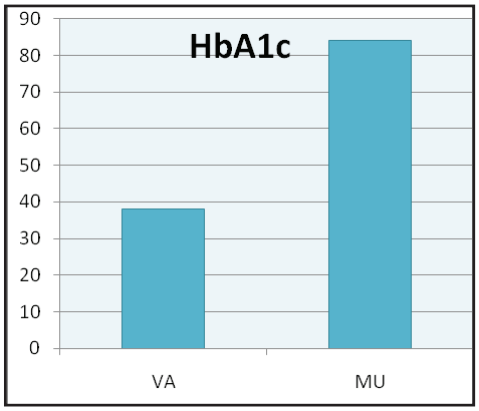
Background: The Diabetes epidemic is associated with huge human and economic costs. Diabetes related morbidity and mortality may be prevented or delayed by improving diabetes care. We tried to study documentation of care provided to people with type 2 diabetes in a University and VA hospital in Columbia, Missouri.

Methods: Data was collected randomly on patients with diabetes type 2 attending the Diabetes Clinic during 2006 and 2007. A chart review was done for documentation of diabetes indicators including annual HbA1c, eye exam, urine for microalbumin, LDLcholesterol, and statin use.

Results: 170 patients were included in our study. 69 % were VA patients. The clinic notes documented that 70 % of the patients had an eye exam, 48% had LDLcholesterol checked, 57 % had an Hba1c checked, and 24 % had urine microalbumin checked. Further analysis showed that in the University patients 84% had documented yearly HbA1c, whereas in VA patients only 38% had documented HbA1c.

Conclusion: As per 2010 ADA guidelines, A1c should be performed at least twice a year in patients who are meeting treatment goals and quarterly in patients whose therapy has changed or who are not meeting glycemic goals. Our results show that many patients in our clinical setting may not be getting optimal diabetes care. We are not sure if poor documentation is contributing. We propose that a simple action like a computer alert to prompt physicians to document HbA1c while seeing diabetic patients will enhance management and follow up of diabetic patients.





POSTER 85

INSULIN-MEDIATED INCREASES IN ARTERIAL BAROREFLEX CONTROL OF MUSCLE SYMPATHETIC NERVE ACTIVITY FOLLOWING MEAL INTAKE IN HUMANS

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Animal studies indicate that insulin enhances arterial baroreflex (ABR) control of sympathetic nerve activity (SNA); however, the extent to which these findings can be extrapolated to humans is unknown. To begin to address this, we utilized a mixed meal as a physiological method to evoke sustained increases in plasma insulin. Muscle SNA and arterial blood pressure (BP) were measured in 10 subjects (25 ± 2 yr) before and for 120 minutes following mixed meal intake. Weighted linear regression analysis between muscle SNA and diastolic BP was used to determine the gain (i.e. sensitivity) of ABR control of SNA. Plasma insulin was significantly elevated within 30 minutes following meal intake (Δ29 ± 7 uIU; $P<0.05$) and remained above baseline for up to 120 minutes. Similarly, 30 minutes after meal intake, ABR gain of muscle SNA burst incidence (–3.31 ± 0.64 vs. –5.13 ± 0.95 bursts/100 heart beats/mmHg; baseline vs. 30 min, $P<0.05$) and total muscle SNA (–3.22 ± 0.60 vs. –5.89 ± 1.30 arbitrary units/beat/mmHg; baseline vs. 30 min, $P<0.05$) was increased and remained elevated for the duration of the protocol. BP was unchanged by meal intake. In a subset of subjects the ABR muscle SNA gain remained unchanged during time control experiments. These preliminary findings suggest that increases in plasma insulin following meal intake enhance the gain of ABR control of muscle SNA in healthy humans.

Support: NIH RO1HL093167

POSTER 86

SAHA: FDA APPROVED HISTONE DEACETYLASE INHIBITOR DEMONSTRATES EXCEPTIONALLY HIGH INHIBITION OF CORNEAL HAZE FOLLOWING PRK SURGERY IN RABBIT MODEL

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Purpose: TGFβ induces the transformation of corneal keratocytes into fibroblasts and myofibroblasts resulting in the formation of corneal haze (scar) following injury. We investigated whether epigenetic modifications can prevent development of corneal haze *in vivo* using a rabbit model.

Methods: *In vivo* studies with New Zealand white rabbits were performed with –9.0 diopter photorefractive keratectomy (PRK) surgery using an excimer laser. Human stromal fibroblasts (HSF) were used for *in vitro* studies. HSF cultures at 70% confluence were exposed to TGFβ (1ng/ml) with or without SAHA (vorinostat) under serum-free conditions for five minutes. SAHA (25.0nM=0.06%) was applied topically on the rabbit cornea immediately after PRK. Cornea tissue was harvested at four weeks post-operatively and studied with Trypan blue exclusion, slit lamp biomicroscopy, TUNEL assay, real-time PCR, immunocytochemistry, immunocytochemistry, and western blotting techniques.

Results: Treatment with the FDA approved histone deacetylase inhibitor SAHA (0.06%) significantly reduced cellular markers of myofibroblast transformation and haze development (αSMA, fibronectin and phalloidin) in the rabbit cornea *in vivo* (up to 73%; $p<0.001$) and in HSF *in vitro* (46-83%; $p<0.001$). Furthermore, this dose appeared to be well tolerated and did not cause redness, swelling, or inflammation in the rabbit eye *in vivo* or alter HSF viability or phenotype *in vitro.* Other tested doses showed low efficacy or high toxicity.

Conclusions: This study suggests that epigenetic modification is a novel approach for treating corneal haze *in vivo*. Additionally, vorinostat (0.06%) is highly efficacious in reducing PRK-induced corneal haze with minimal side effects in rabbit eyes *in vivo*.

POSTER 87

OUTCOME OF MEDICAL VERSUS SURGICAL THERAPIES FOR GASTROESOPHAGEAL REFLUX DISEASE: META ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Murtaza Arif (Postdoctoral Fellow)
Nicholas M. Szary (Postdoctoral Fellow)
Lakshmi Chauhan (R2)
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Background: Gastroesophageal Reflux Disease is one of the most common chronic gastrointestinal tracts. Medical management includes use of antisecretory medications or surgical management. Randomized controlled trials have compared both forms of treatment with controversial results. Therefore, we conducted meta-analysis to compare medical versus surgical therapy of GERD.

Methods: MEDLINE, Cochrane Central Register of Controlled Trials & Database of Systematic Reviews, Pub Med, and recent abstracts from major conference proceedings were searched (05/2010). RCT's comparing the two treatment options were included. Standard forms were used to extract data. The effects of both the methods were analyzed by calculating pooled estimates for symptom remission, complications and cross over to other techniques or need for other therapies for symptom control. Separate analyses were performed for each outcome by using odds ratio (OR) by fixed and random effects models. Publication bias was assessed by funnel plots. All were graded by Jadad score. Heterogeneity among studies was assessed by calculating I^2 measure of inconsistency.

Results: Four trials met inclusion criteria. Trials were of adequate quality (Jadad score $\geq$ 2). Three trials used open technique, one trial used laparoscopic technique. No significant heterogeneity was noted for major outcomes. Need for additional antisecretory medication is significantly higher in surgical group versus medical group (OR 4.79; 95% CI: 1.71-13.44, $p< 0.01$). Funnel plot revealed no publication bias.

Conclusions: Both medical and surgical therapies are effective in symptom control with similar number of complication but in the surgical group more patients are started back on antisecretory medications.

POSTER 88

PLASMA miRNAS AS NOVEL BIOMARKERS FOR BREAST CANCER DETECTION

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Objective: MicroRNAs, a family of 19- to 25-nucleotide noncoding RNAs that primarily regulate genes at post-transcriptional level, are frequently dysregulated in cancer including breast cancer. Recent studies demonstrate that the microRNAs in blood are present in a notably stable form. The objective of this study was to investigate the potential of circulating microRNAs as novel non-invasive biomarkers for breast cancer detection.

Methods: First, we searched the miRNA microarray data of breast cancer from published literature, and selected 15 of miRNAs (miR-17, 21, 24, 106a, 125b, 128, 155, 182, 183, 197, 199b, 203, 205, 210 and 221) that were most frequently up-regulated in breast cancer tissues. Total RNA including miRNAs were isolated with Trizol LS reagent, then polyadenylated and reverse-transcribed with a poly(T) adapter into cDNAs for real-time PCR using the miRNA-specific forward primer and the sequence complementary to the poly(T) adapter as the reverse primer. The levels of miRNAs were determined in 83 plasma samples from breast cancer patients and 36 from non-cancer controls.

Results: We found that the levels of miR-21 and miR-25 in plasma of breast cancer patients were significantly elevated compared with controls. MiR-21 yielded an AUC (the areas under the ROC curve) of 0.6799 (95% CI: 0.5872 to 0.7726, $P<0.001$), miR-25 yielded an AUC of 0.7268 (95% CI: 0.6374 to 0.8263, $P<0.001$) in discriminating breast cancer from controls.

Conclusions: MiR-21 and miR-25 are significantly elevated in patient plasma with breast cancer and can be the potential non-invasive molecular biomarker for breast cancer detection and clinical follow-up.

POSTER 89

HYDROGEN SULFIDE (H_2S) AUGMENTS SYNAPTIC NEUROTRANSMISSION IN THE NUCLEUS OF THE SOLITARY TRACT (NTS)

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Hydrogen sulfide (H_2S) is a gasotransmitter generated through the metabolism of cysteine to serine. In the central nervous system, H_2S is produced primarily by the enzyme cystanthionine-β-synthase (CBS). The brainstem nTS serves as the principal site for sensory afferent integration for cardiorespiratory regulation. We sought to determine the role of H_2S, and its generation by CBS, in nTS excitability in normoxia and following chronic intermittent hypoxia (CIH), a rodent model of sleep apnea. Immunohistochemistry analysis examined CBS distribution and protein levels in the nTS. Patch clamp electrophysiology in brainstem slices examined excitatory postsynaptic currents (EPSCs) in nTS neurons. CBS-immunoreactivity was observed in select nTS neurons, the area postrema, and near blood vessels associated with glial cells. In normoxic cells, exogenous H_2S (10 μM) significantly increased the amplitude of spontaneous (s)EPSCs, solitary tract (TS)-EPSCs, and asynchronous (a)EPSCs. On the other hand, the CBS inhibitor aminooxyacetic (AOA, 1 mM) significantly reduced the frequency of sEPSCs and aEPSCs and the amplitude of TS-EPSCs. Following CIH, H_2S application and blockade of CBS increased and decreased, respectively, the amplitude of TS-EPSCs. However, synaptic responses to H_2S and AOA were similar between CIH and normoxic controls. In a subset of normoxic and CIH animals, an acute hypoxic challenge (10% O_2, 3 hr) activated nTS neurons as indicated by Fos-immunoreactivity, a portion which co-labeled with CBS-positive neurons as well, which suggests a functional role of H_2S. These data suggest endogenous H_2S plays a role in excitatory neurotransmission in the nTS and possibly chemoreflex function. Supported by HL085108

POSTER 90

THE EFFECTS OF TDCS ON INDIVIDUALS WITH COMPROMISED COGNITION: A REVIEW OF THE LITERATURE

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Objectives: To review the literature pertaining to tDCS and its effects on cognition in individuals with neurological abnormalities, and to uncover a gap in knowledge in research on tDCS and propose future research to help fill this gap.

Methods: MEDLINE was searched using the keywords "transcranial direct current stimulation AND prefrontal cortex", with the search parameters "English only" and "2000-current". The search rendered 49 articles. Inclusion criteria for use in this literature review included: use of a sham or control group to compare to the experimental group, the research had to be conducted on cognitively impaired individuals, and age of the participants between 18-80 years. After certain articles were excluded based on these specific criterion, 20 articles remained to be used in the literature review.

Results: tDCS has shown to significantly improve cognitive functioning in individuals with compromised cognition due to neurological abnormalities. However, there is a gap in knowledge on the effects of tDCS for improving cognition with individuals with mild traumatic brain injury (MTBI).

Discussion: We propose a research study to measure the effects of tDCS on cognitive functioning in MTBI patients. If results show that cognition benefits from using this modality, occupational therapist may use this tool when rehabilitating their clients who have MTBI, in order to improve quality of life and lead to greater independence in daily activities.

POSTER 91

INTEGRIN-LINKED KINASE: A POTENTIAL PLAYER IN OVARIAN CANCER METASTASIS

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Epithelial ovarian cancer (EOC) is the fifth leading cause of overall cancer death among American women. In 2008, 15,520 deaths were directly attributed to EOC, and an additional 21,650 cases were diagnosed. When EOC is diagnosed prior to metastatic dissemination, the overall 5 year survival rate is 93%; however, over 75% of women with EOC are diagnosed with metastasis already present, dropping the survival rate to less than 20%. The process of EOC metastasis is described as follows: epithelial cells detach from the primary tumor into the peritoneal cavity where they form multicellular aggregates (MCA), adhere intraperitoneally and undergo localized invasion into the interstitial collagen-rich submesothelial matrix, where they proliferate to anchor secondary lesions. The exact mechanism that controls the transition from detached cells to peritoneally anchored metastatic lesions is still unknown. Studies have shown that β1 integrin activation is a key event in ovarian carcinoma metastatic dissemination and regulates expression of several gene products involved in metastasis. Activation of a β1 integrin cytoplasmic domain interactor, integrin-linked kinase (ILK), has been shown to regulate several biological processes that suppress anoikis and promote invasion, two key events in ovarian cancer metastasis. This study attempts to characterize the overall expression of ILK in ovarian cancer cell lines and tissues through immunofluorescence analyses, Western blotting, and real time PCR. Preliminary results suggest that ILK activity is stimulated by collagen binding; and enhanced nuclear localization has been observed on collagen surfaces.

POSTER 92

^{177}Lu RADIOLABELED PEPTIDES FOR BREAST CANCER THERAPY

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ErbB-2 is a type 1 receptor tyrosine kinase over-expressed on ~30% of breast cancers and is an attractive target for the development of new diagnostic and therapeutic agents. The ErbB-2 avid peptide KCCYSL, originally identified from phage display, has shown promising imaging results in pre-clincial breast carcinoma animal models. In this study the peptide DOTA-GSG-KCCYSL was radiolabeled with the beta-particle emitter lutetium-177 (^{177}Lu) and examined for its therapeutic potential. The peptide DOTA-GSG-KCCYSL was synthesized using Fmoc solid phase peptide synthesis and purified to homogeneity. DOTA-GSG-KCCYSL was radiolabeled with Lu-177 and purified via high performance liquid chromatography. In vitro stability studies showed that the radiolabeled complex was stable to challenges from metal chelators and was stable to >60% in serum at 37˚C over 24 h. Cell binding of ^{177}Lu-DOTA-GSG-KCCYSL to MB-435 human breast carcinoma cells displayed saturable binding at 2 h. Log P studies indicated that the radiolabeled complex was very hydrophilic. Initial biodistribution studies in MB-435 xenografted mice showed modest tumor uptake of 1.82 % injected dose per gram (ID/g) 30 min post injection and 0.56 % ID/g at 1 h post injection. Additional biodistribution and imaging studies are underway to determine dosimetry and potential tumor therapeutic properties.

POSTER 93

REVERSAL OF CNS AUTOIMMUNITY BY INDUCTION OF ORAL TOLERANCE TO BRAIN ANTIGENS MEDIATED BY ANTIGEN PRESENTING CELLS OF THE LAMINA PROPRIA

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The phenomenon of oral tolerance is important for inducing non-reactivity to food borne antigens and commensal organisms by the immune system. In this study we have devised a method to induce tolerance to an auto-antigen, myelin oligodendrocyte glycoprotein (MOG), by oral administration of a chimeric immunoglobulin, Ig-MOG. Oral treatments with Ig-MOG ameliorated experimental autoimmune encephalomyelitis (EAE), an animal model of human multiple sclerosis (MS). Disease suppression was characterized by the reduction of pro-inflammatory cytokines and reduced T cell infiltration into the CNS. Intriguingly, Ig-MOG treatment led to a loss of T cell activation markers exclusively in the lamina propria, suggesting that lamina propria antigen presenting cells (LP APC) may be responsible for the induction of oral tolerance. Lamina propria APCs were unable to stimulate T cells with Ig-MOG, despite their ability to process and present whole proteins and to stimulate with MOG peptide. Upon oral Ig-MOG treatment, LP APCs acquired a “tolerogenic” phenotype, as Ig-MOG fed LP APCs lost their ability to stimulate T cells with MOG peptide and were able to transfer tolerance to naïve mice induced for MOG EAE. Transfer of tolerance by LP APCs was dependent upon antigen specific APC-T cell contact in the gut, and led to a “global tolerance” as Ig-MOG fed LP APCs were subsequently unable to stimulate T cells with diverse specificities. In conclusion, this study provides a novel mechanism of oral tolerance mediated by LP APCs which can be utilized to induce tolerance to auto-antigens and reverse autoimmunity.

POSTER 94

THE THERAPEUTIC ROLE OF RESVERATROL IN ALLERGIC LUNG INFLAMMATION

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Abstract

CD4+ T helper type 2 (Th2) cells are crucial for mediating allergic inflammatory lung disease such as asthma, by producing key cytokines including interleukin (IL)-4, IL-5 and IL-13. The phytoalexin, resveratrol, which is rich in grapes and red wine, can increase lifespan and has been suggested as a potential reagent to treat aging-related diseases. Herein we report that resveratrol prevents mice from developing experimental asthma induced by ovalbumin sensitization and re-challenge. Feeding mice with resveratrol inhibits the chronic allergic inflammation in lungs and reduces the numbers of eosinophil/neutrophils in bronchoalveolar lavage fluid. The mechanism appears to be resveratrol-induced suppression of allergic lung inflammation by inhibition of Th2-cytokine production via GATA-3. OVA-specific IL-5 and IL-13 production by CD4+ T cells in treated mice is reduced, and HuR expression in treated mice is reduced. Indeed, resveratrol blocks the in vitro polarization of naïve CD4+ T cells to the Th2 phenotype. Western blotting analysis further shows that resveratrol specifically down-regulates the expression of the Th2 transcription factor, GATA-3 which has been shown to be a HuR target. These results suggest that resveratrol has therapeutic potential for altering the course of allergic inflammatory lung diseases such as asthma.

POSTER 95

SELECTIVE REVIEW OF TDCS AND COGNITIVE TRAINING STUDIES ENHANCING COGNITIVE PERFORMANCE IN HEALTH AND DISEASE

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Introduction: Cognitive decline is an inevitable part of the normal aging process that has been shown to impact a person's functioning in daily life. Despite this, there is a lack of evidence which supports practical and effective methods of cognitive intervention for home or clinic use. The purpose of this study is to identify if anodal transcranial direct current stimulation (tDCS) can augment cognitive computer trainings for a practical and comprehensive cognitive intervention.

Methods: A database search was conducted to review literature on: 1. the effects of tDCS on cognitive performance and 2. effects of cognitive training programs on cognitive performance. From the search, 7 articles were selected and synthesized to show the effects of both tDCS and cognitive training programs on cognitive performance.

Results: It is proposed that the literature review will help us determine: 1. the effects of cognitive training programs on baseline performance in health and disease, 2. the effects of tDCS on cognitive performance in health and disease.

Discussion: Non-invasive brain stimulation and cognitive training programs together is an area that has not been addressed in the literature. Learning the evidence behind both modalities will provide insight into the use of tDCS and a computer program as comprehensive and practical cognitive intervention. This select review will help indicate the need for further research on this topic and usefulness in a home or clinic setting.

POSTER 96

INTERSPECIFIC AND ONTOGENETIC VARIATION IN GREAT APE PEDAL PHALANGEAL CURVATURE

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Considerable attention has been devoted to understanding phalangeal curvature in primates, particularly with regard to hominid locomotor evolution. It is received wisdom that phalangeal curvature is an adaptation for climbing and grasping behaviors, with greater curvature indicative of increased climbing. Although the link between curvature and climbing has been posited for hands *and* feet, little is known about the functional morphology of pedal phalangeal curvature. Here, digital measures were collected from adult 3rd and 5th digit proximal pedal phalanges in *Gorilla gorilla* (n=44), *Pan troglodytes* (n=58) and *Pongo pygmaeus* (n=47). An ontogenetic sample of *Pan troglodytes* (n=91) was used to evaluate the postnatal link between variation in phalangeal curvature and grasping behaviors. Angles of curvature were calculated with SAS and compared via ANOVA ($p<0.05$). Using behavioral studies to predict an interspecific gradient of variation in adult pedal phalangeal curvature, *Pongo* is found to be significantly more curved than *Pan* and *Gorilla*. Contrary to predictions, *Pan* is not significantly more curved than *Gorilla*. These interspecific findings suggest that the functional association posited between pedal phalangeal curvature and climbing behavior is not as strong as previously assumed or, at least, that taxa with intermediate frequencies of grasping need not exhibit intermediate levels of pedal phalangeal curvature. Interestingly, general ontogenetic decreases in pedal phalangeal curvature among chimpanzees accord well with postnatal decreases in climbing frequency documented in the wild, but significant overlap between juvenile and adult individuals raises important questions regarding the cause and function of ontogenetic changes in proximal pedal phalangeal curvature.

This study was funded by the Weiland Fund of Hunter College of the CUNY and a Life Sciences Fellowship from the University of Missouri – Columbia.

POSTER 97

COORDINATE REGULATION OF *GATA3* AND CD4+ T-HELPER 2 (TH2) CYTOKINE GENE EXPRESSION BY THE RNA-BINDING PROTEIN HUR

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Asthma and other allergic inflammation diseases are major contributors to hospitalizations and deaths worldwide. These diseases are the result of over reactive immune responses initiating pro inflammatory mediators. These CD4+ T helper type 2 (Th2) mediated diseases are driven by the transcription factor GATA3 as well as the cytokines IL-4 and IL-13. HuR, an RNA binding protein (RBP), has been shown to posttranscriptionally regulate many early response genes, including these critical allergy mediators. Specifically, GATA3 contains an AU-rich element in its 3' untranslated region (UTR), a putative binding site for HuR. When GATA3's 3' UTR is inserted into the highly stable β-globin mRNA, it significantly accelerates its decay in actinomycin D assays, suggesting it's role in GATA3's mRNA turnover. Furthermore, a knockdown of HuR in Jurkat T cells showed a significant decrease in GATA3 mRNA and protein levels as well as mRNA stability. To further understand HuR's role in GATA3 regulation and it's specific binding sites on its target mRNA, we designed probes for various sections of the GATA3 mRNA; GATA3 5' UTR, open reading frame (ORF) and 3 equal portions of the 3' UTR containing the putative binding domains of HuR. We will use these probes in immunoprecipitations to enrich for bound segments of GATA3 mRNA with HuR protein. We will then mutate the putative binding domains of HuR to analyze its effects on GATA3 regulation. Understanding HuR's regulation of GATA3 will be critical for fully understanding the development and progression of allergic inflammation and asthma in addition to its other important physiological roles.

POSTER 98

TRIGEMINAL NERVE MORPHOLOGY IN THE AMERICAN ALLIGATOR: IMPLICATIONS FOR INFERING SENSORY POTENTIAL IN EXTINCT SPECIES

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Among the many adaptations of modern crocodilians, one of the most intriguing is their derived sense of face touch, in which numerous trigeminal nerve-innervated dome pressure receptors speckle the face and mandible and sense vibrations and other mechanical stimuli, directing the animal towards, or away from stimuli. However, the morphological features of this system are not well known, and it remains unclear how aspects of the trigeminal system change during ontogeny and how they scale with other cranial and nervous structures.

A cross-sectional study integrating histological, morphometric, and 3D imaging analyses was conducted to identify patterns in cranial nervous and bony structures of the American Alligator (*Alligator mississippiensis*). Nine individuals from a broad size range were CT-scanned followed by histomorphometric sampling of mandibular and maxillary nerve divisions of the trigeminal nerve. Endocast volume (a proxy for brain size), trigeminal fossa volume, and maxillomandibular foramen size were compared with nerve counts from proximal and distal regions of the trigeminal nerves in order to identify scaling properties of the structures.

The trigeminal fossa has a significant positive correlation with skull length and endocast volume. Nerve fiber density is greater in smaller alligators and total nerve count has a significant negative correlation with skull size. These variables were then collect from several fossil crocodilians from differing habitats to test for ecomorphological significance. These findings are important for not only understanding sensory evolution in living crocodilians but also for predicting sensory potential in fossil taxa.

POSTER 99

OVEREXPRESSION OF THE RNA-BINDING PROTEIN HUR IMPAIRS TUMOR GROWTH IN TRIPLE NEGATIVE BREAST CANCER ASSOCIATED WITH DEFICIENT ANGIOGENESIS

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Breast cancer is the second most common cancer in women and causes the death of 519,000 people worldwide. Many cancer genes are posttranscriptionally regulated by RNA-binding proteins (RBPs) and microRNAs. The RBP HuR binds to the AU-rich (ARE) regions of labile mRNAs, such as proto-oncogenes, stabilizing their mRNA and facilitating their translation into protein. HuR has been described to control genes in multiple areas of the acquired capabilities model of cancer and has been hypothesized to be a tumor-maintenance gene, allowing for cancers to proliferate once they are established. We investigated the role of HuR in aggressive and difficult to treat triple-negative breast cancer. MDA-MB-231 cells with higher levels of HuR had alterations in cell cycle kinetics and faster growth. Unexpectedly, HuR overexpression significantly interfered with tumor growth in orthotopic mouse models. Tumors overexpressing HuR had fewer blood vessels and less apoptosis than the control tumors. Microarray analysis revealed several genes overexpressed in the tumors with higher levels of HuR, including anti-angiogenic TSP1 and TSP2. Further analysis revealed TSP1 mRNA stability to be significantly increased in the cells overexpressing HuR. Additionally, VEGFα was found to be downregulated at the mRNA and protein levels in the tumors overexpressing HuR. Therefore, the putative mechanism seems to be an anti-angiogenetic effect by increasing expression of TSP1 but also surprisingly, down-regulating VEGFα, a target which HuR normally increases. An approach of modulating HuR levels may overcome limitations associated with monotherapies targeting tumor vessel formation.

POSTER 100

SMAD-SIGNALING INHIBITION: POTENTIAL FOR DEVELOPING NEWER TREATMENTS FOR CORNEAL FIBROSIS

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Purpose: Transforming growth factor β (TGFβ) is known to cause fibrosis in the cornea following injury and/or infection. Effective reduction in corneal fibrosis has been reported by inhibiting TGFβ activity. However, associated molecular mechanism is still unknown. The aim of study was to test the hypothesis that the alteration in SMAD signaling is a novel approach for treating corneal fibrosis using an established *in vitro* model.

Methods: Primary corneal fibroblast (HSF) cultures generated from donor human corneas were exposed to TGFβ1 (1ng/ml). To test the hypothesis gene transfer approach was used. Decorin (a natural inhibitor of TGFβ) cDNA was introduced into HSF with non-viral (lipids) or viral (AAV5) vector. Real-time PCR, immunoblotting and/or immunocytochemistry measured the markers of fibrosis (αSMA, F-actin and fibronectin). Immunoblotting and/or immunocytochemistry examined the non-phosphorylated and phosphorylated forms of SMAD2 and SMAD7 proteins.

Results: TGFβ1 treatment significantly induced myofibroblast formation and fibrosis in the HSF as shown by mRNA and protein levels of αSMA (myofibroblasts marker). Decorin-transfected HSF showed significant decrease in TGFβ1-induced fibrosis in the human cornea *in vitro*. Detection of significant increase in Smad7 and decrease in Smad2 levels in decorin-overexpressing clones was detected compared to naked vector-transfected clones. The effects were more pronounced in AAV-transduced clones than the plasmid-transfected clones, most likely due to the higher transgene delivery with AAV than the plasmid vector.

Conclusions: Inhibition of SMAD signaling pathway can be used for developing mechanism-based newer anti-fibrotic therapies for the cornea.

POSTER 101

ABSENCE OF DYSTROPHIN ALTERS THE PASSIVE PROPERTIES OF THE EXTENSOR DIGITORUM LONGUS MUSCLE IN MICE

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Dystrophin is a cytoskeletal protein not directly participating the myosin-actin contractile apparatus in muscle. The loss of dystrophin leads to Duchenne muscular dystrophy. It is well-established that contractility is reduced in dystrophin-null muscle. Surprisingly, little is known about the influences of dystrophin-deficiency on the passive properties of muscle. We hypothesize that the loss of dystrophin alters the passive properties of the skeletal muscle. To test this hypothesis, we examined the passive properties of the extensor digitorum longus (EDL) muscle from normal BL10 and dystrophin-null mdx mice. Consistently, the mdx EDL showed an increase in muscle stiffness along age (2, 6, 14 and 20-month-old) compared to BL10. Interestingly, the EDL muscle failed at the proximal muscle tendon junction (MTJ) in ≥14-month-old mdx while it failed within muscle fiber in BL10 and younger mdx. Previous ultrastructural studies in mdx indicated a reduction in the MTJ strength due to a decrease in the junctional membrane folding. Thus, we initially suspected that the weakness of the MTJ in older dystrophic muscle might have shifted of the failure site toward the MTJ. However, we did not detect a difference in the junctional membrane folding between mdx and BL10. Nevertheless, we observed degeneration in some myofiber at the MTJ in 14-month-old mdx. Our results suggest that the shift of the failure site was likely a consequence of the increased muscle stiffness although MTJ degeneration may have also contributed.

POSTER 102

3D ANALYSIS OF PRIMATE HINDLIMB JOINTS: RECONSTRUCTING POSITIONAL ABILITIES IN EXTINCT PRIMATES

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Apes use more varied hindlimb positions than monkeys, particularly terrestrial species, in order to negotiate a complex 3D environment. Femoral and pelvic morphology both affect and reflect hindlimb positional adaptations, but the relative influence of particular aspects of hip and thigh morphologies on hindlimb postures is unknown, affecting our ability to use these features to interpret locomotor behavior in fossil taxa.

This study uses articulated 3D polygonal models of the pelvis and femur to simulate range of abduction during loading, and evaluates effects of different aspects of morphology on femoral postures. Continuous laser scan data of the pelvis and femur were collected for a large sample of extant primates, as well as fossil apes and hominins. Microscribe landmark data of intact pelves were used to orient innominate scans in 3D virtual space. Morphological variation and range of thigh abduction were quantified with PolyWorks software.

Our results show significant variation in femoral postures, and thus knee position, among species for any given hip position. In particular, more suspensory apes have femora that are inherently more abducted in neutral hip positions than cercopithecids. Features most influential on femoral postures include neck-shaft angle, neck length, femoral head and acetabular orientation, fovea capitis position, and bicondylar angle. Acetabular fossa size and greater trochanter height were less significant. Results of our study provide a basis with which to evaluate locomotor adaptations in extinct primates.

POSTER 103

THYMIC MYELOID AND LYMPHOID CELLS DERIVE FROM DISTINCT DN1 PROGENITORS

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T cells develop in the thymus; however, it is has been shown that non-T cells such as NK cells and dendritic cells also develop in the thymus. As such, the question arises, are these non-T cells developing from a common or lineage-specific progenitor population. Recently, it has been shown that macrophages and granulocytes can also develop from early thymic progenitors (ETPs). Using an IL-13R$\alpha 1^{+/+}$-GFP mouse, it was observed that a small population of ETPs expresses IL-13Rα1. This population did not express early T cell markers but instead expressed markers associated with granulocyte-macrophage progenitors (GMPs), a population found in the bone marrow but previously uncharacterized in the thymus. In fact, IL-13R$\alpha 1^{+}$ GMPs matured into $CD11b^{+}$ macrophages but not T cells both *in vitro* and *in vivo* while IL-13R$\alpha 1^{-}$ ETPs supported T cell but not macrophage development. Furthermore, these $CD11b^{+}$ macrophages were able to present antigen and aid in the selection of CD4 T cells in the thymus. Interestingly, using an IL-13R$\alpha 1^{-/-}$ mouse, GMPs still trafficked to the thymus but were unable to support macrophage development *in vitro*.

This work supports the development of a new model of hematopoiesis and suggests that resident macrophages may in fact develop in the thymus from distinct progenitors and stay to support T cell selection.

POSTER 104

RELATIONSHIP BETWEEN OTITIS MEDIA AND TEMPORAL BONE PNEUMATIZATION

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Chronic otitis media, or middle ear inflammation, is correlated with reduced pneumatization of the temporal bone. It is unclear whether the chronic otitis media causes reductions in the size of the air cell system, or if the initial small size of the air cell system increases the risk of chronic otitis media. However, little is known about changes of the size of the air cell system across the lifespan of individuals without otitis media. The purpose of this study was to assess changes throughout in the lifespan of temporal bone pneumatization.

Micro-computed tomography scans were acquired of 29 temporal bones without evidence of chronic otitis media. The sample included individuals ranging in age from neonate to adult. Volumes of the air cell system within the temporal bone, excluding the ear structures, were calculated using Amira® software. Results indicate that the size of the air cell system doubles between 0 and 4 years of age. After this timepoint, the size increases more gradually, but the adult air cell system is nearly ten times the size seen in neonates. These results suggest that disturbances early in postnatal development, such as otitis media, may play a large role in the adult size of the pneumatized spaces.

POSTER 105

DON'T BE SUCH A BABY!
OR
THE EFFECTS OF THE ENVIRONMENT AND T CELLS ON NEONATAL IMMUNITY

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It is known that neonates are highly susceptible to microbial infections and allergic reactions. This susceptibility is due to a lack of Th1 cells and an excess of its Th2 counterparts. However, the mechanism underlying this Th1/Th2 imbalance has not been clearly elucidated. Although both Th1 and Th2 cells are present in the primary response, only Th1 cells up-regulate the IL-13Rα1 chain. Consequently IL-13Rα1 can associate with IL-4Rα to form a heteroreceptor through which IL-4 from Th2 cells can signal and cause the apoptosis of Th1 cells upon secondary re-challenge with antigen. Formation of this IL-13Rα1/IL-4Rα heteroreceptor is influenced by two factors: the neonatal environment and intrinsic T cell factors. Previous studies demonstrate that the lack of IL-12 in the neonatal environment supports IL-13Rα1 up-regulation and Th1 apoptosis. This lack of IL-12 is due to a low frequency of CD8α+CD4- DCs, the main producer of IL-12. However, by day 6 postpartum, this DC subset reaches a significant accumulation and produces sufficient IL-12 that down-regulates IL-13Rα1 and restores Th1 responses. Interestingly, T cells also contribute to the Th2 bias of neonatal immunity as evident by the fact that when adult T cells are transferred into a neonatal environment, they do not up-regulate IL-13Rα1. Current studies show that T cells from 8d mice are no longer susceptible to antigen induced IL-13Rα1 up-regulation when transferred into the neonatal environment. Determining the mechanism as to why 8d T cells are resistant to this up-regulation is ongoing, but indicates the involvement of the IL-12Rβ2 chain.

POSTER 106

METABOLIC RHYTHMS IN HAPLORHINE AND STREPSIRRHINE PRIMATES

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Microstructural evidence from teeth and bone has recently been used to support the hypothesis that growth, metabolism, and reproduction – i.e., life history – are centrally regulated by a neuroendocrine rhythm known as the Havers-Halberg Oscillation (HHO). Many questions about HHO biology and its relationship to life history evolution remain. For example, studies have shown that body mass is a strong predictor of HHO for anthropoid primates, but it cannot explain the unusual HHO patterns of strepsirrhine primates. It is uncertain whether this results from phylogenetic differences in HHO regulation across major primate clades, or whether such differences are eliminated by application of more physiologically relevant predictor variables.

This study examines Retzius line periodicity (a proxy for HHO) gathered from histological sections of haplorhine and strepsirrhine teeth to provide insight into this question. Results for regressions of Retzius periodicity against body mass, brain mass, encephalization, and basal metabolic rate (BMR) show that for all primates, brain mass and BMR are the best predictor variables. However, strepsirrhines still differ in these two relationships with respect to haplorhines. This suggests that while brain mass and BMR are more physiologically appropriate variables for assessing patterns in HHO variation, phylogeny may still play a major role in governing how HHOs of specific taxa respond to ecological forces. Results also suggest that relatively longer HHOs seen in larger-brained subfossil lemurs correspond with their relatively "slower" life history schedules, reinforcing the idea that HHO can influence the evolution of life history in response to specific ecological selection regimes.

POSTER 107

REPORTING QUALITY AND SYSTEM DESIGN CONCERNS OF VOLUNTARY MEDICAL INCIDENT REPORTING SYSTEMS: A LITERATURE REVIEW

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Voluntary medical incident reporting system (VMIR) is the application of technology to support health professionals on medical errors reporting and to ultimately improve healthcare quality and patient safety. The underreporting and low quality reported data are two major barriers impeding system effectiveness of learning from incident to prevent its reoccurrence. A number of approaches have been discussed to address the former difficulty for encouraging voluntary participation of incident reporting such as non-punitive medical environment, perception of system usefulness and assistive feedback from expert review. However, few studies seem to be published to analyze completeness and accuracy of reported data and then to provide ideas for report quality improvement. In this study, we will conduct a literature review searching mainly in the field of medical incident/error reporting to examine the situation of reporting quality and pertinent system design in voluntary computer program.

POSTER 108

ACUTE (BINGE) ADMINISTRATION OF ETHANOL CAUSES HISTONE H3 PHOSPHORYLATION AT SER-10, SER- 28 & GENE EXPRESSION IN RAT LIVER IN VIVO

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Epigenetic histone modification is emerging as a critical player in the cellular actions of ethanol. In this study we have examined the effect of ethanol on histone H3 phosphorylation in vivo using an acute model. Twelve week old male Sprague Dawley rats were intraperitoneally administered either ethanol in a 32% solution, or water as a control, to determine the effect of ethanol on histone H3 phosphorylation at 1h using 1.75g, 3.5g or 5g of ethanol/ kg body weight. Significant increases in the histone H3 phosphorylation at serine-10 and serine-28 occurred at 1.75 and 3.5 grams of ethanol; with negligible change at the higher 5 gram dose. Thus, histone phosphorylation occurred at lower blood alcohol levels but not at higher levels in vivo. There was induction of immediate early genes, c-Fos, c-Jun and MKP-1 that accompanied the changes in histone phosphorylation. Taken together, it is concluded that acute ethanol causes site specific serine phosphorylation in histone H3 at patho-physiological concentrations and modulates expression of genes. These data are relevant to the identification of "early" molecular processes involved in the binge induced liver injury. Supported by NIAAA grant AA16347.

POSTER 109

INTRINSIC HIGH AEROBIC CAPACITY PROTECTS AGAINST LIPID INDUCED HEPATIC INSULIN RESISTANCE

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Hepatic steatosis is commonly linked to hepatic insulin resistance. However, recent studies have found that increased hepatic triacylglycerol (TAG) accumulation is not always associated with impaired hepatic insulin signaling, leading to a hypothesis that partitioning of lipids into TAG in the liver matched with high rates of fatty acid oxidation (FAO) under high lipid exposure conditions may protect against hepatic insulin resistance. We examined this hypothesis in the livers of high and low capacity running (HCR/LCR) rats which were created by artificial selection based on differences in intrinsic aerobic capacity. We examined FAO, TAG storage, and insulin signaling in primary hepatocytes isolated from the HCR/LCR rats to determine if these factors are associated with protection or susceptibility to hepatic insulin resistance. HCR primary hepatocytes demonstrate 2-fold higher FAO to CO_2 than LCR, which is further increased following overnight lipid incubation. Also, HCR primary hepatocytes display 50% lower basal TAG synthesis rates and, unlike the LCR hepatocytes, demonstrate a 4-fold increase in TAG synthesis rate following overnight lipid exposure. Interestingly, overnight lipid exposure leads to the same TAG levels for both HCR and LCR hepatocytes. Finally, HCR hepatocytes are observed to maintain insulin stimulated Akt phosphorylation following overnight lipid exposure, with a significant decrease in signaling observed in the LCR hepatoctyes. In conclusion, isolated primary hepatocytes from HCR rats are observed to have higher FAO, dramatically increased TAG synthesis rate, and maintenance of insulin signaling in response to lipid exposure. These data suggest that coupling of increased hepatic FAO and TAG synthesis in response to increased lipid exposure is protective of hepatic insulin action.

POSTER 110

EMERGENCY SONOGRAPHY: THE USE OF FOCUSED ASSESSMENT WITH SONOGRAPHY FOR TRAUMA IN MID-AMERICAN TRAUMA CENTERS

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The use of Focused Assessment with Sonography for Trauma (FAST) has steadily increased as a safe, inexpensive, noninvasive, and quick alternative to other imaging modalities, such as computed tomography (CT), in evaluating free-fluid caused by trauma. However, lack of regulation makes it difficult to assess its prevalence and who is performing the scans. As a result, accuracy is widely variable depending on the person performing the scan and how much training they have received. The purpose of this study is to interview the trauma centers of Missouri with a survey to measure how much ultrasound is used in the emergency setting and who is performing the scans in the state. According to our results, primarily emergency physicians use FAST scans across the state. Research shows that the accuracy and confidence level in using FAST directly correlates to the emergency physician's sonography experience.

POSTER 111

CHARACTERIZATION OF PERICYTE INVASIVE RESPONSES AND PERICYTE-INDUCED VASCULAR MORPHOGENESIS IN 3D MATRICES: DISTINCTIONS WITH VASCULAR SMOOTH MUSCLE CELLS

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During vascular morphogenic events, mural cells are recruited to developing endothelial tubes to aid in stabilization and maturation of the new vessels. There are two known types of mural cells, pericytes and vascular smooth muscle cells (VSMCs). Their different locations within the vasculature (capillaries versus larger vessels, respectively) suggest that there may be distinct vessel recruitment mechanisms or factors, however, these issues remain unresolved. Platelet-derived growth factor (PDGF) is known to be released from endothelial cells during morphogenic events and has been shown to influence mural cell functions. In this study, we investigate the ability of PDGF isoforms to regulate pericyte versus VSMC invasive behaviors and recruitment to EC monolayers or developing vascular tubes. Using a novel invasion system developed in our lab, we show that PDGF isoforms with affinity for PDGFRβ selectively induce pericyte, but not VSMC, invasion toward an EC monolayer. Coculture studies have allowed us to examine the effect of this recruitment on vessel stabilization and maturation while also providing us the ability to define pericyte versus VSMC functional behaviors. Also, when ECs are seeded as a monolayer on top of 3D collagen gels containing pericytes, we show enhancement of monolayer stability compared to when ECs are seeded alone. Coculture studies also reveal pericyte-induced EC tube sprouting that is sustained over time compared to EC only cultures or EC/VSMC cocultures. This work demonstrates marked functional differences between pericytes versus VSMCs in recruitment to developing EC tubes and stimulation of EC tube sprouting during vascular morphogenesis.

POSTER 112

SPHINGOSINE ANALOG AAL-R ENHANCES DENDRITIC CELL RESPONSES UPON TLR7 LIGATION

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Sphingosine analogs display immune suppressive activities and thus have therapeutic potential in the treatment of autoimmune diseases. In this study, we investigated the effect of a sphingosine analog, AAL-R, on the host immunity of dendritic cell (DC) response upon the stimulation of toll-like receptors (TLRs) or a viral infection. AAL-R impaired DC maturation in response to TLR3 or TLR4 activation, representing its immunosuppressive activity. In contrast, AAL-R increased TLR7-mediated DC responses by elevating the level of MHC-I molecule and type I interferon (IFN), and enhancing DC capacity to induce $CD8^+$ T cell proliferation. Further, AAL-R increased the phenotypic maturation and functionality of DCs infected with lymphocytic choriomeningitis virus. Since AAL-R failed to change the response of type I IFN receptor-deficient DCs to the viral infection, the underlying molecular mechanism involves type I IFN signaling. Thus, our results indicate that AAL-R's regulatory action is strongly affected by the form of pathogenic molecular patterns and is stimulatory when TLR7 is activated on DCs. These findings could provide a basis for the development of novel DC-mediated therapeutic vaccines.

POSTER 113

N/P RATIO IN THE PEI2-GNP-DNA COMPLEX AFFECTS TRANSGENE DELIVERY IN THE HUMAN CORNEA *IN VITRO*

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Purpose: Recently, we discovered that polyethylenimine-conjugated gold nanoparticles (PEI2-GNP) could be used as gene therapy vector for the cornea. It was hypothesized that DNA concentration, incubation timing and PEI monomer amount in transfection solution affect gene transfer efficiency and toxicity. The aims of this study were to test whether molar ratio of PEI2 nitrogen (N) and phosphate (P) of DNA in PEI2-GNP transfection solution regulates transgene delivery in human corneal fibroblasts *in vitro*, and examine PEI2-GNP toxicity, uptake and clearance for the cornea *in vivo*.

Methods: Donor human corneas for *in vitro* and New Zealand White rabbits for *in vivo* studies were used. Various N/P ratios of PEI2-GNP-plasmid expressing GFP transfection solution were tested. DNA complexation was tested by agarose gel-retardation assay. The toxicity was tested with trypan blue assay, slit-lamp biomicroscopy and immunostaining. PEI2-GNP *in vivo* uptake and cellular entry into corneal cells were analyzed with neutron activation analysis (NAA), silver staining and electron microscopy.

Results: The N/P ratios 60 and 120 showed moderate (23-41%, $p < 0.01$) and 180 high (53-58%, $p < 0.001$) transgene delivery into human cornea *in vitro*, without altering cellular viability and phenotype significantly. Appreciable gold uptake (>300 ppm) in treated rabbit cornea with gradual clearance over time was detected with NAA. Electron microscopy studies suggest GNP uptake through endocytosis. Slit-lamp biomicroscopy in live rabbits detected no inflammation, redness or edema whereas moderate cell death and immune reactions were noted with immunocytochemistry.

Conclusion: Selected PEI2-GNPs can offer effective non-viral gene therapy modalities for treating corneal diseases.

POSTER 114

NICOTINE REDUCES ADENOSINE RELEASE IN THE LATERAL HYPOTHALAMUS: A POSSIBLE MECHANISM OF ITS ADDICTION

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Nicotine (tobacco) addiction is a serious health issue and a leading cause of death. However, the mechanism of nicotine addiction is not fully understood. Previous reports suggest that nicotine induced activation of orexin neurons in the lateral hypothalamus (LH) region of the brain may play an important role in nicotine addiction. Adenosine is implicated to inhibit orexin neurons. Does nicotine reduce adenosine release in the LH and thereby causing disinhibition/ activation of orexin neurons? To address this issue, adult male Sprague-Dawley rats (N=4) were surgically implanted with guide cannula in the LH region followed by insertion of microdialysis probe. The inlet and the outlet of the probes were connected to the microdialysis pump and the collection vial, via micro-tubing. Artificial cerebrospinal fluid perfusion was initiated (flow rate=0.7ul/min). The experiment was begun at the dark onset with saline administration (ip) and 6x20 min samples were collected. This was followed by nicotine (1 mg/kg; i.p.) administration and collection of 6x20 min samples. 10 ul from each sample was injected into the HPLC for adenosine measurements. On completion of the experiment, the animals were euthanized, brains removed and sectioned. Cresyl violet staining was performed on coronal sections containing LH for probe localization. Our initial results suggest that systemic administration of nicotine caused a reduction in extracellular adenosine in the LH. Based on our results, we conclude that nicotine inhibits adenosine release in the LH which may be responsible for disinhibition/ activation of LH orexin neurons.

POSTER 115

MODELING PERITONEAL METASTASES OF OVARIAN CANCER

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The majority of women with ovarian cancer (EOC) are diagnosed with disseminated ip metastasis leading to a poor prognosis. Ovarian cancer is the most deadly gynecological cancer in the US due primarily to late diagnosis with already wide spread presence of metastases. The mechanism by which EOC are shed ip and anchor in the peritoneal mesothelium is poorly understood. Our goal is to establish *in vitro* organotypic and *ex vivo* models to better understand mechanistic aspects of EOC metastasis. We have developed a modified 3D *in vitro* model of the peritoneum to investigate this process. To generate "meso-mimetics", primary peritoneal mesothelial cells (human, mouse, pig) or a mesothelial cell line (LP9) are layered upon a collagen I gel with embedded fibroblasts. *Ex vivo* studies use murine peritoneal tissue explants pinned to silastic resin. In both models, fluorescently labeled EOC cells are seeded onto the meso-mimetic or tissue explant as single cells or multi-cellular aggregates, and adhesion is monitored using confocal microscopy and relative fluorescence. Preliminary results show rapid robust adhesion of EOC to meso-mimetics and explants. Analysis of explants by scanning EM confirms these data and show mesothelial invasion by tumor cells within 24 h. Similar results were obtained using mice injected ip with fluorescently labeled ovarian cancer cells: adherent fluorescent cells were visible atop the peritoneum after 24 h, with tissue invasion observed after 72 hours. We have developed a comprehensive suite of assays for mechanistic analysis of key events that regulate EOC tumor progression to metastasis.

POSTER 116

AAV5-MEDIATED TARGETED DECORIN GENE THERAPY: EFFECTIVE AND SAFE FOR CORNEAL FIBROSIS

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Purpose: Corneal fibrosis is 3rd leading cause of global blindness according to WHO report. At present, no agents are proven to clinically reduce corneal fibrosis without causing significant side effects. It was hypothesized that decorin gene delivered into keratocytes prevents corneal fibrosis in the cornea *in vivo* by blocking transforming growth factor β (TGFβ), which converts keratocyte to myofibroblasts and cause fibrosis.

Methods: New Zealand White rabbits were used. Fibrosis in the cornea was produced with photorefractive keratectomy (PRK) using excimer laser. 50µl AAV5 titer ($5X10^{12}$ vg/ml) expressing decorin was topically applied on the PRK-treated and untreated eyes. Slitlamp biomicroscopy was used to evaluate the health of the eye and clinical scoring of corneal haze. Real-time PCR, immunoblotting and immunocytochemistry techniques were used to measure the hallmarks of fibrosis [alpha smooth muscle actin (αSMA), F-actin and fibronectin]. Transmission electron microscopy investigated ultrastructural features. Dot-blot and real-time PCR quantified delivered-decorin gene copies.

Results: The AAV-decorin treated rabbit eyes did not show inflammation, redness or structural changes in the cornea in slitlamp biomicroscopy. A statistically significant (44.9-67.4%±4.3; $p < 0.001$) decrease in the expression of fibrotic markers (αSMA, F-actin and fibronectin) was detected with immunocyctichemistry and immunoblotting in decorin-delivered corneas. Significantly high (8-10 fold, $p<0.001$) decorin mRNA expression was noted in AAV-DCN-treated rabbit corneas.

Conclusions: AAV-mediated decorin gene therapy can effectively reduce fibrosis in the rabbit cornea *in vivo*. Our preclinical studies suggest that decorin gene therapy has potential for treating corneal haze in patients, and set the stage for undertaking clinical trials.

POSTER 117

ULTRASOUND ASSISSTED LIPOSUCTION

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Abstract
The purpose of this study is to examine Ultrasound Assisted Liposuction (UAL) and compare its advantages and disadvantages with traditional liposuction procedures. UAL is a relatively new technology and concept that has met the demands and the notoriety of non-invasive surgery techniques. UAL has been widely used in European countries since 1989 to help assist the more traditional liposuction. UAL helps to give the body a more contoured look where using the traditional liposuction cannula might be dangerous on certain parts of the body, such as the chin, around the cheeks and neck, the breasts, and even the upper thighs and buttocks.

POSTER 118

TISSUE-SELECTIVE CONTROLLED DECORIN GENE DELIVERY IN THE RABBIT CORNEA SIGNIFICANTLY RETARDS CORNEAL ANGIOGENESIS IN VIVO

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Purpose: Recent studies have shown that decorin gene therapy inhibits neovascularization in many non-ocular tissues. We tested the efficacy of decorin gene delivery into stroma with AAV5 to impede vascular endothelial growth factor (VEGF)-induced angiogenesis in rabbit cornea in vivo.

Methods: New Zealand White rabbits were used in our study. Corneal neovascularization was induced by implanting a sucralfate-hydron pellet containing 650ng VEGF using micropocket assay. Decorin gene delivery into rabbit stroma was accomplished via topical application of 25µl AAV5 (5x10e9 vg/µl). Visual eye exam, stereomicroscopy, and slit-lamp microscopy were used to monitor corneal health. Changes in corneal neovascularization were measured with stereomicroscopy, immunocytochemistry, western blotting, and real-time PCR techniques. NIH Image J 1.38X and Adobe Photoshop software were used to quantify vasculature.

Results: AAV5 decorin gene delivery into stroma demonstrated a substantial reduction in blood vessel area compared to control corneas in a time-dependent fashion from day-3 to day-14. Stereo- and slit-lamp microscopy detected a considerable attenuation in corneal neovascularization (9.8-37.3%) in rabbit eyes in vivo with decorin gene therapy. The largest decrease in corneal angiogenesis was observed on day-10 (up to 37.3%). In addition, decorin-overexpressing rabbit corneas exhibited delayed blood vessel appearance, thinning, and retarded migration towards the cornea compared to control. Preliminary immunochemistry, western blotting, and real-time PCR data support these observations. Clinical eye examination did not reveal any significant inflammation in test or control corneas.

Conclusions: Decorin gene therapy effectively reduces corneal neovascularization in vivo. Studies are underway to delineate safety, toxicity, and doses of tested vectors.

POSTER 119

ANATOMY, HISTOLOGY, AND ONTOGENY OF THE SESAMOID CARTILAGE IN THE JAW MUSCLES OF THE AMERICAN ALLIGATOR (*ALLIGATOR MISSISSIPPIENSIS*)

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The cartilago transiliens is a characteristic cartilaginous nodule inside crocodilian jaw muscles. Encased by a fibrous sheath, the cartilago transiliens lies between the pterygoid buttress and the mandible, providing attachment sites for m. pseudotemporalis superficialis dorsally, and m. intramandibularis, ventrally. Previous research showed that the cartilago transiliens functions as a jaw-locking mechanism and bears sesamoid-like features, rather than those of a novel structure. Fibrocartilages often form inside portions of tendons that wrap around bone. These organized, incompressible sesamoid tissues prevent tendon flattening, increase mechanical advantage, and tend to ossify in mammals and reptile limbs, but not in most other instances. Here we investigate the gross anatomy and microstructure of the cartilago transiliens in the American alligator (*Alligator mississippiensis*). Approximately 6 specimens ranging from pre-hatching to adult individuals were used. Specimens were imaged using CT, microCT, MRI, and microMRI, dissected, and processed for histomorphology. MicroCT specimens were stained with Lugol's Iodine to enhance visualization of muscle fiber orientations. The cartilago transiliens connects to numerous jaw muscles as well as the mandible. There are no noticeable topological changes in the cartilage and its neighbors through ontogeny. Histological data indicate that the cartilage is largely composed of fibrocartilage interlaced with collagen fibers, many of which are continuous with the attaching muscles. These data suggest that the cartilago transiliens is a sesamoid, rather than a novel soft-tissue structure. These data offer new insights into homology, evolution, and functional morphology of the crocodilian and reptilian feeding apparatus as well as the biology of fibrocartilaginous sesamoids.

POSTER 120

LECTIN AFFINITY BINDING OF PSEUDONONAS AERUGINOSA WITH POLYACRYLAMIDE NEOGLYCOCONJUGATES

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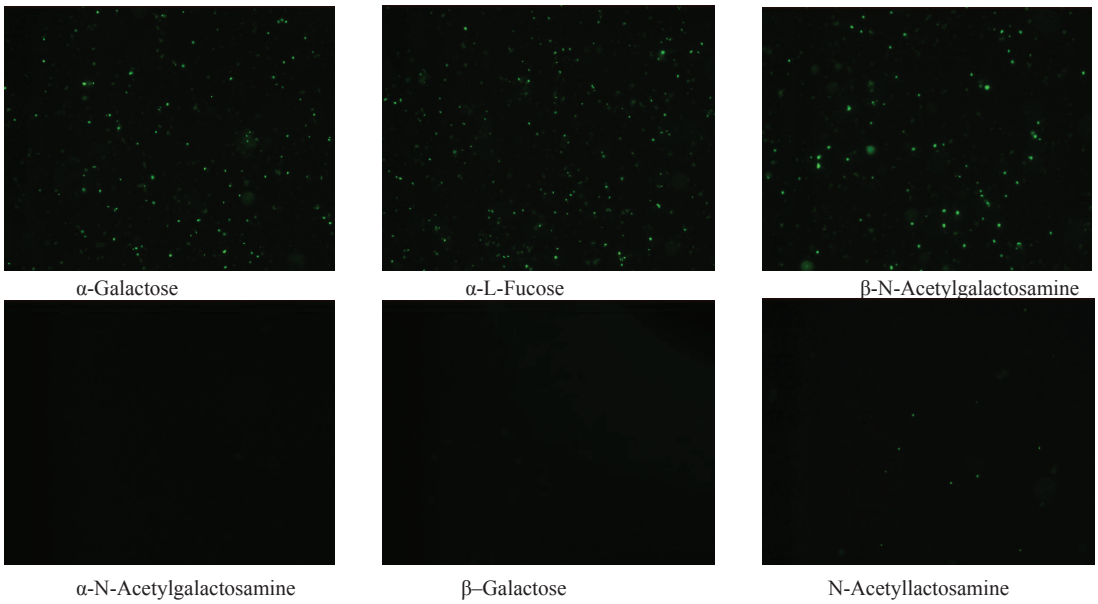
Background: The main clinical feature of cystic fibrosis (CF) is a chronic progressive lung disease caused mainly by Pseudomonas aeruginosa (PA) infection. The mechanism of bacterial invasion is not very clear. It's been shown that PA recognizing specific saccharides through lectins on the airway surface could be the very first step during invasion and infection. This project aims to conduct a comprehensive analysis of saccharides that could bind to different PA isolates from CF patients. **Methods**: We chose nine monosaccharides that were common on human airway surface to test the binding with14 strains of PA (4 laboratory strains, 10 clinical isolates). The sugars were in the form of polyacrylamide (PAA) conjugates (sugars-PAA-fluorescein); polyvalence of sugars could increase the binding affinity and mimic the physiological situation to some extent. Results were attained by fluorescence microscope and microplate reader. **Results:** Among those nine monosaccharides we tested, three (α-galactose, α-L-fucose, and β-N-Acetylgalactosamine) showed strong bacterial binding, and two (α-N-Acetylgalactosamine, α-N-Acetylneuraminic acid) could bind weakly (examples shown below). All 14 PA strains tested showed the same binding pattern. **Discussion:** In this study, we didn't observe strong PA binding with N-Acetyllactosamine or β-galactose, both of which were suggested in the literature to be able to bind; also we found a very similar binding pattern among PA strains, which is contradictory to what has been reported. Considering that the test conditions we employed is closer to true physiological situations than in reported investigations, it's proposed that the current results reflect the etiological process better.



α-Galactose | α-L-Fucose | β-N-Acetylgalactosamine

α-N-Acetylgalactosamine | β–Galactose | N-Acetyllactosamine

P. aeruginosa PAO 1 showed binding with different PAA-Fluor-Sugars (8μg each). Pictures were taken with Nikon E600 using FITC filter, magnification 20.

POSTER 121

HEALTH POLICIES FOR PULMONARY TUBERCULOSIS: WHAT WORKS?

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Abstract

Background: The objective of this study is to systematically review the published literature on tuberculosis and health care policies surrounding tuberculosis.

Methods: I searched Ovid Medline but limited my search to English language only and publication years from 1990-2010, CINAHL again limiting my search to English language only and 1990-2010, and the AAMC website for its list of Schools of Medicine in Missouri and its surrounding states. Articles included were published in scholarly journals and publications within the United States, written in English language, and most were case reviews/reports.

Results: Among the twenty-four articles identified in this review the author was able to place them among five different categories. The categories of existence were: regulating tuberculosis among health care workers,[8, 12, 18] tuberculosis management articles,[2, 5, 6, 16, 17, 19] tuberculosis associated cases,[3, 4, 9, 10, 11, 13, 14, 15, 20, 22, 24] tuberculosis management in relation to dental settings,[1, 7] retrospective cases on tuberculosis,[21, 23].

The literature expresses difficulty in updating health policies to correct an issue as well as difficulty in the adaptation of new health policies within an institution. Also, some institutions require that any policy changes be approved at the system level which serves as another time consuming and difficult loop hole to implementing policy change.

Conclusion: There is a strong need for a uniform health policy in every health care institution in order to maintain tuberculosis.

POSTER 122

POPULATION HISTORY AT THE MICROSCALE: CRANIOMETRICS OF CAYO SANTIAGO MACAQUES

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Being able to understand the effects of relatedness on adult cranial morphology has implications for inferring population histories, and for informing us about the influence of genetics on cranial form among human populations. Several methods have been developed to infer relatedness among human or other primate populations using metric data. R-matrix methods have typically been used to approach questions of population history on global or regional scales with a time depth of tens to thousands of generations.

This study uses detailed genealogical and demographic information for rhesus macaques born over four decades on Cayo Santiago along with individually matched cranial measurements. We evaluated the ability of craniometric data to recover two important patterns expected from the demographic records: individuals born in more distant time periods are less similar to each other; social groups that arose from the fissioning of a parent group will be more similar to each other than to other social groups.

Craniometric data are consistent with both expectations from the demographic data, and reflect discernable genetically based phenotypic variation in cranial form. Further research is needed to refine and test predictions about patterns in the craniometric data. Methods used in this study could be further developed to infer population history in disease modeling, and for explaining population variation in cranial phenotypes.

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POSTER 123

CHANGES IN MUSCLE FORCE PRODUCTION AND PAIN: IS THERE A RELATIONSHIP?

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Objective: Self-reports of function are commonly associated with pain ratings, but not actual performance. The aim of this project was to test if actual performance – muscle force production - is related to pain and if increasing, decreasing, or stable changes in force affect the relationship.

Methods: This project conducted secondary analyses of previously collected data. The original study investigated sensory integration of pain, light, and sound stimuli in 32 healthy participants with average age 23.5 years (54.5% male). During the study, muscle pain intensity and force were collected every 3 seconds during a 30s tonic muscle contraction. For the secondary analyses, the direction of change in force (increasing, stable, decreasing) at the time of pain rating and force recording was retrospectively collected on a subsample of 14 participants, which resulted in 23 increasing force epochs, 77 stable force epochs, and 40 decreasing force epochs. Spearman correlations were calculated between pain rating and force produced for all the data and within each direction of change in force and then compared after Fisher's z transformation.

Results: Overall, there was a statistically significant negative correlation of -.340 between force and pain. The correlation was -.312 when calculated for stable force, -.557 for increasing force, and -.333 for decreasing force. Comparison of the r-values yielded no significant difference between the groups.

Conclusion: This preliminary study suggests that the direction of force does not affect the relationship between pain and force during tonic muscle contraction, but more participants are needed to better answer this question.

POSTER 124

EVALUATION OF [^{99M}Tc]GLUCARATE AS A BREAST CANCER IMAGING AGENT: BENCH TO BEDSIDE

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The use of [^{99m}Tc]glucarate has been reported as an infarct-avid agent with the potential for very early detection of myocardial infarction. [^{99m}Tc]glucarate has also been postulated as an agent for non-invasive detection of tumors. The aim of the study was to develop a glucarate kit and evaluate [^{99m}Tc]glucarate as a potential cancer imaging agent in female SCID mice bearing human MDA-MB-435 breast tumors and in preliminary patient studies.

Methods: Pre-clinical [^{99m}Tc]glucarate micro SPECT-CT, ^{18}F-FDG micro PET-CT, and micro magnetic resonance (MR) imaging studies were performed on MDA-435 breast cancer xenografted SCID mice. In initial clinical studies, 3 patients with breast cancer, 3 patients with non small cell lung cancer and 3 patients with head and neck squamous cell cancer were imaged with [^{99m}Tc]glucarate SPECT.

Results: Micro SPECT-CT imaging showed a uniform tracer uptake in the tumoral volume, whereas PET-CT images demonstrated a higher uptake in the tumor periphery with less accumulation in the necrotic center of the tumor. A tumor metastasis was also visualized. MR imaging studies determined the percentage of tumor necrosis to be between 10% - 30%, which correlated well with [^{99m}Tc]glucarate uptake. Initial clinical studies with [^{99m}Tc]glucarate demonstrated tumor uptake by all primary (n=8) and secondary (n=4) lesions. Confirmed bone and subcutaneous lesions from the same patient were also imaged.

Conclusions: Selective tumor uptake and rapid clearance from non-target organs makes [^{99m}Tc] glucarate a potential agent for breast cancer imaging that awaits validation in a prospective controlled clinical trial.