Wednesday, February 12, 2014
POSTER SESSION I: VISUAL IMPAIRMENT AND INTRACRANIAL PRESSURE
4:30 p.m. Expo Hall A1-A2

Theriot C. A. Parsons-Wingerter P. Vizzeri G. Zanello S. B.

**Hindlimb Suspension as a Model to Study Ophthalmic Complications in Microgravity. Status Report: Optimization of Rat Retina Flat Mounts Staining to Study Vascular Remodeling** [#3104]

We have developed and implemented an optimized technique for the preparation and vascular staining of rat retina flat mounts and the acquisition of high resolution images for the study of vascular remodeling.

Parsons-Wingerter P. A. Vizzeri G. Taibbi G. Zanello S. B. Ploutz-Snyder R.

**Mapping by VESGEN of Blood Vessels in the Human Retina Undergoing Bed Rest for Increased Understanding of VIIP** [#3115]

Remodeling of retinal blood vessels during head-down tilt bed rest will be mapped and quantified by VESsel GENeration Analysis (VESGEN) software. We hypothesize that pathophysiological remodeling of the vessels mediates microgravity-induced fluid shifts prior to development of visual impairments.

Williams M. A. Malm J. Eklund A. Voss S. E. Hamilton D. R. Ebert D. Levine B. D.

**Comparison of Continuous Noninvasive and Invasive ICP Measurement** [#3137]

Two noninvasive methods of ICP measurement, tympanic membrane displacement (TMD) and distortion product otoacoustic emissions (DPOAE), are compared to invasive ICP measurement at 6 different ICP levels obtained during diagnostic CSF infusion testing using the Likvor CELDA device.


**Evaluation of Cardiovascular and Ocular Measures in a 14-Day 6° Head Down Tilt (HDT) Bed Rest Study** [#3111]

This study examined relationships between cardiovascular and ocular variables in the 6-degree head down tilt bed rest analog.


**Fluid Shifts** [#3174]

The purpose of this study is to characterize fluid distribution and compartmentalization associated with long-duration spaceflight, and to correlate these findings with vision changes and other elements of the VIIP syndrome.

Raykin J. Best L. Gleason R. Mulugeta L. Myers J. G. Nelson E. S. Samuels B. Ethier C. R.

**Experimental Measurements Driving Modeling of VIIP Syndrome** [#3209]

We describe experimental measurements of optic nerve sheath mechanical stiffness and fluid permeability. These will be used as input information into our ongoing efforts to model and better understand Visual Impairment and Intracranial Pressure (VIIP) syndrome.

Ethier C. R. Best L. Gleason R. Mulugeta L. Myers J. G. Nelson E. S. Samuels B.

**A Framework for Modelling Connective Tissue Changes in VIIP Syndrome** [#3210]

We describe a framework for the computational modeling of Visual Impairment and Intracranial Pressure (VIIP) syndrome, based on a combination of fluid compartment models, optic nerve head biomechanics models and connective tissue remodeling models.

Phillips S. D. Kattamis N. T. Knaus D. A. Swan J. G. Zegans M. E. Buckey J. C.

**Predicting Microgravity Induced Vision Changes Using a Cranial Venous Circulatory Model** [#3219]

On this project we are using computer modeling to determine how changes in hydrostatic gradients, fluid distribution, and cranial venous anatomy can impact eye structure and geometry and in turn influence microgravity-induced visual changes.
Fuller C. A., Hoban-Higgins T. M., Robinson E. L., Murphy C. J.  
*Head-Down Tilt as a Model for Intracranial Pressure and Ocular Changes During Spaceflight* [#3224]  
This research project is designed to determine if the cephalic fluid shift seen during microgravity exposure is a causative factor leading to the ocular changes reported in astronauts after long-term space flight.

Hawks J. A., Twedt M., Ketchem T., Bashford G.  
*A Composite Silicone Model for Investigating the Feasibility of Using Ocular Blood Flow to Monitor Relative Changes in Intracranial Pressure* [#3228]  
A composite silicone model of the eye and surrounding tissue has been constructed to investigate the feasibility of using ocular blood flow behavior to monitor relative changes in intracranial pressure. Results will benefit the work towards countermeasures for the VIIP risk.

*Postural Effects on the Eye and Ear* [#3270]  
Entrance into microgravity eliminates hydrostatic gradients compared to 1-G. In conjunction with developing a numerical model to predict ocular changes in microgravity, we are measuring changes in eye and ear parameters produced by changing hydrostatic gradients between different postures.

*Association of Diffusion Tensor Imaging Parameters of Optic Tracts and Cerebral White Matter Tracts with Visual Impairment and Structural Changes of the Eyes and Optic Nerves in Long — Duration Microgravity Exposure* [#3266]  
Our goal is to introduce DTI for evaluating microgravity effects on astronauts that has the potential to predict the presence and severity of the related symptoms including visual changes.

*Cephalad Brain Migration in a Human Bed Rest Model of Long-Term Spaceflight* [#328]  
The consequences of microgravity induced fluid redistribution on the brain have not yet been fully investigated and are poorly understood. This investigation will use advanced MRI imaging to study changes in brain structure and blood flow in astronauts following long-term stays on the ISS.

Zanello S. B., Carter B., Skog J.  
*Brain Gene Expression Signatures from Cerebrospinal Fluid Exosome RNA Profiling* [#3334]  
The current hypothesis underlying the etiology of the Visual Impairment and Intracranial Pressure syndrome (VIIP) suggests that an increase in intracranial pressure may lead to the ocular changes observed in astronauts.