

**HINDLIMB SUSPENSION (HLS) IN RODENTS FOR THE STUDY OF
INTRACRANIAL PRESSURE, MOLECULAR AND HISTOLOGIC CHANGES
IN THE EYE, AND CSF PRODUCTION REGULATION AND RESORPTION: A
STATUS REPORT OF TWO STUDIES**

*C.A. Theriot¹, G. Taibbi¹, G. Vizzeri¹, P. Parsons-Wingerter², P. Chevez-Barrios³, A.
Rivera³, and S.B. Zanello⁴*

¹ University of Texas Medical Branch, ² NASA-Ames Research Center, ³ The Methodist Hospital Research Institute, ⁴ Universities Space Research Association

This status report corresponds to two studies tied to an animal experiment being executed at the University of California Davis (Charles Fuller's laboratory). The animal protocol uses the well-documented rat hindlimb suspension (HLS) model, to examine the relationship between cephalic fluid shifts and the regulation of intracranial (ICP) and intraocular (IOP) pressures as well as visual system structure and function. Long Evans rats are subjected to HLS durations of 7, 14, 28 and 90 days. Subgroups of the 90-day animals are studied for recovery periods of 7, 14, 28 or 90 days. All HLS subjects have age-matched cage controls. Various animal cohorts are planned for this study: young males, young females and old males.

In addition to the live measures (ICP by telemetry, IOP and retinal parameters by optical coherence tomography) which are shared with the Fuller study, the specific outcomes for this study include:

-Gene expression analysis of the retina

-Histologic analysis

- Analysis of the microvasculature of retina flat mounts by NASA's VESsel GENERation Analysis (VESGEN) Software

To date, the young male and female cohorts are being completed. Due to the need to keep technical variation to a minimum, the histologic and genomic analyses have been delayed until all samples from each cohort are available and can be processed in a single batch per cohort. The samples received so far correspond to young males sacrificed at 7, 14, 28 and 90 days of HLS and at 90 days of recovery; and from young females sacrificed at 7, 14 and 28 of HLS.

A complementary study titled: "*A gene expression and histologic approach to the study of cerebrospinal fluid (CSF) production and outflow in hindlimb suspended rats*" seeks to study the molecular components of CSF production and outflow modulation as a result of HLS, bringing a molecular and histologic approach to investigate genome wide expression changes in the arachnoid villi and choroid plexus of HLS rats compared to rats in normal posture.