Space Biology Weekly Highlights Report
Ames Research Center
September 28, 2004

Science Highlights

Bioarray News Interviews ARC Investigator


bioArray News
THE GLOBAL WEEKLY OF BIOCHIPS & MICROARRAYS
in this issue
FDA Preparing Draft Document to Help Guide Microarray Data Consideration
At PittCon, Beckman Coulter Rolls out New Microtiter Plate-Based Protein Array Platform

An interview with Dr Viktor Stolc (ARC Gravitational Research Branch Chief and Genome Facility Director) appeared in the 9/22/04 issue of BioArray News. The interview, entitled *NASA's Viktor Stolc on Gene Expression Tools for Studying Model Organisms*, profiles Dr. Stolc's research using molecular barcodes and microarrays to study gene expression in model organisms, such as gene-deletion strains of yeast (see PNAS 2004 Jul 27;101(30):11046-51 and Highlights Report 7/27/04). The researchers plan to use this technology to learn more about gene activity in response to hazards astronauts will encounter during long-duration spaceflight, such as ionizing radiation. Additional applications include studying the role genes play in organism development and disease. Dr Stolc's work has also recently been reported by other industry and science news organizations.

Extramural FSB-funded PI Publications

- The fast and transient transcriptional network of gravity and mechanical stimulation in the Arabidopsis root apex.
  Kimbrough JM, Salinas-Mondragon R, Boss WF, Brown CS, Sederoff HW. Plant Physiol. 2004 Sep;136(1):2790-805

FSB-funded PI Chris Brown (North Carolina State University) has published results from his research studying gene expression in plants (*Arabidopsis thaliana*). The researchers used microarrays to measure expression of 22,744 different genes and found rapid and transient changes in specific gene expression within minutes of gravity (G) or mechanical (M) stimulation, revealing clusters of coordinated events (illustrated right 2-60 minutes after stimulation, red intensity indicates increased gene expression, green indicates decreased expression). Several unknown genes were also shown to be gravity-induced. These results further enhance understanding of the basic mechanisms involved in plant responses to gravity and mechanical stimulation, knowledge of which is essential to understanding plant responses in space and on Earth.

Conference Presentations

- Insertional mutagenesis screen in *Xenopus tropicalis*
  Marcela Torrejon, Rakhi Gupta, Kay Walter & Sigrid Reinsch.

ARC Life Sciences Division investigators Dr. Sigrid Reinsch and Dr. Marcela Torrejon attended the 10th International Xenopus Meeting in Woods Hole, MA, September 14-18, 2004. They presented the above poster on their research on *Xenopus tropicalis* (frog). The Xenopus frog (pictured left) is widely studied by researchers as a model of vertebrate development. Dr Reinsch and colleagues use the green fluorescent protein (GFP) gene as a molecular tag to visualize the expression of genes involved in neural and vestibular development. Several novel vertebrate-specific genes have already been identified. The technique is also used to disrupt the activity of genes to study their function.
Dr. Reinsch also presented details of this and other collaborative research in a seminar entitled *Isolation and characterization of novel genes required for early vertebrate development* at Brown University on September 13, 2004.
(POC: Sigrid Reinsch, ARC, sreinsch@mail.arc.nasa.gov)

Center for Gravitational Biology Research (CGBR)

Dr. Joseph Tash (University of Kansas Medical Center) has begun a six-week hypergravity experiment using the CGBR's 24-Foot Diameter Centrifuge. The experiment will investigate the effects of long-term hypergravity on sperm production and activity in rats.
Dr. Tash's overall research goal is to understand the mechanisms involved in regulation of sperm movement and the factors that influence sperm production and maturation. His FSB-funded research is focused on the effect of spaceflight on sperm activation and fertilization and has led to a more detailed investigation on the impact of long-term spaceflight on male fertility. (POC: Tianna Shaw, ARC, Tianna.L.Shaw@nasa.gov)

Program and Project Accomplishments

Life Sciences Division Hosts International Technical Review

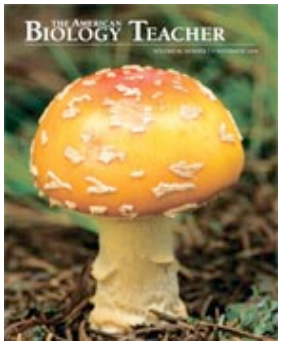
On September 19 - 22, the Life Sciences Division hosted the International Space Life Sciences Working Group (ISLSWG) International Technical Review (ITR) Meeting at the Fairmont Hotel in San Jose, California. The meeting was held to evaluate the technical feasibility of flight experiment proposals submitted against the Spring 2004 International Life Sciences Research Announcement. Representatives were present from ARC, KSC, JSC, NASA HQ, ESA, CSA, DLR, CNES and JAXA. Fifty-eight proposals were discussed and integrated (across agency) reviews were developed. ARC was directly involved in 24 of the reviews. All who attended the meeting agreed that this was the best ITR Meeting held thus far. The results of this meeting will be reviewed at the October ISLSWG meeting and will be used to determine which experiments will be selected for flight development by NASA and the international partners.
(POC: Marianne Steele, ARC, msteele@mail.arc.nasa.gov)

Habitat Holding Rack (HHR)

The FSB-1 project submitted the Payload Developer's Questionnaire for HHR1, Increment 13. Payload configuration was presented to the Life Sciences Division Project Control Board (PCB) for baselining. Authority to proceed was received.
(POC: Cecilia Wigley, ARC, Cecilia.l.wigley@nasa.gov)

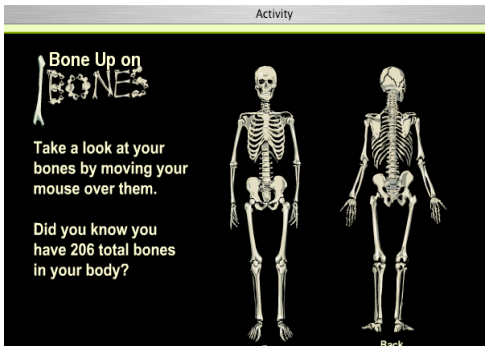
Education and Public Outreach

Hyper-G Competition



The ARC Life Sciences Division Hyper-G Competition is currently being featured on the NASA Education Web Portal on pages for both students and educators. The competition is also featured in the September issue of The American Biology Teacher (right). This journal is published by the National Association of Biology Teachers and has a readership of 12,000 across the US.
(POC: Nicki Rayl, ARC, nrayl@mail.arc.nasa.gov)

Virtual Astronaut Learning Environment



A revised version of the instructional activity *Bone Up on Bones* is now available on the Virtual Astronaut website (left). The activity was revised by Education Outreach Specialist Julia Bulkowski with input from ARC Life Sciences Division researcher and bone expert Dr. Emily Holton. The Virtual Astronaut Learning Environment is an online, interactive, 3-D experience integrating cutting-edge technology with NASA's recent findings in scientific and biomedical research.
(Julia Bulkowski, ARC, jbulkowski@mail.arc.nasa.gov)

Upcoming Events

10/14-16:	AARP National Event, Las Vegas, NV
10/17/04:	Sally Ride Festival, Palo Alto, CA
10/21-24:	Society for Advancement of Chicanos and Native Americans in Science (SACNAS) National Conference, Austin, TX
11/9-12:	American Society for Gravitational and Space Biology (ASGSB) Annual Meeting, New York.