



# NSBRI Explorer

National Space Biomedical Research Institute • October 2004

## Enabling Technology: Blood and Tissue Measurement Sensor Receives Patent

The "Tissue Oxygen Measurement System" resulting from the project of Babs R. Soller, Ph.D., Smart Medical Systems Associate Team Leader, (University of Massachusetts Medical School) was recently awarded U.S. Patent No. 6,766,188. The oxygen sensor is part of a multi-parameter system which will allow accurate, noninvasive blood and tissue measurements not impacted by body fat or skin color. As an extension of this work, Soller will adapt and validate the sensor for measuring muscle metabolism during exercise for space flight. Soller is working with Don Hagan, Ph.D., Manager of JSC's Exercise Physiology Lab. ♦

## Successful Industry/Academic Partners

Industry partnering with NSBRI projects provides added potential spin-offs for terrestrial applications. George C. Brainard, Ph.D., (Thomas Jefferson University) and Charles A. Czeisler, Ph.D., M.D., (Harvard Medical School/Brigham & Women's Hospital) leaders of the Human Performance Factors, Sleep and Chronobiology Team are partnering with Philips Lighting. The company is producing prototype blue-enriched lamps for testing as a countermeasure to circadian disruption before and during space flight. This lighting is predicted to be a more effective circadian stimulus than those currently used. Potential Earth use includes therapeutic, shift work or architectural applications.

Novartis Pharmaceuticals, an NSBRI Industry Forum member, has an ongoing relationship with the zoledronate project of Bone Loss Team member Jay R. Shapiro, M.D., (Uniformed Services University and Kennedy Krieger Institute). In the past, Novartis also provided support for Bone Loss Team meetings and funded the first Space Medicine Symposium at The Endocrine Society meeting. In a recent meeting with NSBRI senior management at Novartis headquarters, the company expressed interest in continued partnering with studies identifying potential targets for pharmaceutical development addressing Earth-based problems related to bone loss. ♦

## NSBRI/NASA Connect™ Collaboration

The NASA Connect™ show, *Good Stress: Building Better Muscles and Bones*, features activities from NSBRI's Muscles and Bones teacher activity guide produced by Baylor College of Medicine's NSBRI Education and Public Outreach Team members. The program, a series of free, integrated math, science, and technology programs for grades 6-8, airs Oct. 21 on PBS and is available on DVD and the [NASA Connect™ Website](#). This show marks the third collaboration between NSBRI's BCM education members and NASA. At least three more programs will use the BCM materials created for NSBRI. ♦

## Postdoctoral Fellowships, K-16 and Graduate Education Program Awarded

The first NSBRI Postdoctoral Fellowships have been awarded. The Fellows were selected following review of Postdoctoral Fellowship Program applications; the annual solicitation closed June 30. ([List of Fellows](#))

Selections from proposals submitted to NSBRI-RFP-04-02 resulted in four K-16 education projects and two recipients of Phase I funding for development of a Graduate Education Program in Space Life Sciences.

Recipients of the K-16 grants are Baylor College of Medicine, Colorado Consortium for Earth and Space Science Education, Morehouse School of Medicine, and Rice University. The programs include teacher professional development, curriculum writing, community outreach and museum programs, and summer research opportunities.

Massachusetts Institute of Technology and Texas A&M University, received the seed funding for the graduate education program. ([List of Projects](#)) ♦

## Science/Med Council Tracks Progress

NSBRI's Executive Science and Medicine Council meets weekly to review the Institute's program, facilitate research and education activities, and assess opportunities for increased collaboration with NASA. The group is made up of NSBRI's Director, Associate Director, Chief of Staff, and the Space Medicine, Behavioral Health and Space Radiation Liaisons. ♦

## Recent Publications

Aboukhalil, A., M. Shelhamer, and R. Clendaniel. Acquisition of context-specific adaptation is enhanced with rest intervals between changes in context state, suggesting a new form of motor consolidation. *Neurosci Lett* 369(2):162-7, 2004. (Neurovestibular Adaptation Team) ♦

Aviles, H., T. Belay, M. Vance, B. Sun, and G. Sonnenfeld. Active hexose correlated compound enhances the immune function of mice in the hindlimb-unloading model of space flight conditions. *J Appl Physiol* 97(4):1437-44, 2004. (Immunology, Infection and Hematology Team) ♦

Ganafa, A. A., M. Walton, D. Eatman, I. K. Abukhalaf, and M. A. Bayorh. Amlodipine attenuates oxidative stress-induced hypertension. *Am J Hypertens* 17(9):743-48, 2004. (Cardiovascular Alterations Team) ♦

Greeneltch, K. M., C. C. Haudenschild, A. D. Keegan, and Y. Shi. The opioid antagonist naltrexone blocks acute endotoxic shock by inhibiting tumor necrosis factor-alpha production. *Brain Behav Immun* 18(5):476-84, 2004. (Immunology, Infection and Hematology Team) ♦

Jackman, R. W., and S. C. Kandarian. The molecular basis of skeletal muscle atrophy. *Am J Physiol Cell Physiol* 287:C834-C843, 2004. (Muscle Alterations and Atrophy Team) ♦

Paddon-Jones, D., M. Sheffield-Moore, R. J. Urban, A. P. Sanford, A. Aarsland, R. R. Wolfe, and A. A. Ferrando. Essential amino acid and carbohydrate supplementation ameliorates muscle protein loss in humans during 28 days bedrest. *J Clin Endocrinol Metab* 89(9):4351-8, 2004. (Nutrition, Physical Fitness and Rehabilitation Team) ♦

Reschke, M., J. T. Somers, R. J. Leigh, J. M. Krnavek, L. Kornilova, I. Kozlovskaya, J. J. Bloomberg, and W. H. Paloski. Sensorimotor recovery following spaceflight may be due to frequent square-wave saccadic intrusions. *Aviat Space Environ Med* 75(8):700-4, 2004. (Neurovestibular Adaptation Team) ♦

Sakamoto, K., C. Liu, and G. Tosini. Circadian rhythms in the retina of rats with photoreceptor degeneration. *J Neurochem* 90(4):1019-24, 2004. (Human Performance Factors, Sleep and Chronobiology Team) ♦

## Selected Accolades

NSBRI Chairman of the Board and CEO, **Bobby R. Alford, M.D.**, was appointed Chancellor of Baylor College of Medicine. ♦

**George C. Brainard, Ph.D.**, Human Performance Factors, Sleep and Chronobiology Associate Team Leader (Thomas Jefferson University), delivered the opening session keynote address to the Illuminating Engineering Society of North America Annual Conference. ♦

**David F. Dinges, Ph.D.**, Neurobehavioral and Psychosocial Factors Team Leader (University of Pennsylvania School of Medicine), received the Federation of Behavioral, Psychological and Cognitive Sciences' Decade of Behavior Research Award and the American Academy of Sleep Medicine's William C. Dement Academic Achievement Award. ♦

**Charles M. Oman, Ph.D.**, Neurovestibular Adaptation Team Leader (Massachusetts Institute of Technology), and **Charles A. Fuller, Ph.D.**, Human Performance Factors Team member (University of California, Irvine), were elected corresponding members of the International Academy of Astronautics. ♦

NSBRI Director, **Jeffrey P. Sutton, M.D., Ph.D.**, received Morehouse School of Medicine's Presidential Appreciation Award. ♦

## Calendar Update

**NASA Bioastronautics Investigators' Workshop:**  
January 10-12, 2005  
NSBRI Investigators attend  
Moody Gardens Hotel and Convention Center  
Seven Hope Blvd., Galveston, Texas ♦