



FYI: THE NEWSLETTER OF THE DAVIS HEART AND LUNG RESEARCH INSTITUTE AT OSU

February 2006

DHLRI Core Facilities Expand Services

Atomic Force Microscopy Begins Offering Services

Atomic Force Microscopy (AFM) is a technique which can be used to visualize single biomolecules, cells or tissues at nanoscale resolution (lateral resolution ~ 1 nm, vertical resolution ~ 0.1 nm). AFM produces a precise topographic image of the sample by scanning the surface with a nanometer-scale probe (tip) attached to a flexible cantilever. A unique advantage of AFM as compared to other microscopic techniques is that AFM enables imaging in a physiologically relevant environment with minimal sample preparation. Therefore single-molecule interactions and live cell surfaces can be imaged without drying/coating them.

With the addition of a new Bioscope AFM being awarded through the NIH Shared Instrumentation Grant we have a unique AFM resource at DHLRI. The AFM core facility at DHLRI can train/assist users in use of AFM for their research, advise them on experimental design, perform AFM experiments and related data analysis. DHLRI members will be offered a 20% discount on normal rates. Please contact core manager Daniel Iscru at 292-0793 for a listing of fees. Discounted monthly rates are also available.

Gunjan Agarwal, PhD, director of the new Atomic Force Microscopy core facility, carries out research in the areas of atomic force microscopy and light microscopy for biomedical imaging.

Novel Services by the DHLRI Bioinformatics Core

Computational analysis of microarray data may provide important insights into studying transcriptional regulatory networks. The pre-processing of the microarray data consists of image analysis and normalization. The statistical examination of plots of microarray spots is important for identifying printing, hybridization, and scanning artifacts, which can lead to biased inference concerning gene expression. Normalization is needed in order to ensure that observed differences in intensities are indeed due to the differential expression.

After the pre-processing, the statistical analysis is needed based on the biological question for which microarray experiment was designed. It involves identification of the differentially expressed genes by clustering method; analysis of designed experiments and the assessment of differential experiment; the diagnostics and quality assessment of the data. Important on its own, the aforementioned analysis may also serve as a starting point for bioinformatics analyses pipeline, including mapping and sequence analysis of promoters of the coregulated genes, prediction of transcription factor binding sites and combinatorial regulatory elements tentatively responsible for the coregulation, identification of additional target genes for the given transcription factors, and more.

Ilya Ioshikhes, PhD, the new director of the Bioinformatics Core Facility at the Institute, has an extensive experience in bioinformatics. **Li Wang**, PhD, postdoctoral researcher in the Department of Biomedical Informatics, acquired an extensive experience in microarrays analysis, development of respective algorithms and software at her previous position in Oak Ridge National Lab. Dr. Wang will be providing additional services along with **Alan Bakaletz**, manager of the Bioinformatics Core facility. For more information on all of the services offered by this core, contact Alan Bakaletz at 247-7688.

Hamlin Awarded University Distinguished Lectureship

Robert L. Hamlin, DVM, PhD, DACVIM has been awarded the University Distinguished Lectureship. The University Distinguished Lecture Series is one of the University's highest honors for a senior faculty member. The lectureship is awarded in recognition of outstanding academic achievement, particularly, but not exclusively, in research, scholarship, or creative activity. Dr. Hamlin has designated his cash award to support graduate studies in the Department of Veterinary Biosciences at The Ohio State University.

Dr. Hamlin is Stanton the Youngberg Professor of Veterinary Medicine, a Professor of Biomedical Engineering, and an Investigator in the DHLRI. He will be presenting his lecture "*Slightly Modified, Giraffes Would Make Great Fighter Pilots, and Bats, Great Cardiologists... and Please Give Me a Heart That's Part Guinea Pig, Part Spider, Part Rat, and Part Goat...or It's Lucky We're so Smart!*" on February 14 at 4:00 in the Wexner Center Film/Video Theater.

Tocotrienol Form of Natural Vitamin E Helps against Stroke

New research from Institute investigator Chandan Sen suggests that an alternate variety of the vitamin E most commonly known by the public - not the popular pill form - might protect against stroke and related damage, and could be delivered orally over time to offer its preventive benefits to those most at risk for certain neurological disorders. Vitamin E occurs naturally in eight forms. The primary vitamin E on drugstore shelves is tocopherol, or TCP.

But another natural form of vitamin E surfacing as a potent neuroprotective agent in repeated studies at OSU Medical Center is tocotrienol, or TCT. "One of the most striking features of these findings is that this neuroprotective property is seen in a nutrient known to be safe for human consumption," says Dr. Sen, professor and vice chair of the Department of Surgery and deputy director of the Institute.

BME Gains Department Status

OSU's newest academic department, the Department of Biomedical Engineering, celebrated its inauguration on January 20 at the Fawcett Center. Faculty members showcased their research in this burgeoning field, and the department honored Professor Herman Weed, an alumnus and former faculty member who pioneered biomedical engineering at Ohio State in 1971. The department status, which became official January 1, was approved by the university's board of trustees in November. Andreas von Recum is the first chair of the Department of Biomedical Engineering.



Ghafourifar Joins Vascular Surgery Research

The Division of Vascular Surgery recently welcomed Pedram Ghafourifar, PhD. Dr. Ghafourifar comes to Ohio State from the Joan C. Edwards School of Medicine at Marshall University. His areas of research include the roles of mitochondria and nitric oxide in oxidative stress and cell homeostasis. Dr. Ghafourifar will be initiating the basic science research efforts for the division.

Ohio State Opens New Office for Undergraduate Research

Research collaborations between undergraduates and faculty at OSU should become more common through a new Undergraduate Research Office that has been created to foster undergraduate research opportunities.

A collaboration between the Office of Research and the Office of Enrollment Services and Undergraduate Education, the new office coordinates a variety of programs and venues to engage undergraduate students in research activities within the Ohio State community. The office will function not only as an incubator – providing support for research endeavors – but as a catalyst to encourage more undergraduate research to take place.

"Our ultimate goal is to make research experience a part of the culture for students at Ohio State," said Allison Snow, the new office's director. Snow, a nationally-respected researcher and a professor in the Department of Evolution, Ecology, and Organismal Biology, says, "Research should be a vital part of the educational process for all students, regardless of whether they are in the sciences or the humanities or in the honors program." For more information contact Amy Murray at murray-goedde.1@osu.edu.

Feb. 1 Deadline for Submissions for Graduate/Postgraduate Research Day

Research trainees interested in participating in the 5th Annual OSUMC Graduate and Postgraduate Research Day to be held March 30, 2006 are reminded to submit their research abstracts no later than February 1, 2006.

Research Day is an annual event featuring the work of research trainees within OSU Medical Center, award presentations, and guest lectures by world-renowned researchers and experts in the field of biomedical science.

Submissions may be made by visiting their website at <http://medicine.osu.edu/researchday>. (This Web site also contains guidelines on poster preparation and presentation.) Participation in Research Day is open to any research trainee whose advisor has a paid percent FTE on the faculty of the OSU College of Medicine, including graduate students, MD-PhD students, medical students, postdoctoral researchers and fellows, and clinical residents and fellows.

For more information contact Jennifer Marin at Jennifer.Marin@osumc.edu.

EHS to Inspect Research Labs

Research Lab inspections by Environmental Health and Safety (EHS) will be starting in the near future for all research labs in the College of Medicine. The Institutional Chemical Hygiene Officer and inspectors will be walking through each lab in the coming months. A lab inspection checklist was recently distributed by email with the fall EHS Lab Management newsletter.

In preparation for these inspections, we're asking all research labs to update their emergency contact signs that should be posted on the entry to each lab. There should be one emergency contact sign for each PI working in any specific lab (so if there are three PIs sharing a lab, there should be three emergency contact signs).

To get a copy of the **inspection checklist** or a **template for emergency contact signs**, contact Chris at Chris.Brakenbury@osumc.edu.



12th Avenue Closes Mid-February for BRT Construction

Starting Feb. 19, 12th Avenue will be closed in front of the Biomedical Research Tower (BRT) construction site until the beginning of April to construct a walkway bridge that will connect the BRT to the Institute.

Pedestrian access to the front (north) entrance into the Institute will be maintained **from the west side only**. Pedestrians approaching from the east will have to follow the marked detour around the Institute to the south. Vehicle traffic will be redirected to Neil Avenue to access the 12th Avenue Parking Garage and Hospitals loading dock area. To access the North Cannon Garage, traffic will need to use Cannon Drive.

When the street reopens in April, it will be one-way westbound until mid-May. Construction schedules and traffic patterns are prone to change, so we will keep building occupants updated by email if and when changes occur.

Medical Center Set To Go Tobacco-Free July 1



OSUMC will become tobacco-free July 1 joining many other organizations and establishments in our city and around the nation. The Medical Center is going tobacco-free in an effort to protect the health and safety of our faculty, staff, students, patients and guests. Tobacco-free means that smoking or the use of other tobacco products will be prohibited throughout the Medical Center campus, including inside and outside buildings and in parking areas. This also includes all off-site Medical Center locations. See the campaign link on OneSource's Home page, "OSUMC to Go Tobacco-free July 1," for more information about this initiative and related resources.

Go Red For Women



National Wear Red Day is part of the American Heart Association's Go Red For Women movement. This movement was established to raise awareness and to support research and education programs related to the prevention and treatment of cardiovascular disease. Join us in our support of Go Red For Women by wearing something **red** on Friday, February 3, 2006. For more information, see www.goredforwomen.org.

Mileage Reimbursement Rate Change

Business mileage reimbursement rates for a personal vehicle have changed effective January 1, 2006. The University's mileage reimbursement is based on the rate established by the federal government. The new reimbursement rate for usage of a personal vehicle for University

business decreased from \$0.485/mile to \$0.445/mile. University-business mileage accrued on and after this date is reimbursable at this new rate.

Mileage accrued between September 1, 2005 and December 31, 2005 is reimbursable at the previous \$0.485/mile rate. University departments may opt to reimburse at a lower per mile rate.



USAC Calls for New Members

The University Staff Advisory Committee, an advisory body to the university president, is now accepting membership applications for 2006-09 terms. USAC's mission is to maintain an active and participatory line of communication with the university community and to provide a forum through which staff can raise, discuss and make recommendations on nonacademic issues and activities. Members are appointed by the university president to three-year terms. Applications are due Friday, February 17: See <http://usac.osu.edu>.

Building Safety Training

All COMPH/OHS faculty, students and staff who are located in College of Medicine/Health Sciences buildings (this includes DHLRI and TMRF) are required to attend a one hour, one time only training session on building safety. This is currently the only mandatory safety training not offered for credit online.

Be sure to sign the registration sheet in order to document your attendance. You will need your University ID number. Those arriving more than 10 minutes late will not be admitted. If you have questions about this training, call Adrienne Frostholt at 292-7747 (frostholt.1@osu.edu). The next offered courses are:

Wednesday, February 15, 1:00 - 2:00 pm
107 Hamilton Hall

Thursday, April 13, 11:00 am - 12:00 pm
107 Hamilton Hall



February Programs and Events

February 3: Research in Progress; Macdonald Wick, PhD; Animal Sciences.*

February 3: Go Red For Women; wear red to raise awareness for women's heart disease.

February 8: 2006 Biophysics Symposium Keynote Address: *"Grabbing the Cat by the Tail: Packaging of DNA by Single Particles of Bacteriophage Phi 29 Studied One Molecule at a Time"*; Carlos Bustamante, PhD, Departments of Physics, Molecular & Cell Biology, and Chemistry, UC Berkeley Howard Hughes Medical Institute; noon, 170 Davis Heart & Lung.

February 10: Research in Progress; Leni Moldovan, PhD; Genetics/Microarray.*

February 15: DHLRI Faculty & Staff Town Meeting; noon, 170 Davis Heart & Lung.

February 17: Research in Progress; Alexandre Samouilov, PhD; Cardiovascular Medicine.*

February 22: Discovery Series: “CD36: A multifunctional scavenger receptor involved in atherosclerosis, angiogenesis, inflammation and lipid metabolism”; Roy L. Silverstein, MD; Chairman, Dept. of Cell Biology; Professor, Dept. of Molecular Medicine; Cleveland Clinic Lerner College of Medicine, Case Western Reserve University; noon, 170 Davis Heart & Lung.

February 24: Special Research Presentation; Rakesh C. Kukreja, PhD; Professor in Molecular Cardiology, Medical College of Virginia, Virginia Commonwealth University Medical Center; noon, 165 Davis Heart & Lung.

**Research in Progress presentations are held at noon on Fridays in 165 Davis Heart & Lung.*



Recent Publications

Cooke GE. Pharmacogenetics of Multigenic Disease: Heart Disease as an Example. *Vasc Pharm* 2006; 44: 66-74.

Cooke GE, Liu-Stratton Y, Ferketich AK, Moeschberger ML, Frid DJ, Magorien RD, Bray PF, Binkley PF, Goldschmidt-Clermont PJ. Effect of P1^A on Platelet Inhibition by Aspirin, Clopidogrel, or their Combination. *J Am Coll Cardiol* 2006; 47(3): 541-6.

Gadd ME, Broekemeier KM, Crouser ED, Graff G, Pfeiffer DR. Mitochondrial iPLA2 activity modulates the release of cytochrome c from mitochondria and influences the permeability transition. *J Biol Chem*, Jan 2, [Epub ahead of print].

Gavrilin MA, Bouakl I, Knatz N, Duncan M, Hall MW, Gunn JS and Wewers MD. Internalization and phagosome escape required for live Francisella to induce human monocyte IL-1 β processing and release. *Proc. Nat. Acad. Sciences* 2006;103(1):141-146.

Hamidinia, S. A., Erdahl, W. L., Chapman, C. J., Gregory E. Steinbaugh, G. E., Taylor, R. W. and Pfeiffer, D. R. “Monensin Improves the Effectiveness of meso-Dimercaptosuccinate When Used to Treat Pb Intoxication in Rats” (2005) *Environ. Health Perspect.* (published on line ahead of print).

Janssen PML, Hiranandani N, Mays T, Rafael-Fortney. Utrophin deficiency worsens cardiac contractile dysfunction present in dystrophin-deficient mdx mice. *Am J Physiol Heart Circ Physiol*, 2005;289:H2373-2378.

Joshi M, Julian MW, Huff JE, Xia Y, Bauer JA, Crouser ED. Calcineurin regulates myocardial function during acute endotoxemia. *Am J Respir Crit Care Med*, Jan 20, [Epub ahead of print].

Leon AR, Abraham WT, Brozena S, Daubert JP, Fisher WG, Gurley JC, Liang CS, Wong G, for the InSync III Clinical Study Investigators. Cardiac Resynchronization With Sequential Biventricular Pacing for the Treatment of Moderate-to-Severe Heart Failure. *JACC* 2005; 46(12):2298-304.

Leon AR, Abraham WT, Curtis AB, Daubert JP, Fisher WG, Gurley J, Hayes DL, Lieberman R, Petersen-stejskal S, Wheelan K, for the MIRACLE Study Program. Safety of Transvenous Cardiac Resynchronization System Implantation in Patients with Chronic Heart Failure. *JACC* 2005; 46(12):2348-56

Raman S, Kelley MA, Janssen PML. Effect of muscle dimensions on trabecular contractile performance under physiological conditions. *Eur J Physiol*. 2006;451:625-630.

Sadée W, Dai Z. Pharmacogenetics/genomics and Personalized Medicine. *Hum Mol Genet*. 14:R207-R214 (2005).

Wang D, Johnson AD, Papp A, Kroetz DL, Sadée W. Multidrug Resistance Polypeptide 1 (*MDR1*, *ABCB1*) Variant 3435C>T Affects mRNA Stability. *Pharmacogen Genomics*. 15: 693-704 (2005).

Zhang Y, Wang D, Johnson AD, Papp AC, Sadée W. Allelic expression imbalance of human mu opioid receptor (*OPRM1*) caused by variant *A118G*. *J Biol Chem* 280: 32618-32624 (2005).

New Awards

PI: Charles Love
Title: Lumos-T safely reduces routine office device follow-up (TRUST)
Sponsor: Biotronik
Start date: 1/15/2006 End date: 1/14/2012

PI: Phil Binkley
Co-PI: Amy Ferketich
Title: Statin induced augmentation of circulating endothelial progenitor cells and myocardial variability in patients with ischemic and nonischemic cardiomyopathy
Sponsor: Pfizer
Amount: \$86,373
Start date: 12/20/2005 End date: 6/1/2007

OSC Grant Awarded to DHLRI Investigators

The Ohio Supercomputer Center (OSC) has recently awarded a major grant for 30,000 resource units (RU) to Frederick A. Villamena, Christopher M. Hadad and Jay L. Zweier for their proposal entitled: “**Computational Approach to Spin Trap and Spin Probe Development for the Identification and Imaging of Free Radicals in Biological Systems**”. The awarded RU has an equivalent value of \$3M of supercomputing time and will be used primarily to understand the fundamental chemistry of spin traps and probes to better improve their properties for in vivo and in vitro applications.

One of the aims of this proposal is to predict electron paramagnetic resonance (EPR) parameters in order to achieve optimal imaging properties of radical probes such as trityl and nitroxyl radicals. OSC is a state-funded institution as a shared resource for Ohio's higher education. OSC is a fully-scalable center with mid-range machines to match those found at the NSF centers and national labs.

For more information on this newsletter, contact the editor at Chris.Brakenbury@osumc.edu. The newsletter is also available online at <http://heartlung.osu.edu>. To unsubscribe, please contact Chris via e-mail.

