

**2011-2012**  
**Summary of Activities**  
**USA Center for Lung Biology**

**General Operations**

The CLB's mission is to provide state-of-the-art scientific development in lung biology that advances the understanding of human health and disease, to improve patient care, and to serve as the foundation for outstanding graduate, post-graduate, and fellowship training. More than 40 faculty members and 25 graduate students, postdoctoral fellows and pulmonary fellows from various departments within the College of Medicine are actively participating in a strong collaborative research environment, a research seminar series and journal club, and graduate, postdoctoral and fellowship training.

The CLB submitted its biannual Newsletter in November of 2011 and again in July of 2012. These issues were distributed to our academic colleagues throughout the country as a way to illustrate exciting research and academic opportunities in the Center. Our next issue will be released in the Fall of 2012 (<http://www.usahealthsystem.com/CLBNewsletter>).

We have continued to update our CLB website along with the College of Medicine. Our **Meet the Professor** series shares the academic lives and careers of our CLB faculty. In this series, we take an in depth look at where our faculty member started, and the life and career decisions that impacted where they went, what they studied, and how they did. We look at their successes and their failures, and probe how these outcomes impacted their next career stage(s). This series is a personal tribute to the lives we lead. You see from this series that not all life decisions are scripted, that the reasons for why decisions are made are not always clear, and that life changes along the journey repeatedly probe our value systems. Enjoy this personal tour through our faculty's life experiences. Our next series will interview Dr. Ivan F. McMurtry. Come meet our professors at <http://www.usahealthsystem.com/MeettheProfessor>.

The **Running and Walking Club** provides a coordinated mechanism for CLB members to share in their active lifestyles. Members meet twice a week in front of the Medical Sciences Building for a group run/walk. In addition, we run and walk at area-sponsored 5K, 10K, half marathon and marathon events. Workout schedules are provided online in the Training Schedule section. The workout schedule is adaptable for any individual's goals. We also provide a summary of recent scientific articles that highlight important health issues in our Science for Health section. Our second article on **Run Forest Run...like your life depends on it** is shown below. Visit our Running and Walking Club at <http://www.usahealthsystem.com/RunningandWalkingClub>.

**Science for Health**

**Run Forest Run...like your life depends on it.** Considerable attention has been paid to the value of daily exercise, including a reduction in susceptibility to cardiovascular disease. In fact, the hemodynamic response to exercise is a

predictable determinant of cardiovascular health, and for these reasons, has become increasingly important in documenting health status. Cardiovascular risk is associated with an exaggerated blood pressure response to exercise, and exercise capacity provides an objective assessment tool for cardiovascular reserve. For example, the six-minute walk test is a standard assessment tool for the integrated indices of cardiopulmonary hemodynamic status in pulmonary hypertension patients.

While it is increasingly well known that daily aerobic exercise improves cardiovascular health, the link to longevity has not been systematically tested. This issue was recently addressed by a multi-center group of investigators led by Dr. Koch at the University of Michigan<sup>1</sup>. These researchers took advantage of rats selectively bred into groups with high and low aerobic capacities, capacities that were tested using treadmill running capacity. Cohorts of the rats bred from generations 14, 15, and 17 were tracked for survivability, in relation to cardiovascular fitness, including measurements of maximal oxygen uptake. The mean lifespan of low aerobic capacity rats was as much as 45% shorter than the lifespan of high aerobic capacity rats; 50% survival of low aerobic capacity animals was 24 months, and of high aerobic capacity animals was 36 months. Declines in systolic and diastolic cardiac function were documented as rats aged, and were especially prominent in low aerobic capacity animals. These collective findings reveal that chronic aerobic exercise, and improvements in aerobic capacity, provides a longevity survival advantage. Perhaps we have the fountain of youth at our fingertips after all.

## **References**

1. Koch, L.G., et al. Intrinsic aerobic capacity sets a divide for aging and longevity. *Circ Res.* 109:1162-72. 2011.

Our administrative offices are located in the Medical Sciences Building in Rooms 3340 and 3342 on the main University campus. Ms. Jennifer Collins and Ms. Charlene Jordan serve as support staff for the CLB and are responsible for clerical duties for the administrative office and research laboratories.

Detailed information about the CLB is available with a click on our homepage (<http://www.usouthal.edu/clb>). The web page is interactive and contains a variety of information including faculty and student bibliographies, recent publications, and information regarding scientific and training programs. A complete annual report is available through Ms. Charlene Jordan (414-8045) at the CLB office.

## **Research Activities**

The CLB was well represented at national and international scientific meetings with a number of faculty, postdoctoral fellows, and graduate students presenting their work at multiple forums, including the American Heart Association, Federation of American Societies for Experimental Biology, American Physiology Society, and the International American Thoracic Society.

Our Critical Care Conference series in conjunction with the Pulmonary Division hosted three speakers. This conference focuses on translational research and acute lung injury, and is held monthly on Fridays at 2:00 pm. Dr. Andrew Paul Fontenot, Henry N. Claman Professor of Medicine, and Head, Division of Allergy and Clinical Immunology at the University of Colorado Denver School of Medicine presented *How metals become antigens: role of genetic susceptibility and T cell activation in beryllium-induced disease?* Dr. Natalie Bauer, Assistant Professor of Pharmacology at the University of South Alabama presented *Microparticles in pulmonary vascular disease.* Dr. Stephen Ballard, Professor of Physiology at the University of South Alabama presented *Mucociliary Transport, Glands, and Cystic Fibrosis Lung Disease.*

## **Extramural Funding**

In the past year, CLB principal investigators submitted 22 grant applications to the American Heart Association (AHA), National Institutes of Health (NIH), and other foundations/industries. To date, two of these applications along with four from the previous fiscal year were awarded generating over \$12.1 million in new revenue over the next five years. This represents a 46% success rate in grant submission for this fiscal year with 9 applications pending.

The Center received four awards from NIH and two awards from outside foundations. Dr. Mark Gillespie received a R01 Research Grant and a subcontract with Exscien Corporation on a R41 Small Business Technology Transfer program grant. Dr. Troy Stevens received a competitive renewal on our P01 Program Project Grant, and Dr. Audrey Vasauskas received an F31 National Research Service Postdoctoral Fellowship. Dr. Sarah Sayner received a pulmonary research fellowship from the Parker B. Francis Foundation. Dr. Victor Solodushko received a grant in aid from AHA, Greater Southeast Affiliate.

## **Education**

During this academic year, 24 predoctoral fellows trained in the laboratories of CLB faculty. Of these trainees, 19 are affiliated with the Lung Biology track in the Basic Medical Sciences Doctoral Program. In this academic year, one CLB trainee held an individual predoctoral fellowship (F31) from the NIH (Ochoa). Cristhiaan Ochoa defended his dissertation in May 2012 and entered a physician scientist training program at University of Texas Southwestern in Dallas, Texas.

The NIH-funded T32 training grant on *Cell Signaling and Lung Pathobiology*, directed by Dr. Mary Townsley, is currently in its 9<sup>th</sup> year of funding. The T32 supports 6 pre-doctoral trainees per year, along with 4 short-term summer research trainees. Summer trainees are drawn from the COM medical students or engineering master's students who apply for summer research positions in the CLB.

The “Did you know?” series, now in its seventh year, is a series of brief historical perspectives authored by CLB trainees. These perspectives review influential discoveries that led to the modern understanding of pulmonary and critical care medicine. In this past year, our trainees authored articles on ventilation and preterm infants (Ashley DeCoux), discovery of the pulmonary circulation (Abdullah Alzoubi), and carbon nanotubes and lung disease (Patricia Villalta). The archives of the series can be found at: <http://www.usahealthsystem.com/archives>.

Finally, the CLB and the Division of Pulmonary and Critical Care held the first collaborative “Annual Lung Bowl” in June 2012. Predoctoral students, postdoctoral fellows, and clinical fellows in CLB training programs were organized into five teams for the competition, while CLB faculty, staff, and undergraduates cheered teams on. Using a team-based learning format, teams tackled case scenarios focused on pathophysiology or clinically-relevant problems. Points were accumulated from individual and team responses to questions in the case scenarios, quick fact questions in the speed round, and the final jeopardy round where teams could bet all-or-nothing on their response to a final historical question. Team “Pulmonauts” – Ali Riaz, Audrey Vasauskas, Jared McLendon, and Patricia Villalta – became the 2012 Lung Bowl Champions.