
2010-2011
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 October of 2010 and again in March of 2011. 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 2011 (<http://www.usahealthsystem.com/CLBNewsletter>).

We have updated our CLB website along with the College of Medicine. We introduced a **Meet the Professor** series that 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 first interview was with Dr. Wiltz Wagner. Come meet Dr. Wagner at <http://www.usahealthsystem.com/MeettheProfessor>.

A new CLB **Running and Walking Club** was introduced on our website. The **Running and Walking Club** provides a coordinated mechanism for CLB members to share in their active lifestyles. We run and walk at area-sponsored 5K, 10K, half marathon and marathon events. The list of these events for the 2011-2012 season are shown. Workout schedules are provided online in the Training Schedule section. The workout schedule is adaptable for any individual's goals. In addition, we provide a summary of recent scientific articles that highlight important health issues in our Science for Health section. Our first article on **Exercise and Cardiovascular Health** is shown below. Visit our Running and Walking Club at <http://www.usahealthsystem.com/RunningandWalkingClub>.

Exercise and Cardiovascular Health

“...Our nation is faced with an increasing health threat called the metabolic syndrome. Metabolic syndrome is characterized by a constellation of risk factors that altogether increase one's risk for cardiovascular disease, including coronary

artery disease, stroke, and type II diabetes. Abdominal weight gain and insulin resistance are two key features of metabolic syndrome. Additional risks include aging, sedentary lifestyle, and genetic predisposition. The activity of one's lifestyle and genetic predisposition(s) has long been known to impact health, issues addressed experimentally in animals¹. Laboratory rats were identified by their aerobic capacity. Low aerobic capacity animals were bred as one group, and high aerobic capacity animals were bred as a separate group. After 11 generations of breeding, the discrepancy in aerobic capacity among groups was exaggerated, and low aerobic capacity animals displayed an increase in the biological markers characteristic of metabolic syndrome. Exercise training improved aerobic capacity in both groups, but this improvement was greatest in the high aerobic capacity animals. These results demonstrate that cardiovascular risk can be determined by one's genetic predisposition. But can one impact this risk by behavior modification?

The findings of Wisloff et al. show that exercise reduces cardiovascular risk¹. Along with aerobic training, Mozaffarian and colleagues² teach us that diet is an important factor in managing the weight gain that makes one susceptible to developing metabolic syndrome. In men and women studied prospectively, the consumption of food items such as potato chips, potatoes, sugar-sweetened drinks, unprocessed red meats, and processed meats were associated with weight gain, whereas whole grains, fruits, vegetables, and yogurt were not. The take home message from these two studies is that balancing an active lifestyle with a disciplined, healthy diet will help to mitigate the risk of developing metabolic syndrome...”

References:

1. Wisloff, U., et al. Cardiovascular risk factors emerge after artificial selection for low aerobic capacity. *Science* 307, 418-420 (2005).
2. Mozaffarian, D., Hao, T., Rimm, E.B., Willett, W.C. & Hu, F.B. Changes in diet and lifestyle and long-term weight gain in women and men. *N Engl J Med* 364, 2392-2404 (2011).

We introduced a new **Endothelial Cell Journal Club**. The **Endothelial Cell Journal Club** represents a study group of scientists dedicated to advancing our understanding of endothelial cell biology. Presentations will be informal, as round table discussions; therefore, it is expected that participants have read the paper and can contribute. Attendance is open to any and all interested participants, including faculty, staff and students at all levels. For students, this journal club is not a part of your formal curriculum requirements. Come enjoy the open forum (<http://www.usahealthsystem.com/EndothelialCellJournalClub>).

Our administrative office is located in the Medical Sciences Building in Room 3340 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. Our 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.

The CLB hosted several seminars during the past year. Our first guest, Dr. Joseph P. Mizgerd, Professor of Medicine, Microbiology, and Biochemistry, and Director, Pulmonary Center at Boston University School of Medicine presented *Transcriptional and post-transcriptional regulation of innate immunity during infection*. Dr. Mizgerd also gave a CLB/Pulmonary Conference on campus entitled *Innate immunity in the pneumonic lung*.

Our Critical Care Conference series in conjunction with the Pulmonary Division hosted five speakers. This conference focuses on translational research and acute lung injury, and is held monthly on Fridays at 2:15 pm. Dr. David M. Guidot, Jeffrey R. Pine Endowed Professor of Medicine, Director, Division of Pulmonary, Allergy & Critical Care Medicine at Emory University presented *Zinc and Nrf2: Getting to the source of redox stress in the alcoholic lung*. Dr. Guidot also gave a Medical Grand Rounds presentation at USAMC entitled *The Alcoholic Lung: A Physician's Perspective*. Dr. Steven M. Dudek, Associate Professor of Medicine at University of Illinois at Chicago presented *Cortactin Regulates the Endothelial Cytoskeleton and Pulmonary Vascular Permeability*. Dr. Dudek also gave a Medical Grand Rounds presentation at USAMC entitled *Evolving Therapies for the Acute Respiratory Distress Syndrome*. Dr. Solomon F. Ofori-Acquah, Assistant Professor of Pediatrics, Director, Center for Endothelial Biology at Emory University School of Medicine presented *Molecular pathology of acute lung injury in hemolytic disorders*. Dr. Jean-Francois Pittet, Professor, Vice Chair Department of Anesthesiology Professor, Departments of Surgery and Cell Biology, Director, Division of Critical Care and Perioperative Medicine at University of Alabama at Birmingham presented *Modulation of P. aeruginosa-induced lung injury by coagulation proteins*.

Extramural Funding

In the past year, CLB principal investigators submitted 37 grant applications to the American Heart Association (AHA), National Institutes of Health (NIH), and other foundations/companies. To date, eleven of these applications were awarded generating over \$3.6 million in new revenue over the next five years. This represents a 39% success rate in grant submission for this fiscal year with 9 applications pending.

The Center received six awards from NIH. Dr. Songwei Wu received a R01 Research Grant and Drs. Masahiko Oka and Mykhaylo Ruchko received R21 Exploratory and Development awards. Dr. Karen Fagan received an R13 Conference Grant to sponsor the 2011 Grover Conference on Risk Factors in Pulmonary Hypertension. Dr. Natalie Bauer received an R03 Small Research grant, and Cristhiaan Ochoa received an F31 National Research Service Predoctoral Fellowship. Three awards were received from the American Heart Association. Dr. Salina Gairhe received a Postdoctoral Fellowship, and Drs. Natalie Bauer and Sarah Sayner received a Research Grant in Aid awards. Our last two awards were received from the pharmaceutical industry. Dr. Karen Fagan received a focus grant from Bayer Bayer Schering Pharma and Dr. Ivan McMurtry received a Pfizer research award.

Education

During this academic year, 18 predoctoral trainees were affiliated with the Lung Biology track and the CLB. Of this number, 4 defended their dissertation research (Drs. Glenda Bonilla, Salina Gairhe, Christina Barry McManus, and Darla Reed). The CLB's T32 on Cell Signaling and Lung Pathobiology currently is in its 8th year of funding. The T32 continues to support 6 predoctoral trainees and 4 short term summer research trainees. In this academic year, 2 CLB trainees held individual predoctoral fellowships from the American Heart Association (David Clark and Glenda Bonilla) and 1 trainee (Cristhiaan Ochoa) was just awarded an individual predoctoral fellowship (F31) from the NIH.

With respect to the predoctoral curriculum in lung biology, we have reorganized the course in Lung Biology and have instituted new active learning elements. The special topics course focused on hands-on skills relevant to understanding structure-function relationships in lung was offered for the 2nd year, with the addition of a new segment on pulmonary function testing.

Predocctoral trainees in the CLB authored two new articles in the CLB "Did you know?" series during this past year: Artificial lung (Cristhiaan Ochoa); Tapeworms and lung disease (Alicia Waggoner). These articles can be obtained from the "Did you know?" archives at: <http://www.usahealthsystem.com/did-you-know>. This series, now in its sixth year, provides trainees in the Center for Lung Biology the opportunity to author an historical perspective reviewing influential discoveries that led to the modern understanding of pulmonary and critical care medicine. Further, as the trainees work with faculty on the Editorial Board, they gain experience in the peer review and editorial processes.

Faculty affiliated with the CLB hosted 14 medical students, Master's students or undergraduates for summer research. Of this group, 3 medical students and a Master's student were supported as short term trainees through the CLB T32 grant.

The NIH-funded T32 training grant on *Cell Signaling and Lung Pathobiology*, is directed by Dr. Mary Townsley. 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 and engineering master's students who apply for summer research positions in the CLB. A summary of outcomes for doctoral trainees in the CLB is noted in the table below.

Summary of Outcomes: (Apr 2004- end FY2010)	Trainees with CLB Faculty	Trainees in Lung Biology Track	T32 Trainees
Total trainees enrolled	37	25	12
US citizen/permanent resident	28	17	12
Under-represented minorities	8	7	6
Individual extramural fellowships	8	6	2
Trainees completing PhD	9	7	3
Alumni active in academia and/or research careers	6 (66%)	5 (71%)	2 (66%)