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Afternoon of Science Showcases

By Eddy Ball
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Birnbaum, right, joked about all of LeMasters' titles as she introduced the first speaker of the afternoon. Birnbaum noted that "Grace has a whole series of awards" and an enviable range of research expertise. (Photo courtesy of Steve McCaw)

Keene described the post-transcriptional regulation by the ribonome as "a dominant force in coordinating gene expression," noting that there are "two- to three-times as many RNA binding proteins as there are transcripton factors." (Photo courtesy of Steve McCaw)

Riviere said that understanding skin is complicated by the fact that "nearly adjacent

surfaces can differ by three or four times in their absorptive capacity." (Photo courtesy of Steve McCaw)

For a rainy Friday afternoon during college basketball's March Madness, the event was well attended. NTP pathologist David Malarkey, D.V.M., Ph.D., above, was one of many NIEHS scientists who made a point to hear the distinguished lecturers. (Photo courtesy of Steve McCaw)

When NIEHS and National Toxicology Program (NTP) Director Linda Birnbaum chose distinguished lecturers to commemorate her official swearing in on March 13 with an Afternoon of Science, she no doubt chose the high-profile scientists on the basis of their contributions to their fields. However, the scientists who made presentations in the afternoon sessions also represented the work they oversee in their roles as members of advisory/scientific boards at NIEHS and NTP, as well as the comprehensive portfolio of research conducted at the Institute and supported by its extramural grants.

The talks highlighted what is frequently referred to as the "rainbow" of NIEHS activities — public health-focused extramural grants with directly translatable outcomes; basic mechanistic research conducted in intramural laboratories to enable discovery of interventions to identify, prevent and treat disease and disease processes; and research coordinated by the NTP to provide solid scientific evidence for decisions by regulatory agencies about hazardous compounds.

NIEHS grantee Grace LeMasters, Ph.D. *(http://www.eh.uc.edu /dir_individual_details.asp?qcontactid=35)*, opened the lectures with a talk title "From Neonate to Nanosensor — A 2010 Study Odyssey: The Cincinnati Childhood Allergy and Air Pollution Study (CCAAPS). LeMasters is a member of the NIEHS National Advisory Environmental Health Sciences Council (NAEHSC) *(http://www.niehs.nih.gov/about /orgstructure/boards/naehsc/index.cfm)*, which advises the Institute on its overall operations and proposals and is specifically charged with overseeing the NIEHS Division of Extramural Research and Training grants portfolio.

LeMasters is the principal investigator on NIEHS training *(http://tools.niehs.nih.gov/portfolio /sc/detail.cfm?appl_id=7468402)* and research *(http://tools.niehs.nih.gov/portfolio /sc/detail.cfm?appl_id=7497526)* grants at the University of Cincinnati, where she is a professor of epidemiology. She directs a comprehensive research effort into the effects of genetics and air pollution — especially diesel exhaust particles — on the respiratory health of inner city children. Her group is on the leading edge of developing individual monitors for exposure biology that promise to influence public policy and help prevent asthma and

other respiratory diseases.

Following LeMasters was Jack Keene, Ph.D. *(http://cmb.duke.edu/faculty/keene.html)*, a professor in the Department of Molecular Genetics and Microbiology at Duke University. He is chair of the NIEHS Division of Intramural Research (DIR) Board of Scientific Counselors, which, working with the NIEHS Office of the Scientific Director, has the primary responsibility for performing regular external reviews of all DIR research programs.

Keene's lecture explored the topic of "Coherent RNA Dynamics in Mammalian Cells." He is a pioneer in the systems biology approach of using advanced proteomics and bioinformatics to understand the post-translational mechanisms of a master regulatory network whose importance is only beginning to be appreciated. The investigations of Keene and others in the field strive to characterize the intense organization and dynamic orchestration of what is called the ribonome, the total cellular complement of RNAs and their regulatory factors, and how that coherence can change with chemical perturbations — with potential implications for preventing and treating disease, especially those linked to cancer and genotoxic responses.

Closing out the Afternoon of Science, Jim Riviere, D.V.M., Ph.D. *(http://cctrp.ncsu.edu/people/jr/index.html)*, spoke on "Skin: Barrier or Portal for Entry of Environmental Contaminants?" Riviere is Burroughs Wellcome Distinguished Professor of Pharmacology and director of the Center for Chemical Toxicology Research and Pharmacokinetics in the College of Veterinary Medicine at North Carolina State University. He is a member of the NTP Board of Scientific Counselors (BSC) *(http://ntp.niehs.nih.gov/?objectid=720164A4-BDB7-CEBA-F5B86E9B53D26DED)*, providing scientific advice to Birnbaum in her role as NTP director and evaluating the scientific merit of the NTP's intramural and collaborative programs. He also sits on the NTP BSC Technical Reports Review Subcommittee.

As Riviere explained, the biological roles of skin and the mechanics of dermal absorption are important considerations in classical and alternative toxicological assessment. Whether a dermal exposure to a substance that triggers molecular pathways truly constitutes a risk to human health depends upon how well that substance can cross the stratum corneum — the "bricks and mortar" outer layer of skin cells and lipids — to enter circulation. "People take the skin for granted," Riviere said, but current understanding of absorption through skin and the human and animal models now in use is far from adequate.

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