FAS Researchers Honored at RSA Annual Meeting

Bowles Center for Alcohol Studies (CAS) researcher Kathleen K. Sulik, Ph.D., presented the T.K. Li Lectureship plenary address at the Research Society on Alcoholism (RSA) meeting in San Antonio, Texas, on June 27, 2010. Her talk, “Fetal Alcohol Spectrum Disorder: Research to Prevention,” focused on her laboratory’s imaging-based investigations of alcohol-induced birth defects, as well as the birth defects prevention-directed middle and high school curricula that she and her colleagues have developed.

Sulik is a professor in the UNC Department of Cell and Developmental Biology and the Bowles Center for Alcohol Studies. Her work aims to achieve a better understanding of the mechanisms, pathogenesis, and pathology associated with a variety of environmentally-induced and genetically-based birth defects. She hopes to use her findings to develop preventive measures relative to these defects.

The Lectureship that opens the RSA conference is named for T.K. Li, M.D., former director of the National Institute on Alcohol Abuse and Alcoholism, and honors his sustained commitment to excellence in alcohol research and its dissemination in practice and policy. It is a great honor to be selected to give this plenary lectureship. Dr. Sulik gave an inspiring presentation of her discoveries and fetal alcohol exposure prevention efforts.

CAS Postdoctoral Fellow Shonagh O’Leary-Moore, Ph.D., received both a Fetal Alcohol Spectrum Disorders Study Group (FASDSG) Merit Award and a Memorial Award from RSA at the June meetings.

The FASDSG Merit Award is presented to a graduate student, postdoc or fellow, who is a member of FASDSG, for outstanding research in the field of FASD. One Award is presented each year at the annual FASDSG meeting and includes a travel stipend. RSA Memorial Awards are given to an outstanding student or postdoc who have presented in RSA symposia. The award comes with a travel stipend, funded by donations to honor RSA members who have passed away within the past 5 years.

O’Leary-Moore came to the UNC Bowles Center for Alcohol Studies in 2007 for postdoctoral training in teratology under Kathy Sulik and continues to apply neuroimaging techniques, including diffusion tensor imaging (DTI), to the study of fetal alcohol exposure.

The CAS congratulates Drs. Sulik and O’Leary-Moore on these honors.

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Center Line, Vol. 21, No. 2
Published quarterly to bring readers a greater understanding of alcoholism research and the Center’s mission.
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This document is supported by subscriptions and donations to the Bowles Center for Alcohol Studies. All research partially funded by NIAAA.
synthesis are necessary, but not sufficient, for the occurrence of alcohol-induced elevation of neuroactive steroids in the bloodstream and brain. ACTH is released by the pituitary gland to modulate adrenal gland function in response to stress and other stimuli. The results suggest that alcohol-associated increases in neuroactive steroids are caused by stimulation of the hypothalamic-pituitary-adrenal (HPA) axis, the body’s main system for responding to stress.

Chronic exposure to alcohol results in tolerance to its ability to increase neuroactive steroid synthesis in the brain as well as to reduce neuroactive steroid-mediated behavioral effects of alcohol such as relaxation and sedation. In another publication, Morrow and her colleagues pinpointed the mechanisms of tolerance to alcohol-induced increases in neuroactive steroids as the disruption of ACTH release and StAR phosphorylation. The lab has thus elucidated the mechanisms for loss of alcohol-induced increases in neuroactive steroids, a phenomenon that might contribute to behavioral tolerance to alcohol and influence the progression to alcoholism.

Considered in aggregate, the large body of evidence amassed by the Morrow lab through animal studies suggests that alcohol-induced elevation of neuroactive steroids is an important mediator of alcohol’s sensitivity to alcohol. The loss of alcohol-induced responsiveness of neuroactive steroids with chronic alcohol consumption might promote excessive alcohol intake to achieve alcohol’s desired effects. Morrow is now using the evidence foundation from her animal research on the mechanisms and roles of neuroactive steroids to guide exciting translational work on neuroactive steroids in humans.

For example, Morrow and colleagues have found that the ASP40 Allele of the OPRM1 Gene: A Pilot Investigation. Ray LA, Hutchison KE, Ashenhurst JR, Morrow AL. J Neurochem. (In Press, 2010).

β5,5 α1/3 α5 α1,5 α1,5 serum GABAergic 3

Differential effects of ethanol on synthesis of alcohol associated with the OPRM1 irregularity. Among 32... steroids could be useful in the treatment of alcoholism,” says Morrow. “Neuroactive steroids increase alcohol sensitivity; they reduce heavy alcohol consumption in animal models of alcoholism; they reduce withdrawal symptoms; they mitigate neuroinflammation; they could go on and on. Converging lines of evidence promise therapeutic potential for alcohol dependence, e.g. a low sensitivity to alcohol increases risk of alcoholism. Leslie Morrow has shown genetic and environmental factors regulate neuroactive steroids. Almost all mental disorders are associated with alterations in the hypothalamic (brain) – pituitary – adrenal axis (brain-body hormone axis). However, scientists could not figure out if these hormonal changes are due to the stress of disease or actually contribute to disease and measure hormone diagnostic factors also never worked. Morrow has discovered that neuroactive steroids, hormones never before carefully measured (or known), are key active agents. This breaks open the field and may at last explain how altered body hormones may underlie the onset of disease. Neuroactive steroids begin the process that could provide new ways to diagnose mental disease as well as treat mental disease. Kathy Sulik has created exciting new ways to detect fetal alcohol brain toxicity using neuroimaging. She has advanced her basic studies of alcohol induced facial morphology that identifies fetal alcohol syndrome to a broader level by imaging the brain and following alcohol-induced dysmorphology in brain. This will allow better identification of babies with alcohol insult as we know who needs treatment. Prevention is even better. Sulik has taken her basic discoveries and translated them to education and prevention messages about how the brain develops and how alcohol damages the fetus. She has developed simple experiments that can be done in elementary level classes, and more complex experiments for middle and high schools. These experiments excite students who carry the message home to the family. “Don’t drink if you are about to get pregnant because alcohol hurts the baby.”

The discoveries of Morrow and Sulik are improving health. I admire their success and am proud to have them in our Center for Alcohol Studies.

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The Director's Column

Fulton T. Crews, Ph.D., Director, Bowles Center for Alcohol Studies

This Center Line presents a wonderful example of what all the Bowles Center for Alcohol Studies faculty want to do: make discoveries that improve health. Biology, physiology, biochemistry and the brain are incredibly complicated and only a few basic science discoveries are hard to make. Even fewer can translate their basic discoveries to human clinical discoveries that in time are translated to improved health and medical care. This issue includes two Center for Alcohol Studies faculty who have done this. I admire their passion to make discoveries that improve human lives and feel blessed to have such wonderful faculty.

The discoveries of Leslie Morrow on neuroactive steroids are exciting, novel and are changing the world. The group’s methods have helped develop sensitive methods to measure them and recently discovered details on how they are synthesized and how they contribute to acute sensitivity to alcohol. The acute sensitivity to alcohol is known to be an instance of a general mechanism for risk for alcohol dependence, e.g. a low sensitivity to alcohol increases risk of alcoholism. Leslie Morrow has shown genetic and environmental factors regulate neuroactive steroids. Almost all mental disorders are associated with alterations in the hypothalamic (brain) – pituitary – adrenal axis (brain-body hormone axis). However, scientists could not figure out if these hormonal changes are due to the stress of disease or actually contribute to disease and measure hormone diagnostic factors also never worked. Morrow has discovered that neuroactive steroids, hormones never before carefully measured (or known), are key active agents. This breaks open the field and may at last explain how altered body hormones may underlie the onset of disease. Neuroactive steroids begin the process that could provide new ways to diagnose mental disease as well as treat mental disease. Kathy Sulik has created exciting new ways to detect fetal alcohol brain toxicity using neuroimaging. She has advanced her basic studies of alcohol induced facial morphology that identifies fetal alcohol syndrome to a broader level by imaging the brain and following alcohol-induced dysmorphology in brain. This will allow better identification of babies with alcohol insult as we know who needs treatment. Prevention is even better. Sulik has taken her basic discoveries and translated them to education and prevention messages about how the brain develops and how alcohol damages the fetus. She has developed simple experiments that can be done in elementary level classes, and more complex experiments for middle and high schools. These experiments excite students who carry the message home to the family. “Don’t drink if you are about to get pregnant because alcohol hurts the baby.”

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