

Themed Issue: Drug Addiction - From Basic Research to Therapies

Guest Editors - Rao Rapaka and Wolfgang Sadée

Editorial: Theme Issue “Drug Addiction - From Basic Research to Therapies”

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The joint AAPS-NIDA symposium “Frontiers in Science: Drug Addiction – From Basic Research to Therapies” was held September 9-11, 2004, on the NIH campus. Attended by scientists from multiple disciplines, the symposium afforded a comprehensive overview of current research on drug addiction. We have extended invitations for contributing review articles to scientists attending and presenting at the meeting, as well as others prominent in the field of drug addiction. As a result we expect several theme issues to emerge, providing comprehensive coverage of the current status of drug addiction and its treatment, written by eminent scientists in the field.

The presentations covered basic research (eg, mechanisms of action of drugs of abuse, development of receptor-specific ligands, animal models), as a background for discussing how to bring basic research results to bear on medications development. Because neuronal circuits involved in drug addiction also impinge upon many other vital functions of the brain and peripheral tissues, one of the critical areas of scientific studies supported by the National Institute on Drug Abuse (NIDA) is the promise for novel treatments not only for addiction, but for a variety of pathophysiologies. For example, whereas opioid drugs often provide effective relief for the treatment of pain, they also engender adverse effects and addiction liability. The search for non-addictive opioid pain medications and for non-opioid drugs directed against novel targets is but one area of intense research efforts. Other directions include the need for drugs to treat stimulant addiction, stimulant toxicity, new therapies for pain, inflammation, cognitive and neurodegenerative disorders, and immunological diseases.

Symposium participants reported on all aspects of basic addiction research and its translation into therapies. The molecular biology, physiology, and pharmacology of receptors and other targets for drugs of abuse were discussed by Jeanne-Pierre Changeux (nicotinic receptors), Alexandros Makriyannis (cannabinoid receptors), Edward Bilsky (opioid receptors), and Peter Kalivas (glutamate transporters and receptors). Discovery of novel chemical drug classes interacting with these targets were addressed by Victor

Hruby, Ivy Carroll, Hazel Szeto, and Peter Schiller. Using computational models, Krzysztof Palczewski and Harel Weinstein explored 3D structures and dynamics of receptor proteins and interaction with ligands, an area of growing promise in drug discovery. Basic principles of signal transduction in neuronal systems were presented by Paul Greengard and Solomon Snyder, focusing on novel pathways relevant to drug addiction. Marc Caron and Laura Bohn presented a functional analysis of these pathways using transgenic animals as a model system. George Koob highlighted the importance of stress in the addictive process, while Steve Negus delineated the challenges for researchers who study drug response behaviors in animal models. Martin Adler described interactions between neuronal and immune responses to drugs of abuse while Benjamin Cravatt and Wolfgang Sadée discussed genetic variants that play a role in drug response and addictive behavior. This was complemented by Jill Becker’s presentation on sex differences in drug abuse, using results from animal studies. With respect to human studies, NIDA Director Nora Volkow described the use of novel imaging technologies to provide insights into the brain regions involved in drug seeking behavior and response to drugs of abuse. Finally, James Anthony reviewed the epidemiological studies in human populations that are contributing to an understanding of drug abuse.

These diverse disciplines and technologies all converge on a more detailed understanding of addiction, and the promise for developing improved treatment strategies for a spectrum of neurological disorders. Abstracts of these presentations are found in the first issue. Moreover, participants and other invited scientists will provide brief reviews in a series of theme issues that aim at covering the current spectrum of basic and translational research in drug addiction. Published papers are peer-reviewed for this *AAPS Journal*. It will be publicly accessible, with links operative from other Web sites. Questions or comments should be directed to the editors.

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