

Professor and Vice Chairman

Chauncey Leake Distinguished Professor of Pharmacology

Director, UTMB Center for Addiction Research

Affiliations: Department of Pharmacology & Toxicology, Department of Psychiatry and Behavioral Sciences

EDUCATION

B.A. 1976 University of St. Thomas (Houston, TX)

Ph.D. 1985 University of South Carolina

RESEARCH INTERESTS

Psychostimulant abuse [esp., cocaine and 3,4-methylenedioxymethamphetamine (MDMA; ecstasy)] imposes serious medical, psychological and criminal challenges for society. A thorough understanding of the neural basis underlying the effects of these psychoactive drugs is critical to the development of science-based treatment protocols for stimulant overdose and dependence. Serotonin (5-hydroxytryptamine, 5-HT) is involved in the etiology of psychotic (e.g., schizophrenia) and affective disorders (e.g., anxiety, depression) which are often experienced by stimulant abusers. Our laboratory is focused on the behavioral neuropharmacology of cocaine and MDMA and the role of serotonin (5-hydroxytryptamine; 5-HT) neurotransmission in the in vivo effects of these drugs. In collaboration with Dr. Mary Thomas, the cellular and molecular substrates that underlie the modulation of stimulant-induced behaviors by female sex hormones are also of primary research interest. These studies include anatomical, molecular and behavioral pharmacological techniques directed toward an analysis of the role of 5-HT_{1B} receptors (5-HT_{1BR}), 5-HT_{2AR}, 5-HT_{2CR} and 5-HT_{4R} in the in vivo effects of cocaine and MDMA. We are particularly involved in the application of new, sensitive molecular tools to sophisticated behavioral analyses of psychostimulants in vivo. For example, measures of behavioral and pharmacological analyses are coupled to measures of gene expression, in vivo knockdown with antisense oligonucleotides or overexpression" using viral vectors encoding specific receptor proteins. These studies should clarify the anatomical localization of action and the role for specific 5-HT receptors in mediating the behavioral consequences of cocaine exposure. These data will lend understanding not only to the actions of the abused drug cocaine and approaches to its pharmacotherapy, but also to the potential involvement of 5-HT receptors in disorders characterized by dopamine dysfunction, such as schizophrenia.

BIOGRAPHICAL INFORMATION

Kathryn A. Cunningham graduated magna cum laude in 1985 from the University of St. Thomas and received her Ph.D. with honors from the University of South Carolina. Dr. Cunningham is currently the Chauncey Leake Distinguished Professor of Pharmacology, Director of the UTMB Center for Addiction Research at UTMB and Vice Chairman of the Department of Pharmacology and Toxicology. She is also a Professor in the Department of Psychiatry and Behavioral Sciences.

Dr. Cunningham directs research and teaches in the neurobiology of drug abuse and addiction. Her studies focus on identification and manipulation of genes/proteins in brain using molecular, anatomical and behavioral tools, with the goal to identify the mechanisms with the etiology and pathophysiology of addiction.

Author of over 75 research manuscripts, Dr. Cunningham's research has been funded for 18 years by the NIH National Institute on Drug Abuse (NIDA) and she is a recipient of a NIDA Independent Scientist Award. She is also the Director of a NIDA institutional training grant and has mentored over 20 pre- and post-doctoral students in addiction research. Dr. Cunningham served as a member of the College on Problems of Drug Dependence (CPDD) Board of Directors (2000-2003) and chairman of the CPDD Publications Committee (1999-2003). She is currently the President-elect of CPDD (<http://www.cpdd.vcu.edu/>). Dr. Cunningham serves on NIH study sections (1992-2005)

and is the Associate Editor of *Drug and Alcohol Dependence*, and an editorial board member for *Neuropsychopharmacology* and *Behavioral Neuroscience*.

Dr. Cunningham was named the Young Psychopharmacologist of 1990 by the American Psychological Association and has been the recipient of numerous fellowships and travel awards. She was named the Hedwig van Ameringen designate at the Executive Leadership in Academic Medicine Program for Women in 2000 and was honored with the 2001 Distinguished Faculty Research Award at UTMB. Dr. Cunningham recently obtained a Certificate in Business Administration. She is also active in her community and currently serves on the Board of Directors for the Alcohol and Drug Abuse Women's Program in Galveston, Texas. She lectures on drug abuse, addiction and mental health at community treatment programs and at Galveston College.

SELECTED PUBLICATIONS

Sell, S.L., Dillon, A.M., Cunningham, K.A. and Thomas, M.L. Estrous cycle influence on individual differences in the response to novelty and cocaine in female rats. *Behav. Brain Res.*, in press.

Herin, D.V., Liu, S., Ullrich, T.L., Rice, K.C. and Cunningham, K.A. Role of the serotonin 2A receptor (5-HT_{2A}R) in the hyperlocomotive and hyperthermic effects of (+)-3,4-methylenedioxymethamphetamine. *Psychopharmacology* 178:505-13, 2005 (Epub 2004 Oct 23).

Koldzic-Zivanovic, N., Seitz, P.K., Watson, C.S., Cunningham, K.A., and Thomas, M.L. Intracellular signaling involved in estrogen regulation of serotonin reuptake. *Mol. Cell. Endocrinology* 226:33-42, 2004.

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Zhou, W., Cunningham, K.A., Thomas, M.L. Estrogen regulation of gene expression in the brain: A possible mechanism altering the response to psychostimulants in female

rats. *Mol. Brain Res.* 100:75-83, 2002.

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