

BIOGRAPHICAL SKETCH

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NAME Sanders-Bush, Elaine		POSITION TITLE Professor	
eRA COMMONS USER NAME (credential, e.g., agency login) bushes			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Western Kentucky University, Bowling Green, KY	B.S.	1962	Biology/Chemistry
Vanderbilt University, Nashville, TN	Ph.D.	1967	Pharmacology
Vanderbilt University, Nashville, TN	Postdoctoral	1967-1969	Psychopharmacology

A. Positions and Honors

Positions and Employment

1967 - 1968 Postdoctoral Fellow, Neuropharmacology, Vanderbilt University
 1968 - 1970 Instructor, Department of Pharmacology, Vanderbilt University
 1970 - 1973 Assistant Professor, Department of Pharmacology, Vanderbilt University
 1973 - 1980 Associate Professor, Department of Pharmacology, Vanderbilt University
 1980 - pres Professor, Department of Pharmacology, Vanderbilt University
 1986 - pres Professor, Department of Psychiatry, Vanderbilt University
 1997 - pres Director, Neuroscience Graduate Program, Vanderbilt University
 2001 - pres Director, NIMH Meharry/Vanderbilt Alliance for Training in Neuroscience

Honors

Merck, Sharp & Dohme Faculty Development Award, 1969-1970; Research Scientist Development Award, NIMH, 1974-1979; Mental Health Research Education Review Comm, NIMH, 1986-88; Bristol-Myers Squibb Unrestricted Grant for Neuroscience Research, 1991-1995; Neuropharmacology and Neurochemistry Review Committee, NIMH, 1991-1994; NIMH MERIT Award, 1995-2005; Department of Pharmacology Teaching Award, 1999; NIMH National Advisory Council, 2000-2003; Teaching Award for Training Graduate & Medical Students in Research Setting, Vanderbilt Medical School, 2005; President, American Society of Pharmacology & Experimental Therapeutics, 2006; Harvey Branscomb Distinguished Professor, 2006-2007.

B. Selected peer-reviewed publications (in chronological order)

Burns, C.M., Chu, H., Reuter, S.M., Hutchinson, L.K., Canton, H., Sanders-Bush, E. and Emeson, R.B. Regulation of serotonin 2C receptor G-protein coupling by RNA editing. *Nature* 387:303-308, 1997.
 Niswender, C. M., Copeland, S. C., Herrick-Davis, K., Emeson, R.B. and Sanders-Bush, E. RNA editing of the human serotonin 5-HT_{2C} receptor silences constitutive activity. *J. Biol. Chem.* 274:9742-9751, 1999.
 Chang, M., Zhang, L., Tam, J.P. and Sanders-Bush, E. Dissecting G-protein receptors signaling pathways with membrane permeable blocking peptides: endogenous 5-HT_{2C} receptors in choroid plexus epithelial cells. *J. Biol. Chem.* 275(10): 7021-7029, 2000.
 Price, R.D. and Sanders-Bush, E. RNA editing of the human serotonin 5-HT_{2C} receptor delays agonist – stimulated calcium release. *Mol. Pharmacol*, 58: 859-862, 2000.
 Backstrom, J.R., Price, R.D. Reasoner, D.T. and Sanders-Bush, E. Deletion of the serotonin 5-HT_{2C} receptor PDZ recognition motif prevents receptor phosphorylation and delays resensitization of receptor responses. *J. Biol. Chem.* 275(31): 23620-23626, 2000.

- Niswender, C.M., Herrick-Davis, K., Dilley, G.E., Meltzer, H.Y., Overholser, J.C., Stockmeier, C.A., Emeson, R.B., and Sanders-Bush, E. RNA editing of the human serotonin 5-HT_{2C} receptor: Alterations in suicide and implications for serotonergic pharmacology. *Neuropsychopharmacology*, 24: 478-491, 2001.
- Price, R.D., Weiner, D.M., Chang, M.S.S., and Sanders-Bush, E. RNA editing of the human serotonin 5-HT_{2C} receptor alters receptor-mediated activation of G₁₃ protein. *J. Biol. Chem.*, 276: 44663-44668, 2001.
- Nichols, C.D. and Sanders-Bush, E. A single dose of lysergic acid diethylamide influences gene expression patterns within the mammalian brain. *Neuropsychopharmacology*, 26: 634-642, 2002.
- Gresch, P.J., Strickland, L.V. and Sanders-Bush, E. Lysergic acid diethylamide induced *fos* expression in rat brain: Role of 5-HT_{2A} receptors. *Neuroscience*, 114:707-713, 2002.
- McGrew, L., Chang, M.S.S. and Sanders-Bush, E. Phospholipase D activation by endogenous 5-HT_{2C} receptors is mediated by G β subunits from G₁₃ proteins. *Mol. Pharmacol.* 62: 1339-1343, 2002.
- Smith, R.L., Barrett, R.J. and Sanders-Bush, E. Characterization of the discriminative stimulus effects of 2,5-dimethoxy-4-iodophenyl)-2-aminopropane in C57BL/6J mice. *Psychopharmacology*, 166: 61-68, 2003.
- Nichols, C.D., Garcia, E. F. and Sanders-Bush, E. Dynamic changes in prefrontal cortex gene expression following lysergic acid diethylamide administration. *Mol. Brain Res.* 111: 182-188, 2003.
- Parker, L. L., Backstrom, J. D., Sanders-Bush, E. and Shieh, B-H. Agonist-induced phosphorylation of the serotonin 5-HT_{2C} receptor regulates its interaction with multiple PDS protein 1 (MUPP1). *J. Biol. Chem.* 278(24):21576-83, 2003.
- McGrew, L, Price, RD, Hackler, E, Chang, MSS and Sanders-Bush, E: RNA editing of the human serotonin 5-HT_{2C} receptor disrupts trans-activation of the small G-protein Rho. *Mol. Pharmacol.* 65: 252-6, 2004.
- Nichols, CD and Sanders-Bush, E. Molecular genetic response to lysergic acid diethylamide include transcriptional activation of MAP kinase phosphase-1, C/EBP- β and ILAD-1, a novel gene with homology to arrestins. *J. Neurochem.* 90: 576-84, 2004.
- Akin, D., Manier, D. H, Sanders-Bush, E. and Shelton, R.C. Decreased serotonin 5-HT_{2A} receptor-stimulated phosphoinositide signaling in fibroblasts from melancholic depressed patients. *Neuropsychopharmacology*, 29: 2081-87, 2004.
- Hazelwood, LA. and Sanders-Bush, E. The His452Tyr polymorphism in the human 5-HT_{2A} receptor destabilizes the signaling complex. *Mol. Pharmacol*, 66(5):1293-1300, 2004.
- Akin, D., Manier, D. H, Sanders-Bush, E. and Shelton, R.C. Signal transduction abnormalities in melancholic depression. *Int. J. Neuropsychopharm.* 8(1):5-16, 2004.
- Benneyworth MA, Smith RL, Barrett RJ and Sanders-Bush E. Complex discriminative stimulus properties of (+)lysergic acid diethylamide (LSD) in C57Bl/6J mice. *Psychopharmacology (Berl)*. 179(4):854-62, 2005.
- Gresch PJ, Smith RL, Barrett RJ and Sanders-Bush E. Behavioral tolerance to lysergic acid diethylamide is associated with reduced serotonin-2A receptor signaling in rat cortex. *Neuropsychopharmacology*, 30(9):1693-1702, 2005.
- Fentress HM, Grinde E, Mazurkiewicz JE, Backstrom JR, Herrick-Davis K, and Sanders-Bush, E. Pharmacological properties of the Cys23Ser Single Nucleotide polymorphism in human 5-HT_{2C} receptor isoforms. *Pharmacogenomics J.* 5(4):244-54, 2005.
- Sodhi MS, Airey D, Lambert W, Paul J. Harrison PJ, Burnet PWJ, and Sanders Bush E. A rapid new method to detect RNA editing reveals antipsychotic-induced changes in 5-HT_{2C} transcripts. *Mol. Pharmacol.* 68(3):711-719, 2005.
- Hackler, EA, Airey, DC, Shannon, CC Sodhi, MS and Sanders-Bush,E. 5-HT_{2C} receptor RNA editing in the amygdala of C57BL/6J, DBA/2J, and BALB/cJ mice, *Neurosci. Res.* 55(1):96-104, 2006.
- Myers, RL, Airey, DC, Manier, DH, Shelton, RC and Sanders-Bush E. Polymorphisms in regulatory region of the human serotonin 5-HT_{2A} receptor gene (HTR2A) influence gene expression. *Biol. Psychiat.* 61(2):167-173.
- Hackler EA, Turner GH, Gresch PJ, Sengupta S, Deutch AY, Avison MJ, Gore JC and Sanders-Bush E. 5-HT_{2C} receptor contribution to m-chlorophenylpiperazine and N-methyl- β -carboline-3-carboxamide - induced anxiety-like behavior and limbic brain activation. *J Pharmacol Exptl Therap* 320(3):1023-1029, 2007.

- Gresch PJ, Barrett RJ, Sanders-Bush E, and Smith RL. Serotonin-2A Receptors in Rat Anterior Cingulate Cortex Mediate the Discriminative Stimulus Properties of Lysergic Acid Diethylamide. *J. Pharmacol. Exp. Therap.* 320:662-669, 2007.
- Garcia EE, Smith RL and Sanders-Bush E. Role of G_q protein in behavioral effects of the hallucinogenic drug 1-(2,5-dimethoxy-4-iodophenyl)-2-aminopropane. *Neuropharmacology* 52(8):1671-7, 2007.
- Benneyworth MA, Xiang Z, Smith RL, Garcia EE, Conn PJ, and Sanders-Bush E. A Selective Positive Allosteric Modulator of Metabotropic Glutamate Receptor Subtype 2 Blocks a Hallucinogenic Drug Model of Psychosis *Mol Pharmacol* 72(2):477-84, 2007.
- Hahn M, Blackford JU, Haman K, Mazei-Robison M, English B, Prasad H, Steele A, Hazelwood L, Fentress H, Myers R, Blakely R, Sanders-Bush E and Shelton, R: Multivariate permutation analysis associates multiple polymorphisms with subphenotypes of major depression, *Genes, Brain and Behavior*, [EPub ahead of print] Dec 6, 2007.
- Benneyworth MA, Smith RL and Sanders-Bush, E: Chronic phenethylamine hallucinogen treatment alters behavioral sensitivity to a metabotropic glutamate 2/3 receptor agonist. *Neuropsychopharmacology*, 33:2206-2216, 2008.
- Sanders-Bush E and Airey DC: Centennial Perspectives: Serotonin Receptors. *Molecular Interventions*, 8(5): 200-203, 2008.

C. Research Support

Ongoing Research Support

- 2R01 MH034007-27 Sanders-Bush (PI) 12/08/06-11/30/09
NIH/NIMH Characterization of Central Serotonin Receptors
This project explores the regulation of serotonin 5-HT_{2C} receptor signaling and function *in vivo*, focusing primarily on the role of RNA editing.
Role: PI
- 5R01 DA005181-18 Sanders-Bush (PI) 09/30/04-07/31/09
NIH/NIDA
Hallucinogens and Serotonin Signal Transduction
This project explores the role of signaling molecules in the mechanism of action of hallucinogenic drugs in wild-type and genetically engineered mice. Strategies move from biochemical studies *in vitro* to *in vivo* behavior.
Role: PI
- 1P50 MH078028-01A1 Blakely, R. (PI) 09/15/07-06/30/12
NIH/NIMH
Genes controlling assembly and function of serotonin systems
Conte Center grant proposal: Sanders-Bush project utilizes a genetic reference population of mice to explore genetic and epigenetic factors that control serotonin neurotransmission.
Role: PI of Project 4 (Genetic Variation in Support of Murine Serotonergic Phenotypes)

Completed Research Support

- 5R01 NS035891 Emeson, R. 02/01/02-01/31/07
NIH/NINDS
Post-transcriptional regulation of serotonin receptors
The mechanisms and consequences of RNA editing of the serotonin 5-HT_{2C} receptor are explored in transgenic mice.