**Hugh M. Fentress, Ph.D.**
Assistant Professor of Biology
Department of Life and Physical Sciences
Hughes-Kellogg Biology Research Laboratory
Fisk University

Adjunct Assistant Professor of Pharmacology
Vanderbilt University School of Medicine

**Education**

B.Sc. Tennessee State University, Department of Biology, Nashville, TN **1995-1999**
Major: Biology Minor: Chemistry

Ph.D. Vanderbilt University School of Medicine, Nashville, TN **1999 –2005**
Neuroscience Graduate Program
Advisor: Elaine Sanders-Bush, Ph.D.
Dissertation Title: *Human 5-$HT_{2C}$ Receptor Variants: Functional Properties and Genetic Associations in Major Depressive Disorder*

Post-Doctoral Research Fellow **07/2005-10/2008**
Molecular and Behavioral Neuroscience Institute (MBNI), University of Michigan, Ann Arbor, MI
Advisor: Huda Akil, Ph.D.
Studied drug abuse and psychiatric disorders in mice overexpressing the glucocorticoid receptor.

Scientist-Educator Fellow **10/30/2008-7/31/2011**
Division of Genetic Medicine
Vanderbilt University School of Medicine
8405 Medical Research Building IV
2215 Garland Avenue
Nashville, TN
Advisor: Maureen K. Hahn, Ph.D.
Research examined the neurobehavioral consequences of norepinephrine transporter variants. Also served as an instructor in the brain and behavior module in the Vanderbilt University School of Medicine.

**Current Research Interests**
Fields: Neuroscience, pharmacology, molecular biology, genetics, cell signaling
Areas: genetic variation of serotonin receptors and the norepinephrine transporter, depression, attention deficit hyperactivity disorder (ADHD), regulation of serotonin receptors by beta arrestin, drug interaction at polymorphic serotonin receptors

**Publications**
**Hugh M. Fentress**, Jessica K. Krueger, Rebecca Klar, Jana K. Shirey-Rice, Maureen K. Hahn. Heterozygous Norepinephrine Knockout Mice have Anxiety-Like Behavior and Reversal Memory Deficits. In preparation.

Qiang Wei*****, **Hugh M. Fentress***, Mary T. Hoversten, Limei Zhang, Elaine K. Hebda-Bauer, Stanley J. Watson, Audrey F. Seasholtz, and Huda Akil. Early-Life Forebrain Glucocorticoid Receptor Overexpression Increases Anxiety Behavior and Cocaine Sensitization. 2011, Biological Psychiatry, in press. DOI: 10.1016/j.biopsych.2011.07.009. (* equal contribution).

Hebda-Bauer EK, Pletsch A, Darwish H, **Fentress H**, Simmons TA, Wei Q, Watson SJ, and Akil H. Forebrain glucocorticoid receptor overexpression increases environmental reactivity and produces a stress-induced spatial discrimination deficit. *Neuroscience*. Aug 25;169(2):645-53. Epub 2010 May 31.

Maureen K. Hahn, Jennifer Blackford, Kirsten Haman, Michelle Mazei-Robison, Harish C. Prasad, Angela Steele, Lisa Hazelwood, **Hugh Fentress**, Regina Myers, Randy D. Blakely, Elaine Sanders-Bush, and Richard Shelton. Multivariate Permutation Analysis Associates Multiple Polymorphisms With Subphenotypes Of Major Depression. *Genes, Brain and Behavior*. 7: 487-495, 2008.

**Hugh M. Fentress**, Ellinor Grinde, Joseph E. Mazurkiewicz, Jon R. Backstrom, Katharine Herrick-Davis, and Elaine Sanders-Bush. Pharmacological Properties of the Cys23Ser Single Nucleotide Polymorphism in Human 5-$HT_{2C}$ Receptor Isoforms. *Pharmacogenomics J*. 5:244-54, 2005.

Elaine Sanders-Bush, **Hugh Fentress**, Lisa Hazelwood. 5-$HT_2$ Receptors: Molecular and Genomic Diversity. *Mol. Interv*. 3: 319-330, 2003.

James J.-L. Wang, Zhaolin Hua, **Hugh M. Fentress**, and Charles K. Singleton. JNK1 is inactivated during thiamine deficiency-induced apoptosis in human neuroblastoma cells. *Nutr. Biochem*. 11:208-215, 2000.

**Current Research Description**
My research investigates the role of serotonin receptors in psychiatric diseases such as depression, anxiety, and bipolar disorder. To this end, we are focusing on a 7 transmembrane-spanning (7TM) G-protein coupled receptor (GPCR), the serotonin 2C (5-$HT_{2C}$) receptor, that plays a role in hypolocomotion, hyperphagia, anxiety, penile erection, hyperthermia, neuronal

excitability, and spatial learning. My laboratory is studying how naturally occurring single nucleotide polymorphisms (SNPs) and mutations in the human 5-$HT_{2C}$ receptor may lead to psychiatric disease or endophenotypes within the disease. SNPs and mutations, which can lead to changes in protein sequence and, in some case, altered activities, can provide insights into critical structure-function relationships of a protein. Though over 2,000 SNPs have been identified in the human 5-$HT_{2C}$ receptor gene, little characterization of structural and functional consequences of those SNPs has occurred, and no studies have explored whether or not such changes modify the preferential signaling via G protein-coupled or arrestin-mediated pathways. The objectives of our research are to 1) introduce into heterologous cells, cDNAs encoding various polymorphic 5-$HT_{2C}$ receptors whose sequence modifications are in regions previously identified as critical for coupling to signaling pathways and ligand binding, 2) characterize the functional consequences of these SNP-encoded sequence modifications by examining receptor selectivity for receptor activators, G-protein dependent and independent signaling, and receptor trafficking, 3) examine associations of functional SNPs with endophenotypes within depressed patients, and 4) screen populations of psychiatric patients for novel SNPs in serotonin receptors.