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Research Interest

Dr. Mactutus's major research interests are in the areas of drug abuse neurotoxicity and cognitive processes. Developmental neurotoxic effects caused by maternal use of licit (nicotine, caffeine) or illicit drugs (cocaine, amphetamine) or via exposure to environmental agents (e.g., passive smoking) are a primary focus. A second focus is on the mechanisms underlying the development and dissolution of cognitive function. Cognitive processes reflect the ultimate integrative function of the central nervous system and ought to be particularly sensitive to neurotoxic insult--such insults may also tell us about the biological mechanisms underlying cognitive processes. Methodologically, the studies utilize a pronounced multidisciplinary approach. The program currently employs behavioral (spatial memory, conditioning, auditory startle), anatomical (immunocytochemistry, cell counting, cellular & subcellular morphometric analyses), pharmacological (GC/MS, blood gas analyses, in vivo drug probes, receptor binding & autoradiography), neurochemical enzyme activity & Western blotting), and molecular biological techniques (in situ hybridization and Northern blotting). The convergence of experimental outcomes across these multiple neurobiological techniques provides for the most compelling interpretation of the effects of a drug or neurotoxic agent. Supported by NIH (NIDA, NIEHS, NIA) and the Commonwealth of Kentucky.



Selected Research Publications/Presentations

Mactutus CF: Conceptual and procedural issues concerning the neurotoxicological assessment of learning and memory processes. In LW Chang (Ed.) Handbook of Neurotoxicology. I. Basic Principles and Current Concepts. New York: Marcel Dekker, pp. 397-441, 1994.

Mactutus CF: "Conceptual and procedural issues concerning the neurotoxicological assessment of learning and memory processes." In LW Chang (Ed.), Principles of Neurotoxicology: Basic Principles and Current Concepts, New York: Marcel Dekker, 1994, pp. 397-441.

Wallace DR, Mactutus CF and Booze RM: Repeated intravenous cocaine administration: Locomotor activity and dopamine D2/D3 receptors. Synapse, 23:152-163, 1996.

Booze RM, Lehner AF, Wallace DR, Welch MA and Mactutus CF: Dose-response cocaine pharmacokinetics and metabolite profile following intravenous administration and arterial sampling in unanesthetized freely moving male rats. Neurotoxicol. Teratol., 19:7-15, 1997.