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Education:

- M.S. 1981, Ph.D. 1986, Hunter College, CUNY
- Postdoc. 1987-1990, Rockefeller University

Research Interest:

- **Neuropeptide Regulation and Function in Nigrostriatal and mesolimbic pathways**

Our current research is focused on clarifying the cellular and molecular mechanisms by which some neuropeptides mediate long-term adaptations to offset the damaging impact resulting from chronic exposure to psychostimulant drugs such as cocaine and amphetamines. Clarification of these mechanisms is of central importance in understanding how the central nervous system adapts and recovers during adult life. Because cocaine and amphetamines increase the concentration of extracellular dopamine at synapses of the central nervous system, the research in my laboratory centers around the neurotransmitter dopamine and its effects on neuropeptides that in turn feedback and modulate the cascade of reactions restoring homeostasis and neuroadaptability in the neostriatum of the rodent brain. We study the mechanism by which neuropeptides restore homeostasis in the neostriatum after exposure to psychostimulants at behavioral, neurochemical, and molecular levels. In addition, histological

methods are used to study the damaging effects of the pscyhostimulant methamphetamine and to demonstrate that some neuropeptides protect neurons from the damaging impact of this commonly abused drug. We utilize both Sprague-Dawley rats and mice as model systems, the latter species affords the construction of gene knockouts and transgenes in order to validate hypotheses. The strongest point of our research is that we apply various techniques to elucidate one central question, namely, the involvement of neuropeptides during exposure and recovery from addictive drugs.

Selected Publications:

- Afanador L, Mexhitaj I, Diaz C, Ordonez D, Baker L, Angulo JA. The role of the neuropeptide somatostatin on methamphetamine and glutamate-induced neurotoxicity in the striatum of mice. Brain Res. 2013 Mar 19. doi:pii: S0006-8993(13)00391-0. 10.1016/j.brainres.2013.03.010. [Epub ahead of print] PubMed PMID: 23524190.
- Yarosh HL, Angulo JA. Modulation of methamphetamine-induced nitric oxide production by neuropeptide Y in the murine striatum. Brain Res. 2012 Nov 5; 1483:31-8. doi: 10.1016/j.brainres.2012.09.013. Epub 2012 Sep 13. PubMed PMID: 22982589.
- Tulloch, I., Afanador, L., Mexhitaj, I., Ghazaryan, N., Garza, A. and Angulo, J. A. (2011) A single high dose of methamphetamine induces apoptotic and necrotic striatal cell loss lasting up to three months in mice, Neuroscience (in press).
- Wang, J. and Angulo, J. A. (2011) Synergism between methamphetamine and the neuropeptide substance P on the production of nitric oxide in the striatum of mice, Brain Research, 1369, 131-139.
- Wang, J. and Angulo, J. A. (2011) Methamphetamine induces striatal neurokinin-1 receptor endocytosis primarily in somatostatin/NPY/NOS interneurons and the role of dopamine receptors in mice, Synapse, 65, 300-308.
- Tulloch, I., Afanador, L., Zhu, J. Angulo, J. A. (2011) Methamphetamine induces striatal cell death followed by the generation of new cells and a second round of cell death in mice, J. Current Neuropharmacology, 9, 79-83.
- Zhu, J., Xu, W., Wang, J., Ali, S. F. and Angulo, J. A. (2009) The neurokinin-1 receptor modulates the methamphetamine-induced striatal apoptosis and nitric oxide formation in mice, J. Neurochemistry, 111, 656-668.
- Wang, J., Xu, W., Ali, S. F. and Angulo, J. A. (2008) Connection between the striatal neurokinin-1 receptor and nitric oxide formation during methamphetamine exposure, Annals of the New York Academy of Sciences, 1139, 164-171.
- Zhu, J. P. Q., Xu, W. and Angulo, J. A. (2006) Distinct mechanisms mediating methamphetamine-induced neuronal apoptosis and dopamine terminal damage share the neuropeptide substance P in the striatum of mice, Annals of the New York Academy of Sciences, 1074, 135-148.
- Zhu, J. P. Q., Xu, W. and Angulo, J. A. (2006) Methamphetamine-induced cell death: Selective vulnerability in neuronal subpopulations of the striatum in mice, Neuroscience, 140, 607-622.