Laura Harrison, PhD
Research Assistant Professor of Pharmacology and Neuroscience

Education

2001-2004	Postdoc, University of New Orleans
1998-2001	Postdoc, Oregon Health and Science University
1998	PhD, Neuroscience, Tulane University
1990	BA, Psychology, Loyola University

Positions

2007 – present	Research Assistant Professor of Pharmacology and Neuroscience, LSU Health Sciences Center
2004-2007	Research Assistant Professor, Department of Psychology, University of New Orleans

Current Research

Several major human health disorders, such as schizophrenia and drug addiction, are known to involve dysregulation of dopamine (DA) systems. However, despite much progress in unraveling the mechanisms of DA signaling, many questions remain. One important issue is the question of how the balance of DA receptor signaling through various intracellular pathways is regulated. For example, DA receptors are now known to increase intracellular calcium through $G_{\alpha}q/11$ coupling, in addition to the more well-studied action on adenylyl cyclase (AC) activity through coupling to $G_{\alpha}s/olf$ and $G_{\alpha}i/o$. Disruption of the balance of signaling through these pathways is likely to have pathological consequences. Our laboratory is investigating the role of a GTP-binding protein, Rhes, in regulating DA signaling through these pathways. Behavioral studies in mice indicate that Rhes differentially affects DA-mediated behavior, depending on the signaling cascade involved. We are now testing the mechanism of Rhes actions in DA signaling through protein-protein interaction studies and signaling studies in primary striatal cultures. Acquiring this information will lead to better treatment for disorders such as drug addiction and schizophrenia by demonstrating the range of pathways that can be targeted by drugs in order to alleviate particular dysfunctions.

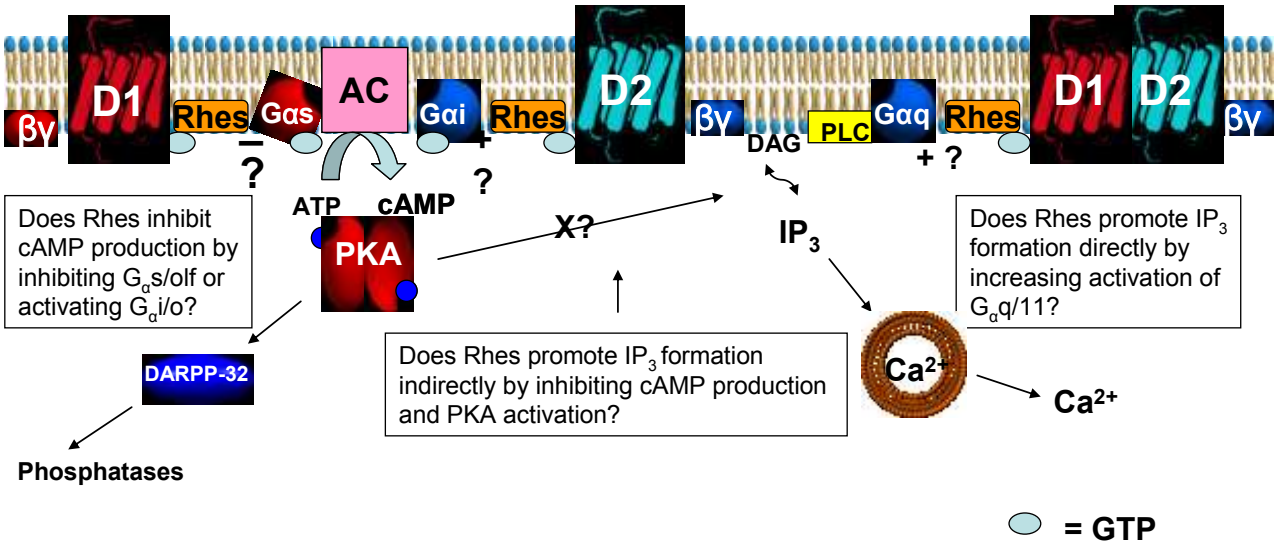

Figure 1. Schematic of Rhes interaction with DA receptor signaling cascades. Rhes is proposed to inhibit cAMP accumulation by D1 receptors, either by inhibiting $G_{\alpha}s/olf$ or activating $G_{\alpha}i/o$. Also, Rhes may promote IP_3 formation by one of two mechanisms: either directly, by increasing the coupling of DA receptors to $G_{\alpha}q/11$ or indirectly, by preventing excess activation of the cAMP-PKA pathway from inhibiting this pathway.

Research Interests and Goals
Our laboratory is focused on signal transduction through dopamine receptors, the regulation of G protein-coupled receptor signaling, and dopamine receptor-mediated behaviors. We are investigating a novel GTP binding protein, Rhes, which is involved in dopamine signaling and has a potential role in dopamine-related disorders such as schizophrenia and drug addiction.

Awards/Recognitions/Lectures

National Research Service Award Individual Predoctoral Fellowship
Chemical Rubber Company Freshman Chemistry Award

Key Recent Papers

Quintero, G.C., Spano, D., LaHoste, G.J., **Harrison, L.M.** The ras homolog rhes affects dopamine D1 and D2 receptor-mediated behavior in mice. NeuroReport 19(16): 1563-1566, 2008.

Harrison, L.M., LaHoste, G.J., Ruskin, D.N. Ontogeny and dopaminergic regulation in brain of ras homolog enriched in striatum. Brain Research 1245: 16-25, 2008.

Nolan E.B., LaHoste G.J., **Harrison L.M.** and Ruskin D.N. D1/D2 dopamine receptor synergism is intact in connexin 36-deficient mutant mice. Synapse 61(5): 279-87, 2007.

Harrison L.M. and LaHoste G.J. Rhes, the ras homolog enriched in striatum, is decreased under conditions of dopamine receptor supersensitivity. Neuroscience 137(2): 483-92, 2006.

Bunzow J.R., Sonders M.S., Arttamangkul S., **Harrison L.M.**, Zhang G., Quigley D.I., Darland T., Suchland K.L., Pasumamula S., Kennedy J.L., Olson S.B., Magenis R.E., Amara S.G. and Grandy D.K. Amphetamine, 3,4,-methylenedioxymethamphetamine, lysergic acid diethylamide, and metabolites of the catecholamine neurotransmitters are agonists of a rat trace amine receptor. Molecular Pharmacology 60(6): 1181-8, 2001.

Malin D.H., Lake J.R., Moon W.D., Moy D., Montellano A.L., Moy E., Bell M.V., Bryant D., **Harrison L.M.**, and Grandy, D.K. Nociceptin/Orphanin FQ induces a quasi-morphine abstinence syndrome in the rat. Psychopharmacology 151(4): 344-50, 2000.

Harrison, L.M. and Grandy, D.K. Opiate modulating properties of nociceptin/orphanin FQ . Peptides 21(1): 151-172, 2000.

Harrison, L.M., Kastin, A.J. and Zadina, J.E. Opiate tolerance and dependence: Receptors, G-proteins, and antiopiates. Peptides 19(9): 1603-30, 1998.

Harrison, L.M., Kastin, A.J. and Zadina, J.E. Differential effects of endomorphin-1, endomorphin-2, and Tyr-W-MIF-1 on activation of G-proteins in neuroblastoma membranes. Peptides 19(4): 749-53, 1998.

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