

Test-Driving Research

The Undergraduate Research Fellows program is a year-long intensive research community of senior students and professors. It is a taste of the intellectual responsibilities, independent study and research ethics that comprise a successful graduate school career.

In January of each year, the program invites eligible students — all juniors with a 3.4 grade point ratio or higher, and nine credits of Honors classes — to attend organizational meetings and search out a faculty mentor. In March, eligible prospective students who desire to be considered for the program submit proposals that undergo a rigorous screening process on their way to selection as a Fellow.

In their senior year, Fellows register for three hours of independent study each semester and meet monthly in small groups of about five or six people to present and discuss their research progress. The final product — their thesis — gets bound, catalogued and deposited in Evans Library.

Meet two liberal arts majors and their mentors who participated in the program this past year.

Jessica Harrison and Psychology Professor Mary Meagher

Major: Psychology

Hometown: Katy, Texas

After graduation: In August, Harrison moved to Mexico to teach English for a year before beginning graduate school the following fall. Not sure what graduate program she will pursue, Harrison is interested in several fields, most notably public health and public policy.

Project title: “A Behavioral Characterization of the Acute Phase of Theiler’s Murine Encephalomyelitis Virus Infection”



Psychology Professor Mary Meagher and Jessica Harrison

Description: Theiler’s murine encephalomyelitis virus (TMEV) infection provides a well-characterized animal model of multiple sclerosis (MS). TMEV causes an acute infection of the central nervous system (CNS) that subsequently triggers a chronic inflammatory demyelination during late disease. Harrison’s Honors Fellows thesis focused on the acute phase of TMEV infection as the severity of acute infection influenced the chronic demyelinating disease process. The aim of this study was to use behavioral and physiological measures to characterize the sickness syndrome induced by inflammation of the CNS during both the acute phase and chronic phase. Sickness syndrome refers to a coordinated series of behavioral and physiological responses to immune challenge that almost everyone can identify with if they have had the flu

or a cold. Sickness responses included the following: (1) fever, (2) loss of appetite and body weight loss, (3) loss of pleasure (anhedonia), (4) increases in pain sensitivity (allodynia and hyperalgesia), (5) decreases in exploratory locomotor and social activity, and (6) impairments in learning and memory. These are adaptive responses that are designed to conserve energy and combat infection. The process is triggered by immune activation and coordinated by the brain. Although many studies have shown that acute peripheral bacterial and viral infections induce sickness syndrome in humans and other animals, this study was the first to evaluate whether chronic viral infection and inflammation of the CNS also induces sickness syndrome. The results indicated that acute TMEV infection induces fever, enhances pain sensitivity and reduces pleasure-seeking behaviors.

Meagher on Harrison: It has been a pleasure to supervise Jessica’s thesis. After working in my psychoneuroimmunology laboratory for several semesters, Jessica expressed an interest in pursuing an Honors Fellows project. Through her Psychology 485 experience, she was exposed to a wide range of behavioral, physiological, pharmacological, molecular and statistical procedures. It was clear that Jessica was highly motivated and well prepared to tackle a challenging Honors Fellows project. Through this project, Jessica learned about the process of scientific discovery and about herself. She has learned how to generate testable hypotheses, to organize and analyze her data, and to effectively communicate her findings. More importantly, Jessica learned that she can persevere and independently see a project through to completion and critically evaluate and integrate information across diverse levels of analysis. Although Jessica may pursue a different content area in graduate school (e.g., public health), she has learned many lessons about herself and the process of research that will transfer to this new domain.

Harrison on research: I wanted to participate in Fellows so that I could experience firsthand the work required to conduct one’s own research project. Furthermore, I was not sure about graduate programs in neuroscience. Fellows provided the opportunity to “try on” graduate school, without all the commitment. 📖



Published Articles (partial list):

Wellman, P.J., Livermore, C.L., Miller, D.K., Green, T., and Nation, J.R. (1998). “Effects of (-)- Ephedrine Hydrochloride on Extracellular Dopamine Levels within Rat Accumbens.” *Psychopharmacology*, 135: 133–140.

Miller, D.K., McMahon, L.R., Green, T., Nation, J.R., and Wellman, P.J. (1998). “Chronic Administration of Ephedrine Induces Behavioral Sensitization in Rats.” *Psychopharmacology*, 140: 52–56.

McMahon, L.R., Jones, S.L., Gilliland, T.R., Hall, W.D., and Wellman, P.J. (1999). “Effects of Ephedrine Enantiomers on Conditioned Taste Aversion and Kaolin Consumption in Rats.” *Pharmacology, Biochemistry and Behavior*, 63: 33–38.

Miller, D., Nation, J.R., and Wellman, P.J. (1999). “Sensitization of Anorexia and Locomotion Induced by Chronic Administration of Ephedrine in Rats.” *Life Sciences*, 65: 501–511.

Wellman, P.J. (2000). “Norepinephrine and the Control of Food Intake.” *Nutrition*, 16: 837–42.

Wellman, P., Ho, D., Cepeda-Benito, A., Bellinger, L., and Nation, J. (2002). “Cocaine-Induced Hypophagia and Hyperlocomotion in Rats Are Attenuated by Prazosin.” *European Journal of Pharmacology*, 455(2–3): 117–26.

Wellman, P.J., Miller, D.K., and Ho, H. (2003). “Noradrenergic Modulation of Ephedrine-Induced Hypophagia.” *Synapse*, 48: 18–24.

Bellinger, L., Cepeda-Benito, A., and Wellman, P.J. (2003). “Meal Patterns in Male Rats During and After Intermittent Nicotine Administration.” *Pharmacology and Behavior*, 74(2): 495–504.

Bellinger, L., Cepeda-Benito, A., Bullard, R.L., and Wellman, P.J. (2003). “Effect of i.c.v. Infusion of the Alpha-MSH Agonist MTH on Meal Patterns in Male Rats Following Nicotine Withdrawal.” *Life Science*, 73: 1861–72.

91 authored or co-authored journal articles since 1978

Select Presentations:

Wellman, P.J. “Behavioral Properties of the Ephedrine Enantiomers.” Presentation to the American Academy of Forensic Sciences, 2004, Dallas, Texas.

Marr, K., Wellman, P.J., and Bellinger, L.L. “Infusions of Neuropeptide-Y (NPY) and Cocaine-Amphetamine-Regulated Transcript (CART) on Meal Patterns in Nicotine (N) Treated Rats.” FASEB, 2003.

Wellman, P.J., Ho, D., and Nation, J. “Differential Impact of Cocaine on Meal Patterns in Male and Female Rats.” Society for the Study of Ingestive Behavior, 2003, Groningen.

Ho, D.H., Wellman, P.J., Nation, J.R., and Bellinger, L.L. “Antagonism of Cocaine-Induced Hypophagia by the Alpha1-Adrenoceptor Antagonist Prazosin in the Rat.” Society for the Study of Ingestive Behavior, 2002, Santa Cruz, Calif.

Ho, D.H., Wellman, P.J., and Bellinger, L.L. “Meal Patterns in Rats After Systemic Mazindol and Prazosin.” Society for Neuroscience, 2002, Fla.