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THE GLENN LAB

Associate Professor Melissa Glenn's hub of neuroscience research turns students into colleagues

By Jenny Chen '12

White rats scabble in their cages; others swim in a large metal vat of water. Students in lab coats dole out food and carefully monitor the buzzing rat activity throughout.

This is the behavioral neuroscience lab of Associate Professor of Psychology Melissa Glenn, where she and her students conduct cutting-edge research on the dietary causes of schizophrenia and mood disorders. The lab in the Davis Science Center is the only facility in the country that looks at the DISC1 protein in rats, a protein linked to psychological disorders—including schizophrenia, bipolar disorder, and depression—and one of the few rat labs in the country that employs a brain lesion technique to look at the ways in which specific parts of the brain are affected by choline supplementation.

Glenn and her student researchers have been adding to the body of knowledge on the subject since she arrived at Colby in 2007, building the existing rat lab capacity at Colby from 20 to 200. She received a grant in 2010 from the National Institutes of Health to further her work in choline supplementation and schizophrenia.

Her interest in the topic began during her postdoctoral fellowship at Duke University, working with Christina Williams, a neuroendocrinologist studying the ways nutrients and hormones affect brain development. At the time, choline—a nutrient found in broccoli, shrimp, and eggs—was taking center stage in the field of neuroscience.

Prenatal choline intake had been shown to prevent age-related cognitive decline, to limit symptoms of Down syndrome and prenatal alcohol exposure, and possibly protect against neurodegenerative diseases like Alzheimer's and dementia. Increased choline levels during fetal development had also been linked to optimal brain development in rats.

“My goal is to get them to be really rigorous scientists by the time they graduate.”

—Associate Professor of Psychology Melissa Glenn

Working with Williams, Glenn explored the way prenatal choline supplementation actually increases the neuroplasticity of the brain by increasing the growth of new neurons in the hippocampal region. The hippocampal region is linked to memory, stress response, and mood disorders like schizophrenia. Studies showed that schizophrenia and depression patients often had less neuroplasticity in their brains. Since choline was linked to neuroplasticity, Glenn began to wonder whether choline supplementation might help schizophrenia patients. Soon after arriving at Colby she had help searching for the answer.

Glenn's students often become her research partners. She challenges them with graduate-level expectations—encouraging them to ask their own research questions, design their own experiments, and make presentations at conferences. “My goal is to get them to be really rigorous scientists by the time they graduate,” Glenn said.

Stephanie Desrochers '18, a Presidential Scholar and Colby Academic Research Assistant in Glenn's lab, said Glenn has taught her about the meticulousness required of a scientist. “She's taught us about detailing everything you do ... what works, making sure you record any errors. If the video monitoring doesn't start right when the rats start, we have to record that; if some food falls to the bottom of the [rat] cage, that's going to affect the experiment and we have to record that,” she said.



Many of Glenn's research projects are fueled by discussions with students. For instance, Glenn's current research on concussion effects on the brain (in partnership with the Maine Concussion Management Initiative) aligns with an interest of one of her former student researchers, Tory Gray '11. Before the work in Glenn's lab there was no good way to model concussions in rats, but Glenn and her students developed a completely new animal model to test for concussions in rats. Eventually, Glenn says, she wants to look at the ways in which repeated, and even seemingly minor, traumatic brain injury might increase risk for PTSD and other psychological disorders—and how prenatal choline might reduce that risk.

Glenn's relationships with her students don't end with graduation. In 2011 Glenn started a Facebook group called "Glenn Lab—Past and Present" to stay in touch with all the students who have either worked in her lab previously or are working there currently. She and alums of Glenn Lab also post job opportunities and resources for current students.

"Students are drawn to Melissa and her energy," said Professor of Psychology Ed Yeterian, chair of the department. "The lab is always full of activity. ... The amount of animal research in the department [since Glenn arrived] is unprecedented."

For Jennifer Corriveau '10, meeting Associate Professor of Psychology Melissa Glenn was a life-changer. Story 