

# Princeton University

HONORS FACULTY MEMBERS  
RECEIVING EMERITUS STATUS



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The biographical sketches were written by staff and colleagues in the departments of those honored.

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# BARRY LEONARD JACOBS



Professor of psychology and the Princeton Neuroscience Institute, Barry L. Jacobs will transfer to emeritus status at the end of this academic year. Barry began his career on the Princeton faculty in 1972. For more than forty years, he studied the brain mechanisms of sleep, the brain chemical serotonin, and the impact of hallucinogens and other psychoactive drugs on the brain. He wrote five books and many articles published in top scientific journals during a distinguished scientific career.

Barry received his Ph.D. in 1971, with distinction, from the University of California, Los Angeles. He then joined the department of psychiatry at the Stanford University School of Medicine for two years, until 1972. He joined the Princeton faculty in the Department of Psychology in 1972 and became an active part of the scientific community. Among other roles, he was the director of the small neuroscience graduate program at Princeton, from 1988 to 2000. At that time, the neuroscience graduate program was contained within the psychology department.

The central interest of Barry's work spanning his entire scientific career has been the function of a particular set of chemicals in the brain that communicate from neuron to neuron—monoamine neurotransmitters. These chemicals include dopamine, norepinephrine, epinephrine, and serotonin. These molecules are among the most recognizable to the public because of their complex role in mood and drugs, like antidepressants, that directly affect them. Barry's interest in these neurotransmitters has spanned their full range of operation, including their synthesis in the brain, the particular circuits of neurons where they operated, and their extremely complicated, subtle impact on behavior, stress, sleep, and mental illness. Barry has also been interested in how drugs and stress affect the monoamine neurotransmitters and in turn how these interactions impact brain function and dysfunction.

Barry studied these systems in the brain by measuring the electrical activity of individual neurons in the brains of animals as they slept, woke, performed behavior typical of the species, and

performed highly controlled, trained behavior. His research addressed many specific, and yet fundamental, questions about the monoamine systems in the brain. For example, how is movement, including aspects of movement associated with fatigue, related to the electrical activity of the serotonin neurons in the brain? Barry's research group discovered a relationship between a specific group of serotonin neurons in the brainstem and types of movement that are unlearned, repetitive, and stereotypical. Chewing, breathing, scratching, walking—Barry found that these behaviors are associated with a high activity rate of the serotonin neurons in the brain stem. His research group also discovered that the same serotonin neurons become suppressed and inactive when fatigue sets in, such as after animals have engaged in extensive physical exercise.

He has used a marker for the activity of neurons, the immediate early gene c-Fos, to study how stress can affect the activity of many groups of neurons in the brainstem. These brainstem nuclei, which appear to play a role in the stress response, include the raphe nuclei and the locus coeruleus—common targets of the experiments in Barry's lab. Of particular interest to him are the long-term changes in these brain regions caused by stress.

For many years, Barry taught the popular and highly rated undergraduate course, "The Brain: A User's Guide." In this course, Barry showed a gift for communicating a sense of wonder about neuroscience to students from a wide range of backgrounds—often including students who would never have taken a science course otherwise. Too often people in the sciences focus on teaching the next generation of graduate students and scientists, but Barry was able to share a highly technical knowledge in a clear, wonderfully engaging way with the rest of society, an invaluable exercise. His seminar courses on sleep and depression were also popular among undergraduate students. These courses were geared toward students with a strong interest in the brain and fulfilled requirements for the neuroscience certificate.

Barry has been a personable colleague known through the department for his cheerful and energetic manner, his friendly greetings, as well as his sense of humor.