Eric R. Kandel Biography

Eric R. Kandel

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Biography

Eric Kandel received the Nobel Prize for physiology or medicine in 2000 for his research on the neurological mechanisms of memory. With colleagues Arvid Carlsson and Paul Greengard, Kandel discovered the connections between varying synaptic functions and the physiology of learning and memory.

Born in Vienna, Austria, Kandel immigrated to the United States in 1939. In college, Kandel majored in literature and history. Opting for a career in the sciences, Kandel then studied medicine at New York University, earning his degree in 1956. After post-doctorial work in both the United States and France, Kandel held professorships at Harvard and New York University before moving his research to Columbia University. There he embarked on his prize-winning research and was founding director of the Center for Neurobiology and Behavior.

Over the course of two decades, Kandel researched brain function and learning on the cellular and molecular level. He centered his studies on the mechanisms of learning by observing the manner in which parts of the brain learn from, and adapt and respond to certain stimuli. Using the three basic modes of learning (sensitization, habituation, and conditioning), Kandel discovered that the brain reacted to the stimuli and showed evidence of actual physical change, as well manifesting behavioral change. Kandel identified that stimuli created changes in behavior by altering neural connections.

Furthering the idea of the connection between synaptic change and learning. Kandel endeavored to identify physiological differences between the creating of long-term and short-term memory. In his experiments on sea slugs, Kandel discovered that the brain's synapses produce different reactions to various stimuli. The nature of these chemical reactions dictates whether the experience is stored in short-term or long-term memory. In other words, varying levels of learning and memory are the result of subtlety different processes in the brain. While at first glance sea slugs may seem too distant a specimen to bear relevance on human medicine, such studies are foundational to developing research Alzheimer's disease, Parkinson's disease, and traumatic head injuries. Increased understandings of the specific functions of neurotransmitters, the chemical processes of synapses and their role in memory, is the essential cornerstone for pharmacological and surgical treatment of neurological disorders and injuries.