

Codirectors, Mortimer B. Zuckerman Mind Brain Behavior Institute

Richard Axel, MD

Richard Axel is a Nobel laureate, a University Professor, an investigator at the Howard Hughes Medical Institute and Columbia University Medical Center and a codirector of Columbia's Mortimer B. Zuckerman Mind Brain Behavior Institute. Dr. Axel obtained an AB from Columbia College and an MD from Johns Hopkins Medical School. In earlier studies, Dr. Axel and his colleagues, Michael Wigler and Saul Silverstein, developed gene transfer techniques that permit the introduction of virtually any gene into any cell. These studies not only allowed for a novel approach to isolate genes but also provided a detailed analysis of how they worked. At the same time, these experiments allowed for the production of an increasingly large number of clinically important proteins. These studies also led to the isolation and functional analysis of a gene for the lymphocyte surface protein, CD4, the cellular receptor for the AIDS virus, HIV.

Dr. Axel then began to apply molecular biology to problems in neuroscience with the expectation that genetics could interface with neuroscience to approach the tenuous relationship between genes, behavior and perception. His studies on the logic of the sense of smell revealed over a thousand genes involved in the recognition of odors and provided insight into how genes shape our perception of the sensory environment; this research earned him the 2004 Nobel Prize in Physiology or Medicine. Dr. Axel's current work centers on how the recognition of odors is translated into an internal representation of sensory quality in the brain and how this representation leads to meaningful thoughts and behavior.

Thomas M. Jessell, PhD

Thomas M. Jessell, PhD, is an investigator at the Howard Hughes Medical Institute and the Claire Tow Professor in the Departments of Neuroscience and Biochemistry at Columbia University. Dr. Jessell is codirector of the Mortimer B. Zuckerman Mind Brain Behavior Institute, a fellow of the Royal Society of London, a member of the U.S. Institute of Medicine and a Foreign Associate of the National Academy of Sciences. His work has been recognized by numerous awards including the Gruber Neuroscience Prize, the Vilcek Prize, the Gairdner International Award and the Kavli Prize in Neuroscience. He is also a coeditor of the textbook *Principles of Neural Science*.

Dr. Jessell's research has examined the cellular and molecular mechanisms that control the assembly and function of circuits for mammalian motor control. His work has defined how diverse neuronal subtypes assemble into motor circuits and how the precision and logic of network wiring contributes to refined motor skills. His most recent studies are focused on circuits that control two forms of limb motor behavior: locomotion and skilled reaching. He is defining the cellular rules and molecular mechanisms that direct the intricate wiring of these motor circuits. In parallel, he uses insights into the molecular origins of neuronal subtype to devise precise genetic methods to monitor and manipulate the activity of selected classes of interneuron, permitting an insight into the design of systems and circuits involved in the planning and execution of movement.

Eric R. Kandel, MD

Eric R. Kandel, MD, is University Professor at Columbia University; Kavli Professor and director, Kavli Institute for Brain Science; codirector, Mortimer B. Zuckerman Mind Brain Behavior Institute; and an investigator at the Howard Hughes Medical Institute. A graduate of Harvard College and NYU School of Medicine, Dr. Kandel trained in neurobiology at the NIH and in psychiatry at Harvard Medical School. He joined the faculty of the College of Physicians and Surgeons at Columbia University in 1974 as the founding director of the Center for Neurobiology and Behavior. At Columbia Dr. Kandel organized the neuroscience curriculum. He is an editor of *Principles of Neural Science*, the standard textbook in the field, now in its fifth edition. In 2006, Dr. Kandel wrote a book on the brain for the general public entitled *In Search of Memory: The Emergence of a New Science of Mind*, which won both the L.A. Times and U.S. National Academy of Science Awards for best book in Science and Technology in 2008. A documentary film based on that book is also entitled *In Search of Memory*. In 2012 Dr. Kandel wrote *The Age of Insight: The Quest to Understand the Unconscious in Art, Mind, and Brain, from Vienna 1900 to the Present*, which won the Kreisky Award in Literature, Austria's highest literary award. Dr. Kandel's new book, entitled *Reductionism in Art and Brain Science: Bridging the Two Cultures*, published by Columbia University Press, has just been released.

Dr. Kandel's research has been concerned with the molecular mechanisms of memory storage in *Aplysia* and mice. More recently, he has studied animal models in mice; age-related memory disorders; post-traumatic stress disorders; and nicotine, alcohol, marijuana and cocaine addiction.

Dr. Kandel has received twenty-three honorary degrees and is a member of the U.S. National Academy of Sciences as well as a Foreign Member of the Royal Society of London and a member of the National Science Academies of Austria, France, Germany and Greece. He has been recognized with the Albert Lasker Award, the Heineken Award of the Netherlands, the Gairdner Award of Canada, the Harvey Prize and the Wolf Prize of Israel, the National Medal of Science USA and the Nobel Prize for Physiology or Medicine in 2000.