Jorge Aranda, Ph.D., received his doctorate in biomedical research in 2006 from the National Autonomous University of Mexico. He will work with Dr. Andrius Kazlauskas at the Harvard Medical School. Dr. Aranda will explore the molecular mechanisms of diabetic retinopathy, the leading cause of blindness in people with diabetes. The disorder is characterized by abnormal proliferation of blood vessels in the eye. Dr. Aranda believes that one contributor to this disorder is the stabilization of existing blood vessels that, under normal conditions, would recede and disappear. Using molecular and cell biological techniques, combined with a model system that Dr. Kazlauskas and his colleagues established for studying blood vessel growth in a test tube, Dr. Aranda will try to determine how elevated concentrations of glucose, a hallmark of diabetes, promote formation of new blood vessels and retard the disappearance of vessels that have already formed. His work has clear implications for the treatment of diabetic retinopathies and also could be relevant to other disorders that involve the excessive proliferation of blood vessels, such as cancer.

Gloria Loretto Arriagada will receive her doctorate in cellular and molecular biology from the University of Concepcion, Chile, in July 2007. She will work with Dr. Stephen Goff of Columbia University. Ms. Arriagada will investigate why certain retroviruses (a specific class of virus that copies from RNA to DNA, rather than the usual DNA to RNA), can only infect cells while they are actively dividing. To replicate successfully, retroviruses must integrate their DNA into a host cell's chromosomes—a process that for some viruses requires the host cell to divide. Using a suite of molecular biological methods, Ms. Arriagada will explore how the Moloney murine leukemia virus tricks dividing cells into drawing its genetic material into their newly formed nuclei and incorporating it into their freshly replicated DNA. Her results could lead to the design of novel antiretroviral therapies or to improved methods of performing gene therapy.

Angelina Morand Bianchi Bilate, Ph.D., received her doctorate in immunology from the University of Sao Paulo in 2006. She will work with Dr. Juan Lafaille at New York University. Dr. Bilate will investigate the mechanisms by which immune cells called T cells differentiate and direct myelin-destroying inflammation to either the brain or the spinal cord. Although inflammation of either site leads to autoimmune disease such as multiple sclerosis (MS), symptoms may vary depending on the location of the inflammation. Using cutting-edge techniques in cell biology, genetics and microscopy, Dr. Bilate will analyze why these myelin-destroying T cells are attracted to either the brain or the spinal cord and what actually occurs to draw them there. Her results could lead to more effective treatments for the many symptoms and types of tissue damage associated with autoimmune diseases like MS.

Julio Lenin Domínguez-Ramirez, Ph.D., received his doctorate in biochemistry from the National Autonomous University of Mexico in 2005. He will train with Dr. Edward A. Berry at the Lawrence Berkeley National Laboratory. Dr. Domínguez-Ramirez will investigate the three-dimensional shape of ATP synthase, the large protein complex that generates energy for all living cells. In 1997, chemists Paul Boyer and John Walker received a Nobel prize for unraveling the mechanism by which ATP synthase generates energy. However, the scientists' elegant models detailed the structure and function of

only one half of this remarkable multiprotein machine. Dr. Domínguez-Ramirez hopes to discover the structure of the entire ATP synthase "supercomplex" by using state-of-the-art techniques to crystallize it and then determine its atomic structure. This work could lead to a richer understanding of the protein complex that is central to the operation of all living cells, and perhaps point towards novel therapies for diseases associated with defects in ATP synthase, including a family of neuromuscular disorders termed mitochondrial myopathies that produce such symptoms as muscle weakness, heart arrhythmias, deafness and seizures.

Maria Eugenia Gómez-Casati, Ph.D., received her doctorate in neurobiology from the University of Buenos Aires in 2006. She will train with Dr. Gabriel Corfas at the Children's Hospital of Harvard Medical School. Dr. Gómez-Casati plans to explore how growth factors promote the survival of nerve cells in the inner ear. Studies from Dr. Corfas's lab suggest that a growth factor called neuregulin1 (NRG1) helps to keep neurons in the ears of adult mice alive and in good working order. Using a range of genetic, molecular biological and physiological methods, Dr. Gómez-Casati will generate mice that produce too little—or too much—NRG1 and examine how that affects the survival and activity of inner-ear neurons. Her work could translate into powerful new tools for preventing and treating hearing loss and balance disorders.

Javier Guillermo Magadán, Ph.D., received his doctorate in cell biology from the University of Buenos Aires in 2006. He will work with Dr. Juan Bonifacino at the National Institutes of Health's National Institute of Child Health and Human Development. Dr. Magadán plans to investigate how specialized transport molecules help to ferry proteins back and forth between various cellular compartments. These transporters are required for cells to work properly; decreased amounts of one such molecule—a large protein complex called "retromer"—have been hypothesized to contribute to the development of Alzheimer's disease. Using cellular, molecular and structural biology techniques, Dr. Magadán will explore, among other things, how retromer recognizes its cargo and what signals direct these complexes to the proper destination. This work could lead to fresh insights into the biology and treatment of Alzheimer's and other diseases caused by defects in transport.

Patricio Olguin Aguilera, Ph.D., received his doctorate in biomedical sciences from the University of Chile in 2006. He will train with Dr. Marek Mlodzik at the Mount Sinai School of Medicine. Dr. Aguilera intends to explore how cells in the Drosophila fly eye orient themselves with respect to their neighbors during development. The proper alignment of photoreceptor cells in the eye is essential for accurate vision. Currently, it is believed that three classes of signaling mechanisms are involved in the placement process. Using numerous advanced molecular biological and genetic techniques, Dr. Aguilera will attempt to uncover the molecular cues that photoreceptor cells use to locate and position themselves in the developing fly eye. This work could help scientists better understand how tissues and organs are properly assembled and the disease consequences that occur when the assembly process goes awry.

Sebastian Poggio, Ph.D., received his doctorate in biomedical sciences from the National Autonomous University of Mexico in 2006. He will work with Dr. Christine Jacobs-Wagner at Yale University. Dr. Poggio plans to search for proteins in the bacterium Caulobacter crescentus that might act as topological markers to help cells distinguish one end from another. Many microbes are polar—that is, they develop specialized structures, such as flagella, at only one end. Polarity can be crucial for an organism's survival: in E. coli, for example, clustering of chemoreceptors at one pole help the bacterium swim toward nutrients or away from toxins. To achieve polarity, a cell must produce some sort of marker protein that allows it to recognize its pole. Using biochemical and genetic techniques coupled with bioinformatic analyses, Dr. Poggio proposes to identify and characterize all of the proteins that interact with peptidoglycan, a substance that is present in all the cell's walls but is particularly stable at the pole. These proteins, he predicts, would be excellent candidates for the marker proteins that allow Caulobacter to identify its poles. His results could enhance our understanding of how microbes regulate their shape, and possibly lead to the development of a novel class of antibiotics.

Leonardo Karam Teixeira, Ph.D., received his doctorate in biochemistry from the Federal University of Rio De Janeiro in 2006. He will work with Dr. Steven Reed at the Scripps Research Institute in La Jolla, California. Dr. Teixeira intends to explore how a protein—cyclin E— that controls when a cell replicates its DNA can contribute to tumor formation. In humans, improper regulation of this protein has been associated with the growth of aggressive tumors and with poor outcomes in different forms of cancer. Using a combination of molecular and cell biological techniques, Dr. Teixeira will try to determine how overproduction of this key regulatory protein interferes with proper DNA replication and promotes DNA damage and chromosomal abnormalities in cultured cells and in mice. His work could lead to deeper understanding of tumor formation and progression and how those processes might be halted.

Citlali Trueta, Ph.D., received her doctorate in biomedical sciences from the National Autonomous University of Mexico in 2003. She will work with Dr. Stephen Baccus at Stanford University School of Medicine. Dr. Trueta will investigate how nerve cells in the retina adapt to patterns—a phenomenon that allows an animal to pay less attention to the visual background and, as a result, focus on things in its environment that are novel and potentially of greater interest. Using state-of-the-art technology for monitoring the activity of multiple neurons in an isolated salamander retina, Dr. Trueta will assess how a particular type of nerve cell—called an amacrine cell—contributes to pattern recognition. This work could lead to insights into how cells in the retina act together to encode key features of the visual scene, which in turn allows organisms to organize and make sense of the visual stimuli they receive.