

## **Laboratories in the Center for Molecular Genetics Facility; Russell F. Doolittle, Richard Firel, Theodore Friedmann, Peter Geiduschek, Donald Helinski and John O'Brien**

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Laboratories in the Center for Molecular Genetics Facility

More than 50 laboratories are engaged in molecular genetics research at UCSD. The work ranges from the graphic analysis of protein structure to designing carriers for introducing genes into developing animals, which serve as model systems for gene therapy.

Following is a list of the six senior faculty whose laboratories are being relocated in the new facility.

RUSSELL F. DOOLITTLE, Ph.D., professor of chemistry, is one of the foremost authorities on structure and evolution of human proteins. He developed a computerized data base to store the chemical codes, or sequences, of genes and proteins, which enables scientists to compare the structure of different genes or proteins in order to identify the ones that have potential applications in research or medicine.

RICHARD FIRTEL, Ph.D., professor of biology, is known for his outstanding work in the analysis of gene structure and the control of gene expression throughout an organism's development. He uses *Dictyostelium discoideum*, a simple soil amoeba, as a basis for understanding how cells change and relate during differentiation in more complex systems.

THEODORE FRIEDMANN, M.D., professor of pediatrics, is recognized as one of the leading researchers in the field of gene replacement. He is working with the HPRT gene, which must be present in an individual's chromosomes to prevent the Lesch-Nyhan syndrome, a devastating, incurable disease. Friedmann directs an effort to insert the HPRT gene and other genes into cells, with the ultimate goal of developing techniques to transfer normal genes into patients with genetic defects.

PETER GEIDUSCHEK, Ph.D., professor of biology, is a renowned expert on mechanisms of gene transcription -- the transfer of genetic information to messenger RNA to make proteins during an organism's development. In his laboratory, researchers are isolating the components that are involved in turning on and off genes in order to understand precisely how the mechanisms of gene regulation work.

DONALD HELINSKI, Ph.D., director of the Center for Molecular Genetics and professor of biology, is known for his research in biological nitrogen fixation in plants. He is studying the genes of a bacterium that has the genetic capacity to take atmospheric nitrogen and 'fix' it to make it available to certain plants. He wants to learn how these genes are regulated and how they might be altered to increase efficiency and produce more vigorous plants with less chemical fertilizer. This and a second goal, to transfer the bacterium's nitrogen-fixing ability to other bacteria so they can introduce it to other plants, would have an enormous impact on agriculture.

JOHN O'BRIEN, M.D., professor of neuroscience, conducts pioneering research on the genetic basis of lysosomal diseases, which result from a deficiency or lack of specific enzymes necessary to break down and eliminate certain compounds from the body. The genes for these enzymes have been isolated and cloned, an important step toward developing diagnostic and therapeutic techniques for inherited diseases. O'Brien gained

international notice when he discovered the basic enzyme defect which causes Tay-Sachs disease and devised a blood test to detect carriers of the gene for this fatal disorder.

The center plans to hire a seventh scientist whose major direction will be human disease and gene therapy.

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