

Plenary Session

Breeding and Building Molecules For Whole-Animal and Clinical Imaging



Roger Tsien

STATE-OF-THE-ART LECTURE

Roger Tsien, PhD, will present a state-of-the-art lecture on “Breeding and Building Molecules for Whole-Animal and Clinical Imaging” during the Thursday, October 29, plenary session, which begins at 8 a.m. Renowned for designing and building molecules that gauge signal transduction, Dr. Tsien has revolutionized the fields of cell biology and neurobiology by making it possible to look inside living cells and study the behavior of molecules in real time.

An investigator at the Howard Hughes Medical Institute at the University of California, San Diego (UCSD), Dr. Tsien is also professor of pharmacology at the UCSD School of Medicine and professor of chemistry and biochemistry at UCSD.

Dr. Tsien will address two complementary topics: the use of fluorescent and singlet-oxygen-generating proteins for imaging at nanometer to millimeter resolution in genetically manipulable cells and organisms, and synthetic peptides aimed at clinical imaging and therapy.

Dr. Tsien developed dyes to track levels of cellular calcium—an ion that regulates many physiological processes, including nerve impulses, muscle contractions, and fertilization. By genetically modifying molecules that make

jellyfish and corals glow, Dr. Tsien created fluorescent-colored proteins that can track where and when certain genes are expressed in cells or in whole organisms. Scientists worldwide have used these multicolored fluorescent proteins to study biological processes from the most basic to the most complex.

Over the years, Dr. Tsien has expanded the color palette of fluorescent proteins. He also developed a method to monitor the interactions of two proteins, each labeled with different hues of fluorescent proteins.

Because fluorescent proteins usually require introduction of foreign genes—an action difficult to justify in clinical practice—Dr. Tsien has developed novel, nongenetic ways to image and one day even treat cancer by delivering targeted drugs to tumors. Recently, he and his colleagues built U-shaped peptide molecules to carry an imaging molecule or chemotherapy drug to a tumor. The peptides are substrates for certain proteases—protein-splitting enzymes—that are exuded from tumor cells but rarely seen on normal cells. When the protease splits the bottom of the U, the two arms of the U are separated, unleashing one arm to drag the imaging or drug portion of the peptide into a neighboring cancer cell.

Dr. Tsien was awarded the Nobel Prize in Chemistry in 2008 (shared with Dr. Osamu Shimomura and Dr. Martin Chalfie) for the discovery and development of the green fluorescent protein. He received the Gairdner Foundation International Award in 1995 and the Wolf Prize in Medicine in 2004 for his contribution to the design and application of novel fluorescent and photolabile molecules to analyze and perturb cell signal transduction. He co-founded two bioscience companies; is a member of the National Academy of Sciences, the Royal Society, and the Institute of Medicine; and has published countless scientific papers.

Dr. Tsien received his PhD in physiology from the University of Cambridge in 1977 and remained there to complete his Research Fellowship in 1981.

William E. Mitch to Receive John P. Peters Award at Thursday Plenary Session



William E. Mitch

The American Society of Nephrology announces William E. Mitch, MD, as this year's recipient of the John P. Peters Award. The award recognizes Dr. Mitch's outstanding contributions to improving the lives of patients with kidney disease and to furthering the understanding of the kidney in health and disease.

Established in 1983, the Peters award honors individuals who have made substantial research contributions to the discipline of nephrology and have sustained achievements in one or more areas of academic medicine, including clinical care, education, and leadership.

For four decades Dr. Mitch has improved the lives of patients with renal disease—as a practicing physician, a medical researcher, and a medical school professor. He is widely recognized as an expert in the care of patients with hypertension and chronic kidney disease, with a particular focus on nutrition and diet. Among an extensive list of professional publication credits, Dr. Mitch is an editor of “The Handbook of Nutrition and the Kidney,” a publication—now in its sixth edition—that guides physicians and nutritionists in applying dietary approaches to treat patients with kidney stones and hypertension.

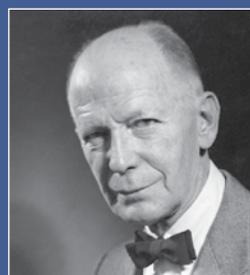
Dr. Mitch's research identified how breakdown of muscle protein, or muscle wasting, is accelerated by chronic kidney disease and can be linked specifically to complications of kidney disease, such as metabolic acidosis, high levels of angiotensin II, and impaired signaling through the insulin/GF-1 pathway. His current research focus includes developing ways to block such pathways to correct the loss of muscle protein. His work has already helped in the development of a method for assessing muscle protein metabolism.

Dr. Mitch has earned numerous awards and accolades. Featured in several patient guides to top physicians, he was named one of “The Best Doctors in America” by *American Health Magazine*. He also received the National Torchbearer Award from the American Kidney Fund, which recognizes extensive work in nephrology and its impact on kidney patients' quality of life.

A graduate of Harvard University Medical School, Dr. Mitch practices in the Houston area and is the Gordon A. Cain Professor of Medicine and Chief of Nephrology at Baylor College of Medicine in Houston.

Dr. Mitch will receive the John P. Peters Award at Thursday morning's plenary session, which begins at 8 a.m.

John P. Peters



John P. Peters, MD, was one of the fathers of nephrology and former chief of the Metabolic Division in the Department of Medicine at Yale University. He transformed clinical chemistry from a discipline of qualitative impressions to one in which precise quantitative measurements of body fluids comprise a vital part of the patient examination and provide great explanatory value.

He advanced the view that disease is a quantitative abnormality of normal physiological processes and that, by understanding disease, one could gain a deeper understanding of normal physiology. His enduring scientific contributions paralleled his intense commitment to the care of the sick, as well as his fervent mission to ensure that the physician be an advocate for the patient.