Philip S. Portoghese Distinguished Lectureship

2013 - Dr. Philip S. Portoghese,University of Minnesota
"Opioid Receptor Heterodimers: Favorable Marriages or Hazardous Liaisons?"

2014 - Dr. Victor J. Hruby, University of Arizona
"Design of Multivalent Peptides and Peptidomimetics for the Detection and Treatment of Disease"

2015 - Dr. Craig Linsley, Vanderbilt University
"Allosteric Modulation Targeting mGlu1 and PLD: New Insights and Therapeutic Potential"

2015 - Dr. Bryan Roth, University of North Carolina
"Genome Wide Approach to GPCR Chemical Biology"

2016 - Dr. Lawrence J. Marnett, Vanderbilt University
"Allosteric Inhibition of Cylcooxygenases and the Mechanism of Action of NSAIDs"

2018 - Dr. Richard A. Glennon, Virginia Commonwealth University
"Drug Discrimination: A Behavioral Technique to Investigate Centrally-acting Agents"

2018 - Dr. P. Jeffrey Conn, Vanderbilt University
"Allosteric Modulators of GPCRs as a Novel Approach for Treatment of Schizophrenias"

2019 - Dr. Maria-Laura Bolognesi, Università di Bologna
"Principles, Implementation, and Application of Multitarget Drug Discovery in Alzheimer's Disease"

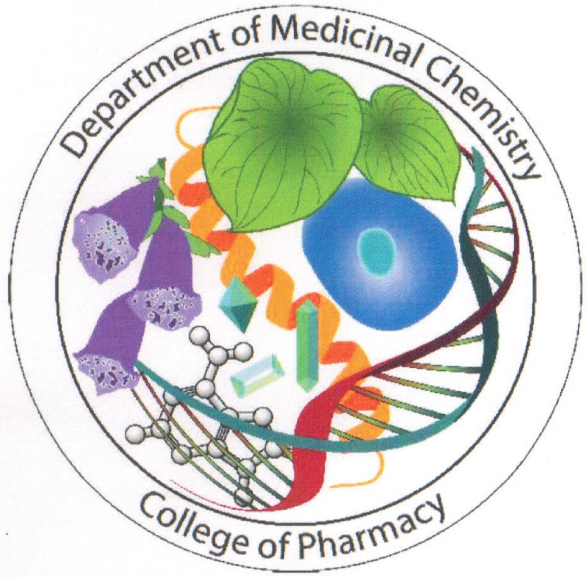
2022 - Dr. Jane V. Aldrich, University of Florida
"Novel Opioid Peptides that Don't Follow the Rules"

2023 - Dr. Andreas Plückthun, University of Zurich
"Binding Proteins: the Design of Evolution and the Evolution of Design"

MEDICINAL CHEMISTRY
UNIVERSITY OF MINNESOTA

Philip S. Portoghese Distinguished Lectureship

Department of Medicinal Chemistry
University of Minnesota



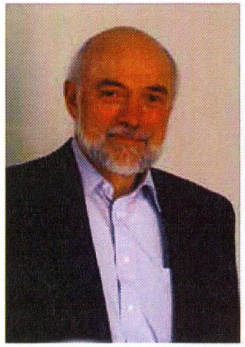
Professor Andreas Plückthun

University of Zurich

In honor of his outstanding contributions to Medicinal Chemistry & peptide drug development.

March 7, 2023

Professor Philip S. Portoghese



Professor Philip S. Portoghese received a B.S. in Pharmacy with honors from Columbia University in New York City in 1953 before continuing graduate school at the University of Maryland. After four months of graduate study he was drafted into the army due to the Korean War. After serving for two years in the U.S. army, he returned to Columbia University to obtain his M.S. in Pharmaceutical Chemistry. He pursued a Ph.D. degree in Medicinal Chemistry under the advisorship of the eminent Professor Edward E. Smissman. He joined the faculty of the Department of Medicinal Chemistry, College of Pharmacy at the University of Minnesota as an Assistant Professor in 1961. He was promoted to Associate Professor in 1964 and in 1969 to Professor.

In 1971 Dr. Portoghese became Editor-in Chief (EIC) of the Journal of Medicinal Chemistry and served in that role until 2011. Under his leadership JMC became the most cited journal in the field. In 2010 the publications division of the ACS and the medicinal chemistry division jointly created a lectureship in his name in recognition of his long service as EIC. Over the years, over 100 graduate students, postdoctorals, and other scientists have worked in his laboratory on projects that have received attention nationally and internationally. Recognition for these contributions has been presented by a variety of professional societies that span both chemistry and biology. These include the European Federation of Medicinal Chemistry, American Chemical Society, College on Problems of Drug Dependence, International Narcotics Research Conference, Academy of Pharmaceutical Scientists, American Association of Colleges of Pharmacy, and the American Association of Pharmaceutical Scientists.

Major discoveries from his laboratory include:

•Proposed in 1965 a new concept based upon multiple modes of interaction of analgesic molecules with multiple opioid receptors which was confirmed by others, with the discovery of multiple opioid receptors.

•Developed opioid antagonists that are highly selective for the different receptor types. These ligands are widely used as the standards in the opioid field today and are available from commercial sources and through NIH.

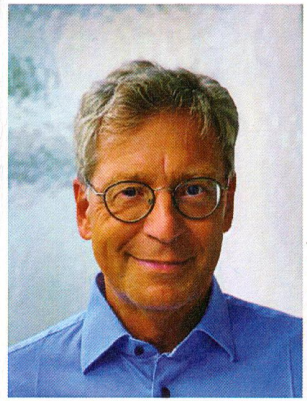
•Explored the ligand selectivity of antagonists based upon receptor structure and amino acid sequence using site-directed mutagenesis. This technology enabled him to identify key amino acid residues that contribute to the binding of kappa and delta opioid antagonists that he developed.

•Used the bivalent ligand approach (1982) developed in his lab, he proposed the concept of opioid receptor dimers nearly two decades before they were demonstrated to exist in cultured cells.

•Pioneered the development of ligands that selectively target delta-kappa, mu-delta, mu-kappa, mu-CB1, and mu-mGluR5 heterodimers.

•Discovered a bivalent ligand approach using a combination of mu agonist and delta antagonist pharmacophores that are potent analgesics devoid of tolerance and dependence. The finding that the spacer linking the pharmacophores must be of critical length for activity without tolerance or dependence, supported the concept that the bivalent ligand is bridging protomers in a mu-delta heterodimer.

•Most recently, one of his bivalent ligands (MMG22) that targets MOR-mGluR5 heteromer is highly effective in the fmol dose range for blocking inflammatory and neuropathic pain that are not effectively treated with traditional opioids



Dr. Andreas Plückthun

Professor of Biochemistry
University of Zurich

Andreas Plückthun has been a Professor in the Department of Biochemistry at the University of Zurich, Switzerland, since 1993. Doing a stint as the Head of the Department from 2012 to 2016. After studying Chemistry at the University of Heidelberg in Germany, Plückthun went on to receive his PhD The University of California, San Diego with Prof. Edward Dennis. Then conducting his postdoctoral training at Harvard University in the Department of Chemistry under Prof. Jeremy Knowles. Dr. Plückthun returned to Germany where became group leader at the Genezentum and Max-Planck-Institute for Biochemistry from 1985-1993. In 1993 Dr. Plückthun was appointed to the faculty of the University of Zurich as a Full Professor of Biochemistry, where he has remained to this day.

Dr. Plückthun's research is focused on protein engineering & directed evolution. His research achievements include fundamental contributions enabling the emergence of antibody engineering, notably by the use of E. coli as an engineering platform, studies on synthetic antibodies which led to the first fully synthetic antibody library, the development of ribosome display — a true in vitro protein evolution technology—, and the development of the Designed Ankyrin Repeat Protein (DARPin) technology. Subsequently, his laboratory developed technologies for evolving stable G-protein coupled receptors for advancing their detailed study. More recently, his laboratory developed technologies to create synthetic virus-like particles, based on adenovirus, to target specific cells and organs. He has authored over 450 publications and one of the most cited protein scientists in the world with an H-index of 131. As a result, he has been the recipient of numerous awards, including the Christian Anfinsen Award from the Protein Society, J. P. Morgan Chase Health Award, World Technology Award and Karl-Heinz-Beckurts Award. He is a member of the German National Academy of Science and a member of European Molecular Biology Organization (EMBO).

Dr. Plückthun has been a very active serial entrepreneur co-founding MorphoSys, a leading antibody company, Molecular Partners AG, which has commercialized DARPin technology, G7 Therapeutics and Vector BioPharma.

Andreas Plückthun, Phil Portoghese and Carston R Wagner