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## Introduction

## Tetrahedron Young Investigator Award 2009: Carlos F. Barbas, III



This special Symposium-in-Print issue of Bioorganic & Medicinal Chemistry Letters commemorates the 2009 Tetrahedron Young Investigator Award in Bioorganic & Medicinal Chemistry awarded to Carlos F. Barbas, III.

Carlos F. Barbas, III, is the Janet and W. Keith Kellogg II endowed Professor of Chemistry and Molecular Biology at The Scripps Research Institute and The Skaggs Institute for Chemical Biology. He received a B.S. degree in Chemistry and Physics (double major) from Eckerd College. He then moved to Texas A&M University to pursue his Ph.D. under the guidance of Professor Chi-Huey Wong. Following postdoctoral studies with Professor Richard Lerner at The Scripps Research Institute, he joined the faculty of The Scripps Research Institute in 1991 where he remains today.

The research efforts of the Barbas laboratory have focused on studies at the interfaces of chemistry, molecular biology, and medicine. Many of his research efforts have involved learning or improving on Nature's strategies to prepare novel molecules that perform specific functional tasks, such as regulating a gene, inhibiting tumor growth, or catalyzing a reaction with enzyme-like efficiency and selectivity. Dr. Barbas and his colleagues developed the first human antibody phage display methods to rapidly clone

human antibodies and used this approach to elucidate human immune responses and discover novel therapeutic antibodies. Professor Barbas invented bio-inspired methods for the synthetic production and evolution of human antibodies without immunization, approaches now widely used in the pharmaceutical industry and technologies behind currently approved antibody drugs. More recently, he invented chemically programmed antibodies that marry small molecules and peptides with protein therapeutics to create a new class of drugs now advancing in multiple clinical trials for the treatment of a variety of diseases. He has further elaborated this approach in the development of chemically programmed vaccines that have shown efficacy in animal models of cancer. More than a decade of studies in DNA recognition and protein engineering allowed his laboratory to develop artificial zinc finger transcription factors to specifically regulate genes in human cells and plants for the first time, paving the way for ongoing clinical trials in this area and biotechnology applications. His studies in catalysis have provided novel insights, allowing Dr. Barbas to create artificial enzymes like aldolase antibodies and have inspired his studies in the use of small organic molecules as catalysts in asymmetric synthesis ushering in a new era of catalysis based on small organic molecule catalysts now known as Organocatalysis. His reactions and approaches are yielding environmentally sound methods to drug synthesis and have spurred worldwide research on this approach. Dr. Barbas was the first to propose a role for organocatalysis in prebiotic chemistry that has led to new ideas concerning the origin of homochirality and has suggested a role for organocatalysis in living systems wherein amines and amino acids might still play a role in biosynthesis.

Professor Barbas serves on the editorial boards of several journals, including Bioorganic & Medicinal Chemistry, Bioorganic & Medicinal Chemistry Letters, and Chemical Society Reviews. He has been recognized with a number of awards and honors including the Investigator Award from the Cancer Research Institute (1993–1997), The Scholar Award of the American Foundation for AIDS Research (1992–1995), ISI Highly Cited Researcher (2004), Fellow of the American Association for the Advancement of Science (2005), and the ACS Cope Scholar Award (2009). In addition, Professor Barbas has founded two successful biotechnology companies, Prolifaron LLC acquired by Alexion Pharmaceuticals in 2000 and CovX Inc., acquired by Pfizer in 2008. He is the author of over 275 scientific articles and is a named inventor on 47 issued US patents.