About the Axelrod Lectures

Dr. Bernard Axelrod served as Head of the Department of Biochemistry and is currently Professor Emeritus. His efforts were instrumental in founding the biochemistry program at Purdue University. On the occasion of his 70th birthday, colleagues and friends established this lectureship in honor of Dr. Axelrod's many contributions to the field of biochemistry and its community of scientists.

Previous Speakers in the Bernard Axelrod Lecture Series

2011	Thomas Cech	Howard Hughes Medical Inst; University of Colorado
2010	Robert T. Sauer	Massachusetts Institute of Technology
2009	Lee Hood	Institute for Systems Biology
2008	Jasper Rine	University of California, Berkeley
2007	Olke Uhlenbeck	Northwestern University
2005	Carol Greider	Johns Hopkins University of Medicine
2003	Stephen Kent	University of Chicago
2001	Winslow Briggs	Carnegie Inst. of Washington at Stanford University
2001	Gregory A. Petsko	Brandeis University
1997	Klaus Hahlbrock	Max Planck Institute, Germany
1997	Aziz Sancar	University of North Carolina
1995	Paul Nurse	Imperial Cancer Research, London

Department of Biochemistry

www.biochem.purdue.edu

175 S. University Street
Purdue University
West Lafayette, IN 47907
Phone: 765-494-1600
Fax: 765-494-7897

PURDUE UNIVERSITY

The Department of Biochemistry

Presents

The Bernard Axelrod Lecture

April 23 and 24, 2012

Dan Tawfik

Department of Biological Chemistry

The Weizmann Institute of Science

Brief Biography

Dan Tawfik
Nella and Leo Benoziyo Professor
Department of Biological Chemistry
Weizmann Institute of Science in Rehovot, Israel

Born in Jerusalem, Prof. Tawfik received a B.Sc. in chemistry and biochemistry from the Hebrew University of Jerusalem in 1988, and an M.Sc. in biotechnology in 1990. He did his doctoral work at the Weizmann Institute under the supervision of Profs. Zelig Eshhar and Michael Sela, and was granted a Ph.D. in 1995 on the basis of his thesis: "Towards Antibody-Mediated Peptide Hydrolysis."

In 1996, Prof. Tawfik completed two years of postdoctoral research under Prof. Alan Fersht, at Cambridge University and the MRC Centre for Protein Engineering (UK).

From 1997 to 2001, he held the position of senior research fellow at Sidney Sussex College, as well as at the MRC Centre for Protein Engineering, where he was appointed group leader in chemical biology in 1999. Prof. Tawfik joined the staff of the Department of Biological Chemistry at the Weizmann Institute of Science in the spring of 2001, where he serves now as full Professor. He has received numerous awards and fellowships, including the Sir Charles Clore Prize, the Weizmann Institute's highest honor for a newly-appointed senior scientist, the Wolgin Prize, and the Haim Weizmann Prize by the City of Tel-Aviv, and the EMBO membership.

He entered the field of protein evolution through his interest in enzyme engineering, when he realized that unraveling the mysteries of protein evolution is a charming intellectual endeavor and a powerful way of facilitating protein engineering. Research in the Tawfik laboratory integrates protein science, and chemical and evolutionary biology. Enzymes ranging from hydrolases to DNA methyltransferases are being studied, while addressing both the applicative and fundamental aspects of protein evolution.

How do Proteins Evolve?

Part I: Protein dynamism and evolvability
Monday, April 23 at 3:00
Deans Auditorium (PFEN)

Part II: The divergence of new enzymatic functions
Tuesday, April 24 at 4:00
Deans Auditorium (PFEN)

Proteins present a dichotomy. They are highly robust and remarkably proficient and specific. They can, nonetheless, rapidly change and adopt new structures and functions, as manifested in the rapid emergence of resistance in plants, insects, and bacteria, or of herbicide and pesticide degrading enzymes.

I will describe experimental work aimed at reproducing the evolution of new proteins and unraveling how they evolve. Several properties that underline protein evolvability will be described in the first part, including the functional promiscuity of proteins, their structural plasticity, and the role of chaperones and of neutral mutations in promoting new functions. In the second part, I will show how the fundamental principles outlined in the first part apply to specific cases. These include a bacterial pesticide degrading enzyme that evolved within a few decades, and a family of human anti-arteriosclerotic enzymes that diverged from an innate immunity enzyme. Emphasis will be given to the notion that evolution is an ongoing process. Thus, many enzymes, particularly in secondary metabolism, still exhibit their ancestral function as well as new functions.