

Editor's LETTER

acs
chemical
biology

EDITOR-IN-CHIEF

Laura L. Kiessling
University of Wisconsin, Madison

BOARD OF EDITORS

Jennifer A. Doudna
University of California, Berkeley

Kai Johnsson
Ecole Polytechnique Fédérale de Lausanne

Anna K. Mapp
University of Michigan, Ann Arbor

Michael A. Marletta
University of California, Berkeley

Peter H. Seeberger
Eidgenössische Technische Hochschule

James R. Williamson
The Scripps Research Institute

EDITORIAL ADVISORY BOARD

Carolyn R. Bertozzi
University of California, Berkeley

Brian T. Chait
Rockefeller University

Tim Clackson
ARIAD Pharmaceuticals, Inc.

Jon C. Clardy
Harvard Medical School

Benjamin F. Cravatt
The Scripps Research Institute

Peter B. Dervan
California Institute of Technology

Rebecca W. Heald
University of California, Berkeley

Linda C. Hsieh-Wilson
California Institute of Technology

Tony Hunter
Salk Institute

Stephen C. Kowalczykowski
University of California, Davis

Richard H. Kramer
University of California, Berkeley

Thomas V. O'Halloran
Northwestern University

Hiroyuki Osada
RIKEN

Anna M. Pyle
Yale University

Ronald T. Raines
University of Wisconsin, Madison

Charles Sawyers
University of California, Los Angeles

Stuart L. Schreiber
Harvard University

Peter G. Schultz
The Scripps Research Institute

Michael P. Sheetz
Columbia University

H. Ulrich Stilz
Sanofi-Aventis, Frankfurt

Christopher T. Walsh
Harvard Medical School

A Glowing Tribute

Chemical biology seeks to use chemistry to advance knowledge of living organisms. One of the areas in which chemical biology continues to contribute in a big way is in the development of tools used to visualize living cells and the processes and interactions inside. This year, the Nobel Prize in Chemistry recognizes what is arguably one of the most outstanding achievements in this endeavor.

The 2008 Nobel Prize in Chemistry was awarded to Osamu Shimomura at the Marine Biological Laboratory (Woods Hole) and Boston University Medical School, Martin Chalfie at Columbia University, and Roger Y. Tsien, affiliated with the University of California San Diego and the Howard Hughes Medical Institute “for the discovery and development of the green fluorescent protein”.

Nowadays, laboratories around the world routinely use this protein, but it has been a long road from the isolation from nature to the development of sophisticated multicolor systems for visualizing increasing biological complexity. The three scientists recognized this year by the Nobel Foundation have been instrumental in bringing this technology to biomedical researchers.

It all began in the early 1960s when Shimomura described a protein that he isolated from the jellyfish *Aequorea victoria*. This protein fluoresced intense green under UV light and would later be known as green fluorescent protein or GFP. Over the next few years, Shimomura described the GFP chromophore in detail.

Early on, it was realized what makes GFP unique. Unlike a host of other bioluminescent proteins, GFP does not require external factors or substrates to fluoresce.

Chalfie recognized the potential for using GFP as a marker for studying gene expression in multicellular organisms. The technique is familiar to us all now and needs no introduction, but when his laboratory first demonstrated that it was possible to light up individual touch receptor neurons in *Caenorhabditis elegans*, it was truly a landmark in modern science.

Tsien, the third recipient of this year's prize, elucidated the mechanism by which the GFP chromophore is formed. Engineering this 238-amino-acid protein made it possible to obtain new variants that glowed in others colors. Different proteins can now be tagged with variants to study how these proteins interact.

Last year in *Nature*, building on these earlier studies, Jeff Lichtman and colleagues published a spectacular demonstration of how different fluorescent proteins can be used to map complex interactions. By creating transgenic mice that produce mixtures of different quantities of fluorescent proteins, the authors created a system that they named “Brainbow”. Remarkably, they were able to visualize ~90 different colors in the mouse brain. So it is evident that the Nobel Prize is also an affirmation that this field has a very bright future.

We congratulate Shimomura, Chalfie, and Tsien for their exceptional achievement, and we expect other vibrant applications that build on their pioneering work.

Anirban Mahapatra
Assistant Managing Editor, *ACS Chemical Biology*

10.1021/cb800276d CCC: \$40.75 Published online November 21, 2008 © 2008 by American Chemical Society