BROOKHAVEN NATIONAL LABORATORY

Laboratory Link

September/October 2004

Published by the Community Relations Office
Building 130, P.O. Box 5000
Upton, NY 11973
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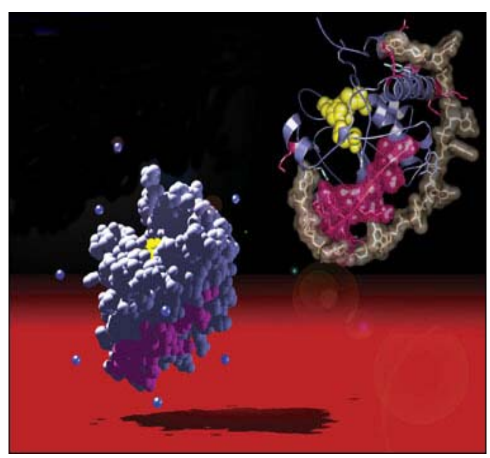
www.bnl.gov

Biophysicist F. William Studier Wins R&D 100 Award for a New Method That Simplifies Protein Production

- F. William Studier, a biophysicist at the U.S. Department of Energy's Brookhaven National Laboratory, has won a 2004 R&D 100 award for developing a new process that simplifies the production of proteins in the widely used T7 gene-expression system.
- Studier started his research on T7 — a common bacteria-eating virus — in 1964, when he first joined Brookhaven Lab. The T7 expression system, which was developed and patented at Brookhaven in the 1980s and 1990s, is used worldwide to produce specific proteins within bacterial cells.
- The Human Genome Project and other genome-sequencing efforts are revealing the full complement of human proteins and those of many other organisms. Expression systems such as the T7 system allow researchers to obtain amounts of individual proteins that are useful for analyzing protein structure and function.
- R&D Magazine gives awards annually to the year's top 100 technological achievements, which are typically innovations that transform basic science into useful products. The 2004 awards will be presented in Chicago on October 14.

First Glimpse of DNA Binding to a Viral Enzyme Offers Help in Designing Antiviral Drugs

- Scientists from Brookhaven Lab and the Albert Einstein College of Medicine have produced the first molecular-scale images of DNA as it binds to an adenovirus enzyme that is called a protease. This step is believed to be essential for the virus to cause infection.
- Adenoviruses cause respiratory, gastrointestinal, and eye infections, including highly contagious viral pink eye. Some eye infections lead to blindness.
- The images showing how DNA and the virus bind, are already are being used to design new antiviral drugs to block this interaction.



Shown are two views of the adenovirus enzyme.

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Discovery May Allow Polymer 'Nanowires' to Be Used in Solar Energy Cells

- Scientists from Brookhaven Lab and the University of Florida have uncovered information that may help "molecular wires" replace silicon in micro-electronic circuits and/or components in solar energy storage systems. Their experiments explored how electric charge is distributed in polymer molecule chains that are several nanometers, or billionths of a meter, long.
- One potential application for their findings is in the solar energy industry, particularly in a new field called "plastic solar." The aim of plastic solar is to replace materials like silicon with polymer nanowires, which are cheaper, lighter, and more flexible.
- Electrons in current plastic solar cells encounter barriers that require more energy to traverse than those that hinder electron movement within typical nanowires. But, before researchers can learn how to eliminate these barriers, they must first understand how the electrons move within single polymer wires.
- In the future, scientists plan to search for ways to increase the conduction efficiency of the wires.

Studies May Lead to a Better Catalyst for the Production of Ammonia

- Research at the Laboratory may lead to a more efficient catalyst for use in the ammonia-production industry, one of the nation's largest industries.
- Ammonia is the fifth most abundantly produced chemical in the United States and ranks second on the list of chemicals requiring the most energy to produce. It is created by combining nitrogen and hydrogen under high temperatures and pressures in the presence of a catalyst usually made from iron.
- Brookhaven scientists have uncovered details about the structure and reactivity of tiny particles of the metal ruthenium, which lead them to believe it could be more efficient in ammonia production than the catalysts currently used. Ruthenium catalysts are rarely used at present, because they do not remain active long enough.
- Continuing studies of ruthenium catalysts may investigate how to use additives, called promoters, to boost ruthenium's effectiveness.

Open to the Public

Pegram Lectures

Richard E. Smalley, winner of the 1996 Nobel Prize in Chemistry for the discovery of a structure of carbon atoms known as a "buckyball," will give a series of two free lectures at Brookhaven Lab as follows:

Tuesday, October 19, 4 p.m., Berkner Hall: Nobel laureate Smalley will explore the difficult problem of supplying the world with energy in the 21st century and beyond in a talk entitled "Our Energy Challenge."

Wednesday, October 20, 11 a.m., Berkner Hall: Professor Smalley will talk about "buckytubes" in a lecture entitled "The Brave New World of Buckyballs." Buckytubes are elongated buckyballs that function as a new high-tech polymer able to conduct electricity.

Due to heightened security, everyone 16 and older who enters the Laboratory site must present a photo ID.