Thirtieth Annual Briefing NEW HORIZONS IN SCIENCE

November 8 through 12, 1992
Radisson Hotel La Jolla
La Jolla, California

CASW *Council for the Advancement of Science Writing, Inc.*

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Sunday, November 8
6:30 p.m. to 9:00 p.m.

Registration and Welcome Reception
Radisson Hotel

Monday, November 9
8:30 a.m. to 11:30 a.m.

ANTIBIOTICS FROM THE SEA: CURES FOR THE NEXT DECADE

William Fenical, Ph.D., Professor of Oceanography and Director,
Marine Research Division, Scripps Institution of Oceanography,
University of California, San Diego

The discovery in 1929 of penicillin triggered the pharmaceutical equivalent of a "gold rush" — an assiduous mining of soil and the microorganisms that inhabit it for other disease-fighting compounds. A wide spectrum of life-saving antibiotics and anti-tumor agents have been uncovered in this way, but the rate of new terrestrial strikes has been decreasing steadily. As a result, scientists have recently begun to turn their attention to a largely untapped resource: ocean-dwelling microorganisms.

DIRECTED EVOLUTION

Gerald F. Joyce, Ph.D., Assistant Professor of Chemistry and Molecular Biology,
The Scripps Research Institute, La Jolla

Scientists suddenly have the wherewithal to take evolution into their own hands — not at the level of organisms, or even cells, but rather at the level of individual biomolecules. Still in its infancy, this new technology, which puts Darwinian principles of evolution (selection, amplification and mutation) to work generating molecules with exquisitely targeted functions, is currently applicable only to populations of DNA and RNA. But strategies for directing evolution of proteins are on the horizon — and with that the means to create novel enzymes.

Monday, November 9
2:30 p.m. to 5:30 p.m.

TOMORROW'S CRYPTOGRAPHY

Charles H. Bennett, Ph.D., Research Scientist, IBM Research Division,
T. J. Watson Research Center, Yorktown Heights, NY

When first proposed over two decades ago, the idea — that two parties who share no secret information initially can nonetheless communicate in secret over public channels with complete confidence that a third party cannot gain access to the message —smacked of science fiction. No longer. Recent experiments suggest that quantum cryptography, which depends on the Heisenberg uncertainty principle, may soon find its way into commercial use, not only to insure eavesdrop-proof exchanges but also for a number of other modern applications.

'DIGGING' 20TH CENTURY ARTIFACTS

Michael B. Schiffer, Ph.D., Professor of Anthropology,
University of Arizona, Tucson

A new breed of scientist, practitioners of a discipline dubbed "behavioral archaeology," contends that there is much to be learned from studying 20th Century artifacts as from unearthing ancient clay pots or decoding cuneiform tablets. These explorers center their attention mainly on objects related to the emergence of latter-day American technology — e.g. the portable radio and the electric car. From this pursuit come surprising and critically important practical lessons that industry and government, worried about global competitiveness and the parlous state of the economy, would do well to heed.

6:00 p.m.

Hospitality Suite open
Free evening

Tuesday, November 10
8:30 a.m. to 11:30 a.m.

HUMAN MONOCLONAL ANTIBODIES

Dennis R. Burton, Ph.D., Member, The Scripps Research Institute, La Jolla

For all its disease-thwarting promise, monoclonal antibody technology has yet to reach its full clinical potential. The main obstacle lies with the fact that monoclonals are mouse-made. Thus, after only a limited number of exposures, the recipient's immune system attacks and destroys these antibodies as it would other foreign agents, making further treatment useless. A variety of protein-engineering tactics aimed at circumventing the rejection problem have been introduced (e.g. construction of human-mouse monoclonal hybrids) but these too have demonstrable drawbacks. Now, a new strategy, antibody combinatorial technology, could open the way to the manufacture of all-human monoclonals.

AIDS: WHAT NEXT?

Flossie Wong-Staal, Ph.D., Florence Riford Chair in AIDS Research,
Professor of Medicine and Biology, School of Medicine,
University of California, San Diego

With no effective preventive or therapeutic measures yet available, the AIDS epidemic, now entering its second decade, seems to have gained the upper hand. But leading researchers think there is reason for optimism. As they see it, recent acquisition of an immense amount of important new knowledge about the human immunodeficiency virus — e.g. how it regulates its growth; how it induces disease — has generated a variety of new ideas for curtailing its spread.

Tuesday, November 10
2:00 p.m. to 5:30 p.m.

SPECIAL SYMPOSIUM: THE BRAIN BRIEF

Ushering in the much-heralded Decade of the Brain with a session focusing on new advances in the neurosciences.

MOLECULES, MEMORY AND DISEASE

Stephen F. Heinemann, Ph.D., Director, Molecular Neurobiology Laboratory,
The Salk Institute for Biological Studies

Glutamate and its extended family of receptors have an early, major say in memory acquisition and learning. The system has also been implicated in a number of neurodegenerative disorders. Now, with the cloning of the receptor genes, researchers are positioned to understand the system at the molecular level and, as a consequence perhaps, uncover ways to either enhance or interfere with the processes it mediates.

GENE THERAPY FOR THE CENTRAL NERVOUS SYSTEM

Fred H. Gage, Ph.D., Professor of Neuroscience, School of Medicine,
University of California, San Diego

One idea is to remove brain cells from patients with disorders attributable, say, to a missing enzyme, furnish said cells with a gene capable of producing the absent agent and then implant these transgenic vehicles directly into the site of the deficiency. Among other things, such a procedure could obviate the need for hard-to-come-by fetal tissue to treat degenerative ills.

MESSAGES: MOLECULAR AND MAGNETIC

Floyd E. Bloom, M.D., Chairman and Member, Department of Neuropharmacology,
The Scripps Research Institute

Recent observations that messenger RNA can accumulate and remain viable in the intracellular spaces of the brain for long periods has raised the possibility of treating brain disorders directly with the brokers of protein manufacture in lieu of gene transplantation. At the same time, a new system for recording brain-generated biomagnetic signals will allow investigators to monitor function, moment by tiny moment, with far greater accuracy than hitherto possible.

ON LEARNING LANGUAGE

Helen J. Neville, Ph.D., Director, Neurophysiology Laboratory,
The Salk Institute for Biological Studies

Pioneering studies with congenitally deaf children have yielded a plethora of surprising new insights into brain plasticity and cognitive function, including the observation that there is a critical developmental "window" during which the brain learns, through experience, how to process language.

Tuesday, November 10
6:30 p.m.

Buses depart for the UCSD Faculty Club.

7:00 p.m.

RECEPTION AND ANNUAL CASW BANQUET

Presentation of the 1992 National Association of Science Writers' Science-in-Society Journalism Awards

Featured Speaker: Richard E. Friedman, Th.D., Professor of Hebrew and Comparative Literature, University of California, San Diego, on *'Science' and the Bible.*

Wednesday, November 11
8:15 a.m.

Buses depart for the UCSD International Relations and Pacific Studies Graduate Autitorium.

Wednesday, November 11
9:00 a.m. to 12 Noon

OPTICAL SILICON
Michael J. Sailor, Ph.D., Assistant Professor of Chemistry,
University of California, San Diego

Made porous by exposure to a simple chemical etching process, silicon chips can be induced to emit intense visible light. That discovery, made just two years ago, has triggered an intense burst of research activity. Today, there is growing conviction that porous silicon will vastly expand the capabilities of silicon-based computers, allowing them to communicate, and possibly think, using light instead of electrons. Moreover, a number of additional properties inherent to porous silicon have since come to light that will likely translate into a host of other, novel applications.

THE TWINKLING CELL
Roger Y. Tsien, Ph.D., Professor of Pharmacology and Chemistry,
Howard Hughes Medical Institute, University of California, San Diego

The goal: to find ways to monitor the chemical traffic inside living cells and the signaling that mediates cell-cell discourse. The plan: build "spy" compounds that when inserted into living cells fluoresce at tell-tale frequencies when "tickled" by target messengers. Researchers have finally succeeded in fabricating molecular sensors designed to provide an extraordinarily intimate look at several, immensely critical agents of cellular communication. Moreover, with the advent of yet another recent innovation, confocal microscopy, they are now able to extend their investigations to thick cells and tissues.

12:30 p.m.

Lunch

1:30 p.m. to 4:00 p.m.

OPTIONAL TOURS OF UCSD MEDICAL/SCIENCE LABS

6:30 p.m.

GALA EVENING
STEPHEN BIRCH AQUARIUM-MUSEUM
UCSD SCRIPPS INSTITUTION OF OCEANOGRAPHY

Reception and exclusive, behind-the-scenes tour of this spanking new, breathtaking facility. Buses will depart the hotel at 6:00 p.m.

Thursday, November 12
8:30 a.m. to 11:30 a.m.

HOT-WATER CHEMISTRY

Andrew Kaldor, Ph.D., Laboratory Director, Resource Chemistry Laboratory,
Exxon Research and Engineering Co., Annandale, NJ

Prevailing dogma has long held that the slow transformation of oil shale to petroleum (and lignite to coal) depends on heat alone. Excluded from consideration was any role for water, even though these fuel sources are known to evolve only in an aqueous environment. But compelling new evidence suggests otherwise. Hot water, it seems, does react vigorously with organic material. Armed with this new knowledge, scientists are working to develop a host of new, environment-enhancing applications, ranging from cleaner fuel processing, to municipal waste disposal, to the recycling of plastics.

THE SEARCH FOR DARK MATTER

Bernard Sadoulet, Ph.D., Professor of Physics and Director,
Center for Particle Astrophysics, University of California, Berkeley

What in the universe is missing? Is it ordinary, "hot" matter, the stuff we are made of? Or is it composed of something altogether different, slow-moving, exotic "cold" particles, like WIMPS and axions? The recent detection of temperature fluctuations in the cosmic background has served to intensify the search for dark matter, whatever its make-up, with several new studies either already underway or on the verge of launch.

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