CASW

COUNCIL FOR THE ADVANCEMENT OF SCIENCE WRITING, INC.

NEW HORIZONS IN SCIENCE

Twenty-Third Annual Briefing

November 3 through November 7, 1985
Tremont Plaza Hotel
Baltimore, Maryland

Co Chairs:

Joann E. Rodgers
Ben Patrusky

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SUNDAY, NOVEMBER 3
6:30 P.M. to 9:00 P.M.

Registration and Welcome Reception, Tremont Plaza

MONDAY, NOVEMBER 4
8:30 A.M. to 11:30 A.M.

OPIATE RECEPTORS: THE NEW LEGACY

Solomon H. Snyder, M.D., Distinguished Service Professor of Neuroscience, Pharmacology and Psychiatry and Director, Department of Neuroscience, The Johns Hopkins University School of Medicine, Baltimore

Probes developed to study opiate receptors in the brain have led recently to major discoveries, including: identificiation of the substance that may lie at the root of peripheral pain perception; synthesis of antagonists that promise fast, effective, topical pain relief; new findings that may help resolve the long-standing mystery of how we recognize thousands of distinct odors.

HANDS-ON MOLECULAR GRAPHICS

Richard J. Feldmann, Computer Specialist, Division of Computer Research and Technology, National Institutes of Health, Bethesda

It may be the most advanced computer graphics system for representing biological molecules and for custom-tailoring proteins and drugs. The user can steer and "dock" interacting molecules—such as an enzyme and its receptor—simply by grasping strings and moving his hands. A feedback mechanism translates the energy of interaction between molecules into string forces that the user can sense directly. The system lets the user look and feel for the optimum fit and, hence, the blueprint for designing the agent(s) that would fulfill the task at hand.

MONDAY, NOVEMBER 4
2:30 P.M. to 5:30 P.M.

THE GREENING PROCESS IN A NEW LIGHT

Constantin A. Rebeiz, Ph.D., Professor of Plant Physiology, University of Illinois, Urbana

Newly acquired knowledge of the greening process—the formation of chlorophyll by plants—may trigger a revision in thinking about plant evolution. On a more practical level, the finings have opened the way to the development of novel herbicides and insecticides; plant growth promoters that increase food yields, and retardants that inhibit the growth of turf grass or other unwanted species; and, ultimately, artificial photosynthetic membranes for converting water, carbon dioxide and sunshine into "solar oil," a renewable source of chemical energy.

HIGH-TECH LIVESTOCK

Thomas E. Wagner, Ph.D., Professor of Cellular and Molecular Biology and Director of the Edison Animal Biotechnology Center, Ohio Univeristy, Athens

In the past, improvement in livestock productivity came by breeding of superior animal strains or treating animals with chemical agents (hormones, vaccines, antibiotics) to enhance yield. Now, with newly developed gene transfer strategies it has become possible to think about applying both techniques—genetic and chemical—in an integrated fashion to achieve significant increases in peformance in a very short time. Dramatic advances are being scored on another, related research front: embryonic cellular engineering. Here, the aim is to persuade nonfertilized eggs isolated from select animals to divide, grow and, ultimately, to create true parthenogenic copies of the highly productive mother.

6:00 P.M.

Hospitality Suite Open.

TUESDAY, NOVEMBER 5
8:30 A.M. to 11:30 A.M.

THE PACKAGING OF DNA IN THE NUCLEUS

Donald S. Coffey, Ph.D., Professor of Urology, Oncology and Pharmacology and Experimental Therapeutics, The Johns Hopkins University School of Medicine, Baltimore.

DNA's form—how it loops and coils within the nucleus—has much to do with its function. The agency of organization is a scaffolding system called the nuclear matrix. This matrix helps explain how DNA, measuring a yard in length, can be packed into the microscopic nucleus with incredible efficiency. From recent studies, it appears that the matrix, composed of hundreds of proteins, also has a major say in genetic dynamics, including DNA replication, RNA synthesis and, ultimately, cell differentiation.

BEHAVIORAL IMMUNOLOGY

Steven F. Maier, Ph.D., Professor of Psychology, University of Colorado, Boulder

Scientists used to think the immune system operated in a biological vacuum, independent and isolated from other body systems. Now, there's an abundance of irrefutable evidence showing the immune system and central nervous system to be intimately linked. And researchers are on their way to ferreting out the details of just how psychological events act upon the body's ability to fight disease. In the offing, as a payoff to this growing insight, are strategies for preventing impairment of immune function stemming from such stressful states as learned helplessness, bereavement and depression.

TUESDAY, NOVEMBER 5
2:30 P.M. to 5:30 P.M.

ARMS CONTROL VERIFICATION: THE TECHNOLOGIES THAT MAKE IT POSSIBLE

David Hafemeister, Ph.D., Professor of Physics, California Polytechnic University, San Luis Obispo

Not as well broadcast as the progress in offensive technologies (which have accelerated the arms race) are the major strides being made in defensive technologies for verifying compliance with arms-control treaties (which could work to defuse the world situation). Given the decision by the U.S. and U.S.S.R. to resume bilateral arms negotiations—and given the climate of mistrust between the two nations—any advance in the quality of verification capability takes on special significance.

TOWARDS A NEW SCIENCE OF COMPLEXITY

Steven Wolfram, Ph.D., Institute for Advanced Study, Princeton

Many natural systems manifest formidibly complicated patterns—snowflakes, turbulent fluid flow, mollusk shells. These, however, have been found to consist of simple components acting in cooperative fashion. Efforts are now underway to understand the mechanisms by which the individual components produce the complexity observed. What's beginning to emerge is a theory of complexity that will have important, practical impact on many areas, from physics to biology to computer design.

6:30 P.M.

ANNUAL BANQUET

Banquet speaker: Donald S. Coffey, Ph.D., Professor of Urology, Oncology and Pharmacology and Experimental Therapeutics, The Johns Hopkins University School of Medicine, on "Human Destiny." Presentation of the 1985 National Association of Science Writers' Science-in-Society Journalism Awards.

WEDNESDAY, NOVEMBER 6
8:30 A.M. to 11:30 A.M.

REMOTE SENSING IN ARCHAEOLOGY

Thomas L. Sever, Remote Sensing Specialist and Archaeologist, National Space Technology Laboratory, NASA, Bay St. Louis

Addressed to the search for extinct human cultures, new advances in remote-sensing technology are being hailed as a breakthrough akin to radiocarbon dating. With new radar, for example, it is possible to penetrate dense jungle canopies in a quest for clues to ancient habitats. There's concern, however, that this technology is not being put to work by archaeologist at a fast enough pace. The sense of urgency grows from the fact that treasure hunters have access to the same technology.

SUPERSTRINGS AND COSMIC STRINGS

Edward Witten, Ph.D., Professor of Physics, Princeton University, Princeton

The search continues for a unified field theory that will explain everthing in physics. The latest approach, called superstring theory, holds special promise in that it clears hurdles encountered by other unifying schemes. A principle feature of the new theory is that it treats subatomic particles as strings, geometric objects extending in one direction. There may be other strings attached to the universe, namely cosmic strings representing topological defects in the tapestry of the universe. The recently discovered millisecond pulsar—the pulsar with the fastest spin—may serve as a unique probe for searching out these irregularities in the cosmic skein.

WEDNESDAY, NOVEMBER 6
2:30 P.M. to 5:30 P.M.

THE ULTRAVIOLET SKY

Arthur F. Davidsen, Ph.D., Director of the Center for Astrophysical Sciences and Professor of Physics and Astronomy, The Johns Hopkins University, Baltimore

Paul D. Feldman, Ph.D., Professor of Physics and Astronomy, The Johns Hopkins University, Baltimore

Set to make its maiden voyage in March, 1986, the new Hopkins Ultraviolet Telescope will open a new window on space. Designed to measure previously unexplored ultraviolet wavelengths from a wide range of celestial objects—stars, galaxies, interstellar matter, supernova remnants and quasars—the telescope will complement observations by the Space Telescope of the same objects at longer wavelengths. HUT's first mission aboard the space shuttle has been timed to coincide with the European and Soviet fly-by missions of Comet Halley.

THE SOFT X-RAY LASER

Dennis L. Mathews, Project Director, Soft X-ray Laser Research, Lawrence Livermore Laboratory, Univeristy of California, Livermore

After more than 15 years of effort, physicists have finally succeeded in extending the range of the laser into the "soft" X-ray region. Once fully developed, the Xraser promises a diverse range of applications, including: three-dimensional holograms of cellular and molecular structures in living organisms; improvements in CAT scanners and other medical X-ray equipment; more precise spectroscopy; analysis of very short-live chemical intermediates as prelude to creation of new materials; and ultra-fine measurements of crystals and surfaces.

6:30 P.M.

COCKTAIL RECEPTION

Hosted by The Johns Hopkins University at the Peabody Institute Library on Mount Vernon Place.

THURSDAY, NOVEMBER 7
8:30 A.M. to 11:30 A.M.

Second Thoughts—a session designed to put fresh perspective on issues that have received heavy media play but are not turning out as envisaged.

ONCOGENES: THE SEARCH CONTINUES

Peter H. Duesberg, Ph.D., Professor of Biology, University of California, Berkley

Andrew P. Feinberg, M.D., Assistant Professor of Oncology and Medicine, The Johns Hopkins University School of Medicine, Bethesda

Upon their discovery a few years ago, oncogenes were thought to hold the answer to cancer. But on the basis of a review of experimental evidence gathered to date, Dr. Duseberg contends that none of the 20 or so putative cancer genes has shown to be necessary or sufficient to cause any human cancer. On the other hand, Dr. Feinberg believes that oncogenes still remain the most promising candidate in the quest for cancer's genesis, although there are criteria still to be met before these genes can be named as the responsible culprits. It may be that other, as-yet unidentified rogue genes will be found to play a role in human malignancy. And beyond that there is the need to unravel, at the molecular level, how these biological fifth columnists get turned on and go haywire.

MASS EXTINCTION: THE UNDERTOLD STORY

Steven M. Stanley, Ph.D., Professor of Earth and Planetary Sciences, the Johns Hopkins University, Baltimore

There has been much speculation about extraterrestrial sources being at the root of mass extinction of living things. Most recently, debate has centered on Earth-comet collisions which happen every 26 million years as a result of perturbations of a hypothetical companion of the Sun (dubbed Nemesis or Death Star). The paleontological evidence, however, argues otherwise, suggesting that there is no regularity to such extinctions. It also says many mass extinctions were gradual rather than sudden events and that global cooling was the true culprit.

ADJOURNMENT