as an internal anticoincidence system. Difficulties with end effects and electronegative impurities should be overcome by this unique system.

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Biomacromolecules: Views and Models

A symposium entitled "Views and Models of Biomacromolecules" was held 15 May 1967 at the New York University Medical Center, New York City. A. K. Kleinschmidt (New York University School of Medicine) discussed the techniques used to determine the size and configuration of nucleic acid strands when removed from the core of different virus particles. The basic techniques consisted of extracting and letting the nucleic acids absorb from a solution to a protein monolayer, either by spreading a protein-nucleic acid mixture, or by utilizing the undisturbed diffusion of the filamentous macromolecules to a preformed absorptive stable film. Extraction of viral nucleic acids in various ways and originating the film can be performed in one step, so that the results show lengths of nucleic acids per virus particle. This was shown mainly with reovirus RNA extracted by urea. These nucleic acids have a tendency to fall apart in short pieces of trimodal size. DNA from many viruses was found in one filament that fit the lengths calculated from the known data of molecular weight. The shape predicted from models in solution was assumed to be transferable to electron micrographs. Measurements of length and end-to-end distances have been used to determine the spatial arrangement. Emma Shelton (National Cancer Institute) discussed the appearance of ribosomes in both monomeric and polymeric states. Using plasma cell ribosomes from neoplastic mice as the experimental material, the development of polyribosomes was traced. The differing degrees of coiling of free and membrane-bound polyribosomes were attributed to the intermolecular forces involved in attachment. Ribosomes polymerize; their smaller subunits bound to the extended messenger RNA give rise to a helical array of polyribosomes. The possibility of the pathway of messenger RNA between the large and small subunits as well as models for the possible method of transfer RNA and polypeptide formation were discussed. Morris J. Karnovsky (Harvard Medical School) demonstrated the use of peroxidases as tracers in the movement of macromolecules through cellular structures. By electron microscopy and measurements of the widths of cell unit membranes, as well as the tracer techniques, it was shown that the vascular channels in endothelial brain cells of rat and mouse were actually open when a small enough tracer was used. The peroxidase tracer and lanthanum nitrate were also used to demonstrate that, in mice, a barrier between blood and brain does exist. The cellular pores are closed between the chorioplexus and the nervous tissue; this may be demonstrated in both directions. Some further experiments to show the reactions of enzymes in muscle T-bands were illustrated with excellent micrographs.

Roderic Park (University of California, Berkeley) discussed the interpretation of cleaved membranes in chloroplasts. The use of freeze-etching and freeze-fracture techniques indicated that the fracture planes are most likely in the lipid layers between the grana. This interpretation is at variance with other workers in Zurich. The interpretation of electron micrographs of freeze-fractured surfaces has become a growing feature of electron microscopic research. It presents views of ultrastructure split at minimum interfacial tension, which varies considerably from previous methods of sample preparation. A very convincing model of chloroplast layers and structures was described and defended by Park. E. Kellenberger (Université de Genève) described experiments with mutants of bacteriophage T4 of *Escherichia coli* which were designed to reveal certain morphological features relating to their positions along the genetic map. The organized T4-phage head and its proteins of double-mutants were identified by electron microscopy and acrylamide gel techniques, combined with the localization of the genes responsible for the morphopoiesis of the phage heads. Some mutants had features which could be used to relate the specific genes responsible for the head formation of the T4 phage, either as a regular, or a prolate icosahedron. Considerable effort has gone into the examination of many mutant T4 strains, to determine precisely which morphological features are the results of the deletion, inclusion, or recombination of specific genes. S. S. Breese, Jr. (Plum Island Animal Disease Laboratory) presented material on the virus of foot-and-mouth disease as a macromolecule. Methods by which physical constants such as sedimentation and diffusion could be determined on impure but infectious samples were discussed. Examples were shown of the formation of crystalline arrays of virus in tissue culture cells and determination of the electron microscopic substructure of the virus. The difficulties of this virus as an experimental model as well as its advantages were pointed out.

The symposium was held under the auspices of the New York Society of Electron Microscopists and the New York University School of Medicine.

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Cellular Dynamics

The fifth conference on cellular dynamics was held at Princeton, New Jersey, 8–11 January 1967. Representatives of many disciplines—medical, biological, and biochemical—convened for a reevaluation, in the light of recent progress in those disciplines, of aging in cells and cell strains. On the assumption that such aging does take place, it was expected that the relation of these processes to more familiar manifestations of the syndrome in whole animals would be examined.

The sessions, arranged by M. D. Rosenberg, were broadly based in the several fields of clinical and biological research from which solutions to problems of aging must eventually flow. The argument that aging of animals is a reflection of aging in cells was reviewed by B. L. Strehler, who described the several classes of hypothesis currently held, and offered a speculative one of his own.

Some populations of fixed, postmitotic cells in the mammalian body show losses in number correlated with the other manifestations of aging. Even those populations for which a decrease in numbers cannot be demonstrated may show age-related loss in functional capacity. However, some cell populations and tissues showing no loss in basal function have, in age, a demonstrably reduced capacity to respond to stress.