

Meetings

Macromolecular Complexes

The Society of General Physiology held its 14th annual meeting at the University of Illinois, Urbana, 7, 8, and 9 September 1959. Contributed papers were presented on these three days, and on 9 September a joint session was held with the American Physiological Society, concurrently holding its fall meeting in Urbana.

The annual symposium of the Society of General Physiology, on the origin and role of complex macromolecular aggregates in development, was organized by M. V. Edds, Jr., and was held in connection with the annual meeting. Proceedings of this symposium will be published by the Ronald Press. This will be the sixth symposium volume published under the auspices of the society.

D. F. Waugh set the mood of the symposium in the first paper. He discussed several aspects of macromolecular interaction which may be involved in the formation of structures visible with the electron microscope, and in functions which begin to emerge at this level. He contended that the specificity of interaction between large molecules can be largely "understood on the basis of short-range interactions between appropriately placed submolecular groups of atoms having different interaction characteristics." In some cases, however, short-range forces seem insufficient to account for the observations. The presence of large amounts of water in some biological systems, for example, poses special problems which have set off speculations about the structure of water, and about long-range forces. None of these speculations, however, has led so far to important increases in our understanding of how "structure is developed and of the relationship between structure and function."

A. Hodge then discussed recent studies which confirm and extend previous hypotheses advanced by F. O. Schmitt and his co-workers concerning the nature of collagen macromolecules and the interaction mechanisms whereby they become aggregated into fibrils. Particularly cogent new evidence was adduced in support of the idea that

the native fibril is composed of tropocollagen units packed in a staggered array, with each unit displaced longitudinally 0.25 of its length in relation to neighboring units. The probable importance of "end chains" in the formation of collagen aggregates was supported by the observation that proteases split a terminal, tyrosine-rich polypeptide from the collagen macromolecule and thereby prevent the formation of end-to-end linkages.

M. J. Glimcher reviewed his general concept of the mechanisms of calcification, with particular reference to the role of the collagen fibril in providing sterically matching sites for crystals of hydroxyapatite. He also considered a substantial body of new evidence bearing on the question of which of the amino acid side chains constitute or contribute to these sites. The epsilon amino groups of lysine and hydroxylysine appear to be of primary importance, as revealed especially by experiments in which the capacity of collagen to initiate mineralization was reversibly inhibited by blocking these groups with FDNB.

The second session of the symposium was devoted to lamellar and fibrous systems. H. Fernández-Morán reviewed the major structural features of representative lamellar systems in the myelin sheath and in photoreceptors and described the advances made possible by the use of improved low-temperature preparative methods. He also discussed the molecular organization of lamellar systems in relation to general concepts of energy transfer processes now emerging from biochemical and biophysical studies.

J. J. Wolken next took up the chloroplast, including its lamellar structure and its molecular organization as a protein-lipid-pigment complex. Citing evidence collected by several techniques, he considered the chloroplast developmentally, structurally, and functionally. Turning to the mitotic spindle as an example of a fibrillar aggregate, H. A. Went described his immunological analyses of the origin of spindle components. His results suggest that the mitotic apparatus contains only two antigens, and that these both occur in the unfertilized egg.

The final session of the symposium dealt with fibrous and particulate aggregates in plants. J. A. Bergeron discussed the submicroscopic chromatophores involved in photosynthesis in the purple sulfur bacterium *Chromatium*. He considered the chromatophore as a pigmented particle with specific physicochemical properties and chemical composition; as the structural and functional unit of photophosphorylation; and as the photochemical organelle. The various data presented were used to construct a model of the ultrastructure of the chromatophore as a complex of protein, lipid, and pigment molecules.

W. J. Nickerson drew attention to the drastic extraction methods previously used to separate the polysaccharide fraction of the yeast cell wall, pointing out that they had obscured both "the importance of protein-polysaccharide complexes as the macromolecular fibers of the cell wall fabric" and the natural structure of the polysaccharide. New data were given for cell walls cleaned by differential centrifugation. The isolation of three protein-polysaccharide complexes was reported, along with their chemical, physicochemical, immunochemical, and electron-microscopic properties.

Lastly, R. D. Preston undertook "to inquire how far present evidence will allow us to go in defining" cellulose-protein complexes involved in the formation and final structure of the cell walls of higher plants. After reviewing the evidence that polysaccharides play a role in stabilizing associated collagen, and that cellulose-protein complexes occur in mammalian tissue, he considered the celluloses of plant cell walls, giving special attention to wall-cytoplasmic interactions. He concluded that while no direct biochemical evidence exists for cellulose-protein complexes, there is good indirect evidence. Further studies of regions in or near the cytoplasmic surface are urgently needed.

The annual business meeting of the society was held 8 September. Newly elected officers were William D. McElroy, president; John Buck, vice president; James W. Green, secretary; and Edward G. Boettiger, treasurer. William Arnold and Harry Grundfest were elected for 2-year terms as councilors. Thirty new members were elected.

The 15th annual meeting of the Society of General Physiologists will be held 6-8 September 1960, at Woods Hole, Mass.

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