Adhesion in Biological Systems

Symposium of AAAS Section on Dentistry, 28–29 December 1967, AAAS Annual Meeting, New York City

Arranged by R. S. Manly (Tufts University School of Dental Medicine)

28 December

Lester R. Cahn (Vice President of Section Nd, AAAS) will welcome participants and deliver an address, "Global Oral Pathology," in the evening.

Systems with Two or Three Biological Phases

Barnet M. Levy (University of Texas Dental Science Institute at Houston), *Chairman.*

Leonard Weiss (Roswell Park Memorial Institute)–*A Biophysical Consideration of Cell Contact Phenomena.*

A. Cecil Taylor (University of Texas Dental Science Institute at Houston)–*Adhesion of Cells to Surfaces.*

Robert Baier, Elaine Shafrin, and W. Zisman (U.S. Naval Research Laboratory)–*Mechanisms Assisting or Impeding Adhesion in Biological Systems.*

Systems with Two Biological Phases

Sholom Pearlman (American Dental Association), *Chairman.*

Nathan F. Cardarelli (University of Akron)–*Barnacle Cements.*

Robert E. Hillman and Paul Nace (William F. Clapp Laboratories of Battelle Memorial Institute)–*Barnacle Cyprid Adhesive Formation.*

C. W. Cooper (Battelle Memorial Institute)–*Adhesion between Tissues by Chemical Bonding.*

29 December

Systems with Two Biological Phases

Peter M. Margetis (Walter Reed Army Medical Center), *Chairman.*

Fred Leonard (U.S. Army Medical Biomechanical Research Laboratory)–*Alpha Cyanoacrylate Polymers and Tissue Adhesion.*

Surindar N. Bhaskar (U.S. Army Institute of Dental Research)–*Clinical Use of Alpha Cyanoacrylates in Dentistry.*

Teruo Matsumoto (Walter Reed Army Institute of Research)–N-*Alkyl-α-Cyanoacrylate Monomers in Surgery.*

Systems with One Biological Phase

Ralph W. Phillips (Indiana University), *Chairman.*

Gilman N. Cyr (Squibb Institute for Medical Research), Ralph Heiser (Squibb Institute for Medical Research), and James Chen (Squibb Institute for Medical Research)–*Compositions Producing Adhesion to Tissue through Hydration: Laboratory Studies and Clinical Observations.*

Henry L. Lee (The Epoxylite Corporation)–*Mechanism of Adhesion of Epoxy Resins to Hard Tissues.*

John D. Galligan and Anthony M. Schwartz (Harris Research Laboratories, Division of the Gillette Research Institute)–*Mechanism of Adhesion of Polyurethanes to Hard Tissues.*

Strong cohesive and adhesive bonds between cells are required for the survival of most land—and sea animals. These bonds hold the fibers in a tendon together and attach tendons to bones. Some marine organisms, such as barnacles, can form strong adhesive bonds, even under water, to such inert surfaces as Teflon, glass, and steel.

Adhesives are being developed to fasten tissues together, and to bond tissues to organic and inorganic substances. Such substances are valuable to surgeons as substitutes for sutures, and to dentists as restorative materials for oral hard tissue lesions.

The topic "Adhesion in Biological Systems" was chosen to provide an interdisciplinary program that might stimulate the sharing of knowledge about adhesion by scientists in hitherto unrelated disciplines. Many scientists in physics, chemistry, zoology, botany, engineering, medicine, pharmacy, and dentistry have special knowledge regarding adhesion. Others in these fields have an interest in and a need for extending their understanding of the mechanisms of adhesion. The emphasis on adhesion in biological systems may provoke the scientists and engineers who have studied adhesion in nonbiological systems to become interested in the mechanism by which biological adhesion is successful in the presence of moisture.

Three phases are involved in the cementation of one solid to another. The symposium begins with a discussion of those systems in which all three phases are of biological origin, such as adhesion among cells in vivo. Next to be considered are systems with two biological phases, involving cementation of living tissues. Finally, systems in which only one phase is of biological origin, such as the cementing of restorations to teeth, or the adhesion of bandages to wounds, are discussed. The program emphasizes adhesion that occurs and remains effective in the presence of moisture. This focuses attention on the mechanisms for adhesion which have biological and clinical applications.

There have been excellent symposia on the theory and action of adhesives commonly used for bonding surfaces of paper, wood, or metal. This program has little overlap with such symposia because our emphasis is on adhesion in the presence of moisture. We will be more concerned with the theories of adhesion, especially as they apply to biological systems, than with the nature of adhesives. It is our hope that our special viewpoint on adhesion theory will lead to an exchange of concepts among scientists in several different fields of knowledge.

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See Science, *22 September 1967, for details about registration, hotel reservations, and tour registration for the AAAS Annual Meeting.*