

the latter argument has considerable merit, there is little evidence that surveillance and audit of antibiotic use has corrected physicians' prescribing habits or their well-documented abuse of antibiotics. Misuse or abuse of antibiotics has contributed to the high incidence of microbial resistance in infections acquired both in and out of the hospital and requires further development of new compounds able to eradicate organisms with seemingly more sophisticated mechanisms of resistance.

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## Bacterial Adherence

**Adhesion and Microorganism Pathogenicity.** Papers from a symposium, London, May 1980. Pitman, London, 1981 (U.S. distributor, Medical Education Administration, Ciba Pharmaceutical Company, Summit, N.J.). x, 346 pp., illus. \$35. Ciba Foundation Symposium 80.

In essentially any environment where both microorganisms and solid surfaces occur, some of the microbes will attach to the surface and may subsequently proliferate and colonize it. This phenomenon has interesting, and frequently serious, implications in a wide range of habitats, including natural waters, soil, industrial containers and pipelines, and plant and animal hosts. This book of symposium proceedings deals specifically with the role of attachment of microbial pathogens in disease but should be fascinating reading for anyone interested in microbial attachment to surfaces.

The papers are roughly organized into three groups. The first group deals with mechanisms of microbial adhesion and includes papers on the attachment of mycoplasmas to inert surfaces and eukaryotic cells, of amoebae to eukaryotic cells, of bacteria to mucosal surfaces and cell-surface sugars, and of viruses to plant protoplasts. The second group deals with the pertinent question of whether adhesion is a dominant factor in pathogenicity, and the significance of adhesion to the pathogenicity of *Escherichia coli*, *Neisseria gonorrhoeae*, malaria merozoites, and chlamydiae (obligate intracellular parasites) is discussed. The third group deals with the ways in which disease may be prevented by inhibiting microbial adhesion and includes papers on aspects of the molecular basis for adhesion, such as the surface glycoproteins of myxoviruses and paramyxo-

viruses and the effects of glycoprotein synthesis or sublethal concentrations of antibiotics on bacterial adhesion. The main facts of these papers are then summarized in a table.

For the most part the papers are of excellent quality, but the real strength of the book lies in the discussions that follow each paper and in the general discussions of the use of glycolipids in receptor assays, streptococcal adherence, terminology, the nature of receptors, other factors affecting adhesion, the relevance of models, and clinical implications. The interchange between participants not only clarifies the answers to questions but also defines subjects for future research. For example, concerning the attachment of streptococci to eukaryotic cells, one participant refers to evidence suggesting that lipid moieties of lipoteichoic acid of streptococci are available for interaction and hypothesizes that the lipoteichoic acid is bound to bacterial surface proteins by hydrogen bonds, thus allowing the lipid ends to flip open as a host membrane approaches and to interact with receptor sites. Such a hypothesis could also help to explain a number of hydrophobic interactions that have been observed between apparently hydrophilic bacteria and hydrophobic surfaces in a range of habitats other than animal hosts. However, none of the other participants can provide theoretical or experimental support for the hypothesis, which only provokes further questions. Other stimulating questions touched on in the papers and explored during the discussions are whether there are examples of mixed bacterial infections where one species promotes or inhibits adhesion of another and whether adhesiveness could be a disadvantage to the pathogen by increasing its potential for interaction with phagocytic cells.

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## Books Received

- Annual Review of Ecology and Systematics.** Vol. 12. Richard F. Johnston, Peter W. Frank, and Charles D. Michener, Eds. Annual Reviews, Palo Alto, Calif., 1981. x, 470 pp., illus. \$20.
- Annual Review of Physical Chemistry.** Vol. 32. B. S. Rabinovitch, J. M. Schurr, and H. L. Strauss, Eds. Annual Reviews, Palo Alto, Calif., 1981. x, 478 pp. \$20.
- Applied Time Series Analysis II.** Proceedings of a symposium, Tulsa, Okla., Mar. 1980. David F. Findley, Ed. Academic Press, New York, 1981. xii, 798 pp., illus. \$49.50.
- The Archaeology of Death.** Robert Chapman, Ian Kinnes, and Klavs Randsborg, Eds. Cambridge University Press, New York, 1981. viii, 160 pp., illus. \$29.50. New Directions in Archaeology.
- Arzneimittelwirkungen.** Ein Lehrbuch der Pharmakologie für Pharmazeuten, Chemiker und Biologen. Ernst Mutschler. Wissenschaftliche Verlagsgesellschaft, Stuttgart, ed. 4, 1981. xviii, 774 pp., illus. DM 68.

- Astronomy Through the Telescope.** Richard Lerner. Van Nostrand Reinhold, New York, 1981. 224 pp., illus. \$29.95.
- Atmospheric Chemistry.** Fundamental Aspects. E. Mészáros. Translated from the Hungarian edition (1977). Elsevier, New York, 1981. 202 pp., illus. \$41.50. Studies in Environmental Science 11.
- Between Science and Values.** Loren R. Graham. Columbia University Press, New York, 1981. xii, 450 pp. \$19.95.
- Bibliography of Bioethics.** Vol. 7. LeRoy Walters, Tamar Joy Kahn, Renée Johnson, and Cecily Orr, Eds. Free Press (Macmillan), New York, and Collier Macmillan, London, 1981. xii, 284 pp. \$55.
- The Biology of Algae and Other Verses.** Ralph A. Lewin. University Press of America, Lanham, Md., 1981. viii, 104 pp. Paper, \$6.75. Reprint of the 1978 edition.
- Brain Mechanisms of Perceptual Awareness and Purposeful Behavior.** Papers from a symposium, Pisa, July 1980. Ottavio Pompeiano and Cosimo Ajmone Marsan, Eds. Raven, New York, 1981. xxii, 494 pp., illus. \$57. International Brain Research Organization Monograph Series, vol. 8.
- The Burnout Syndrome.** Current Research, Theory, Interventions. John W. Jones, Ed. London House Press, Park Ridge, Ill., 1981. vi, 180 pp. Paper, \$12.95.
- Cancer.** An Introduction. William A. Creasey. Oxford University Press, New York, 1981. xiv, 272 pp., illus. Cloth, \$18.95; paper, \$12.95.
- Cell Markers.** G. Jasmin, Ed. Karger, Basel, 1981. xii, 294 pp., illus. \$99.50. Methods and Achievements in Experimental Pathology, vol. 10.
- Cellular Interactions.** Papers from a symposium, Cambridge, England, Sept. 1980. J. T. Dingle and J. L. Gordon, Eds. Elsevier/North-Holland, New York, 1981. xiv, 296 pp., illus. \$80. Research Monographs in Cell and Tissue Physiology, vol. 6.
- Disorders of the Cerebellum.** Sid Gilman, James R. Bloedel, and Richard Lechtenberg, Eds. Davis, Philadelphia, 1981. x, 416 pp., illus. \$40. Contemporary Neurology Series, 21.
- Drug Dependence and Alcoholism.** Vol. 2, Social and Behavioral Issues. Proceedings of a conference, Seattle, Apr. 1978. Arnold J. Schechter, Ed. Plenum, New York, 1981. xxii, 1042 pp. \$39.75.
- Dynamics of Large Mammal Populations.** Charles W. Fowler and Tim D. Smith. Wiley-Interscience, New York, 1981. xviii, 478 pp., illus. \$42.50.
- Ecological Genetics.** David J. Merrell. University of Minnesota Press, Minneapolis, 1981. xii, 500 pp., illus. \$25.
- Educational Policy and Management.** Sex Differentials. Patricia A. Schmuck, W. W. Charters, Jr., and Richard O. Carlson, Eds. Academic Press, New York, 1981. xiv, 338 pp. \$26.50. Educational Psychology.
- Elliptic Problem Solvers.** Proceedings of a conference, Santa Fe, N.M., June 1980. Martin H. Schultz, Ed. Academic Press, New York, 1981. xiv, 444 pp. \$27.50.
- Emission and Scattering Techniques.** Studies of Inorganic Molecules, Solids, and Surfaces. Proceedings of an institute, Alghero, Sardinia, Italy, Sept. 1980. Peter Day, Ed. Reidel, Boston, 1981 (distributor, Kluwer Boston, Hingham, Mass.). viii, 390 pp., illus. \$48. NATO Advanced Study Institutes Series C, vol. 73.
- Endogenous Peptides and Learning and Memory Processes.** Joe L. Martinez, Jr., Robert A. Jensen, Rita B. Messing, Henk Rigter, and James L. McGaugh, Eds. Academic Press, New York, 1981. xx, 588 pp., illus. \$49.50. Behavioral Biology.
- Environmental Speciation and Monitoring Needs for Trace Metal-Containing Substances from Energy-Related Processes.** Proceedings of a workshop, Gaithersburg, Md., May 1981. Frederick E. Brinckman and Richard H. Fish, Eds. National Bureau of Standards, Washington, D.C., 1981. xii, 326 pp., illus. Paper. NBS Special Publication 618.
- Environmental Systems Optimization.** Douglas A. Haith. Wiley, New York, 1982. xiv, 306 pp., illus. \$28.95.
- Essays of an Information Scientist.** Vol. 4, 1979-1980. Eugene Garfield. ISI Press, Philadelphia, 1981. xxii, 780 pp., illus. \$20.
- Etiology and Pathogenesis of Insulin-Dependent Diabetes Mellitus.** Julio M. Martin, Robert M. Ehrlich, and F. John Holland. Raven, New York, 1981. xvi, 296 pp., illus. \$33.50. Advances in Pediatric Research.
- Evaluation Roles in Education.** Arieh Lewy and David Nevo, Eds. Gordon and Breach, New York, 1981. xii, 512 pp., illus. \$35.
- Fear of Fear.** A Survey of Terrorist Operations and Controls in Open Societies. John B. Wolf. Plenum, New York, 1981. xx, 236 pp. \$22. Criminal Justice and Public Safety.

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