



Introduction to the first issue on Biofilms

In recent years, there has been a markedly increased awareness that bacteria in nature rarely exist as discrete individuals, but most often occur in communities; these communities very often are associated with a surface and form a structure known as a biofilm. Consideration of the biofilm paradigm has allowed for a much greater understanding of microbial phenomena, ranging from disease processes to fouling and corrosion. The much-increased interest and research activity in this field prompted the Editors of JIM to initiate Special Issues on Biofilms. Our invitations to participate in the Biofilms Special Issues elicited a heartening and enthusiastic response; so great was the response that we are publishing *two* issues on Biofilms. This first issue (Vol 15, No 3) contains an Introduction by Professor William Costerton, and includes papers devoted to dental, medical and clinical aspects of biofilms. The second issue (Vol 15, No 4) deals with physiological, ecological and environmental aspects. Both issues include both reviews and original research papers.

Typically, in the formation of a biofilm, a surface becomes attractive to microbes by virtue of adsorbed organics or other nutrients; cells become attached, usually via special attachment structures or compounds called adhesins. Any of a number of biopolymers is elaborated by the organisms, resulting in the formation of a viscous matrix, or glycocalyx, in which the cells multiply, and to which additional microbes adhere. Often there may be receptors on some members of the microbial population which are specific for members of other species. This issue contains papers dealing with aspects of the biopolymers involved in biofilm formation.

One important area that has received considerable attention is that of device-related infections. Biofilms containing

pathogenic bacteria frequently develop on such devices as indwelling catheters, biliary stents, cardiac pacemakers, prosthetic heart valves and artificial joints, leading to serious and often intractable infections. Also, biofilms harboring such pathogens as *Legionella* and *Listeria* can develop on various environmental surfaces, leading to outbreaks of infection by these organisms. Several papers in this issue deal with these problems.

A well-known example of a biofilm is dental plaque, a normal coating of the teeth that forms very rapidly after each brushing and/or flossing, and which may play a role in protecting the teeth from adverse environmental conditions and harmful microbes. Under some conditions certain of these microbes may proliferate, leading to the formation of dental caries and/or periodontal disease processes. A number of papers in this Special Issue deal with these dental aspects of biofilms, including how the plaque is formed, the physiology and metabolism of plaque biofilms, and a genetic analysis of adherence by oral bacteria.

Other papers in this issue deal with the adhesion of microorganisms to contact lenses and fibers, and with methods of treating surfaces to eliminate harmful microbes.

We hope that these Special Issues will serve as a reference for workers in the area of biofilms, and that they will stimulate others to appreciate the subject, and attract researchers to contribute to the field.

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