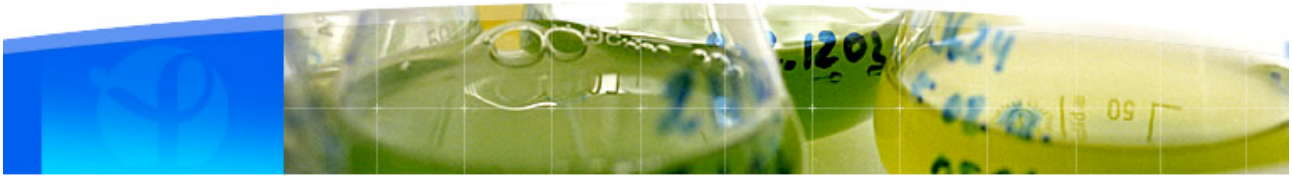

Genetics of Biofilms Laboratory - **URA CNRS2172**

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Annual Report

Biofilms are communities of microorganisms that develop on surfaces in most natural and artificial environments. Biofilm maturation requires cell contact with a surface and cell-cell adhesion counteracting the shear forces of the environment (Figure). Biofilms are characterized by a surface covered by a high number of cells (a film) encased in a self-produced extra cellular matrix, are highly heterogeneous environment, both at structural, physiological and specific levels and biofilm bacteria express still under-explored specific biological properties such as a characteristic increased tolerance to biocides

Biofilms cause sanitary and industrial nuisances.

Besides the positive ecological roles assumed by sessile microbial communities, biofilms that form in industrial and medical settings, in particular on indwelling medical devices, are difficult to eradicate and are therefore associated with both health and economic issues. During the last decade, their negative impact on human activities has stimulated research aimed at providing clues to fight detrimental biofilms

Molecular analysis of bacterial biofilm formation.

The objectives of the studies undertaken in the laboratory are to identify bacterial factors involved in the formation of commensal and pathogenic *Escherichia coli* biofilms, with particular emphasis on biofilm-specific physiological properties and competitive bacterial interactions within mixed biofilms (see www.pasteur.fr/recherche/unites/Ggb).

During the past 5 years, the use of genetic, genomic and molecular biology approaches combined with different biofilm models, has enabled us: **(i)** to identify several bacterial factors promoting both initial surface contacts and bacterial-bacterial interactions during the tri-dimensional development of the biofilm; **(ii)** to study gene regulatory pathways involved in, or specifically associated with, biofilm formation; **(iii)** to investigate functions performed in the heterogeneous biofilm environment both in mono and multispecific contexts and **(iv)** to maintain several close collaborations in which similar questions have been addressed in other microorganisms such as *Salmonella enteritidis, Klebsiella pneumoniae, Staphylococcus aureus, Candida albicans* and *Candida glabrata.*

Fighting against detrimental biofilms

These approaches contribute to a better fundamental understanding of the bacterial biofilm lifestyle. Some aspects of our studies, at the interface between fundamental and clinical/applied researches could also lead, in partnership with the industry, to the development of new strategies to control or limit the extent of pathogenic or detrimental biofilms in situations in which they represent a sanitary, industrial or ecological problem.

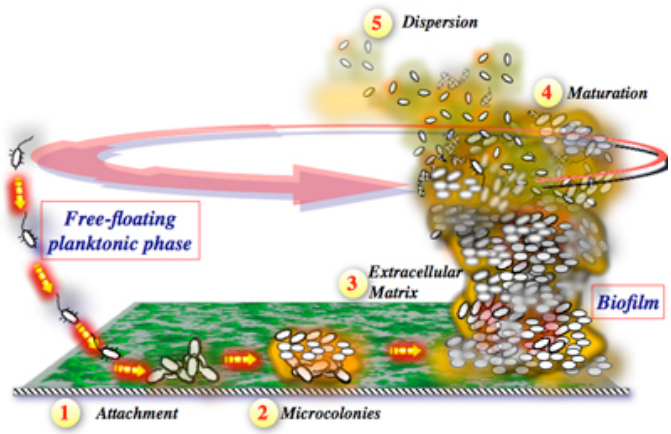

Figure : Essential steps of bacterial biofilm formation

Web Site

More informations on our web site

Publications

Publications 2006 of the unit on Pasteur's references database

Activity Reports 2006 - Institut Pasteur
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