



EPS-Matrix Initiative: Exploring the bacterial biofilm matrix on a protein level

Project Coordinator



Dr. Jean-Marc Ghigo

Institut Pasteur
Groupe de génétique des biofilms
25 rue du Dr Roux
75724 Paris Cedex 15
France
Tel.: +33 1 40 61 34 18
E-Mail: jmghigo@pasteur.fr

Project Description

Biofilms are thin layers of slime embedded with microorganisms. With the assistance of biofilms, microorganisms can amass into communities and settle on variable surfaces. However, they can also cause serious problems on industrial or medical surfaces, affecting health and business. One of the most characteristic biological features that distinguishes biofilms from planktonic populations is the production of a special extracellular matrix around the film, which is assumed to play a structural and protective role. Scientists have already found many polysaccharides that apparently act as building blocks in the structure of this matrix. Moreover, other studies are providing increasing evidence that certain proteins in the matrix also have an important biological function.

Five researcher teams from two countries have now begun the EPS-Matrix initiative under the roof of *ERA-NET Pathogenomics*, which has the aim of taking a closer look at proteins that play non-structural roles within the biofilm matrix of bacterial communities. The scientists are assuming that these proteins are likely to be secreted in the extracellular matrix and that they contribute to many different aspects of the biofilm physiology. It is also assumed that they have a potential role to play in defence or signalling mechanisms, but these cannot be identified with simple biofilm screens. In order to address these issues on a broad basis and to identify general bacterial mechanisms, the scientists are using four model organisms for their *in vitro* mature biofilm studies and proteomic analyses: the infection agents *Salmonella enterica* serovar Enteritidis, *Pseudomonas aeruginosa* and *Staphylococcus aureus*, as well as the gastrointestinal tract inhabitant *Escherichia coli*. This approach is combined with *in silico* analyses of these four bacteria to identify potential bacterial secretion systems that are responsible for delivering these proteins within the matrix. This combination of methods is complemented by various genetic techniques, which help to investigate secretion pathways and the potential biofilm-related role of the identified proteins.

