DESCRIPTION FOR THE GENERAL PUBLIC

Bacteria are delimited by an active barrier called cell wall which is composed by several layers. Among these layers, in some bacteria is present a most external coat that faces with the environment and that is called Surface layer (S-layer). S-layers are composed of one or more proteins repeated in a regular fashion surrounding the whole bacterial cell. Quite amazingly, these repeated units are characterized by self-assembling properties, so that the S-layer has a crystalline regularity.

Despite to the fact that S-layers are broadly spread among bacteria, their function is mysterious and unknown. However, the importance of the S-layer must be pivotal since the bacterial cell spends a lot of efforts to keep it in place and its proteins alone represent between the 10-15% of the total proteins in the cell. The aim of this project is to understand how these proteins are done and work. These information will provide important suggestions that will help in uncovering the mysterious functions associated to S-layers. We will perform these studies on *Deinococcus radiodurans,* a bacterium that is able to efficiently resist a high exposure of gamma, beta and ultraviolet (UV) radiation.

In *D. radiodurans* the S-layer is characterized by a regular porosity. We have found that this pore is a particular type of secretion system type IV (T4P) for which its role in the S-layer context still remain obscure. Since S-layers are cryptic structures diffused among bacteria, including the most nasty human pathogens, the outcome of the present proposal would be extremely important either in terms of basic research and in terms of applied research in important fields such as, for example, medical microbiology.

Suspected functions of this system are related with the S-layer assembling and maintenance and/or with the DNA transfer in and out of the bacterial cell. The present project proposal aims at understanding how this T4P is done through a structural analysis by Transmission Electron Microscopy. Moreover, the present proposal also aims at a compositional characterization of its protein components by a proteomic approach using the very sensitive technique of mass spectrometry. These informations will be merged to provide a final functional and structural overview of the T4P in the structural and functional context of its S-layer.