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.

We have recently shown that this bacterium uses its main S-layer protein, called DR_2577, to withstand UV-radiation. This type of radiation is normally able to kill other bacteria by inducing severe damages to their DNA and proteins. For instance, UVC radiation is responsible for skin diseases and eyes damages. A characteristic of DR_2577 is its pink color, which is provided by the carotenoid deinoxanthin. This carotenoid, also present in other parts of the bacterial cell, contributes to the UV radiation resistance of *Deinococcus radiodurans*. The aim of this project is to understand how the carotenoid deinoxanthin contributes to the protective properties of this S-layer implementing our general understanding of these cryptic structures.