Type of presentation: Poster

LS-6-P-2841 Cryo-electron tomography of the novel Pseudomonas "STACK" structure on vitreous sections and whole plunge-frozen bacteria

Delgado L.[1], Martinez G.[1], Mercade E.[2], Lopez-Iglesias C.[1]

[1]Cryo-Electron Microscopy, Scientific and Technological Centers of the University of Barcelona, Spain., [2]Laboratory of Microbiology, Faculty of Pharmacy of the University of Barcelona, Spain.

Email of the presenting author: clopeziglesias@ub.edu

Cryo-electron tomography of vitrified specimens has enabled the study of cells and their constituents in their natural hydrated state, facilitating the validation and furthering our knowledge of prokaryotic structures. On the one hand, Cryo-electron tomography of vitreous sections (CETOVIS) provides the means to study the structure of cells at high resolution disclosing molecular details. On the other hand, Cryo-electron tomography of plunge-frozen bacteria can produce images of cellular assemblies in the context of the whole cell, enabling the analysis of the spatial distribution of entire structures throughout the bacteria. Both techniques can be used complementarily in order to combine the advantages of each one in the 3D-study of cells.

In our previous work, we described a new bacterial structure, which we named "STACKS", in the Antarctic bacteria Pseudomonas deceptionensis M1T through electron tomography after freeze-substitution and cryo-electron microscopy of vitreous sections (CEMOVIS) (Delgado et al., 2013). Now, we have used cryo-electron tomography of vitreous sections and whole plunge-frozen bacteria to reveal the 3D-structure of the "STACKS" recently described. These techniques confirmed these structures as grouped discs surrounded by a lipid bilayer membrane, usually arranged perpendicularly to the cell membrane and found in variable number and in different locations within the cell. No connection among these new structures and the plasma membrane has been observed in any of the experiments performed, and significant differences have been found between the thickness of the plasma membrane and the layer surrounding the discs, suggesting that the "STACKS" are not invaginations of the plasma membrane.

Delgado, L., Carrión, O., Martínez, G., López-Iglesias, C., Mercadé, E., 2013. PloS One 8, e73297.