

Biofilm biogenesis in *Shewanella oneidensis*: from a complex regulatory network to the exopolysaccharides of the matrix

Keywords: signal transduction, c-di-GMP, polysaccharide, biofilm

Summary

The goal of the proposed project is to better understand the biogenesis of biofilms of the aquatic bacterium model *Shewanella oneidensis*. It was recently shown that biofilm formation in this organism is controlled by a complex regulatory network¹. Strikingly, the major regulator of chemotaxis, involved in the oriented swimming of the planktonic cells, is central to this network. Other players of this network are proteins involved in biosynthesis of and binding to the secondary messenger c-di-GMP. One output of this regulatory system is most probably the biosynthesis and secretion of an exopolysaccharide of an unknown composition, forming the matrix of the biofilm. Using different approaches (molecular biology, genetics, biochemistry, microscopy), we will determine the composition of the exopolysaccharide and the molecular mechanism triggering its biosynthesis. Since several evidences indicate that the regulatory network is more complex than previously shown, we will look for additional c-di-GMP players and determine their role in the regulatory network. The dual role of the central regulator in both chemotaxis and biofilm will be deciphered. Finally, we will question the more general role of this kind of regulator in other bacteria.

¹ Gambari et al. (2019) Environ Microbiol. 21(1): 81–97.

The co-supervisors

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Location

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Doctoral school

Life and Health Sciences (ED 62), Aix-Marseille Université

Expected profile of the candidate

The candidate should have good knowledge in microbiology, molecular genetics, molecular biology and biochemistry. Previous work in the field of bacterial biofilm would be an advantage.