



## Talk

# A novel molecular switch controls assembly and regulation of bacterial focal adhesions

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Host: Florian Schur

Cell motility is central to all biological systems, from bacteria to animals, allowing adaptative responses and multicellular development. In the bacterium *Myxococcus xanthus*, single cells glide using the adventurous motility allowing them to explore new places and invade prey colonies. This motility is dependent on the assembly of bacterial focal adhesion complexes (bFAs) which are macromolecular machines linking the intracellular cytoskeleton to the extracellular substrate. bFAs are composed of (i) a cytoplasmic platform consisting of the MglA-GTP and AglZ proteins, (ii) a molecular motor (Agl) energizing (iii) a multiprotein Glt complex (GltA to GltK) crossing the entire bacterial membrane. bFA assembles at the leading pole of the cell and moves in the direction of the lagging cell pole, attaching to the substrate thus powering the cell directional movement. To date, there is no structural exploration of protein interactions in the Agl-Glt system that would provide a molecular understanding of Glt proteins function in this motility system. Here, we show that the transmembrane Gltj protein contains two cytosolic motifs (ZnR and GYF domains) that link the motility machinery to the cytoplasmic platform. By combining NMR spectroscopy for structure and interaction studies with motility assays and bFAs dynamics by TIRF microscopy, we identified that Gltj drives bFAs assembly by independently recruiting MglA-GTP (Linker) and AglZ (GYF). Remarkably, binding of MglA-GTP causes a switch in the conformation of an adjacent Zinc finger domain (ZnR) that becomes available to recruit MglB, a MglA GTPase-Activating Protein. This binding activates GTP hydrolysis, which dissociates MglA from Gltj thus triggering bFAs disassembly in vivo. Gltj protein thus emerges as a new class of molecular switches which act in concert with GTPases to control bFAs dynamics.

**Monday, May 8, 2023 11:00am - 12:00pm**

Big Seminar Room B / Sunstone Building, Ground Floor

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