

BDR SEMINAR via Zoom

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Wednesday, March 16, 2022

15:30-16:30

Zoom meeting URL will be announced on the event day by e-mail.

※This seminar is only for BDR members.

Powering the bacterial flagellar motor

Summary

Bacteria rotate large filaments known as flagella to swim, which is important to discover new niches or in infectious disease. Rotation of these flagella is powered by the flagellar motor, an extremely complex biological rotary nanomotor connected through a flexible hook to the filament. The motor consists of a large rotor surrounded by, ion channels known as MotAB, which power rotation of the rotor. The exact mechanism of action of these stator units, however, remained unknown.

Using cryo-electron microscopy, we obtained structural insight into these MotAB ion channels. Based on structures of several homologues, we reveal that they actually have 5:2 stoichiometry, rather than the widely accepted 4:2. We furthermore obtained structures of mimics of different states of activated stator units, which we validate using swimming assays. Together, and combined with prior data, our data allow us to propose an ion pathway as well as to model the likely interaction site between the stator unit and the flagellar rotor. Finally, we propose a rotary mechanism involving rotation of MotA around the peptidoglycan-anchored MotB, to power flagellar rotation.



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