

Abstract of Presentation

Presentation Title:

Molecular mechanisms of self-assembly and motion of the bacterial flagellum

Abstract:

The bacterial flagellum is made of a rotary motor and a long helical propeller by means of which bacteria swim. The motor rotates at around 300 Hz and drives the rapid rotation of each flagellum to propel cell movements. The propeller is a relatively rigid, supercoiled filament that switches between left- and right-handed helical forms in response to reversal of the motor rotation, allowing bacteria to alternate their swimming pattern between run and tumble for taxis. A short, highly curved segment called hook connects the motor and the helical propeller, and its bending flexibility makes it work as a universal joint. The flagellum is constructed by self-assembly of proteins translocated from the cytoplasm to the distal end of the growing structure, where cap complexes help efficient self-assembly. We combine electron cryomicroscopy and X-ray diffraction to visualize flagellar structures at near atomic resolution to understand molecular mechanisms of self-assembly and rotation.