1SDA-02  細菌ペニ毛ディスタルロッドの構造解析
High-resolution structure of the bacterial flagellar distal rod

The flagellar rod is a competent drive shaft that transmits torque through the hook to the filament to propel the bacterial locomotion. The distal part of the rod is a helical assembly of FlgG, which shows an obvious sequence similarity with the hook protein. However, the mechanical property of the rod and the hook is quite distinct; the hook is a flexible universal joint, and the rod is a rigid drive shaft. To elucidate the structural basis of the mechanical property of the rod, we crystallized a core fragment of FlgG (FlgG47-227) and solved the structure at 2.0 Å. On the basis of the high resolution X-ray structure and the density map of the poly-rod obtained by electron cryomicroscopy, we will discuss the structure and mechanical property of the flagellar distal rod.

1SDA-03 バチルス属細菌のペニ毛モーター固定子のイオン選択性と運動性
One stator that couples to multiple different ions: flagellar stator and motility of Bacillus spp.
Masahiro Ito (Fac. Life Sci., Toyo Univ.)
The bacterial flagellum acts as the propeller for cell locomotion in a variety of environments. The flagellar motor, consisting of the rotor and the stator, rotates the flagellar filament. All the bacterial flagellar motors characterized so far are energized by either transmembrane electrochemical gradients of protons or sodium ions that are coupled to motility via membrane embedded stator complexes. There are at least four groups of flagellar motors in alkaliphilic Bacillus species as determined by the properties of each flagellar stator. In 2012, our group identified a novel type flagellar motor which stimulates swimming speed under elevated K+ or Rb+ concentrations. In this symposium, we report our current progress on the novel type flagellar stator from Bacillus.

1SDA-04 バクテリア運動の驚異
Wonders of bacterial motility
Howard C Berg (Department of Molecular & Cellular Biology and of Physics, Harvard University)

Much is known about the motile behavior of Salmonella. and Escherichia coli. I will mention some history and then describe two recent vignettes, involving adaptation at the output of the sensory-transduction pathway. Receptor methylation is required for adaptation on the second time scale, which enables cells to make temporal comparisons and swim up spatial gradients of attractants. Without methylation, one still observes partial adaptation, on the minute time scale, as the motor shifts its operating point. The motor also adapts to changes in viscous load. When the load suddenly increases, additional force-generating units are added one by one; thus, the motor is a mechanosensor.