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The structure of the archaellum machinery investigated by cryoEM



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Archaea inhabit a wide variety of environments, ranging from the most extreme to the human microbiome. Archaeal cells move and interact with their surroundings by means of specialised flagella-like filaments, called archaella. The archaellum machinery acts as a cellular multi-tool. Through ATP hydrolysis, the archaellum is capable of rapid gyration and thus allows cells to swim through liquid media. In its resting state, the archaellum filament serves as an adhesion organelle and enables biofilm formation and communication between cells. To understand the mode of action of this versatile and fascinating molecular complex, I have recently solved the first in situ structure of the archaellum machinery using a combination of cryoET, single particle cryoEM and helical reconstruction. This research provides novel insights into archaellum assembly and the working mechanism, furthering our understanding of archaeal motility and interaction.