

Research Project

A Death-Dealing Bacterial Nanomachine

Third-party funded project

Project title A Death-Dealing Bacterial Nanomachine

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Organisation / Research unit

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Type 6 secretion systems (T6SS) are harpoon-like nanomachines that Gram-negative bacterial cells employ to kill other bacterial and eukaryotic cells. Briefly, the T6SS weaponry is tethered to the bacterial cell envelope by a membrane complex, that serves as a platform upon which a baseplate, an extended spring-like sheath and a central spike are assembled. Sheath contraction is biochemically triggered and results in a rapid ejection of the central spike that pierces through a neighboring cell membrane to deliver toxins and other effectors into it. While fluorescence imaging and structural methods have provided deep insight into T6SS structure and function, its destructive mode of action remains unresolved. Here, we will use high-speed atomic force microscope (HS-AFM) imaging, as well as AFM indentation-type force spectroscopy and confocal microscopy (CM) to study the nanomechanical basis by which the T6SS spike punctures bacterial and eukaryotic cell membranes.

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