
Structural basis of cell wall perforation by bacteriophage T5

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Résumé

The vast majority of bacteriophages (phages) - bacterial viruses - present a tail that allows host recognition, cell wall perforation and safe channelling of the viral DNA from the capsid to the cytoplasm of the infected bacterium. The majority of tailed phages bears a long flexible tail (*Siphoviridae*) at the distal end of which a tip complex, often called baseplate, harbours one or more Receptor Binding Protein-s (RBPs). Interaction between the RBPs and the host surface triggers cell wall perforation and DNA ejection, but little is known on these mechanisms for *Siphoviridae*. Here, we present the structure of siphophage T5 tip at high resolution, determined by electron cryo-microscopy, allowing to trace most of its constituting proteins, including 35 C-terminal residues of the Tape Measure Protein. We also present the structure of T5 tip after interaction with its *E. coli* receptor FhuA reconstituted into nanodisc. It brings out the dramatic conformational changes underwent by T5 tip upon infection, *i.e.* bending of the central fibre on the side, opening of the tail tube and its anchoring to the membrane, and formation of a transmembrane channel. These new structures shed light on the mechanisms of host recognition and activation of the viral entry for *Siphoviridae*.

Mots-Clés: Phage T5, Structure, Perforation de la paroi bactérienne, microscopie électronique

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