Institut de Minéralogie et de Physique des Milieux Condensés
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SÉMINAIRE
Lundi 17 Février, 10h30

Salle de Conférence, 4ème étage, Tour 22-23, Salle 1
IMPMC, Université P. et M. Curie, 4, Place Jussieu, 75005 Paris

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STRUCTURE OF A TYPE IV SECRETION SYSTEM BY ELECTRON MICROSCOPY

Bacterial type IV secretion (T4S) systems translocate virulence factors into eukaryotic cells, distribute genetic material between bacteria, and have shown potential as a tool for the genetic modification of human cells. Given the complex choreography of the substrate through the secretion apparatus4, the molecular mechanism of the T4S system has proven difficult to dissect in the absence of structural data for the entire machinery. Here we use electron microscopy (EM) to reconstruct the T4S system encoded by the Escherichia coli R388 conjugative plasmid. We show that eight proteins assemble in an intricate stoichiometric relationship to form a ~3 megadalton (MDa) nanomachine that spans the entire cell envelope. The structure comprises an outer membrane-associated core complex connected by a central stalk to a substantial inner membrane complex that is dominated by a battery of twelve VirB4 ATPase subunits organised as side by side hexameric barrels. Our results show a secretion system with markedly different architecture, and consequently mechanism, to other known bacterial secretion systems.

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