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The bacterial type 3 secretion system: Structure function analysis of a molecular syringe

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Many different bacterial pathogens use protein secretion systems to transport effector molecule into host cells. Effector transport through these systems is essential to establish and maintain host cell infection. To understand host-pathogen interaction and pathogenesis during infection, we analyzed the structure and function of the type 3 secretion system (T3SS) of Gram-negative bacteria including *Shigella flexneri* and *Salmonella typhimurium*. The T3SS is a highly conserved virulence machinery of Gram-negative bacteria that initiates infection by subverting host cell defense mechanisms. Although great efforts were made to elucidate the structure of the T3SS in the last decades, the mechanistic details of the protein transport remains elusive. By using structural biology methods in combination with biochemical and cellular assays we analyzed the assembly and the architecture of the T3SS. Our studies explain the assembly of the T3SS needle and they provide a model of substrate molecule transport. We also developed tools to block substrate molecule transport through the T3SS channel which might help to characterize important steps in the secretion process.

Biography

Michael Kolbe has studied Chemistry at the Universities of Paderborn and Hamburg. Thereafter he has completed his Doctorate on the structure and function of the chloride pump Halorhodopsin at Max-Planck-Institute for Biochemistry and the Ludwig-Maximilians University in Munich. After his Postdoc at the Max-Delbrück Centre in Berlin he joined the Max-Planck-Institute for Infection Biology as Leader of a Junior Research Group. Since the beginning of the year 2015, he is a Professor at the University Hamburg and Head of the Department for Structural Infection Biology at Helmholtz Center for Infection Research.

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