A phospholipase A₁ antibacterial Type VI secretion effector interacts directly with the C-terminal domain of the VgrG spike protein for delivery

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Summary

The Type VI secretion system (T6SS) is a multiprotein machine that delivers protein effectors in both prokaryotic and eukaryotic cells, allowing interbacterial competition and virulence. The mechanism of action of the T6SS requires the contraction of a sheath-like structure that propels a needle towards target cells, allowing the delivery of protein effectors. Here, we provide evidence that the entero-aggregative Escherichia coli Sci-1 T6SS is required to eliminate competitor bacteria. We further identify Tle1, a toxin effector encoded by this cluster and showed that Tle1 pos-

Introduction

The T6SS is built by the assembly of at least 13 proteins encoded by usually clustered genes. A transmembrane complex anchors to the cell envelope a phage-like tail complex that extends from the membrane in the cytoplasm (Coulthurst, 2013; Ho et al., 2014; Zoued et al., 2014; Basler, 2015). The membrane complex serves as docking station for assembly of the tail complex (Durand et al., 2015), a dynamic tubular structure functionally and structurally homologous to the contractile tail of bacteriophages (Bönemann et al., 2009; Leiman et al., 2009; Bönemann et al., 2010; Basler et al., 2012). It is constituted of an inner tube made of stacked hexameric rings of the Hcp protein, whose three-dimensional structure is very similar to that of the bacteriophage tail tube gpV (Mougous et al., 2006; Pell et al., 2009; Ballister et al., 2008; Brunet et al., 2014; Douzi et al., 2014). This Hcp edifice resembles a channel-like tubular structure with a 40-Å internal diameter and is surrounded by a contractile sheath made of the TssB and TssC proteins (Kudryashev et al., 2015). The inner tube/sheath structure is built on an assembly platform – the baseplate – that contacts the membrane