

Investigating the interaction of EtpA and flagellin from enterotoxigenic *Escherichia coli* (ETEC)

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Abstract

Enterotoxigenic *Escherichia coli* (ETEC) is the most common diarrhoea-inducing bacterium with high mortality rates especially in young children. As part of its infection strategy, ETEC invades and colonizes the epithelium of the small intestine where it secretes heat-labile and/or heat-stable enterotoxins to induce diarrhoea. Pathogenicity is further controlled by plasmid and chromosome encoded virulence factors. One of these, EtpA, is a 170 kDa glycoprotein secreted by a two-partner secretion system. EtpA is essential for the effective colonization of intestinal epithelia. As an adhesin it links flagellin (FliC) at the tip of ETEC flagellae to the host cell surface. Previous studies have demonstrated that the N-terminus of EtpA is involved in interactions with flagellin. However, structural information on EtpA and its interaction with flagellin is currently unavailable. Here we describe the first crystal structure of EtpA⁶⁹⁻⁴⁷⁷ from ETEC and confirm its interaction with FliC also from ETEC. Structurally EtpA⁶⁹⁻⁴⁷⁷ forms an extended β -helix known to be particularly stable and hence useful for secreted proteins. Our molecular pull-down assay indicated that EtpA⁶⁹⁻⁴⁷⁷ binds to ETEC FliC in a 1:1 ratio. By contrast, it does not bind to FliC from *E. coli* ATCC 8739. These data provide insight into the structure of ETEC EtpA⁶⁹⁻⁴⁷⁷ and its interaction with ETEC FliC with possible implications for vaccine design.

References

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