

Structure-function analysis of the IpaB transport channel from *Shigella flexneri*

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Shigella flexneri causes dysentery, a severe form of bloody diarrhea. During infection, *Shigella* delivers virulence factors via type III secretion system to invade the host cell and mediate apoptosis in macrophages. *Shigella* lacking Invasion plasmid antigen B, C and D (IpaB, IpaC and IpaD) is non-invasive, resides in the phagosome and fails to induce caspase-1 -mediated apoptosis of macrophages. The mechanisms of *Shigella*-induced cytotoxicity remain unclear. However, our recent data showed that IpaB is a channel in eukaryotic membranes, which needs to be endocytosed to cause apoptosis. The PhD candidate will work on which proteins are transporting virulence factors across host membranes, what is the role of ions in this process and how transport of virulence factors by these proteins is fulfilled. In order to understand the IpaB function biochemical and biophysical techniques will be used.

Publications:

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2. Lunelli M, Lokareddy RK, Zychlinsky A, Kolbe M., IpaB-IpgC interaction defines binding motif for type III secretion translocator., Proc Natl Acad Sci., 106, 9661-6 (2009)
3. Averhoff P, Kolbe M, Zychlinsky A, Weinrauch Y., Single residue determines the specificity of neutrophil elastase for *Shigella* virulence factors., J Mol Biol., 377, 1053-66 (2007)