Eppendorf Young Investigator Award 2011

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"This award is the recognition of the highly focused work of my group over the past years. For me it is the justification to further pursue bacterial pathogenesis and illustrate even more that bacteria are very clever indeed."

Bacterial Immune Escape

The innate immune system is critical in our first line of defense against bacteria. Phagocytes migrate from the blood to the site of infection to engulf and kill bacteria. This is largely dependent on the activation of the complement system, a family of thirty plasma proteins, that label bacteria with opsonins (C3b) to support phagocyte recognition and generate chemo-attractants (C5a) to attract cells to the site of infection. My group discovered that the pathogen *Staphylococcus aureus* secretes a number of proteins that block critical steps in the complement cascade. As a PhD student, I discovered a unique bacterial complement inhibitor (SCIN) that blocks a key enzyme of the complement cascade: the C3 convertase.

In 2005, I started my own research group focusing further on bacterial complement evasion. In close collaboration with crystallographers, I managed to resolve the structure of SCIN in complex with the C3 convertase. This was key to the complement field, since the C3 convertase is highly instable (half-life of 90 s) and its structure could only be revealed thanks to the stabilizing properties of SCIN.

Further, my group has discovered other complement inhibitors in bacteria and we have previously shown that these inhibitors are essential to bacterial virulence *in vivo.* The immune evasion strategies deployed by pathogenic bacteria hold information crucial for future drug development. Bacterial immune escape will be turned into our own advantage, creating new opportunities for treatment of inflammatory and infectious diseases.