Discovery and characterization of novel ubiquitin-targeted effector proteins in pathogenic bacteria

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At the heart of many immune signaling pathways is the essential regulatory modifier ubiquitin, which can signal for many different cellular outcomes including protein degradation or kinase activation. Some bacterial detection pathways even require three or four discrete types of ubiquitin modifications for proper signaling. Unfortunately, pathogenic bacteria have evolved secreted effector proteins that redirect, inhibit, or eliminate host ubiquitin signaling events in order to facilitate invasion, replication, and persistence. Although some families of these ubiquitin-targeted effectors are eukaryote-like in structure and mechanism, others are entirely distinct and likely reflect a strong evolutionary pressure that has led to convergence of function. Our research aims at identifying novel ubiquitin-targeted effectors among human pathogens, characterizing their target specificity and mechanism of action, and evaluating their contribution to infection and disease. I will present our latest findings that demonstrate the remarkable strategies employed by bacteria to subvert host signaling, and highlight how studying these effectors can shed light on both host and microbial biology.