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Role of the polyscaccharide capsule in Bordetella pertussis virulence: A novel capsule-mediated virulence mechanism in a bacterial pathogen

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Abstract

Polysaccharide capsules are important virulent determinants for many bacterial pathogens by providing various protective mechanisms against hostile extracellular environments. Bordetella pertussis, the causative agent of whooping cough, produces a microcapsule at its surface but its role in pertussis pathogenesis remained to be investigated. In this work, we demonstrate that the proteins involved in the polysaccharide export across the bacterial envelope, but not the surface-exposed capsule itself, are involved in B. pertussis virulence. Absence of KpsT, a membrane-associated protein involved in the polysaccharide transport resulted in the down-modulation of a large number of virulence genes which correlated with strong attenuation in vivo. Mechanistically, we provide experimental evidence of a crosstalk between the polysaccharide export machinery and the two-component system BvgA/S which modulates the expression of the great majority of B. pertussis virulence genes in response to environmental stimuli. Our work unravels a novel capsule-mediated virulence mechanism in the bacteria kingdom.

Biography

Alonso obtained a PhD degree in Cellular and Molecular Biology from the University Claude Bernard Lyon I (France). As a post-doctorate fellow at the Pasteur Institute of Lille (France) and Cornell University (Ithaca, USA), she investigated the mechanisms involved in the pathogenesis of Bordetella pertussis and Mycobacterium tuberculosis. She then joined National University of Singapore (NUS) in 2004 in the Department of Microbiology, Yong Loo Lin School of Medicine. She is also a member of the Immunology Programme. Her current research focuses on host-pathogen interactions during bacterial (M. tuberculosis and B. pertussis) and viral (Dengue, Enterovirus 71) infection.