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Clostridium difficile flagellin FliC as an adjuvant to induce a protective gut mucosal immune response

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The role of the bacterial flagellin immunogenicity has been reported. Thanks to its close interaction with the immune system, the flagellin represents an interesting adjuvant and vaccine candidate. *Salmonella typhimurium* flagellin (FLA-ST) has already been tested as an adjuvant to modulate the mucosal immunity. Here we assessed the interest of *Clostridium difficile* flagellin FliC as a mucosal adjuvant, first with ovalbumin (OVA) as antigen, secondly with the C. *difficile* S-layer protein (SlpA). Using OVA as an antigen, we compared the gut mucosal adjuvant capacity of FliC to FLA-ST and to cholera toxin (CT). After immunizations in a mouse model via the intra-rectal or intra-peritoneal route, the mucosal and systemic antibody responses against OVA (IgG and IgA) were analyzed by ELISA in intestinal contents and in sera of immunized mice. In addition, OVA-specific IgA and IgG producing cells were detected in the intestinal lamina propria by ELISPOT. We showed that FliC as an adjuvant in immunization via a mucosal and systemic route was able to stimulate both a gut mucosal and systemic antibody response against OVA. Then, in order to develop a mucosal vaccine to prevent C. difficile intestinal colonization, we assessed the role of FliC as an adjuvant when co-administrated with the C. *difficile* precursor of SlpA as an antigen. Rectal immunizations with SlpA precursor and FliC or CT as adjuvant were performed in a mouse model. After challenge, a significant decrease of C. *difficile* intestinal colonization was observed in immunized groups compared to the control group. Our results showed that the C. *difficile* FliC could be used as an adjuvant in mucosal vaccination strategy against C. difficile infections.

Biography

Jean-François Bruxelle is specialized in host-pathogen interactions acquiring multidisciplinary knowledge in immunology, microbiology and pharmacology. During his PhD, he mastered skills and learned new techniques through vaccine development with characterization of antigens, their vectorization and immunizations assays followed by the study of the immune response induced. His current project focuses on the development of a mucosal vaccine strategy targeting colonization factors of *Clostridium difficile*. The objective is to induce a local protection against C. difficile colonization; which is the first stage of the infection. This strategy could prevent the inflammatory response as well as the dissemination of bacteria in the environment.

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