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In vivo imaging to explore the respiratory tract in a model of Bordetella pertussis infection in non-human primates

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Non-invasive and longitudinal imaging approaches are required to study host/pathogens interactions in relevant animal models. Whooping cough or pertussis, resulting from infection with the bacteria Bordetella pertussis in the respiratory tract is a contemporary medical and public health problem. The deficiencies of current acellular vaccines are well documented, including the striking observation that acellular vaccination of non-human primates (NHP) only protects against disease symptoms but not colonization or transmission. The baboon model of B. pertussis infection has recently shown promising results according clinical symptoms and transmission. To enable the development of more effective vaccine strategies, a better understanding of mechanism of action of the bacteria *in vivo* is needed using this model. We thus implement fluorescence imaging techniques including fibered confocal fluorescence microscopy (FCFM) coupled with bronchoscopy to explore the respiratory tract for visualizing the localization of Bordetella pertussis and its interactions with immune cells after infection ex vivo and *in vivo* in non-human primates. Using GFP-expressing B. pertussis and fluorescent labeled anti-HLA-DR monoclonal antibodies, we were able to specifically detect the bacterial and antigen presenting cells (APCs) localizations and interactions in the lower respiratory tract of young baboons after infection. These preliminary findings confirm previous published *in vitro* data about strong interactions between Bordetella pertussis and dendritic cells and macrophages. This approach using fluorescence imaging will then be a useful tool to describe the mechanisms of action of the bacteria during infection to develop more effective vaccines against pertussis.

Biography

Thibaut Naninck is pursuing his PhD at Infectious Diseases Model for Innovative Therapies Center, France. His project focuses on "Whooping cough physiopathology in non-human primate models and on innovative imaging techniques allowing infection follow-up *in vivo*".

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