

Cellular dynamic of antibody-mediated immune response during nasal vaccination

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Abstract

The purpose of nasal vaccination is to generate long-lasting protection from airway pathogens. Activation of the immune response in nasal associated lymph tissues (NALT) is highly effective through prime-boost vaccination. How the NALT unique structure supports an immune response and why primary vaccinations are less effective, remains unclear. In this study, I examined the dynamics of antigen-specific responses in NALT by intravital imaging. Nasal vaccination-induced B cell expansion in the sub-epithelial dome (SED) whereas T cells originated from inter-follicular regions. T-B interactions were observed in the SED early during the response and clonal expansion in this niche was MHC-II-dependent. Transfer of B cells without cognate-antigen presentation or transgenic T cells was not sufficient to support an immune response whereas the expansion of T cells through initial priming induce germinal center formation. Thus, the amount of antigen-specific T cells in the SED niche is critical to initiating the immune response and explains why prime-boost approaches are highly efficient.