

博士論文(要約)

Immune Regulation by Cytokines and Chemokines  
following Nasal Vaccination

(経鼻ワクチンにおけるサイトカインと  
ケモカインによる免疫制御)

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## 論文の内容の要約

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Mucosal vaccination, especially through nasal administration, is recognized as a promising alternative to conventional parental vaccination for preventing infectious disease. In addition to its superior ability to elicit local mucosal immune responses compared with systemic vaccination, nasal vaccination can achieve protective immunity in both respiratory as well as vaginal mucosa. To develop successful nasal vaccines, we need to understand the cellular and molecular mechanisms that underlie the induction of immunity in the mucosal surfaces of the respiratory and reproductive tissues after nasal immunization. In addition, we need to elucidate the means of immunological crosstalk between different mucosal surfaces. In this thesis, I present how local cytokine and chemokine signaling pathways are involved in the induction of antigen-specific immune responses in the respiratory and reproductive tissues after nasal vaccination. In this context, I revealed a new immunological role of TSLP–TSLPR signaling in the induction of respiratory antigen-specific IgA response after nasal immunization. In addition, I showed that selective signaling due to interaction between a specific chemokine ligand and its receptor is required for the migration of nasally primed effector cells from the nasal mucosa to the vagina after nasal vaccination. Finally, I discussed the implications of my findings in regard to nasal vaccination against respiratory and sexually transmitted diseases, such as pneumococcal infection and genital herpes. This study highlights the effectiveness of

nasal vaccination and the importance of new strategies that activate specific imprinting and homing pathways for the design of nasal vaccines against respiratory and sexually transmitted infectious diseases.