1. No.
   2022Y002

2. Title
   The Effects of Smoking on the Nasal Epithelial Barrier and the Development of Invasive Pneumococcal Infection

3. Period
   2022-2024

4. Summary

   It is well known that smoking is an exacerbating factor for infectious diseases, but the mechanism has not been fully elucidated. *Streptococcus pneumoniae* is an important pathogenic microorganism that causes invasive pneumococcal disease (IPD). In this study, we established a mouse model and demonstrated that exposure of the upper respiratory tract to cigarette smoke extract significantly increases the incidence of invasive infection. *S. pneumoniae* colonizes the nasopharynx and invade deep tissues by breaching the mucosal barrier of the upper respiratory tract. An *in vitro* model demonstrated that cigarette smoke extract may facilitate the invasion of pneumococci into deep tissues by impairing the expression of tight junction-associated molecules between nasopharyngeal epithelial cells and attenuating intercellular adhesion.

   This study shows that exposure of the airway mucosa to cigarette smoke impairs the host's defense mechanism against pneumococci, and is expected to develop preventive strategy against pneumococcal infection among smokers and passive smokers, including children. In future research, we aim to establish a strategy for constructing defense mechanisms in models of upper airway mucosal damage caused by cigarette smoke exposure, not only to warn against smoking but also to establish a strategy for preventing pneumococcal infection among people exposed to cigarette smoke.