

Review article

**Immunological Mechanisms of Barrier Homeostasis of Epithelial Tissues of the Upper Respiratory Tract And Ear**

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**ABSTRACT**

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**Background:** The epithelial tissues of the upper respiratory tract and ear serve as crucial barriers protecting against pathogens and environmental insults. To maintain homeostasis and prevent infections, the immune system employs various immunological mechanisms. This original article investigates the immunological mechanisms involved in barrier homeostasis of the epithelial tissues of the upper respiratory tract and ear, focusing on immune cell populations, mucosal immunity, and epithelial defense mechanisms.

**Methods:** A comprehensive review of existing literature and experimental data was conducted to explore the immunological mechanisms underlying barrier homeostasis in the upper respiratory tract and ear. Key aspects considered include immune cell populations, such as resident and infiltrating immune cells, mucosal immune responses, including secretory immunoglobulins and mucosal-associated lymphoid tissue, and epithelial defense mechanisms, such as innate antimicrobial peptides and mucus production.

**Results:** The findings of this original article demonstrate that multiple immunological mechanisms contribute to barrier homeostasis in the upper respiratory tract and ear. Resident immune cells, including epithelial-associated dendritic cells and macrophages, play a critical role in sensing and responding to pathogens. Infiltrating immune cells, such as neutrophils and lymphocytes, are recruited during infections to enhance defense. Mucosal immunity, mediated by secretory immunoglobulins and mucosal-associated lymphoid tissue, provides specific immune protection at the mucosal surfaces. Epithelial defense mechanisms, including production of antimicrobial peptides and mucus, create a hostile environment for pathogens and aid in clearance and protection of the epithelial barrier.

**Conclusions:** This original article highlights the complex immunological mechanisms involved in maintaining barrier homeostasis in the upper respiratory tract and ear. Understanding these mechanisms is essential for developing strategies to enhance protective immunity and prevent infections. Targeting specific immune cell populations, mucosal immune responses, and epithelial defense mechanisms may offer potential avenues for therapeutic interventions.

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**Keywords:** upper respiratory tract, ear, immunological mechanisms, barrier homeostasis, immune cells, mucosal immunity, epithelial defense.

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