



## Analysis of apoptotic cells in allergic and non-allergic nasal mucosa

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**Background:** Although the mechanisms controlling the resolution of inflammatory processes are still not clear, it is thought that a number of inflammatory cells, including neutrophils and eosinophils, and ingestion of these cells by macrophages may be involved in the apoptotic cell process in allergic or non-allergic nasal tissues. We postulated that apoptosis of inflammatory cells may occur in vivo in nasal mucosa, thus regulating allergic and non-allergic inflammation, and to test this hypothesis we examined apoptotic cells in the nasal tissue of surgical specimens.

**Methods:** Human turbinates were obtained after conchotomy performed on patients with nasal obstruction refractory to medication. Nasal tissues were fixed in formalin and embedded in paraffin. The paraffin-embedded tissues were stained for apoptotic cells by terminal deoxynucleotidyl transferase-mediated deoxyuridine 5'-triphosphate (dUTP) nick end-labeling (TUNEL). To identify cell types undergoing apoptosis, double staining was performed by combining TUNEL and immunohistochemistry.

**Results:** The majority of TUNEL-positive cells were identified as leukocytes. Most TUNEL-positive cells found in these tissues represented granulocytes. A higher proportion of TUNEL-positive cells was found to be macrophages and most TUNEL-positive macrophages had intact nuclei and contained phagocytosed TUNEL-positive material (assumed to be apoptotic cells or bodies) in the cytoplasm.

**Conclusions:** These experiments represent the demonstration of cell type-specific apoptosis in human nasal mucosa. The results may have an important clinical implication and also promote further investigation to control the apoptosis of these cells in health and disease.

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