CHAPTER 15
Therapeutic Approaches to Airway Mucous Hypersecretion

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1. Introduction

Airway mucus is the intraluminal product of glandular and goblet cell exocytosis, vascular permeability, cellular infiltration and desquamation. Factors promoting each of these processes may contribute to a state of
Figure 1. “Mucus” refers to the fluid lining the mucosal epithelium, and is composed of secreted macromolecules derived from glandular and epithelial goblet cell exocytosis and plasma components that exudate across post-capillary venule and epithelial barriers. There is a constant influx of inflammatory cells, and these contribute significantly to mucus during inflammatory conditions. Regulation of these secretory processes by neural reflexes and inflammatory mediator release is complex.

“mucous hypersecretion” (Figure 1). The challenges of quantifying these processes in vivo have made it difficult to determine the relative importance of serous, mucous and goblet cell exocytosis, leak, neural reflexes and inflammatory cell infiltration in various bronchial nasal, sinus and middle ear diseases, and the effects of individual drugs on these processes.

Submucosal glands contain two populations of cells based upon their Alcian Blue-periodic acid Schiff base (PAS) staining characteristics [1, 2]. Essentially all submucosal gland cells in the bronchial and nasal mucosa are PAS-positive, indicating the presence of a high concentration of carbohydrate residues that probably represent mucins [1–3]. Alcian Blue-positive cells are defined as “mucous”, and contain acidic, sulfated carbohydrate polymers (“acid mucin”) [1]. Alcian Blue-negative, PAS-positive cells are thought to contain “neutral mucin”, and have been termed “seromucous” or “serous” [1]. Serous cells of the nasal and bronchial mucosa contain many proteins including lysozyme, lactoferrin, secretory leukocyte protease inhibitor (SLPI) and secretory component. Secretory component