RASHIDA HUSSAIN is from Quetta, Pakistan. She obtained her Master's degree in Zoology from Balochistan University, Quetta, in 2000. From 2000-2004 she has been teaching biology to students preparing for the General Certificate of Education, an academic qualification that has examination boards in the United Kingdom. After that, she has been working as a lecturer in the Sardar Bahadur Khan University, Quetta, Pakistan. In 2008 she received the Master of Science degree in “Biotechnology and Informatics” from Balochistan University of Information Technology, Engineering and Management Sciences, Quetta. She decided to continue her career in Sweden and she has been registered as a PhD student with Professor Godfried M. Roomans since December 2009.

Respiratory epithelium is metabolically very active. Normally, the airway epithelium exhibits the capacity to actively secrete chloride (Cl-) ions and absorb sodium (Na+) ions, which maintains a correct airway surface liquid (ASL) volume, which is necessary for efficient mucociliary clearance. In this regards the cystic fibrosis transmembrane conductance regulator (CFTR), and the epithelial sodium channel (ENaC) are two important ion channels. In addition, the epithelium can produce a variety of cytokines and plays a major role in the recruitment of inflammatory cells in the airways. Synthesis of nitric oxide (NO) in airway epithelia is increased in response to proinflammatory mediators and infection through the action of the enzyme nitric oxide synthase (NOS). Bacterial infection in the airways occurs in all age groups. In cystic fibrosis (CF), *Pseudomonas aeruginosa* is among the most common pathogens in airways. CF is an autosomal-recessive trait resulting from a mutation in CFTR that causes impaired Cl- efflux. Morbidity and mortality in CF are mainly due to the deterioration in the airway epithelia. In neonates, staphylococcal sepsis is a major risk factor for subsequent development of chronic lung disease with bacterial colonization. Thus, the studies presented in this thesis focus on the responses of airway epithelial cells relevant to maintaining homeostasis in the airways.