PULMONARY BIOMECHANICS: PART 2 LOWER AIRWAYS

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INTRODUCTION

Lung structure and respiratory function

The respiratory system has many different functions (physiological, biological) among them a major role in respiration. The aim of respiration is to bring oxygen to living tissues and eliminate carbon dioxide. This is achieved by means of four main mechanisms that should be viewed as capable to respond to the variety of physiological conditions (from rest to heavy exercise): (i) Lung ventilation which supposes back and force motion of air from airway opening to alveoli through a convective / diffusive system (see Fig. 1) governed by macro-scale physical and mechanical principles, (ii) Diffusion of oxygen and carbon dioxide between alveoli and blood through the alveolo-capillary barriers governed by physico-chemical mechanisms, (iii) Transport of oxygen and carbon dioxide by means of blood and body fluids toward the cells and conversely, (iv) Diffusion of oxygen and carbon dioxide between blood and cells, the three later processes being governed by micro/nano-scale chemico-physical phenomena including cell and tissue biomechanics at the micro/nano scale.