Summary

In this dissertation, we have dealt with the effect of mucus and serous fluid on mucus transport in the human lung.

Chapter 1 dealt with the general introduction part, in which anatomy of human lung, mucus, cilia and cilia beating, forced expiration, mechanism of mucus transport in a normal and diseased lung along with some diseases like asthma, COPD, chronic bronchitis have been studied.

Chapter 2 dealt with the literature review of research work done by various investigators related to our work of mucus transport.

Chapter 3 dealt with the mathematical modelling of mucus transport in an airway due to normal cough by considering a two layer model. Cough is represented by a time dependent pressure gradient function. It is assumed that the co-axial flows of mucus and air are taking place in a circular tube model representing an airway. In the central core, air is assumed to flow under quasi-steady state turbulent condition and the mucus layer surrounding this central core is assumed to flow under steady laminar condition.

Chapter 4 dealt with analysis of model. Here the model is solved and graphs are plotted to see the effect of flow of mucus viscosity and mucus layer thickness on mucus transport.

Chapter 5 dealt with the generalized mathematical modelling of mucus transport in an airway due to normal cough by considering a three layer model. Cough is represented by a time dependent pressure gradient function. It is assumed that the co-axial flows of serous, mucus and air are taking place in a circular tube model representing an airway. In the central core, air is assumed to flow under quasi-steady state turbulent condition, the mucus layer surrounding this central core is assumed to flow under steady laminar condition and the serous layer surrounding this mucus layer is assumed to flow under steady laminar condition.

Chapter 6 dealt with analysis of model. Here the model is solved and graphs are plotted to see the effect of flow of mucus and serous fluid viscosity as well as effect of mucus and serous layer thickness on mucus transport.

Conclusion dealt with the effect of Mucus and Serous fluid on mucus transport in the human lung.