

Control of Pulmonary Absorption of Drugs by Various Pharmaceutical Excipients

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In general, drugs are well absorbed from lung, and the pulmonary absorption of therapeutic protein and peptide drugs, which are poorly absorbed from the gastrointestinal tract, was observed. However, the local acting drugs including antiasthmatic agents, bronchodilators and expectorants should be localized for a long period in the lung tissues. In this study, therefore, the effects of various viscous vehicles on the absorption of theophylline and fluticasone propionate after intrapulmonary administration were examined in rats. Consequently, carrageenans were effective to regulate the absorption rate of these drugs. On the other hand, the bioavailability of therapeutic protein and peptide drugs with relatively high molecular weights from the pulmonary route is still poor when compared with the parenteral route. Therefore, we examined the effects of chitosan and chitosan oligomers on the pulmonary absorption of interferon- α and salmon calcitonin in rats. Accordingly, chitosan oligomers were effective for improving the pulmonary absorption of these drugs, and chitosan hexamer appeared to be especially more effective than other oligomers. Furthermore, the present study indicated that chitosan oligomers did not cause any membrane damage to the rat pulmonary tissues. In conclusion, it was suggested that the various pharmaceutical excipients achieved the sustained pulmonary absorption for local acting drugs and the improved pulmonary bioavailability for therapeutic protein and peptide drugs.