

Development of inhibitor-resistant lung surfactant

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2000 Fiscal Year Final Research Report Summary

Development of inhibitor-resistant lung surfactant

Research Project

Project/Area Number

10470316

Research Category

Grant-in-Aid for Scientific Research (B).

Allocation Type

Single-year Grants

Section

一般

Research Field

Anesthesiology/Resuscitation studies

Research Institution

Kanazawa University

Principal Investigator

KOBAYASHI Tsutomu Kanazawa U., School.Med., Professor, 医学部, 教授 (40019922)

Co-Investigator(Kenkyū-buntansha)

TASHIRO Katsumi Kanazawa U.Hospital, Associate Prof., 医学部・附属病院, 講師 (30242556)

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1998 - 2000

Keywords

ARDS / surfactant / dextran / surfactant protein / surfactant inhibitor / surface activity / palmitoyl radical / polymer

Research Abstract

In ARDS, surfactant inhibitors appear and cause respiratory failure. In studies to develop an inhibitor-resistant surfactant, the following results were obtained.

(I) Effects of polysaccharides (dextran). (1) Addition of dextran (40-70kDa) to a mixture of surfactant and serum (a surfactant inhibitor) reversed the inhibited activity and increased tidal volumes of immature newborn rabbits. (2) In rats with ARDS, inhalation of aerosolized surfactant followed by aerosolized dextran improved the lung functions significantly better than that of aerosolized surfactant alone. (3) Dextran reduced surfactant inhibition by meconium, suggesting the therapeutic effects on meconium aspiration syndrome.

(II) Modulation of surfactant proteins. (1) ARDS rats were treated with reconstituted surfactants consisted of synthetic phospholipids plus various doses of surfactant proteins B and C (SP-B & SP-C). It was demonstrated that >0.7% in SP-B and >1.4% in SP-C were needed for the reconstituted surfactant to bring about the therapeutic effects. (2) Monomeric form of SP-C (mSP-C) which lacks palmitoyl radical in the molecular structure does not improve the physiologic function, but polymeric form of

mSP-C shows the physiologic function better than normal SP-C. An application of polymeric form of mSP-C was strongly suggested for development of artificial surfactant to treat ARDS patients.

(III) Additional studies. (1) In immature rabbits, positive end-expiratory pressure reversed serum-inhibited function of lung surfactant. (2) Surfactant replacement reversed respiratory failure caused by inhalation of fabric protector. (3) Propofol reduced inflammatory responses.

Research Products (48 results)

All Other

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