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Amelioration of allergic airway inflammation by fatty acids composition from sea cucumber

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In a previous study, our research group demonstrated that sea cucumber (*Apostichopus japonicus*) extracts ameliorated allergic airway inflammation via CD4⁺CD25⁺Foxp3⁺ T (regulatory T) cell activation and recruitment to the lung. Here, we aimed to determine which components of sea cucumber contribute to the amelioration of airway inflammation. We used n-hexane fractionation to separate sea cucumber into three phases (n-hexane, alcohol, and solid) and evaluated the ability of each phase to elevate Il10 expression in splenocytes and ameliorate symptoms in mice with ovalbumin/alum-induced asthma. Splenocytes treated with the n-hexane phase showed a significant increase in Il10 expression. In the n-hexane phase, 47 fatty acids were identified. Individual fatty acids that comprised at least 5% of the total fatty acids were 16:0, 16:1n-7, 18:0, 18:1n-7, 20:4n-6, and 20:5n-3 (eicosapentaenoic acid). After administering the n-hexane phase to mice with ovalbumin/alum-induced asthma, their asthma symptoms were ameliorated. Several immunomodulatory effects were observed in the n-hexane phase-pretreated group, compared with a vehicle control group. First, eosinophil infiltration and goblet cell hyperplasia were significantly reduced around the airways. Second, the concentrations of Th2-related cytokines (IL-4, IL-5, and IL-13) and Th17-related cytokines (IL-17) were significantly decreased in the spleen and bronchoalveolar lavage fluid. Finally, the concentrations of TGF- β and IL-10, which are associated with regulatory T cells, were significantly increased in the bronchoalveolar lavage fluid and splenocyte culture medium. In conclusion, a fatty acid-rich fraction (n-hexane phase) of sea cucumber extract ameliorated allergic airway inflammation in a mouse model.

Biography

Hak Sun Yu received his Ph.D. degree in veterinary Medicine from Kyungpook National University, Daegu, Republic of Korea. Since 2004, he have been working as Professor in the Dept. of Parasitology at Pusan National University School of Medicine, Busan Republic of Korea. My interests and specialties include parasitology, immune regulation, immunology, molecular biology, and allergy.

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