The Investigation of the Effects of Eicosapentaenoic Acid and Docosahexaenoic Acid on Cultured Human Airway Epithelial Cells

Fatemeh Ramezani Kapourchali, 1 Ahmad Saedisomeolia, 2 Ali Malekshahi Moghadam and 3 Ehsan Kazemnejad Leili

1 Department of Nutrition and Biochemistry, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
2 Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran
3 Guilan Trauma Research Center, Guilan University of Medical Sciences, Rasht, Iran

Abstract: Fatty acid composition has an important role in cellular structure and function. Inflammatory behavior of the airway epithelial cells can be changed due to the manipulation of their fatty acid content, which has a critical importance in asthma. The objective of the present study was to determine the fatty acid composition of human airway epithelial cells after co-culturing with eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Hence, airway epithelial cells (Calu-3, Passage 40-43, from ATCC, USA) were incubated with different concentrations (0, 10, 200, 400μM) of EPA and DHA for 24h at 37°C in the presence of 5% CO2 and the incorporation of fatty acids was analyzed using gas chromatography (GC). Findings showed that there was a significant decreasing trend in the concentration of n-6 polyunsaturated fatty acids (PUFAs) and nonsignificant increasing trend in total n-3 PUFAs due to EPA and DHA supplementation. As a result of EPA incorporation, the levels of saturated fatty acids (SFAs), monounsaturated fatty acids (MU FAs) and DHA declined significantly. On the contrary, docosapentaenoic acid (DPA) content elevated markedly due to EPA supplementation. The EPA concentration increased
significantly as a consequence of DHA incorporation. Additionally, the n-3/n-6 ratio elevated notably in both DHA and EPA supplemented groups. In conclusion, incorporation of DHA and EPA can alter the fatty acid content of airway epithelial cells in a way which has a lower inflammatory characteristic.

**Key words:** Airway epithelial