

DIETARY FAT ENHANCES AIRWAY INFLAMMATION IN ASTHMA

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Dietary fat activates innate immune responses, leading to an increase in systemic inflammation. However, the effect of dietary fat on airway inflammation has not been investigated. We hypothesised that a high fat intake may lead to increased airway neutrophilia in asthma. The aim of this study was to examine the effect of a high fat versus low fat food challenge on airway inflammation in asthma.

Methods: Non-obese subjects with asthma were randomized to receive a high fat/ high energy (HF) (n=14) or low fat/ low energy (LF) (n=16) food challenge. 16 obese subjects also received a HF challenge. Subjects on the HF challenge consumed a meal containing 4480 kJ, including 52% of energy (60g) from fat. Subjects on the LF challenge consumed a meal containing 840 kJ, including 13% of energy (3g) from fat. At baseline, hypertonic saline challenge and clinical assessment were performed. Induced sputum samples were collected at baseline and at 4 hours. Airway inflammatory markers included induced sputum total and differential cell counts, IL-8 and neutrophil elastase, measured by commercial assay. TLR4 mRNA expression from sputum cells was measured using RT-PCR.

Results: At 4 hours after the food challenge, subjects on the HF challenge, had a significantly higher increase in %sputum neutrophils (16.4 (4.4 (SEM)) % vs 3.4 (4.1) %, $p = 0.044$) and higher fold increase in TLR4 mRNA expression (2.06 (1.3-5.4 (IQR)) vs 1.00 (0.6 – 1.4), $p = 0.037$), compared to the LF challenge. Subjects on the HF challenge also had an impaired bronchodilator response, with a lower increase in FEV1/FVC% at 4 hours compared to the LF challenge (1.0 (-2.0-2.6 (IQR)) % vs 4.5 (2.7-6.8) %, $p = 0.001$). There were no differences in the responses of obese vs non-obese asthmatics to the HF challenge. **Conclusions:** A high fat/ high energy challenge causes an increase in airway inflammation and suppresses bronchodilator response in asthma. Strategies aimed at reducing dietary fat intake may be useful in reducing inflammation in asthma.

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