ABSTRACT ‘TO 069’

DIETARY INFLAMMATORY INDEX IS RELATED TO ASTHMA RISK, LUNG FUNCTION AND SYSTEMIC INFLAMMATION IN ASTHMA

WOOD L 1, SHIVAPPA N 2, BERTHON B 1, GIBSON P 1,3, HEBERT J 2

1 University of Newcastle, NSW, Australia, 2 University of South Carolina, SC, USA, 3 John Hunter Hospital, NSW, Australia

Introduction: Asthma prevalence has increased in recent years and evidence suggests that diet may be a contributing factor. Increased use of processed foods has led to a decrease in diet quality, which may be creating a pro-inflammatory environment, thereby leading to the development and/or progression of various chronic inflammatory diseases and conditions. Recently, the Dietary Inflammatory Index (DII) has been developed and validated to assess the inflammatory potential of individual diets.

Aim: To examine the DII in subjects with asthma compared to healthy controls and to relate the DII to asthma risk, lung function and systemic inflammation.

Methods: Subjects with stable asthma (n = 99) and healthy controls (n = 61) were recruited. Blood was collected and spirometry was performed. The DII was calculated from food frequency questionnaires administered to study subjects.

Results: The mean DII score for the asthmatics was higher than the DII score for healthy controls (−1.40 vs. −1.86, p = 0.04), indicating their diets were more pro-inflammatory. For every 1 unit increase in DII score the odds of having asthma increased by 62% (OR: 1.62, CI: 1.01, 2.60). FEV1 was significantly associated with DII score (β=−3.22, p = 0.04), indicating that for every 1 unit increase in DII score, FEV1 decreased by 3.22 times. Furthermore, plasma IL-6 concentrations were positively associated with DII score (β=0.1213, p = 0.0015).

Conclusion: The usual diet consumed by asthmatics in this study was pro-inflammatory relative to the diet consumed by the healthy controls, as assessed using the DII score. The DII score was associated with lower lung function and increased systemic inflammation. Hence, consumption of pro-inflammatory foods in the diet may contribute to worse asthma status.
THE ROLE OF DIETARY FATTY ACIDS IN TRANSPORT OF SALBUTAMOL ACROSS CALU-3 EPITHELIA

ABSTRACT ‘TO 072’

THE ROLE OF DIETARY FATTY ACIDS IN TRANSPORT OF SALBUTAMOL ACROSS CALU-3 EPITHELIA

HAGHI M 1,2, CHRZANOWSKI W 3, TRAINI D 1,2, WOOD L 4, OLIVER B 1,2, YOUNG P 1,2

1 Woolcock Institute of Medical Research, 2 Discipline of Pharmacology, Faculty of Medicine, The University of Sydney, 3 Faculty of Pharmacy, The University of Sydney, 4 Centre for Asthma and Respiratory Diseases, The University of Newcastle

Introduction: Western diets are characterized by the use of processed foods, high in dietary fat. The effect of consuming high fat meal (mixture of saturated fatty acids (SFAs) and polyunsaturated fatty acids (PUFAs)) in asthmatic subjects demonstrated a reduced bronchodilator response to salbutamol. One potential mechanism by which FAs may interfere with bronchodilation involves inhibition of drug transport across the airway epithelium.

Methods: The aim of this study was to investigate the impact of FAs (arachidonic acid, palmitic acid and eicosapentanoic acid) exposure on salbutamol transport through Calu-3 sub-bronchial epithelial cells. Calu-3 cells were seeded on Transwells using a fat-free medium and were used for transport study after 12 days. The cells were incubated for one h with 30μM of each FA and the basal medium was replaced with Hanks buffer. Salbutamol solution was then added to the apical to a concentration of 100μM. After 4 h the concentration of salbutamol was analyzed using high performance liquid chromatography. To investigate the influence of FAs on cell stiffness related to membrane structure/permeability, cells were probed using molecular force probe.

Results: Analysis of data suggested that the amount of salbutamol transported in presence of PUFAs to be significantly higher compared to incubation with SFA or transport in the fat-free culture medium. No significant differences were observed between n-6PUFA and n-3PUFA. Furthermore, the analysis of cell stiffness showed a significant drop in stiffness following incubation with PUFAs.

Conclusion: The findings of this study suggest that the presence of PUFAs is essential for membrane fluidity. It was observed that under physiologically relevant conditions, the transport of salbutamol is sensitive to alterations in the FA environment. This provides the first evidence that the transport of β-2agonist can be modified by dietary fat consumption.