

High-fat Western diet alters silica-induced airway epithelium ion exchange but not airway smooth muscle reactivity_dataset

Introduction

Silicosis is an irreversible occupational lung disease resulting from crystalline silica exposure. Previously, we discovered that Western diet (HFWD)-consumption increases susceptibility to silica-induced pulmonary inflammation and fibrosis. This study investigates the potential of HFWD to alter silica-induced effects on airway epithelial ion transport and smooth muscle reactivity.

General description of data collection methods

This was a laboratory-based investigation that utilized a rat model to study the effects of a high-fat Western diet on silica-induced changes in airway epithelial ion transport and airway smooth muscle reactivity. Six-week-old male F344 rats were fed a HFWD or standard rat chow (STD) and exposed to silica (Min-U-Sil 5®, 15 mg/m³, 6 h/d, 5 d/wk, for 39 d) or filtered air. Experimental endpoints were measured at 0, 4, and 8 wk post-exposure. Transepithelial potential difference (V_t), short-circuit current (ISC) and transepithelial resistance (R_t) were measured in tracheal segments and ion transport inhibitors [amiloride, Na⁺ channel blocker; NPPB; Cl⁻ channel blocker; ouabain, Na⁺, K⁺-pump blocker] identified changes in ion transport pathways. Changes in airway smooth muscle reactivity to methacholine (MCh) were investigated in the isolated perfused trachea.

Publication based on the data set

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