Allergic asthma induced in rhesus monkeys by house dust mite (Dermatophagoides farinae).

To establish whether allergic asthma could be induced experimentally in a nonhuman primate using a common human allergen, three female rhesus monkeys (Macaca mulatta) were sensitized with house dust mite (Dermatophagoides farinae) allergen (HDMA) by subcutaneous injection, followed by four intranasal sensitizations, and exposure to allergen aerosol 3 hours per day, 3 days per week for up to 13 weeks. Before aerosol challenge, all three monkeys skin-tested positive for HDMA. During aerosol challenge with HDMA, sensitized monkeys exhibited cough and rapid shallow breathing and increased airway resistance, which was reversed by albuterol aerosol treatment. Compared to nonsensitized monkeys, there was a fourfold reduction in the dose of histamine aerosol necessary to produce a 150% increase in airway resistance in sensitized monkeys. After aerosol challenge, serum levels of histamine were elevated in sensitized monkeys. Sensitized monkeys exhibited increased levels of HDMA-specific IgE in serum, numbers of eosinophils and exfoliated cells within lavage, and elevated CD25 expression on circulating CD4(+) lymphocytes. Intrapulmonary bronchi of sensitized monkeys had focal mucus cell hyperplasia, interstitial infiltrates of eosinophils, and thickening of the basement membrane zone. We conclude that a model of allergic asthma can be induced in...
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rhesus monkeys using a protocol consisting of subcutaneous injection, intranasal instillation, and aerosol challenge with HDMA.