Suppressive effect of 3-O-methylquercetin on ovalbumin-induced airway hyperresponsiveness

施純明

Ko WC;Shih CM;Chen MC;Lai YH;Chen JH;Chen CM;Lin CN

摘要

Abstract

Rhamnus nakaharai Hayata (Rhamnaceae) has been used as a folk medicine in Taiwan for treating constipation, inflammation, tumors, and asthma. 3-O-Methylquercetin (3-MQ), a main constituent of the plant, has been reported to inhibit total cAMP-and cGMP-phosphodiesterase (PDE) of guinea pig trachealis at low concentrations. 3-MQ has been also reported to more selectively inhibit PDE3 than PDE4 with a low Km value. Therefore we were interested in investigating its suppressive effects on ovalbumin (OVA)-induced airway hyperresponsiveness in vivo and in vitro. 3-MQ(3 - 30 pmol/kg, i.p.) significantly suppressed the enhanced pause (Penh) value induced by aerosolized methacholine (50 mg/mL) in sensitized mice after secondary allergen challenge. 3-MQ (3-30 μmol/kg, i.p.) also significantly suppressed total inflammatory cells, macrophages, neutrophils, and eosinophils, but not lymphocytes. In addition, 3-MQ (3 μmol/kg, i.p.) significantly decreased the secretion of TNF-α, and at the highest dose (30 pmol/kg, i.p.) even decreased the secretions of IL-4, IL-5, and TNF-a. 3-MQ(1 - 10 μM) as well as Ro 20 -1724 (3- 30 μM), a selective PDE4 inhibitor, significantly attenuated OVA (100 μg/mL)-induced contractions. 3-MQ(30 pM) as well as milrinone (1 - 10 μM), a selective PDE3 inhibitor, significantly enhanced baseline contractions in isolated guinea pig left and right atria. However, neither 3-MQ nor milrinone significantly affected baseline beating rate in the right atria. 3-MQ (3 - 30 pmol/kg, i.p.) did not significantly affect systolic pressure in conscious mice. In conclusion, 3-MQ has both anti-inflammatory and bronchodilating effects, and has the potential for use in the treatment of asthma at a dose without affecting blood pressure.