The flavonoid quercetin reverses pulmonary hypertension in rats

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Quercetin is a dietary flavonoid which exerts vasodilator, antiplatelet and antiproliferative effects and reduces blood pressure, oxidative status and end-organ damage in humans and animal models of systemic hypertension. We hypothesized that oral quercetin treatment might be protective in a rat model of pulmonary arterial hypertension. Three weeks after injection of monocrotaline, quercetin (10 mg/kg/d per os) or vehicle was administered for 10 days to adult Wistar rats. Quercetin significantly reduced mortality. In surviving animals, quercetin decreased pulmonary arterial pressure, right ventricular hypertrophy and muscularization of small pulmonary arteries. Classic biomarkers of pulmonary arterial hypertension such as the downregulated expression of lung BMPR2, Kv1.5, Kv2.1, upregulated survivin, endothelial dysfunction and hyperresponsiveness to 5-HT were unaffected by quercetin. Quercetin significantly restored the decrease in Kv currents, the upregulation of 5-HT2A receptors and reduced the Akt and S6 phosphorylation. In vitro, quercetin induced pulmonary artery vasodilator effects, inhibited pulmonary artery smooth muscle cell proliferation and induced apoptosis. In conclusion, quercetin is partially protective in this rat model of

PAH. It delayed mortality by lowering PAP, RVH and vascular remodeling. Quercetin exerted effective vasodilator effects in isolated PA, inhibited cell proliferation and induced apoptosis in PASMCs. These effects were associated with decreased 5-HT2A receptor expression and Akt and S6 phosphorylation and partially restored Kv currents. Therefore, quercetin could be useful in the treatment of PAH. © 2014 Morales-Cano et al.