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Capsaicin-induced metabolic and cardiovascular autonomic improvement in an animal model of the metabolic syndrome.

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Abstract
The metabolic syndrome (MetS) is associated with an increased risk of cardiac mortality, as it is characterised by the clustering of multiple cardiovascular risk factors. Studies have shown that capsaicin (red pepper) may be useful as a nutraceutical, ameliorating metabolic profile and cardiovascular function. The aim of the present study was to investigate the cardiovascular and metabolic effects of orally administered capsaicin in rats with the MetS. Neonate spontaneously hypertensive rats were injected with monosodium glutamate and subjected to one of the following three treatments by oral administration for 14 d, between 27 and 30 weeks: low-dose capsaicin (CAP05, n 18, synthetic capsaicin powder diluted in a vehicle (10 % ethyl alcohol) plus 0·5 mg/kg body weight (BW) of capsaicin); high-dose capsaicin (CAP1, n 19, synthetic capsaicin powder diluted in a vehicle (10 % ethyl alcohol) plus 1 mg/kg BW of capsaicin); control (C, n 18, vehicle). Lee’s index, lipid/metabolic profile, and cardiovascular parameters with the rats being conscious, including arterial pressure (AP) and heart rate (HR) variability, as well as aortic wall thickness (haematoxylin and eosin staining) and CD68 (cluster of differentiation 68) antibody levels (monocyte/macrophage immunostaining) were evaluated. Weight, Lee’s index, and lipid and metabolic parameters, as well as AP and HR and aortic wall thickness, were similar between the groups. Capsaicin determined HR variability improvement (16·0 (sem 9·0), 31·0 (sem 28·2) and 31·3 (sem 19·0) ms² for the C, CAP05 and CAP1 groups, respectively, P= 0·003), increased vascular sympathetic drive (low-frequency component of systolic AP variability: 3·3 (sem 2·8), 8·2 (sem 7·7) and 12·1 (sem 8·8) mmHg² for the C, CAP05 and CAP1 groups, respectively, P< 0·001) and increased α-index (spontaneous baroreflex sensitivity). The present data show that capsaicin did not improve lipid and glucose abnormalities in rats with the MetS. However, beneficial cardiovascular effects were observed with this nutraceutical.

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