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An orally active angiotensin-(1-7) inclusion compound and exercise training produce similar cardiovascular effects in spontaneously hypertensive rats.

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Abstract

Low angiotensin-(1-7) (Ang-(1-7)) concentration is observed in some cardiovascular diseases and exercise training seems to restore its concentration in the heart. Recently, a novel formulation of an orally active Ang-(1-7) included in hydroxy-propyl-beta-cyclodextrin (HPB-CD) was developed and chronically administered in experimental models of cardiovascular diseases. The present study examined whether chronic administration of HPB-CD/Ang-(1-7) produces beneficial cardiovascular effects in spontaneously hypertensive rats (SHR), as well as to compare the results obtained with those produced by exercise training. Male SHR (15-week old) were divided in control (tap water) or treated with HPB-CD/Ang-(1-7) (corresponding to 30µgkg(-1)day(-1) of Ang-(1-7)) by gavage, concomitantly or not to exercise training (treadmill, 10 weeks). After chronic treatment, hemodynamic, morphometric and molecular analysis in the heart were performed. Chronic HPB-CD/Ang-(1-7) decreased arterial blood pressure (BP) and heart rate in SHR. The inclusion compound significantly improved left ventricular (LV) end-diastolic pressure, restored the maximum and minimum derivatives (dP/dT) and decreased cardiac hypertrophy index in SHR. Chronic treatment improved autonomic control by attenuating sympathetic modulation on heart and vessels and the SAP variability, as well as increasing parasympathetic modulation and HR variability. Overall results were similar to those obtained with exercise training. These results show that chronic treatment with the HPB-CD/Ang-(1-7) inclusion compound produced beneficial effects in SHR resembling the ones produced by exercise training. This observation reinforces the potential cardiovascular therapeutic effect of this novel peptide formulation.

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