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Taurine and magnesium supplementation enhances the function of endothelial progenitor cells through antioxidation in healthy men and spontaneously hypertensive rats.

Katakawa M[1], Fukuda N[2,3], Tsunemi A[3], Mori M[4], Maruyama T[3], Matsumoto T[1], Abe M[3], Yamori Y[4].

Author information

1 Division of Cell Regeneration and Transplantation, Department of Functional Morphology, Nihon University School of Medicine, Tokyo, Japan.
2 Nihon University Research Center, Tokyo, Japan.
3 Division of Nephrology Hypertension and Endocrinology, Department of Medicine, Nihon University School of Medicine, Tokyo, Japan.
4 Mukogawa Women's University, Institute for World Health Development, Nishinomiya, Hyogo, Japan.

Abstract

Endothelial damage is repaired by endothelial progenitor cells (EPCs), which are pivotal in preventing cardiovascular diseases and prolonging lifespan. The WHO Cardiovascular Diseases and Alimentary Comparison Study demonstrated that dietary taurine and magnesium (Mg) intake suppresses cardiovascular diseases. We herein evaluate the effects of taurine and Mg supplementation on EPC function and oxidative stress in healthy men and spontaneously hypertensive rats (SHRs). Healthy men received taurine (3 g per day) or Mg (340 mg per day) for 2 weeks. SHRs and Wistar-Kyoto (WKY) rats were housed with high-salt drinking water (1% NaCl). The SHRs received 3% taurine solution and/or a high-Mg (600 mg per 100 g) diet for 4 weeks. Their peripheral blood mononuclear cells were separated to quantify EPC colony formation. Oxidative stress markers in their peripheral blood were evaluated using a free radical analytical system and a thiobarbituric acid reactive substance (TBARS) assay. Taurine and Mg supplementation significantly increased EPC colony numbers and significantly decreased free radical levels and TBARS scores in healthy men. Taurine and Mg supplementation significantly increased EPC colony numbers and significantly decreased TBARS scores and free radical levels in SHRs. Nicotinamide adenine dinucleotide phosphate oxidase component mRNA expression was significantly higher in the renal cortex of salt-loaded SHRs than in WKY rats, in which it was suppressed by taurine and Mg supplementation. Taurine and Mg supplementation increased EPC colony formation in healthy men and improved impaired EPC function in SHRs through antioxidation, indicating that the dietary intake of taurine and Mg may prolong lifespan by preventing the progression of cardiovascular diseases.

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