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microRNA

Human angiotensinogen +11525 C/A polymorphism modulates its gene expression through microRNA binding

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Abstract

Hypertension is a serious risk factor for cardiovascular disease. Like other complex disease, hypertension is caused by a combination of genetic and environmental factors. The renin-angiotensin system plays an important role in the regulation of blood pressure. Angiotensinogen (AGT) gene is associated with essential hypertension in Caucasians, Japanese, and Asian-Indian subjects. AGT gene may also be associated with cardiac hypertrophy, coronary atherosclerosis, and microangiopathy related cerebral damage. Human AGT gene has a C/A polymorphism at nucleoside 11525 (rs7079) that is located in the 3′-untranslated region (3′-UTR) and is modestly associated with increased blood pressure. We show here that miR-31 and miR-584 bind strongly to the hAGT 3′-UTR containing 11525C allele compared with 11525A allele. We also show that transfection of miR-31 and miR-584 downregulates the hAGT mRNA and protein levels in human liver cells. These studies may provide new therapeutic approach to reduce hypertension.

human angiotensinogen gene 3′-untranslated region single nucleotide polymorphism miRNA rs7079 hypertension blood pressure regulation