e0038 EFFECTS OF ANGIOTENSIN II ON ATPASES IN AORTIC VASCULAR SMOOTH MUSCLE CELLS FROM WISTAR-KYOTO RATS AND SPONTANEOUSLY HYPERTENSIVE RATS

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Aim To explore the effects of Angiotensin II on the activities of Ca^{2+}-ATPase, Na^+, K^+-ATPase and mRNA expression levels of the plasma membrane Ca^{2+}-ATPase isoform 1 (PMCA1) and Na^+, K^+-ATPase α_1-subunit in cultured thoracic aortic vascular smooth muscle cells (AMSCs) from Wistar-Kyoto (WKY) rats and spontaneously hypertensive rats (SHR).
Methods AMSCs isolated from 14-week-old male WKY rats and SHR were cultured and treated with different concentrations (1×10^{-9}, 1×10^{-8}, 1×10^{-7} mol/l) of Angiotensin II. The activities of Ca^{2+}-ATPase, Na^+, K^+-ATPase were measured by biochemistry and enzymology. RT-PCR assay was employed to determine the relative levels of PMCA1 and Na^+, K^+-ATPase α_1-subunit mRNA in AMSCs.
Results Low and moderate concentration of Angiotensin II significantly increased the activity of Ca^{2+}-ATPase and up-regulated PMCA1 mRNA level in AMSCs from Wistar-Kyoto rats, while high concentration of Angiotensin II inhibited Ca^{2+}-ATPase activity and down-regulated PMCA1 mRNA level. Three different concentration of Angiotensin II significantly decreased the activity of Ca^{2+}-ATPase and PMCA1 mRNA level in AMSCs from SHR. Three different concentrations of Angiotensin II stimulated the activity of Na^+, K^+-ATPase and increased its α_1-subunit mRNA expression in AMSCs from WKY rats. Low and moderate concentration of Angiotensin II did not affect the activity of Na^+, K^+-ATPase in SHR, while high concentration of Angiotensin II significantly suppressed the activity and α_1-subunit mRNA level of Na^+, K^+-ATPase.
Conclusions In WKY rats, Angiotensin II may have biphasic effects on Ca^{2+}-ATPase activity and PMCA1 mRNA expression, and may promote the activity and α_1 subunit mRNA expression of Na^+, K^+-ATPase in a dose-dependent manner in AMSCs. In SHR, Angiotensin II can inhibit Ca^{2+}-ATPase activity and PMCA1 mRNA expression, and only high dose of Angiotensin II can suppress the activity and α_1 subunit mRNA expression of Na^+, K^+-ATPase in AMSCs.

e0039 EFFECTS OF LISINOPRIL ON THE ACTIVITIES AND MRNA EXPRESSION OF ION PUMPS IN AORTIC SMOOTH MUSCLE CELLS FROM SPONTANEOUSLY HYPERTENSIVE RATS

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Objectives To explore the effects of Lisinopril upon the activities of Na^+, K^+-ATPase and Ca^{2+}-ATPase and mRNA expression levels of Na^+, K^+-ATPase a_1-subunit and plasma membrane Ca^{2+}-ATPase isoform 1 (PMCA1) in cultured thoracic aorta vascular smooth muscle cells (ASMCs) isolated from spontaneously hypertensive rats (SHR).
Methods ASMCs were divided into four groups: Wistar-Kyoto (WKY) control, SHR control, Lisinopril (1×10^{-5}) intervened SHR group and Lisinopril (1×10^{-6}) intervened SHR group. The activities of ion pumps were detected by spectrophotography and mRNA expressions were measured by real time PCR. The content of Angiotensin II (Ang II) in cells-cultured medium were detected by radioimmunoassay.
Results The activities of Na^+, K^+-ATPase, Ca^{2+}-ATPase and the mRNA expression levels of Na^+, K^+-ATPase a_1-subunit and PMCA1 in ASMCs from SHR were significantly lower than those from WKY control ($p<0.01$). Lisinopril significantly increased the activities of Na^+, K^+-ATPase and Ca^{2+}-ATPase and mRNA expression levels of Na^+, K^+-ATPase a_1-subunit and PMCA1 in ASMCs from SHR ($p<0.01$). Ang II content of culture medium in ASMCs from SHR was significantly more than those from WKY control ($p<0.05$), Lisinopril attenuated Ang II content of ASMCs culture medium from SHR ($p<0.05$).
Conclusions The decreased activities of Na^+, K^+-ATPase and Ca^{2+}-ATPase may be related to their lower expression of the mRNA in ASMCs from SHR. The Lisinopril may increase the activities of two ion pumps and upregrulae the mRNA expression of Na^+, K^+-ATPase a_1-subunit and PMCA1 in ASMCs from SHR through blocking the generation of Ang II.

e0040 THE EXPRESSION OF SIGNAL TRANSDUCTION PATHWAY OF TGF1SMAD IN THE RAT CARDIAC TISSUE WITH TYPE 2 DIABETES AND INTERVENTION BY ATORVASTATIN

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Objective Observation on changes of signal transduction pathway of TGF-β_1/Smad in the course of myocardial fibrosis in the rat with type 2 diabetes and preventive effect of atorvastatin.
Methods The experimental type 2 diabetic rats were yielded by injecting streptozotocin (STZ, 30 mg/kg) and fed with high fat and glucose food, then intervention by atorvastatin ($20\ mg\cdot kg^{-1}\cdot d^{-1}$) for 12 weeks. Collagen content was observed by Masson staining. RT-PCR was used to observe the gene expression of TGF-β_1 in experiment rat hearts. The protein expression and tissue localisation of TGF-β1, Smad2/3, Smad7 and were observed with the immunohistochemistry.
Results The interstitial collagen accumulation and thickened capillary basement membrane in the atorvastatin (Masson stain: 0.80±0.16) administration group was obviously relieved compared with that of the DM (1.36±0.16)group ($p<0.01$). The expression levels of TGF-β_1 mRNA in the DM group was obviously increased compared with that of the control group (1.39±0.10 vs 0.16±0.02, $p<0.01$). The expression levels of TGF-β_1 mRNA in the atorvastatin administration groups was obviously reduced compared with that of the DM group (0.57±0.04 vs 1.39±0.10, $p<0.01$). Immunohistochemistry: the positive expressions of Smad2/3 and TGF-β_1 were present in fibroblasts, vascular endothelial and myocardial cells in the control group. The positive expressions of Smad2/3 (10.02±2.32 vs 1.12±0.11, $p<0.01$) and TGF-β_1 (18.19±1.39 vs 3.93±0.46, $p<0.01$) were even darker and larger in size compared with that in the control group in view of their optic density. There were only the vascular endothelial cells and a few of fibroblasts in the atorvastatin groups were the Smad2/3 (10.0±2.32 vs 5.16±0.17, $p<0.01$) and TGF-β_1 (18.19±1.39 vs 10.21±1.08, $p<0.01$) positive, but shallow in colour, the positive optic density was reduced obviously compared with that of DM group. In DM group the positive cells of Smad7 mainly distributed in the vascular endothelial cells, fibroblasts, myocardial cells, the numbers of the positive cells was reduced compared with that of the control group (1.26±0.31 vs 10.16±0.64, $p<0.01$). In atorvastatin group the positive cells of Smad7 was increased in such cells as those mentioned above, especially in the vascular endothelial cells (1.26±0.31 vs 4.00±0.20, $p<0.01$).
Conclusion By way of inhibition activations of pathway of TGF-β_1/Smad, atorvastatin may obviously relieve the collagen accumulation