Pharmacological Reports
2008, 60, 391–398
ISSN 1734-1140

Yohimbine-induced alterations in α_2-adrenoceptors in kidney regions of the spontaneously hypertensive rats: an autoradiographic analysis

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Abstract:
We have tested the hypothesis that a pharmacologically determined alteration in renal α_2-adrenoceptor (α_2-AR) density might be a pathophysiologically important factor of genetic hypertension in the spontaneously hypertensive rats (SHRs). First, we compared the regional distribution and biochemical parameters of α_2-ARs in SHRs and Wistar-Kyoto (WKY) rats, using the full agonist [^{3}H]UK 14304. Secondly, we evaluated the effect of selective blockade and stimulation of α_2-ARs on the development of hypertension and on renal α_2-AR density and regional distribution in SHRs. [^{3}H]UK 14304 binding was distributed predominantly over the outer medulla, less abundantly over the inner medulla and was almost absent from the renal cortex. Renal α_2-ARs were found to be increased in SHRs at the ages tested compared with their respective controls and the increase was completely localized to the outer medulla. In these rats, blood pressures immediately before sacrifice were significantly higher in the hypertensive group compared with normotensive controls. The daily administration of SK&F 86466 or clonidine significantly decreased the blood pressure but the autoradiographic studies showed that the prolonged administration of yohimbine to rats for two weeks resulted in a large increase in the density of α_2-ARs in some areas of the rat kidney but not in others. Taken together these data do not support the hypothesis that alteration in renal α_2-ARs (as measured by autoradiography) is crucial for the maintenance of hypertension in the SHR model.

Key words:
[^{3}H]brimonidine ([^{3}H]UK 14304), yohimbine, SK&F 86466, clonidine, autoradiography, renal α_2-adrenoceptors, SHR