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Effects of Acute and Chronic Treatments with Atenolol and Propranolol on Cardiovascular Responses to Handling Stress in Spontaneously Hypertensive Rats*

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Although the mechanism of antihypertensive action of β-adrenergic bloking drugs (β-blokers) is not known, a theoretical advantage of cardioselective β-blockers over nonselective ones has been proposed in the treatment of hypertension. To study this hypothesis, we examined cardiovascular responses to handling stress in spontaneously hypertensive (SHR) rats after a single (100 mg/kg) and multiple oral treatments (100 mg/kg per day for 17 d) with either atenolol or propranolol. Atenolol and propranolol markedly suppressed the tachycardia induced by handling stress after acute and chronic administration. Resting mean arterial pressure (MAP) was reduced by acute and chronic atenolol treatment, but not by propranolol. Stress-induced increase in MAP was significantly reduced by chronic treatment with propranolol, whereas no consistent effects were observed with atenolol. Acute treatment with guanethidine (30 mg/kg) markedly reduced the rise in MAP induced by stress. These results suggest that suppression of cardiac function by β-blockers does not always attenuate the rise in MAP induced by stress, thus cardioselective β-blockers might not confer any further reduction of the blood pressure increase due to sympatho-adrenal excitation. Inhibition of stress-induced MAP rise by propranolol could be mediated by a modulation of the catecholamine release.

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