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Adaptive vasoactive response to modulatory effects of endothelin-1 in spontaneously hypertensive rats

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Abstract:
In addition to a direct vasoconstrictor effect, endothelins modulate vascular responses induced by different mediators. We compared the effect of subthreshold concentrations of endothelin-1 (ET) on vasoreactivity of isolated pulmonary artery (PA) and on integrated blood pressure (BP) responses in both Wistar rats and spontaneously hypertensive rats (SHR). In one series of experiments (*in vivo*), after anesthesia the carotid artery was cannulated to measure mean BP. In another series of work (*in vitro*), the PA was isolated and changes in isometric tension were recorded. The subthreshold concentrations of ET *in vitro* (1 nM) and *in vivo* (0.1 nM) did not affect the basal tone of PA nor BP either in Wistar rats or in SHR. *In vitro* pretreatment of the PA with ET increased contraction in response to noradrenaline and decreased relaxation in response to acetylcholine in Wistar rats. In SHR, the effect of ET tended to reduce vasoactive tone in the PA: after the pretreatment with ET, contraction in response to noradrenaline was decreased and relaxation in response to acetylcholine was unchanged. *In vivo*, the bolus of ET did not change the integrated hypotensive response to acetylcholine in Wistar rats, while in SHR the response was increased. ET pretreatment did not affect the integrated pressor response to noradrenaline in Wistar rats nor in SHR. The effects of subthreshold concentrations of ET resulted in the increase of vasoactive tone in normotensive rats, while in SHR the potentiating effect of ET was impaired. An adaptive phenomenon to elevated arterial pressure could be one possible explanation for these results.

Key words:
endothelin-1, pulmonary artery, vasoactivity, spontaneously hypertensive rat