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### Monoamine oxidase activity in tissues of spontaneously hypertensive rats

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**Summary.** Monoamine oxidase (MAO) activity was assayed both in central and peripheral blood vessels of spontaneously hypertensive rats (SHR) and age-matched normotensive Wistar Kyoto rats (WKR). The activity of MAO in the brain and peripheral vasculature was essentially the same in both SHR and WKR. It can therefore be concluded that central and peripheral vascular MAO activity is not altered in the genetically hypertensive animals.

We have reported that neither central nor peripheral vascular MAO is involved in the maintenance of blood pressure in rats made hypertensive with deoxycorticosterone acetate (DOCA)-salt treatment<sup>2</sup>. Recently, it has been reported that the activity of the monoamine biosynthetic enzymes of SHR, namely, tyrosine hydroxylase and dopamine- $\beta$ -hydroxylase, were not different from WKR controls<sup>3</sup>. It is not clear whether this is also true of the degradative enzyme, MAO. In the present study, we are reporting on the activity of MAO in the brain and vasculature from SHR at the advanced hypertensive stage.

**Methods.** Male SHR (15 weeks old) and age-matched normotensive WKR in this study were bred at Hoffmann-La Roche & Co. Ltd, Nutley, New Jersey. Systolic blood pressure of these animals were measured in conscious state by the tail cuff method. All rats were sacrificed by decapitation. Brain, mesenteric artery, mesenteric vein and aorta were removed. Brain microvessels were prepared by a modification of the method of Brendel et al.<sup>4</sup> as previously described<sup>2</sup>. The vascular tissues were cleared of fat and blood and kept on dry ice until analyzed. The MAO

activity in the tissue was measured by using tyramine as substrate<sup>2</sup>. Tissue protein was determined by the method of Lowry et al.<sup>5</sup> with bovine serum albumin as standard.

**Results.** SHR of 15 weeks old had a mean systolic blood pressure of  $191.2 \pm 3.7$  (5) mmHg, a value significantly ( $p < 0.001$ ) greater than WKR,  $120.4 \pm 3.6$  (5) mmHg. MAO activity of central and peripheral vasculature was determined and summarized in the table. There was no difference in enzyme activity of either the mesenteric vasculature or in the aorta between SHR and WKR.

**Discussion.** The present study demonstrates no difference in MAO activity in the central or the peripheral blood vessels between SHR and WKR. MAO has been ascribed to play an important role in the regulation of the intraneuronal norepinephrine level in the sympathetic nerve terminals<sup>6</sup>. However, it is not known whether there is a correlation between MAO activity and hypertension. Or, how this catecholamine degradative enzyme would affect the development and maintenance of hypertension in rats. Based on the results of the present study and our previous study with DOCA-salt hypertensive rats<sup>2</sup>, we do not find that any correlation exists between the level of tissue MAO and hypertension. It is therefore, concluded that neither central nor peripheral MAO would be involved in the maintenance of hypertension in genetically hypertensive rats.

MAO activity in the brain and peripheral vascular vessels of SHR and WKR

Tissues	MAO activity (nmole/mg protein/h)	
	WKR	SHR
Brain microvessels	366.8*	354.3*
Mesenteric artery	$42.2 \pm 3.7$ (5)	$48.2 \pm 3.1$ (5)
Mesenteric vein	$89.6 \pm 7.2$ (4)	$92.0 \pm 9.8$ (5)
Aorta	$46.4 \pm 2.9$ (5)	$48.5 \pm 2.4$ (5)

\* Brain microvessels MAO activity was an average of duplicate determination based on a pool of 5 brains. Mesenteric artery, mesenteric vein and aorta were assayed individually. Figures represent mean  $\pm$  SE. The number in the parenthesis denotes the number of experiments.

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