Studies on monoamine oxidase in rat spinal cord

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Monoamine oxidase (MAO) exists in at least two forms ('A' & 'B') which differ in their affinities for different amine substrates (Johnston, 1968). In this study, rat spinal cord and brain MAO activities were compared. Male rats (200–250 g) were killed and the spinal cord was removed, blotted, weighed, and then homogenized in ice-cold sucrose (0.25 M). Each homogenate was centrifuged at 8×10^2 for 5 min and the precipitate retained and resuspended in phosphate buffer (pH 7.2). Brain MAO was prepared as described by Johnston (1968). To assess MAO activity, 0.1 ml of suspension was incubated at 37°C for 1 h with 1 μ mol of [^{14}C]-tyramine (0.3 μ Ci/μmol) and phosphate buffer pH 7.2. A blank was prepared by boiling a 0.1 ml sample of the suspension. The reaction was terminated with HCl and [^{14}C]metabolite was extracted with ethyl acetate : benzene (1:1 v/v). 1 ml of extract was assayed for radio-activity (George & Leach, 1975) and the protein concentration of a 0.1 ml sample of suspension was determined as described by Lowry, Rosebrough, Farr & Randall (1951). The experiments were repeated using [^{14}C]-5-HT and [^{14}C]-benzylamine as substrates. The effects of the MAO inhibitors clorgyline and pargyline were investigated, with regard to enzyme and substrate specificity.

When tyramine is the substrate, clorgyline (1×10^{-7} M), a specific inhibitor of MAO 'A' (Johnston, 1968) causes a greater inhibition of MAO activity in spinal cord (80%) than in brain (41%). Pargyline (1×10^{-7} M), a specific MAO 'B' inhibitor (Squires, 1972), inhibited brain MAO activity by 63% and spinal cord MAO activity by 24% using tyramine as substrate. Since tyramine is a substrate for both MAO types, it appears that type A activity is proportionately greater in rat spinal cord than in rat brain.

Mean MAO activity as n *moles product formed per mg protein* h^{-1}

	5-HT			Tyramine			Benzylamine		
	Control	*C*	*P*	*Control*	*C*	*P*	*Control*	*C*	*P*
Brain	20.62 ±1.98	2.31 ±0.24	17.97 ±1.83	9.64 ±0.89	3.70 ±0.29	6.10 ±0.58	7.21 ±0.78	6.98 ±0.67	1.05 ±0.09
Spinal cord	16.51 ±1.67	1.62 ±0.18	14.96 ±1.32	7.56 ±0.71	1.40 ±0.13	5.92 ±0.60	3.27 ±0.36	3.21 ±0.34	0.25 ±0.23

C = clorgyline 1×10^{-7} M, *P* = pargyline 1×10^{-7} M
Each result is the mean of 7 experiments.

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