

EFFECTS OF AN α_2 -AGONIST ON GROWTH AND ON METABOLIC RATE IN MICE

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The ability of α_2 -adrenoreceptor agonists (α_2 -agonists) to increase growth hormone secretion in numerous species, suggests that these compounds might have anabolic effects. However, in ruminants the effects on growth of the α_2 -agonist clonidine are at best, equivocal (Kennedy and Belluk 1987). In the present study, we report the effects of the α_2 -agonist guanfacine, on growth and on metabolic rate in mice.

Quackenbush mice (28g) were used in two separate experiments. In experiment one, six female mice per treatment received a single oral dose of 0, 0.125, 0.5, 2, 8 or 32 mg guanfacine/kg, dissolved in 0.2 ml water. Oxygen consumption and CO₂ production were measured in pairs of mice over a four-hour period, commencing one hour after treatment. The Haldane apparatus, and the method for calculation of metabolic rate, were as described by Brody (1945). In experiment two, twelve males per treatment received daily doses of 0, 0.125, 0.5 or 2mg guanfacine/kg for 10 days. Weight gain was recorded daily. The mice were housed in pairs and food intake was estimated for each pair at the end of trial. Results were analysed by analysis of variance.

Guanfacine caused a dose-related reduction in metabolic rate, with a maximum decrease from 1225kJ/kg/24h to 725kJ/kg/24h evident at a dose of 8mg/kg. It was estimated that 50% of this effect would occur at a dose of 0.8mg/kg. In mice treated for 10 days, guanfacine caused a significant reduction in weight gain, food intake and food conversion efficiency.

	Dose (mg/kg)				EMS [*]	P
	0	0.125	0.5	2		
Weight gain (g/day)	1.00	0.84	0.66	0.41	0.04	<0.001
Food intake (g/day)	7.89	7.67	7.08	6.15	0.33	<0.001
FCR ^{**}	0.13	0.11	0.09	0.07	3x10 ⁻⁴	<0.01

* Error mean square. ** Food conversion ratio (g weight gain/g food eaten).

The results demonstrate that the catabolic effects of guanfacine are dose-related. The effects of this drug on food conversion ratio indicate reduced metabolic efficiency, and the results of experiment one show that this is unlikely to reflect increased heat production. Further studies will examine other possible areas of energy loss, and the potential involvement of a secondary catabolic hormone mediator.

BRODY, S.B. (1945) 'Bioenergetics and Growth' (Reinhold Publishing Corporation: New York).

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