

THE effect of Gamma hydroxybutyric acid (GHB) on food intake in rats

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Gamma hydroxybutyric acid (GHB) is a metabolite of GABA and has been proposed to act as a neurotransmitter within the brain, but has also been found in binding studies to have agonist characteristics at GABA_B receptors (Mathivet et al., 1997). We have previously demonstrated that the GABA_B receptor agonist baclofen increases food intake in non-deprived rats but has no effect on intake in fasted rats (Ebenezer and Patel, 2011). It was therefore of interest to examine the effects of GHB on food intake in rats.

Experiment 1. Non-deprived male Wistar rats (n=8; b.wt. 300 – 370g) were injected i.p. with either saline or GHB (0.5 – 8 mg kg⁻¹) immediately before being placed singly in separate experimental cages with free access to food and water for 240 min. Cumulative food intake was measured at intervals, as described previously (Ebenezer and Patel, 2011). In a separate experiment, we used a similar protocol except that the male Wistar rats (n=8; b.wt. 300 – 360g) were injected i.p. with either saline or GHB (16 – 64 mg / kg). **Experiment 2.** Male rats (n=8, b.wt. 310 – 370g) that were fasted for 18h a day were injected with either saline or GHB (2 – 64 mg / kg, i.p.) and cumulative food intake measured at intervals over 240 min, as described previously (Ebenezer and Patel., 2011). In both experiments, repeated measures design were used with each rat receiving all treatments; 3 - 4 days separated successive drug trials.

Analyses of the results from Experiment.1 (ANOVA) showed that neither the lower doses (0.5 – 8 mg kg⁻¹) nor the higher doses (16 – 64 mg kg⁻¹) of GHB had any effects on food intake in non-deprived rats. The results obtained with the higher doses of GHB are shown in Figure 1. Likewise, the results from Experiment 2 indicated that GHB had no effects on food intake in fasted rats. Thus, at 60 min, the mean ± s.e.mean food intake was as follows: saline 12.4 ± 0.9g, GHB (32 mg kg⁻¹) 13.8 ± 1.2g (ns) and GHB (64 mg kg⁻¹) 14.3 ± 0.5g (ns).

GHB has been found to exhibit selective but weak GABA_B receptor agonist characteristics in binding studies ((Mathivet et al., 1997). It has been well documented that the GABA_B receptor agonist baclofen increases food intake in non-deprived animals by an action at central GABA_B receptors (see Ebenezer and Patel, 2011). The observation in this study that GHB does not increase food intake in non-deprived animals, indicates that the drug probably does not stimulate central GABA_B receptors *in vivo*.

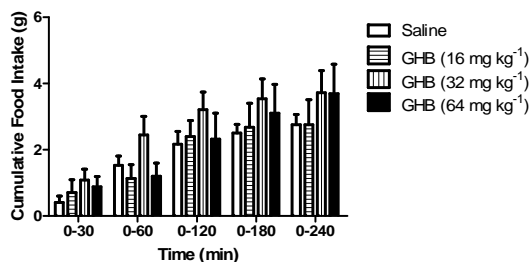


Fig. 1. Effects of GHB on cumulative food intake in non-deprived rats. Vertical lines rep. + s.e.mean.

Ebenezer, I.S. & Patel, S.M. (2011) Eur. J. Pharmacol., 653, 58 – 62.

Mathivet, P., Bersconi, R., DeBarry, J. et al. (1997) Eur. J. Pharmacol., 321, 67 – 75.