Effects of the GABA-B Receptor Agonist Baclofen on Food Intake in Non-Deprived Rats Measured During the Early Period of the Light and Dark Cycles

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It has previously been demonstrated that acute systemic administration of baclofen increases food intake in non-deprived rats measured during the light cycle (e.g. Ebenezer et al., 1992). However, there is no published information on the effects of baclofen on food intake during the dark cycle. In the present study we investigated the effects of i.p. administration of baclofen on food intake in rats during the early period of their light and dark cycles. Adult male Wister rats (n = 15; starting body weights: 320 – 380 g) were divided into 2 groups. The rats in Group 1 (n = 8) were kept on a 12 h light / dark cycle with light on at 10.00 h and lights off at 22.00 h. The rats in Group 2 (n = 7) were kept on reversed 12 h light / dark cycle with light on at 22.00h and lights off at 10.00h. The rats in both groups were injected i.p. with either saline or baclofen (1, 2 or 4 mg kg⁻¹) just before 10.00 h and placed separately into experimental cages with free access to food and water and cumulative food intake measured at 30, 60 and 120 min. All rats received all doses of saline and baclofen in a Latin square design and, at least, two days separated successive trials. The results were analysed by ANOVA with Dunnett’s post-hoc test. Baclofen (1 – 4 mg kg⁻¹) caused a dose-related increase in food consumption in rats injected at the onset of their light cycle (Group 1). All doses increased cumulative food intake at each measurement interval, with the 4 mg kg⁻¹ dose producing the largest increase at 120 min. Thus, food intake (g) ± s.e. mean at 120 min was as follows: saline 3.0± 0.2g, baclofen (1 mg kg⁻¹) 4.0± 0.2 (P<0.05), baclofen (2 mg kg⁻¹) 4.9 ± 0.5g (P<0.01), and baclofen (4 mg kg⁻¹) 5.7 ± 0.7g (P<0.01) By contrast, only the 1 and 2 mg kg⁻¹ doses of baclofen significantly increased cumulative feeding during the 30 and 60 min measurement periods in rats injected at the onset of the dark cycle (Group 2). At 120 min, only the 1 mg kg-1 dose produced a significant hyperphagia. Thus, food intake (g) ± s.e. mean at 120 min was as follows: saline 6.0 ± 0.5g, baclofen (1 mg kg⁻¹) 8.7 ± 0.5g (P<0.01), baclofen (2 mg kg⁻¹) 7.4 ± 0.9g (n.s.), and baclofen (4 mg kg⁻¹) 5.4 ± 0.5g (n.s.) The results indicate that, in contrast to what occurs during the light cycle, the rats appear to become more sensitive to the hyperphagic effects of lower doses of baclofen during the dark cycle, whilst the higher doses are less effective. These findings suggest the possibility that during the onset of the dark cycle, when feeding normally occurs, the sensitivity of the GABA-B receptors may become augmented and may be related to the induction and regulation of feeding observed during the early phase of the dark cycle (see Patel et al., 2004).