Effects of chronic administration of baclofen on spontaneous motor activity in rats in an open field

Sunit Patel, Ivor S Ebenezer

University of Portsmouth, Portsmouth, UK

Acute central or systemic administration of the GABA\textsubscript{B} agonist baclofen can induce depressant effects on spontaneous behaviours in experimental animals (see Ebenezer, 1990). The present study was undertaken to investigate the effects of chronic administration of baclofen on spontaneous motor activity measured in an open field.

Adult male Wister rats (n = 12; starting body weights: 235 - 330 g) were divided into 2 equal groups of 6 animals and injected i.p. with either saline (Group 1), baclofen (2 mg kg\textsuperscript{-1}; Group 2) once daily for 64 days. On selected days the animals were placed individually in an open field immediately after injection and their activity recorded for 30 min on video tape for off line analysis. The open field consisted of a rectangular perspex box (50 x 30 x 20 cm). The floor of the box was pained with 10 cm\textsuperscript{2} black and white squares in a “chess-board” pattern. The top of the box had a transparent glass panel cover to facilitate video recording. The activity of the animals were analysed by replaying the video tapes and an activity count was recorded when an animal moved from one square into another with all 4 feet. The data was analysed by one way ANOVA with repeated measures on time (days) and Dunnett’s post hoc test. The activity of the rats was significantly depressed following administration of baclofen during the 1\textsuperscript{st} 15 min after injection on Day 1 (Fig. 1 A). By Day 8 tolerance had occurred to the depressant effect of baclofen on spontaneous motor activity (Fig.1A). Thereafter, there was a gradual increase in motor activity after administration of baclofen and by Day 50 there was a significant increase in activity (Fig. 1A). It is noteworthy that the increased activity was characterised by short periods of rapid “darting” movement of the rats. There was no effect on activity during the 15 – 30 min measurement period during the course of the experiment (Fig. 1B).

The results show that baclofen (2 mg kg\textsuperscript{-1}) depresses spontaneous motor activity initially but with chronic treatment there is an increase in activity. The reason for this is presently not clear. It is possible there are changes in pre- and / or post- synaptic central GABA\textsubscript{B} receptors with chronic treatment that result in the increased motor activity observed on days 50 and 64 (Fig. 1A). Further work is therefore warranted to investigate effects of chronic administration of GABA\textsubscript{B} agonists on brain function and behaviour.

Ebenezer, I.S. (1990) NeuroReport 1, 3 - 76.