Scopolamine-induced convulsions in fasted animals after food intake: sensitivity of C57BL/6J mice and Sprague Dawley rats

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In a series of studies, we have shown that BALB/c mice and Wistar albino rats treated with scopolamine, atropine or biperiden after fasting for two days or less develop convulsions soon after allowed to eat ad lib (Enginar and Nurten, 2010). Depending upon the similarities in triggering factors and manifestations of the seizure activity, these antimuscarinic-induced convulsions in fasted animals have been suggested to provide insight into the mechanism of eating-evoked seizures in humans (Koul, 1991). Among animal studies, inbred strain studies are especially important in discovering the genes related to the sensitivity to seizures, determining their locations and understanding the metabolic changes related to epileptogenesis (Ferraro et al., 1995; Löscher et al., 1998; Frankel et al., 2001; Schauwecker, 2011). In the present study, strain-related differences in sensitivity to convulsions in scopolamine treated fasted animals were evaluated in C57BL/6J mice and Sprague Dawley rats.

For this purpose, male BALB/c and C57BL/6J mice (24-30 g) and Wistar and Sprague Dawley albino rats (280-350 g) were weighed and deprived of food for 48 and 52 h, respectively. After fasting, animals were reweighed and treated i.p. with saline (n=8-9) or 3 mg/kg scopolamine hydrobromide (n=7-9). Twenty minutes later, they were given food pellets and allowed to eat ad lib. All animals were observed for 30 min for the incidence and onset of convulsions. The seizures observed were staged as 0-5. For the statistical evaluation, body weight loss and onset of convulsions data were analyzed by Student's t test. Incidence of convulsions and seizure stages were evaluated using Fisher's Exact test. There were no significant differences in food deprivation-induced body weight loss among strains. Scopolamine treated animals developed convulsions after food intake. The incidence of convulsions was statistically significant in BALB/c (p<0.01) and C57BL/6J (p<0.01) mice and Wistar (p<0.05) and Sprague Dawley (p<0.01) rats compared to saline treated animals. There were no significant differences in the incidence of convulsions between strains. However, number of animals developing stage 5 was more in C57BL/6J mice (p<0.02). On the other hand, onset of convulsions was longer in C57BL/6J mice than BALB/c mice (p<0.05), but did not differ between Sprague Dawley and Wistar rats. This finding is consistent with previous studies showing increased latency to seizures in C57BL/6J mice (Ferraro et al., 1995; Golden et al., 2001). Present study demonstrated that both C57BL/6J and Sprague Dawley strains were sensitive to convulsions induced by scopolamine treatment and food intake after fasting. However, increased onset of convulsions but greater seizure severity in C57BL/6J mice may need further evaluation in terms of strain-induced differences in these seizures.