The influence of mild stress on food consumption in untrained mice and the effect of drugs

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There is considerable agreement in the literature that, under certain conditions, the minor tranquillizers enhance food consumption (Randall, Schallek, Heise, Keith & Bagdon, 1960; Poschel, 1970) and punished behaviour (Geller, 1964; Bainbridge, 1968; Soubrié, Schoonhoed, Simon & Boissier, 1972) in laboratory animals. There is less agreement as to whether this is due to a diminution of the effects of stress or an enhancement of the hunger drive. The introduction of an animal to a novel environment induces physical signs symptomatic of stress. In this situation if food consumption was reduced, the diminution of food intake might be taken as a quantitative measure of the degree of stress. It should then follow that drugs which reduce the response to stress should tend to cancel the effects of novelty on food intake.

Normal pelleted diet was removed from stock cages containing 24 male Evans mice (25–30 g) at 17.00 h on the day before the experiment. The following day the mice were randomized, marked, dosed (s.c.) and immediately returned to their stock cages. After 45 min they were individually assigned to small plastic cages (12×28×12 cm high) each containing a weighed dish of wet mash (powdered diet : water=1·1 by weight). After a further 30 min the dishes were removed and reweighed.

In this situation both the plastic boxes and wet mash were novel to the mice. The animals were considered to be familiar with their environment or food after a four day exposure. We found that familiarization of mice either to the mashed food or to the small plastic cages resulted in an enhancement of food intake (70–100%) during the first 30 min after night starvation when compared with that of animals to whom both the food and environment were novel. If both food and environment were familiar there was a further increase (80–100%) in consumption.

In naive animals (8 or 12 per group) injected with saline or gum tragacanth the mean quantity eaten in 95 experiments was 0·79 g/mouse. Chlordiazepoxide (0·39–100 mg/kg), diazepam (0·1–62·5 mg/kg), nitrazepam (0·1–62·5 mg/kg), meprobamate (25–200 mg/kg) and phenobarbitone sodium (0·7–56·7 mg/kg) induced a dose related increase in food consumption whereas (+)-amphetamine (0·3–4·8 mg/kg) and fenfluramine (4–64 mg/kg) induced a marked reduction of intake. Imipramine (0·1–62·5 mg/kg), amylobarbitone (7·5–120 mg/kg), pentobarbitone (3·3–30 mg/kg), chlorpromazine (0·025–6·4 mg/kg) and haloperidol (0·11–9 mg/kg) were inactive or inhibited food intake at doses that induced general central depression.

These results suggest that this method could be used as a specific screen for minor tranquillizers and it could be argued to have considerable advantages over 'punished behaviour' methods both in terms of time and expense. This, and the significance of the observations with the minor tranquillizers with respect to the novelty of the environment, will be discussed.

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