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The behavioural effects of (+)-amphetamine and apomorphine in the marmoset

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In primates, administration of amphetamine (Randrup & Munkvad, 1972) or apomorphine (Shintomi & Yamamura, 1975) may cause stereotyped hand and head movements. These effects may be compared to the effect of amphetamine (Schiørring, 1971) or apomorphine (Ernst, 1967) in rodents in which increased locomotion and stereotyped sniffing, licking and gnawing may be seen.

Intramuscular doses of (+)-amphetamine sulphate (0.125–8.0 mg/kg) and apomorphine (0.063–1.0 mg/kg) were administered in a sequence of increasing doses to a group of 8 marmosets (*Callithrix jacchus*). The behaviour of each animal was observed for one min periods at selected time intervals during the following 6 h and again after 22 hours. Behaviour was classified each second into one of four categories:

1. *Checking* (head movements only).
2. *Activity* (behaviour involving part of the body, excluding head only, but including eating, drinking, grooming, manipulation of objects, gnawing, and behaviours of unknown function).
3. *Movement* (displacement of the whole body).
4. *Inactivity* (no observable behaviour).

(+)-Amphetamine had behavioural effects for a period of at least 6 hours. These consisted of a dose-dependent increase in checking ($P < 0.001$ 2-tailed matched pairs t test), with a concomitant decrease in activity ($P < 0.001$) and inactivity scores ($P < 0.001$). There was no change in the amount of movement. Checking decreased at higher doses (4 mg and 8 mg/kg) after ~1.5 h when the onset of severe stereotypy occurred.

Apomorphine administration elicited a biphasic response. The initial response consisted of an increase in movement ($P < 0.01$) and in checking ($P < 0.001$) with associated decreases in activity ($P < 0.01$) and inactivity scores ($P < 0.05$) which lasted for ~0.5–1 hour. The later phase (1–5 h) was characterized by an increase in inactivity ($P < 0.01$) and a decrease in activity scores ($P < 0.001$) but no significant change in checking or movement. Injection of apomorphine usually resulted in vomiting after 2–4 min, and at the highest dose (1 mg/kg) extremely vigorous, self-destructive running and jumping interspersed with episodes during which the animals were prostrate and dyskinetic.

Thus (+)-amphetamine and apomorphine may be contrasted not only in the duration of their effect but also in the nature of the behavioural response, amphetamine inducing mainly checking, and apomorphine mainly affecting the degree of locomotion. At high doses amphetamine induced small stereotypic movements whereas high doses of apomorphine resulted in dyskinesia. The greater behavioural repertoire of the marmoset over rodents may be of use in differentiating the mechanism of these and related drugs.

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