# PSYCHOPHARMACOLOGICAL PROFILE OF COCAINE

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THE REVIEW of literature (see SIMON *et al.*, 1972) concerning the psychopharmacological effects of cocaine can be summarised under the following headings:

—in humans, stimulant, "antifatigue" and psychodysleptic effects of cocaine are reported. The route of administration could influence the quality of the observed effects.

—in animals, the published studies are quite fragmentary: they always concern a particular property of cocaine, often in comparison with amphetamine or imipramine-like antidepressants.

—from a biochemical viewpoint, cocaine is considered, especially at the peripheral sympathetic system level, as the typical representative of catecholamine reuptake inhibitors.

From these different facts, one can establish correlations which differ from one research hypothesis to another.

To determine the effects of cocaine in animals, we conducted a systematic study of its psychopharmacological profile. The obtained spectrum of activity can be compared with that of amphetamine and imipramine-like drugs. Table 1 summarises our findings (for technical details, see SIMON *et al.*, 1972).

TABLE 1

| | Amphetamine | Cocaine | Imipramine |
|---|---|---|---|
| Increased motor activity (M) | +++ | ++ | 0 |
| Stereotyped behaviour (R) | +++ | ++ | 0 |
| Greater toxicity in aggregated mice | +++ | + | 0 |
| Antagonism of hypnotics (M) | + | + | 0 |
| "Antifatigue activity" (R) | +++ | ++ | 0 |
| Antagonism of neuroleptic-induced catalepsy (R) | + | ++ | + |
| Antagonism of reserpine (M) | + | ++ | + |

(M = mice; R = rats)

Cocaine produces amphetamine-like stimulant effects: increase of locomotor activity, stereotyped behaviour, greater toxicity in aggregated animals than in isolated ones, reappearance of an avoidance reaction in exhausted animals (considered as "anti[f]igue" activity (BOISSIER and SIMON, 1968), antagonism of the effect of hypnotics. Other effects of the same type have been reported: increase of autostimulation (BENESOVA, 1969; STEIN and WISE, 1970), similar EEG patterns (MONNIER, 1957), anorexigenic effect (MONNIER, 1957), potentiation of the effects on operant behaviour by imipramine (SCHECKEL and BOFF, 1964).

Generally, with these tests, the maximum effects are weaker than those of amphetamine. On the other hand, two effects are more pronounced with cocaine: antagonism of neuroleptic-induced catalepsy and antagonism of reserpine effects. It must be noticed that these two effects also exist with imipramine-like drugs.

From a pharmacological viewpoint, cocaine simultaneously acts as a moderate amphetamine and tricyclic antidepressant. It would be interesting, but difficult from ethical considerations, to study this possible antidepressant effect in man.

The study of cocaine shows how careful one has to be in order to establish cause and effect relations between biochemical and pharmacological data or between biochemical and clinical data. Two examples can be given:

—the pharmacological effects of cocaine and imipramine-like drugs are not identical, although their biochemical effects are very similar.

TABLE 2

| | Amphetamine | Cocaine |
|---|---|---|
| *Hyperactivity in mice* | | |
| after α MpT | suppressed | unchanged |
| after *p*CPA | decreased | unchanged |
| *Stereotyped behaviour in rats* | | |
| after α MpT | suppressed | decreased |
| after *p*CPA | decreased | unchanged |

—the stimulant effect of cocaine in animals appears to be of the same type as that of amphetamine. However, pretreatment of animals, with α-methylparatyrosine, a tyrosinehydroxylase inhibitor, or with parachlorophenylalanine, a tryptophanehydroxylase inhibitor, does not modify in the same way the effects of cocaine and those of amphetamine (Table 2).

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