Observations of rats living under reversed daylight conditions showed that in young rats of 3 and 4 weeks there was much social interaction which took the form of chasing and rolling over and lying on top of one another whilst grooming each other. The rats were very active and the number of times control rats lay on top of one another totalled about sixty in 1 hr. The treated rats interacted in this way more frequently, often more than 100 times per hour.

Adult male rats of 10 weeks behave in a different way, showing much less interaction, but in rats treated with *p*-chlorophenylalanine sexual behaviour became quite prominent. This increase in mounting was evident 24 hr after the injection of drug as well as 3 days after.

It is known that atropine blocks sexual behaviour in rats (Singer, 1968). When atropine (2·5 mg/kg) was given to rats in these conditions, whether treated with *p*-chlorophenylalanine or not, all social behaviour stopped. The rats moved around eating and drinking normally, but behaved as if no other rat was present. The effect wore off after 4–5 hr.

Experiments with female rats have failed to show any consistent increase in social behaviour after treatment with *p*-chlorophenylalanine.

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Effects of some catecholamines infused into the hypothalamus of young chickens

E. MARLEY and J. D. STEPHENSON*, *Institute of Psychiatry, University of London*

Catecholamines injected intravenously to 1–28 day chickens evoked behavioural and electrocortical sleep (Key & Marley, 1962; Dewhurst & Marley, 1965) and lowered body temperature and oxygen consumption (Allen & Marley, 1967). Similar but longer lasting effects occurred after microinfusions of α-methylnoradrenaline into the hypothalamus of 14–21 day old chicks and were prevented by phenoxybenzamine (Marley & Stephenson, 1968). The effects of noradrenaline, isoprenaline and dopamine infused during 4 min into the hypothalamus in a volume of 0·5–2·0 μl. are now reported together with their interactions with mebanazine (a monoamine oxidase inhibitor), phenoxybenzamine and propranolol.

Noradrenaline (0·05 to 0·075 μ-mole) produced behavioural sleep and hypotonia; temperature was lowered by 2·5° to 6° C and oxygen consumption reduced by up to 24% with recovery after 3–4 hr. The effects of noradrenaline were potentiated by pretreating chickens with mebanazine (10 μ-mole/100 g intravenously 18 hr and 1·5 hr previously). The electrocortical effects were less marked with the catecholamines tested than after intravenous injection. Temperature is lowered by noradrenaline injected into the feline hypothalamus (Feldberg & Myers, 1965).

Isoprenaline had similar but less intense effects than those of noradrenaline and of longer duration. Thus 0·05 to 0·1 μ-mole produced sleep and lowered temperature 1·75° to 5° C with recovery after 5 to 6 hr. Dopamine (0·15 to 0·3 μ-mole) was without effect on behaviour or electrocortical activity although temperature rose 1° C after 1 hr. In contrast, after pretreatment with mebanazine (10 μ-mole/100 g

intravenously 18 hr and 1·5 hr previously), dopamine (0·1 μ-mole) now elicited sleep within 10 min of infusion and lowered temperature 3° C for 5 to 6 hr. The effects of isoprenaline and noradrenaline were prevented by pretreatment with phenoxybenzamine (10 μ-mole/100 g intravenously 1·5 hr to 2 hr previously) but not with propranolol (0·5 to 1 μ-mole/100 g., 30 min previously). These or smaller doses of antagonist abolished the peripheral cardiovascular effects of these amines.

Noradrenaline, which acts peripherally on α-receptors for catecholamines, and isoprenaline, which acts mainly on β-receptors, had only central depressant actions when infused into the hypothalamus of chickens. These results imply that there are receptors in the hypothalamus similar to peripheral α-receptors, because the effects were prevented by phenoxybenzamine but not by propranolol. Noradrenaline, α-methylnoradrenaline and isoprenaline had similar actions in young chickens on behaviour, electrocortical activity, temperature and oxygen consumption whether given into the hypothalamus or intravenously, indicating that their effects when given intravenously were likely to be due to the drugs penetrating to the brain. Dopamine is deaminated more rapidly than the other catecholamines tested (Blaschko, 1952), which could account for its inactivity when given intracerebrally unless the chicken had been pretreated with a monoamine oxidase inhibitor. Its depressant action after monoamine oxidase inhibition suggests that dopamine is a central depressant in the fowl and not a central excitant as proposed for mammalian species.

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Hypothermia due to α-methylnoradrenaline in young chickens

D. J. ALLEN*, K. N. GARG and E. MARLEY, *Institute of Psychiatry, University of London*

In newborn mammals noradrenaline acts on brown fat (Dawkins & Hull, 1964) to produce hyperthermia and increased oxygen consumption unaccompanied by shivering (Taylor, 1960; Moore & Underwood, 1963). In young chicks, noradrenaline does not cause lipolysis (Carlson, Liljedahl, Verdy & Wirsén, 1954) and brown fat is not present (Freeman, 1967); indeed, body temperature and oxygen consumption are lowered by catecholamines given intravenously (Allen & Marley, 1967) or micro-infused into the hypothalamus (Marley & Stephenson, 1968).

The present experiments were made in unanaesthetized 1–21 day old chicks to determine how intravenous α-methylnoradrenaline elicited these effects. Tempera-