

The influence of environmental temperature on the concentration of pentobarbitone in the liver and brain of rats

P. ARVELA and E. SOTANIEMI*, *Department of Pharmacology, University of Oulu, Oulu, Finland*

Environmental temperature affects the body temperature of small laboratory animals. This influence is enhanced by the administration of narcotics, the animals becoming almost poikilothermic. In an earlier study, the body temperatures of guinea-pigs treated with barbiturates were found to fall in a cold and to rise in a hot environment. It was also found that the pentobarbitone but not barbitone concentrations in the tissues were correlated with the change in body temperature (Sotaniemi, 1967).

In the present study the effect of environmental temperature on body temperatures and tissue levels of pentobarbitone were examined in male rats treated with an intraperitoneal injection of pentobarbitone (30 mg/kg). The pentobarbitone concentration was determined according to Brodie, Burns, Mark, Lief, Bernstein & Papper (1953).

In the acute test, the body temperature was found to fall rapidly in a cold environment, while pentobarbitone concentrations in tissues remained at a higher level than those of the rats kept in a hot environment which showed a slight change in body temperature.

Pretreatment with phenobarbitone (80 mg/kg) for 48 hr reduced the fall in body temperature after pentobarbitone injection both in the animals kept at a cold and in those kept at room temperature. The pentobarbitone concentrations in tissues were lower than those of the corresponding control animals, which showed more pronounced changes in body temperatures.

Pretreatment with phenobarbitone for 4 weeks (40 mg/kg every fourth day) nullified the body temperature fall after pentobarbitone injection, and no undecomposed pentobarbitone was found in the tissues 2 hr after injection. In the corresponding control animals the body temperature fell for the first hour but regained its initial level within the second hour. The pentobarbitone concentrations in the tissues of the control animals were found to be lower than in the 48 hr experiment.

The results showed that environmental temperature definitely affected the body temperatures of rats treated with pentobarbitone. Heavy changes in body temperature retarded the fall of the pentobarbitone concentrations in the tissues. In rats pretreated with phenobarbitone the pentobarbitone disappeared more rapidly from the tissues and the change in body temperature was smaller.

REFERENCES

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Hexobarbitone response in barbitone-dependent and withdrawn rats

I. H. STEVENSON and M. J. TURNBULL* (introduced by D. M. SHEPHERD), *Department of Pharmacology, University of Dundee*

The response to a barbiturate often decreases with its repeated administration. Increased hepatic drug-metabolizing enzyme activity has been shown to be responsible for the