Short Communication

Melatonin Administration to Dogs*

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With 4 Figures

Received October 13, 1980

Summary

Melatonin concentrations in serum and urine were examined following oral administration of melatonin to dogs. Four different doses of melatonin ranging from 10 to 80 mg per kg of body weight were given. Melatonin was rapidly absorbed and reached a maximum serum level after 20—30 min, with a distribution phase of 3.5 hours and elimination half life (t½) of 5 hours. The fraction excreted in the urine was 0.25 % of the administrated dose during the first 5 hours. These results as well as the diurnal rhythm of serum melatonin in the dog are similar to corresponding data reported in the human.

Key words: Melatonin administration, diurnal rhythm, dog, pharmaco-kinetics.

Introduction

The physiological as well as possible pharmacological psycho-active properties of melatonin in man are presently being explored. Melatonin dissolved in ethanol given orally to humans is rapidly absorbed into the blood (Wetterberg et al., 1978). Less than 0.5 % of
a given dose of 100 mg is excreted into the urine as immunoreactive melatonin (Wetterberg et al., 1978; Wetterberg, 1979).

In the present study we describe the pharmacokinetics of melatonin following its oral administration to dogs, and the canine diurnal rhythm of melatonin in serum.

Materials and Methods

Five female beagle dogs weighing 10.4—11.7 kg were given different doses of melatonin orally. The dogs were fasted overnight prior to the experiment and were given water ad libitum. Melatonin was administered in capsules which were easily swallowed by the dogs. The first dose of melatonin was given at 11 a.m. in all experiments. The dogs were observed and their behaviour recorded. Rectal temperature, heart rate, blood pressure and ECG pattern were recorded continously during the experiments. Venous blood samples were collected into vacutainer tubes at the different time points. Urine was collected continously from the bladder using an indwelling catheter.

In one experiment, performed during the month of August, endogenous levels of melatonin in serum were studied. Eleven venous blood samples were taken over a 24-hour period.

Results

Diurnal Rhythm

The pattern of serum melatonin in the dog over a 24-hour cycle displayed a circadian rhythm with low concentrations during the day and highest levels during the night at 2 a.m. (Fig. 1).

Fig. 1. Diurnal variation of serum melatonin in one dog observed over a 24-hour cycle with light period 6 a.m.—6 p.m. The concentration of serum melatonin is expressed as nanomoles per liter (nM)