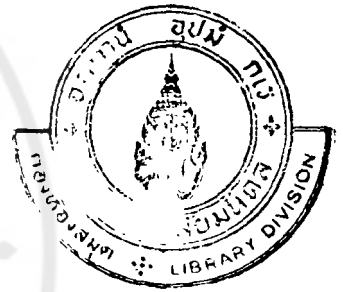


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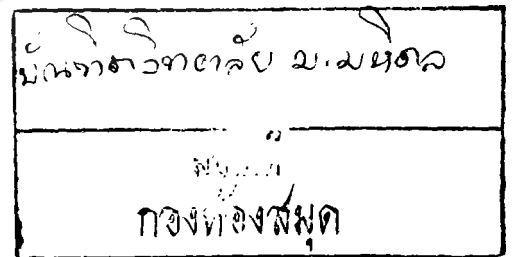
MELATONIN RETENTION IN THE HYPOTHALAMUS,
THE ANTERIOR PITUITARY, THE GONADS AND ACCESSORY SEX ORGANS
OF MALE RATS

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A THESIS SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
(ANATOMY)



IN THE

FACULTY OF GRADUATE STUDIES

OF

MAHIDOL UNIVERSITY

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ABSTRACT

The purpose of this study was to find out the target organ(s) for melatonin in rats by studying retention of melatonin in various organs involved in the reproductive function. The retention patterns of ^3H -melatonin in the serum, hypothalamus, anterior pituitary, testis, prostate gland, epididymis, and seminal vesicle were observed. The skeletal muscle and the lung were used as the control organs. The rats were decapitated after 2, 20, 30, and 60 min postinjection of ^3H -melatonin and the amounts of radioactive materials were quantified in each organ after chloroform extraction and two dimensional thin-layer chromatography. The procedures allowed the measurements of both total radioactivity and purified ^3H -melatonin radioactivity. The half-life of ^3H -melatonin in the serum was found to be about 20 min and those in the skeletal muscle and the lung had a half-life of less than 20 min, suggesting that these two organs are non-target organs for melatonin. The concentration of ^3H -melatonin in the anterior pituitary was the highest among all organs determined and rather stable throughout the 60 min period. The radioactive materials were selectively located in the nuclear fraction of the gland. The concentration of ^3H -melatonin in the hypothalamus was relatively high and stable from 30 to 60 min; selective uptake in the nuclear fraction was also found in this organ. A relatively high and stable ^3H -melatonin concentrations were also found in the

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epididymis but the radioactive materials were distributed equally in both the cytoplasmic and nuclear fractions. The patterns of ^3H -melatonin levels in the seminal vesicle, testis, and prostate gland were similar to those of the serum and the control organs which showed a rapid decline within 60 min period.

The total radioactive curve when subtracted by the ^3H -melatonin radioactive curve resulted in the another curve representing the radioactive materials other than ^3H -melatonin. The levels of non- ^3H -melatonin radioactivity were either stable or declining within 60 min period in the control organs, the hypothalamus, and the anterior pituitary. On the contrary, the levels increased progressively in the testis and the prostate gland. The radioactive material was also selectively located in the nuclear fraction, especially as time passed. In the epididymis and the seminal vesicle, the levels of non- ^3H -melatonin radioactivity increased to a peak at 20 or 30 min and declined afterward; selective nuclear distribution was also found in the seminal vesicle.

These results suggest that the anterior pituitary and the hypothalamus are two most likely target organs of melatonin; the existence of active melatonin metabolite is possible and its site of action is most likely in the testis and the prostate gland; and finally both melatonin and its metabolite may exert their actions in the cellular nuclei of their respective target organs.