POSSIBLE ROLE OF MELATONIN IN RAT SALIVARY GLAND

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ABSTRACT

The purpose of this study was to find out melatonin-salivary gland interaction in rats.

The rats were salivarectomized and blood withdrawn by cardiac puncture at 2 and 30 min post-injection of ^{3}H-melatonin. Serum concentrations of ^{3}H-melatonin were determined by chloroform extraction and two dimensional thin layer chromatography. No significant difference was apparent in the disappearance rates of ^{3}H-melatonin from serum of salivarectomized and sham-salivarectomized rats.

Both total and ^{3}H-melatonin radioactivity were determined in the liver, kidney and salivary glands at 30 min post-injection of ^{3}H-melatonin. The concentrations of total radioactivity in the kidney was more than 10 times that in the liver, which, in turn, was more than 4 times that in the salivary gland. The concentrations of ^{3}H-melatonin in these three organs were not significantly different. About 2% of the total radioactivity in the kidney was melatonin and 10% in the liver; whereas almost half of the total radioactivity in the salivary gland was ^{3}H-melatonin.

Chromatographic patterns of radioactive materials in the liver, kidney and salivary gland were determined by chloroform extraction and one dimensional thin layer chromatography. The kidney chromatographic pattern was similar to the liver pattern, by showing the same R_f peak

lagging behind the R_f of melatonin spot. The salivary gland pattern revealed the radioactive peak at R_f 0.42-0.48 position, the same as melatonin spot.

Retention study of ^{3}H-melatonin in the liver, kidney and salivary gland of rats was done. The skeletal muscle and the lung were used as control organs. The rats were decapitated at 2, 20, 30, and 60 min post-injection of ^{3}H-melatonin. The half-life of serum ^{3}H-melatonin was about 20 min. Disappearance of ^{3}H-melatonin from the skeletal muscle and lung comprised of two phases; an initial 20 min rapid and a subsequent 40 min slow phases; suggesting that these two organs are non-target ones for melatonin. The patterns of disappearance of ^{3}H-melatonin from the liver, kidney and salivary gland were similar to those of the serum and control organs which showed a rapid decline within 60 min peroid.

The total radioactive curve subtracted by the ^{3}H-melatonin radioactive curve resulted in the non-^{3}H-melatonin radioactive curve. The levels of non-^{3}H-melatonin radioactivity in the liver and kidney were increased to a peak at 20 min, subsequently decreased and primarily located in the cytoplasmic fraction. On the contrary, the level increased progressively in the salivary gland. The radioactive material was also selectively located in the nuclear fraction as time passed. In addition, specific ^{3}H-melatonin binding was studied and found in the nuclear, but not in the cytoplasmic fractions of the salivary gland.

These results suggest that melatonin is less likely to be excreted via the rat salivary gland and it may be converted into an active metabolite which act directly within the gland.