Does Somatostatin in Each Organ Act Specifically on That Particular Organ?

YUKIO YAMADA, SEIKI ITO, RYO KAYAMORI, YOICHI IWASAKI,
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YAMADA, Y., ITO, S., KAYAMORI, R., IWASAKI, Y., SHIBATA, A., NARA, Y., SUZUKI, M. and HIRASAWA, Y. *Does Somatostatin in Each Organ Act Specifically on That Particular Organ?* Tohoku J. exp. Med., 1979, 129 (1), 101-102 — Rats with hypercalcemia induced by injection of vitamin D₂ had a decreased thyroid somatostatin content, whereas the somatostatin content in their pancreas was almost within the normal range. This suggests that somatostatin in different organs acts specifically on each particular organ as a local hormone or hormone-like substance. — somatostatin; thyroid; pancreas; local hormone; vitamin D₂

Somatostatin (growth hormone release-inhibiting factor) exists in various organs such as the hypothalamus, central nervous system, thyroid, gastro-intestinal tract and pancreas (Arimura et al. 1975; Hökfelt et al. 1975). This study was performed in order to investigate if somatostatin in different organs responds concurrently and uniformly to a given stimulus.

MATERIALS AND METHODS

Eight male Wistar strain rats weighing 200 to 250 g were given vitamin D₂ (200,000 units/day, Ergocalciferol, Eisai, Japan) by daily subcutaneous injections for 17 days. They were decapitated, together with eight control rats which had had no injection, and their thyroid and pancreas were removed. The thyroid and pancreas were extracted by use of 1 N acetic acid and the extracts were boiled, rapidly chilled and centrifuged and the supernatants were lyophilized. The residues were dissolved in 0.05M veronal buffer (pH 7.5) and measured for somatostatin and calcitonin (CT) contents by radioimmunoassay. Antisera against somatostatin and CT were prepared by injections of synthetic somatostatin or human CT (Peptide Institute, Osaka, Japan) conjugated to bovine serum albumin using glutaraldehyde.

RESULTS AND DISCUSSION

In our study, injection of vitamin D₂ into rats induced a remarkable rise of the serum calcium level (from 9.9 ± 0.9 to 15.5 ± 1.8 mg/100 ml) and a remarkable decrease of thyroid somatostatin content as compared with the corresponding values in control animals ($p < 0.01$). On the other hand, in the pancreatic somatostatin content there was almost no difference between the vitamin D₂-treated and control rats (Fig. 1). This finding

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Fig. 1. Effect of vitamin D₂ on the rat thyroid and pancreatic somatostatin contents. The bars indicate mean $\pm$ S.E.M. $\square$, control rats; ▨ , vitamin D₂ injected rats.

indicates that the thyroid somatostatin and the pancreas somatostatin do not concurrently or uniformly respond to a given stimulus, which suggests that somatostatin in different organs acts specifically on each particular organ as a local hormone or hormone-like substance.

References

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