PARATHYROID HORMONE FUNCTIONS: WONDERFULLY PLANNED

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The experimental history of Parathyroid gland function is briefly reviewed. Complex coordination between parathormone and vitamin D in the metabolism of calcium phosphate is traced in the blood, kidney, intestinal tract, and bone. Interplay of checks and balances is presented as evidence supporting man's origin by divine special creation.

There are many features of the human body for which no explanations exist. Yet by the Word of God we learn we are fearfully and wonderfully made. Among such wonders are the eight ductless endocrine glands. The prime purpose of these glands is the synthesis of certain body regulators called hormones and the release of such hormones into the blood. There are some 20 different hormones synthesized by the endocrine glands.

Hormones have some major functions individually but they also have some other coordinate functions in which they "cooperate" with hormones of other glands or with vitamins. The emphasis of this article is on the hormone produced by the parathyroid glands.

Historical Background

In 1896 G. Vassale and F. Generali of Italy removed the parathyroid glands from animals and noticed before the animals died that their muscles twitched, went into spasms, and finally became rigid.

In 1909 W. G. MacCallum and Carl Voegtlin of Johns Hopkins University decided that these muscular effects were due to a deficiency of calcium. They also found that on removal of the parathyroids a calcium deficiency appeared in the blood.

Isidor Greenwald of Roosevelt Hospital in New York observed that a decrease in calcium ion was accompanied by an increase of phosphate ion in the blood.

It was finally learned that vitamin D is an essential factor in regulation of calcium and phosphate metabolism. Vitamin D and parathyroid hormone overlap in function, each reenforcing the activity of the other.

Hormone Identified

In 1960 Lyman C. Craig and Howard Rassmussen at the Rockefeller Institute in New York finally purified the parathyroid hormone and established that it was a protein. It took five years to produce one milligran of the pure hormone.

The molecule of this hormone has a molecular weight of 9,500 and is made up of a chain containing 83 separate residues of 17 different amino acids. The exact sequence of these amino acids is still unknown but it is understood that only 33 are necessary for the activity of the hormone. Apparently the other 50 amino acid units maintain the stability of the 33 active amino acid residues.

The parathyroid glands consist of four little reddish-brown organs about the size and shape of slightly flattened garden peas. The glands are located close to the thyroid gland near the voice box in the front region of the neck.

Hormone Function

The parathyroid hormone functions in the control of the internal environment of the body organs. This environment is composed largely of blood plasma and extracellular fluids.

One of the most important constituents of this internal fluid is the calcium ion. It is released when calcium compounds go into solution. The normal transmission of nerve impulses, contraction of muscles, coagulation of the blood, fertilization of eggs, and formation of bone each require an optimum calcium ion concentration. Two factors of major importance in this system are parathyroid hormone and vitamin D.

It has been established that the parathyroid hormone acts to promote the absorption of calcium ion into the blood stream from the food in the gastrointestinal tract. Evidently when the concentration of this ion falls too low, the glands are stimulated to synthesize more hormone.

In turn the hormone acts upon the intestinal cells to increase the absorption of calcium. It also acts on the cells of the kidney tubules to increase the reabsorption of calcium ion from the filtered urine.

In line with these functions, the parathyroid hormone acts upon the bone cells and converts them into bone destroying cells called osteoclasts. These osteoclasts then release calcium from storage in the bone and make it available elsewhere.

Likewise, the parathyroid hormone stimulates the kidney to excrete more phosphate ion into the urine. This furthers the desired effect of releasing calcium ion.

The responses of the kidneys and the gastrointestinal tract are rapid because they are sensitive to small changes in hormone concentration. The response of the bone is slow but has unlimited capacity. When the concentration of calcium ion is restored to normal, secretion of the hormone is reduced and this results in a slowing down of the extra addition of calcium. The concentration of calcium ion is returned to normal.

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Bone Structure Dynamics

It has been found recently by using radioactive tracers that bone is being remodeled constantly. Bone contains 98% of the body calcium and 66% of the phosphate. These are deposited as a complex salt, hydroxyapatite, framed in a protein called collagen. The osteoclasts build these fibers and align them to form bone.

When the gastrointestinal tract has enough calcium ion, the small hydroxyapatite crystals grow slowly. While small and growing they are called exchangeable bone because in case of need they give up their calcium and phosphate ion much more readily than does hard bone. If no need for calcium ion arises they grow into non-exchangeable hard bone.

In the average person enough old bone is broken down each day to release 0.5 grams of calcium ion. This absorbed old bone is replaced by new bone. The ions will leave the exchangeable bone if either calcium or phosphate ion concentration becomes too low in the blood plasma. They will enter the exchangeable bone when they are not further needed. Thus the exchangeable bone serves as a supply reservoir.

The role of vitamin D is to maintain the level of calcium and phosphate ion at such a concentration that bone is renewed continually. If the vitamin concentration falls too low, a disease called rickets develops.

Hormone and Vitamin Coordination

Nerve and muscle cells are critically dependent on the proper concentration of calcium ion in the blood. The parathyroid hormone and vitamin D acting together control both the total amount and the ratio of calcium to phosphate ion in the gastrointestinal environment. Vitamin D in excessive amounts can cause a large deficiency of hormone.

However, the situation is not quite so simple as indicated in the last paragraph. The steroid hormones of the adrenal cortex, the growth hormone of the pituitary, insulin from the pancreas, thyroid hormone, and the sex hormones have some influence on bone growth also.

Conclusion

All the mechanisms that evolutionists postulate fail to explain the origin of this complex interplay of checks and balances. The parathyroid hormone and vitamin D have a balanced series of effects upon the gastrointestinal tract, the kidney cells, the bone cells so that a favorable concentration of calcium and phosphate ions is maintained throughout the entire body. Such an intricate control system is evidence supporting the Divine special creation of man's body as recorded in the Scripture.

Reference

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COMMENTS ON SCIENTIFIC NEWS AND VIEWS

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It is common to distinguish two kinds of theories about the universe in addition to the Creationist view. Those who believe in Creation consider that we know that God made the world; and, when we simply know something, we do not say that we have a theory about it, but just that we know the fact.

We usually speak of Creation as of supernatural origin, so it might be reasonable to call the theories of others of natural origin. Indeed, it is hard to say whether "natural" means anything here; if we accept the philosopher's definition for "the natural": "that which happens always or for the most part unless it be forcibly prevented." Now nobody has claimed that the universe originated more than once, so it does not make much sense to talk about what, in that matter, happens "always or for the most part."

Be that as it may, the two "natural" theories are usually contrasted: on the one hand, the "steady-state" theories, such as Hoyle's; and on the other hand, such theories as the "big bang." The purpose here is to suggest that the contrast between these two views may be much less than is usually supposed; that, in a sense, they are both "steady-state" theories.

It might be mentioned that "steady-state" theories are not especially new; Aristotle seems to have believed that the world had existed in more or less its present form from eternity. Indeed, on the basis of the information which he had, that was no doubt the most reasonable view, and it certainly made better sense than most of the pagan cosmogonies. In this connection, it might be remarked that some of the sayings of early Christians, which are quoted to show that they would not object to evolution, really have nothing to do with the origin of species, but rather are intended to reconcile the Scriptural teaching with the eternity of the universe (which was widely considered to have been proved).

While the second law of thermodynamics had not, of course, been formulated in ancient times, yet Aristotle knew well enough that the natural course of events is that things decay. The fact

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