

Parathormone

Parathormone (*PTH*, hormon of the parathyroid glands) is a linear polypeptide of 84 amino acids that increases the permeability of cells to **calcium** and **phosphate** ions. Regulates the level of calcium in the blood. It is produced by the main cells of the parathyroid glands.

Parathyroid hormone is synthesized from a larger precursor (115 AMK) and is not stored in cells. That is why it is renewed several times an hour. The indicator for synthesis is the level of calcium in the blood, when **hypocalcemia stimulates** and **hypercalcemia inhibits** parathyroid hormone synthesis. The secretion of parathormone is also inhibited by calcitriol. PTH synthesis is also stimulated by an increased concentration of phosphates. Magnesium has a similar effect on PTH secretion as calcium, but its effect is milder.

The target tissues of PTH are kidneys, bones (and teeth) and intestine. These structures are important for the regulation of calcemia; they contain specific receptors that are subject to **down-regulation**. Calcium is strictly regulated in the body.

Effects

PTH acts in three ways on target tissues:

1. **Bones - resorption** of bones, after the binding of the hormone to osteoblast receptors, calcium is released from the bone fluid thanks to the calcium pump. Osteoblasts mediate the effect of the hormone on osteoclasts, which thus resorb bone. With a long-lasting effect, the bone thins and at the same time osteoblastic processes are activated to maintain bone density. But resorption **prevails** over new creation.
2. **Kidney** - PTH **increases calcium reabsorption** in the ascending limb of the loop of Henle, distal tubule and collecting duct. Increases tubular resorption of magnesium. Conversely, phosphate excretion is **increased** by decreasing reabsorption in the proximal tubule.
3. **Intestine** - by means of parathyroid hormone, kidney 1-hydroxylase is stimulated, which changes **calcidiol** into **calcitriol**. The latter ensures **increased absorption** of both **calcium** and **phosphates** from the intestines.

It has the opposite effects of calcitonin, a thyroid hormone, which lowers blood calcium levels. With **hypoparathyroidism** there is tetanic convulsions. On the contrary, **hyperparathyroidism** can mean the risk of osteoporosis.

Links

Related articles

- Calcium
- Phosphate
- Vitamin D
- Calciophosphate metabolism disorders

Used literature

- TROJAN, Stanislav, et al. *Lékařská fyziologie*. 4. edition. Praha : Grada, 2003. 772 pp. pp. 484-485. ISBN 80-247-0512-5.
- LEDVINA, Miroslav, et al. *Biochemie pro studující medicíny*. 2. edition. Praha : Karolinum, 2009. ISBN 978-80-246-1414-4.

References

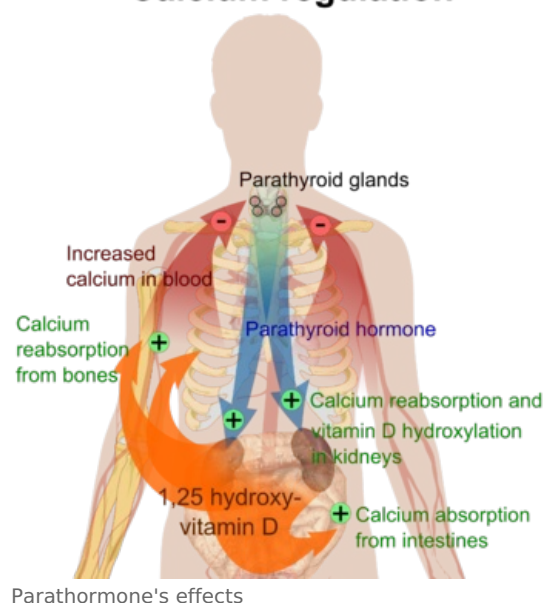
glandulae parathyreoideae
polypeptide with 84 amino acids
bones, kidneys

PTH 1 receptors in bones and kidneys, PTH 2 receptors in CNS, pancreas, testes and placenta ^[1]

see the article

168450 (<https://omim.org/entry/168450>)

Calcium regulation



1. PARFITT, A Michael. Parathyroid hormone and periosteal bone expansion. *J Bone Miner Res* [online]. 2002, vol. 17, no. 10, p. 1741-3, Available from <<https://www.ncbi.nlm.nih.gov/pubmed/12369776>>. ISSN 0884-0431.