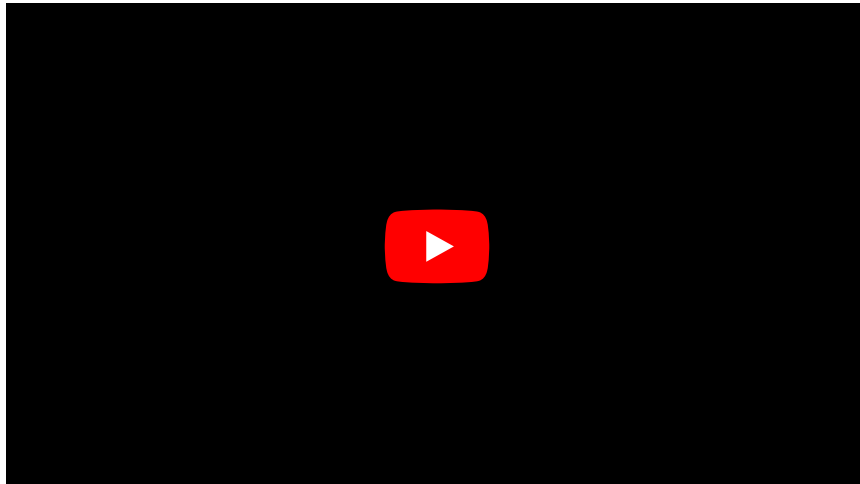
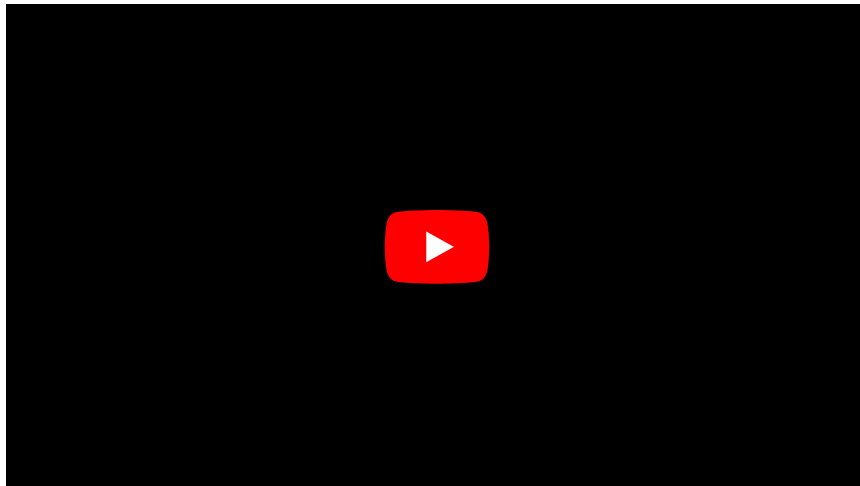


# Parathyroid hormone

PTH:



PTH 2:



**Parathyroid hormone** (*PTH*, parathyroid hormone) is a linear polypeptide of 84 amino acids that increases the permeability of cells to **calcium** and **phosphate** ions. It 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 parathyroid hormone 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 kidney, bone (and teeth), and intestine. These structures are important for calcium regulation; 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. **Bone resorption** after 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 formation.

parathyroid glands  
polypeptide of 84 AMK  
bones, kidneys  
PTH 1 receptors in bones and kidneys, PTH 2 receptors in the CNS, pancreas, testes and placenta <sup>[1]</sup>  
168450 (<https://omim.org/entry/168450>)

2. **Kidney** – díky 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** – renal 1-hydroxylase is stimulated by means of parathormone, which changes **calcidiol** into **calcitriol**. This ensures **increased absorption** of both **calcium**, and **phosphates** from the intestines.

It has the opposite effects of calcitonin, a thyroid hormone, , lowering blood calcium levels. **Hypoparathyroidism** causes tetanic convulsions. On the contrary, **hyperthyroidism** can mean the risk of osteoporosis.

## Links

- ws: Parathormon

## Related Articles

- Calcium
- Phosphate
- Vitamin D
- Disorders of calcium phosphate metabolism

## References

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- LEDVINA, Miroslav. *Biochemie pro studující medicíny*. 2. edition. Karolinum, 2009. ISBN 978-80-246-1414-4.

## Reference

1. PARFITT, A Michael. Parathyroid hormone and periosteal bone expansion. *J Bone Miner Res* [online]. 2002, vol. 17, p. 10, Available from <<https://www.ncbi.nlm.nih.gov/pubmed/12369776>>. ISSN 0884-0431.

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