

Calcitonin Overview

Overview:

Calcitonin is a 32-amino acid peptide hormone produced by the parafollicular (C) cells of the thyroid gland. It plays a key role in calcium and bone metabolism by lowering blood calcium levels.

Mechanism of Action:

Calcitonin binds to the calcitonin receptor (CTR), a G-protein coupled receptor (GPCR) present on osteoclasts and renal tubular cells. Upon binding, it:

- Inhibits osteoclast activity → reduces bone resorption and calcium release.
- Increases renal calcium excretion → enhances urinary calcium clearance.
- Decreases intestinal calcium absorption (indirect effect).

Physiological Functions in the Body:

Bone Metabolism: Inhibits osteoclast-mediated bone resorption, preserving bone mineral density (BMD).

Calcium Homeostasis: Lowers serum calcium and phosphate levels.

Protective Role: May help regulate postprandial calcium surges and bone microarchitecture.

Clinical & Research Use:

Approved Uses:

- Postmenopausal osteoporosis (nasal spray, subcutaneous injection)
- Paget's disease of bone
- Hypercalcemia of malignancy
- Off-Label/Research: Investigated in spinal cord injury, bone pain, and fracture healing.

Dosing (FDA-Approved Context):

Postmenopausal osteoporosis: Nasal spray: 200 IU daily, alternating nostrils.

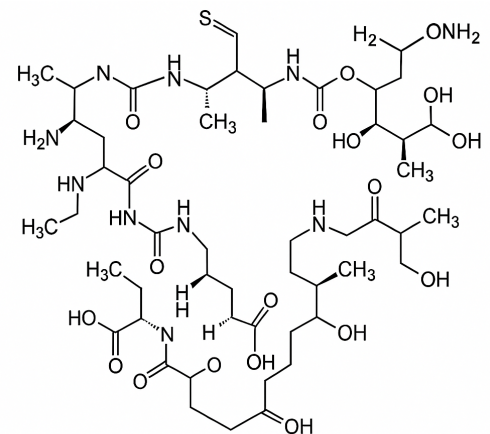
Subcutaneous injection: 100 IU daily

Hypercalcemia of malignancy: IV infusion: 4-8 IU/kg every 12 hours until calcium normalizes.

Paget's disease: IM or subcutaneous: 100 IU daily.

Conclusion:

Calcitonin is a crucial hormone peptide with bone-protective and calcium-lowering effects. It acts via inhibiting osteoclasts and enhancing renal calcium excretion, helping maintain bone density and mineral balance. Clinically, it's FDA-approved for osteoporosis, Paget's disease, and hypercalcemia, with ongoing research exploring additional therapeutic roles.



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