CALCIUM
stored as hydroxyapatite in bone
- involved in the PLC intracellular signaling pathway
- crucial for nerve transmission, secretion, muscle contraction

Bone remodeling: constant process important for Ca^{2+} regulation, bone growth, and bone repair

OSTEOPOROSIS
results from an imbalance in activity of osteoblasts and osteoclasts

ANTI-RESORPATIVES
Osteoclast inhibitors

Estrogens (HRT) inhibit osteoclasts, and may stimulate osteoblasts.

Various synthetic maintain non-fertility benefits, reset shivering threshold

SERMS

Raloxifene

MOA: acts as an estrogen AGONIST in bone, reversing osteoporosis.
- ANTAGONIST in breast and uterine tissue

BOTH increase risk of clotting event

Bisphosphonates mimic pyrophosphate and bind Ca^{2+} in structure of hydroxyapatite

MOA: bind bone → osteoclast apoptosis

Alendronate oral, weekly

Ibandronate oral, monthly

Zoledronate IV, annually
↳ can treat/prevent bone mets

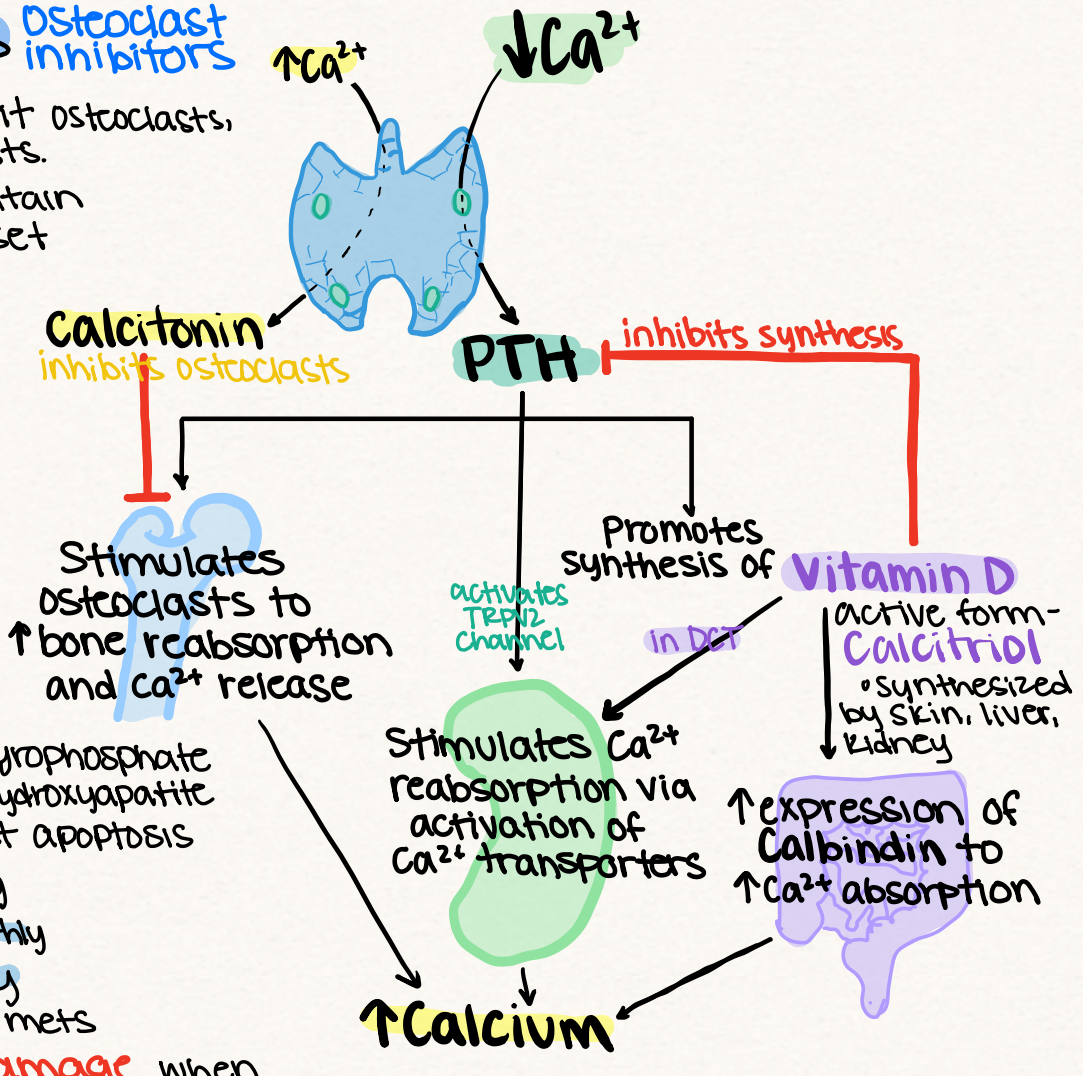
Toxicities: esophageal damage when taken orally.

RANKL Inhibitor

Denosumab

MOA: blocks activation of osteoclasts by interfering with RANKL
- RANKL is necessary for osteoclasts to mature

BOTH increase risk of osteonecrosis of jaw



ANABOLICS
Osteoblast stimulators

PTH-derived peptides

Teriparatide (daily, IM)

MOA: identical to fragment of PTH but stimulates osteoblasts and Ca^{2+} absorption in bone