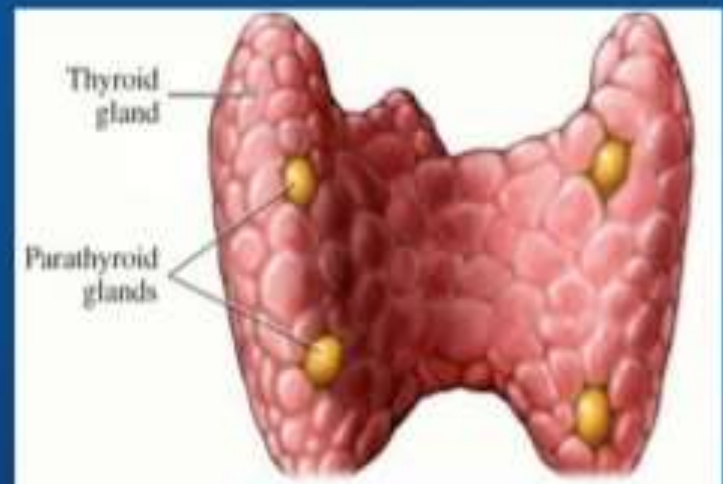


PARATHYROID GLAND-1

DR. SHEETAL JAIN

Parathyroid gland

- ✓ The parathyroid glands are small endocrine glands.
- ✓ They are responsible for the production of parathyroid hormone.
- ✓ Which acts to control calcium levels in the body.



ANATOMY

Anatomy of parathyroid

Shape:

- ✓ They are flattened and oval in shape, situated external to the gland itself, but within its sheath.

Anatomical location:

- ✓ They are located on the posterior, medial aspect of each lobe of the thyroid gland.

Anatomy

Cont....

Size and weight:

- Size of a grain of rice.
- 30 milligrams weighs approximately.
- 3-4 millimeters in diameter.
- The majority of people have four parathyroid gland

HISTOLOGY

Histology of parathyroid

Chief cells

- They are small cell.
- More abundant.
- They secrete parathyroid hormone.

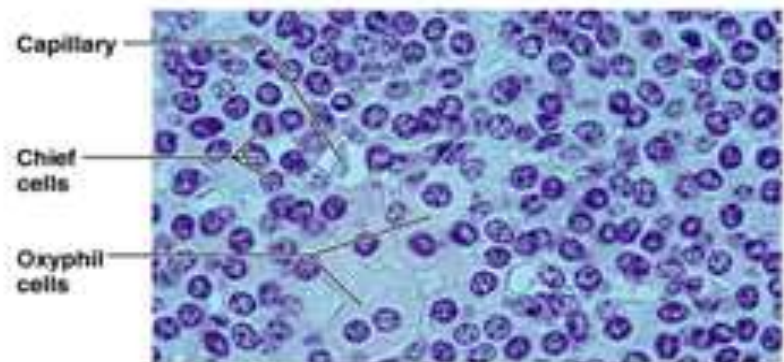
Oxyphil cells-

- They are much larger.
- Less abundant than chief cells.
- Purpose is unknown.
- The number of oxyphil cells increases with age.

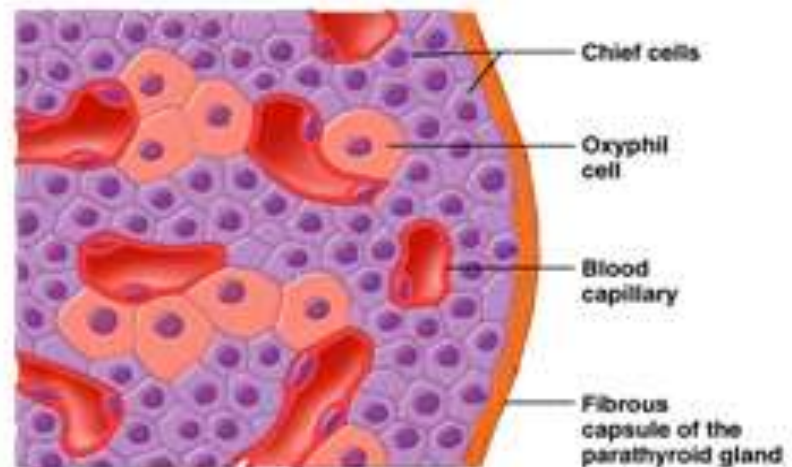
HISTOLOGY

Parathyroids (two types of cells)

- Rare chief cells
- Abundant oxyphil cells (unknown function)
- Chief cells produce PTH
 - Parathyroid hormone, or parathormone
 - A small protein hormone



(b)



PHYSIOLOGY

Physiology

- ✓ **“Parathormone”** is produced by chief cells tends to increase the serum calcium level.
- ✓ PTH is a peptide hormone, is secreted in response to low blood calcium level.
- ✓ Its secretion is controlled by negative feedback system.

Functions of PTH

- Suppression of calcium loss in urine.
- Stimulate loss of phosphate ions in urine
- Mobilization of calcium from bone.
- Enhancing absorption of calcium from the small intestine.
- Activation of Vitamin D

FUNCTIONS

Function of PTH

(parathyroid hormone or “parathormone”)

- ***Increases blood Ca^{++} (calcium) concentration when it gets too low***
- Mechanism of raising blood calcium
 1. Stimulates osteoclasts to release more Ca^{++} from bone
 2. Decreases secretion of Ca^{++} by kidney
 3. Activates Vitamin D, which stimulates the uptake of Ca^{++} from the intestine
- Unwitting removal during thyroidectomy was lethal
- ***Has opposite effect on calcium as calcitonin (which lowers Ca^{++} levels)***

CONTROL

Control of PTH release

- Falling blood Ca^{2+} levels = trigger release
- Hypercalcemia = inhibits release

ROLE OF CALCIUM

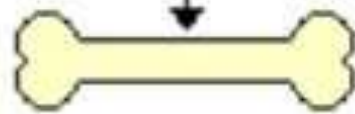
Calcium levels in the blood stream are maintained for

- Muscle contraction
- Nerve impulse transmission
- Blood clotting
- Enzyme activity (acting as cofactors)

Parathyroid hormone (PTH)

Low concentration of calcium in blood

Release of parathyroid hormone



Efflux of calcium from bone



Decreased loss of calcium in urine

Vitamin D



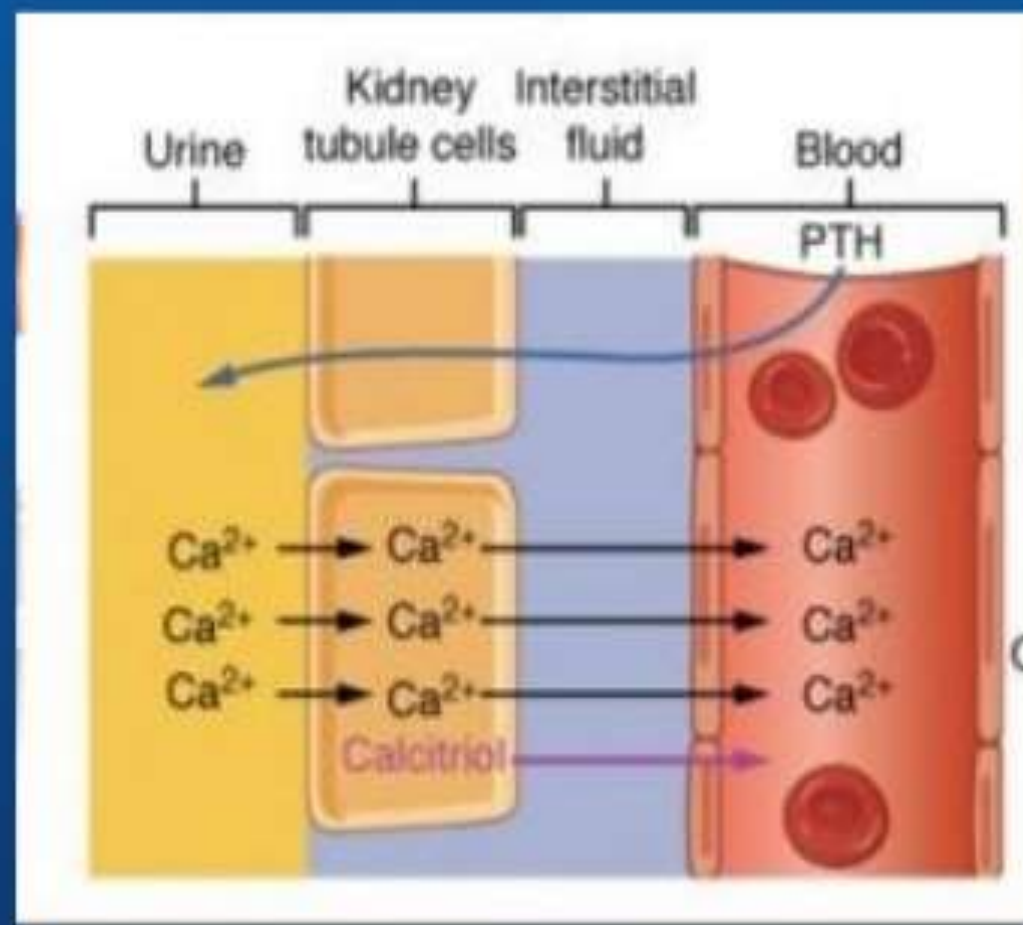
Enhanced absorption of calcium from intestine

Increased concentration of calcium in blood

Dr. Barkha S. Tiwari

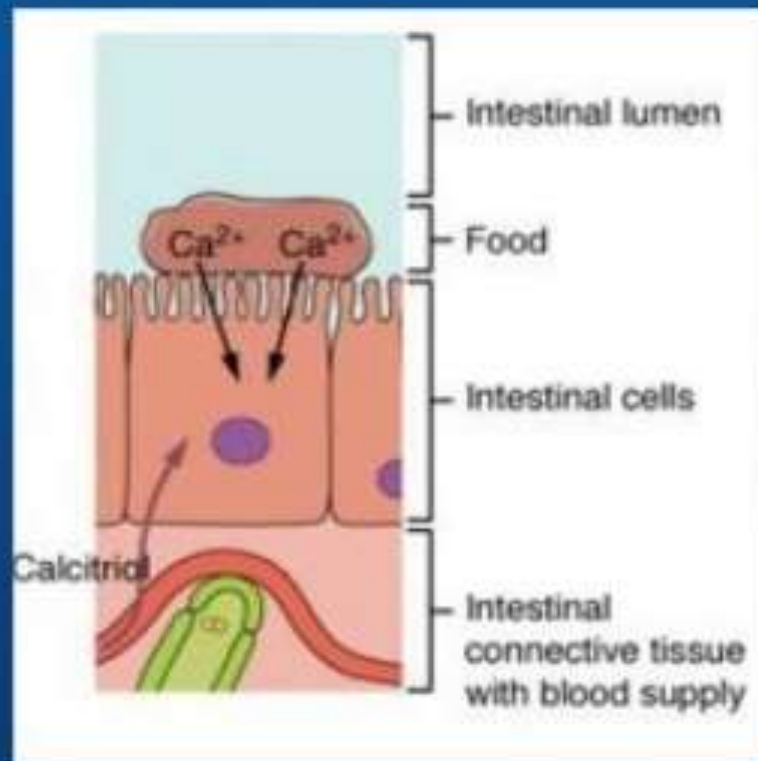
Effects of PTH on kidneys

- PTH stimulates the kidney tubules to recover waste calcium from the urine.
- PTH also stimulates the tubular cells to release calcitriol.



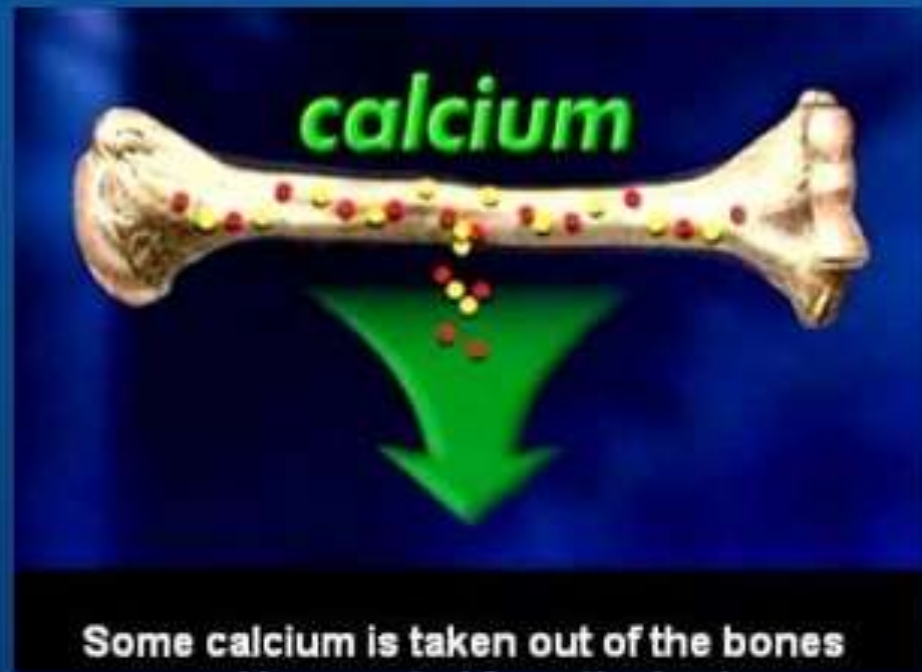
Effects of calcitriol on intestine

- PTH indirectly increases calcium absorption from intestine via its effects on vitamin D synthesis.
- Calcitriol (vitamin D) then stimulates increased absorption of dietary calcium by the intestines.



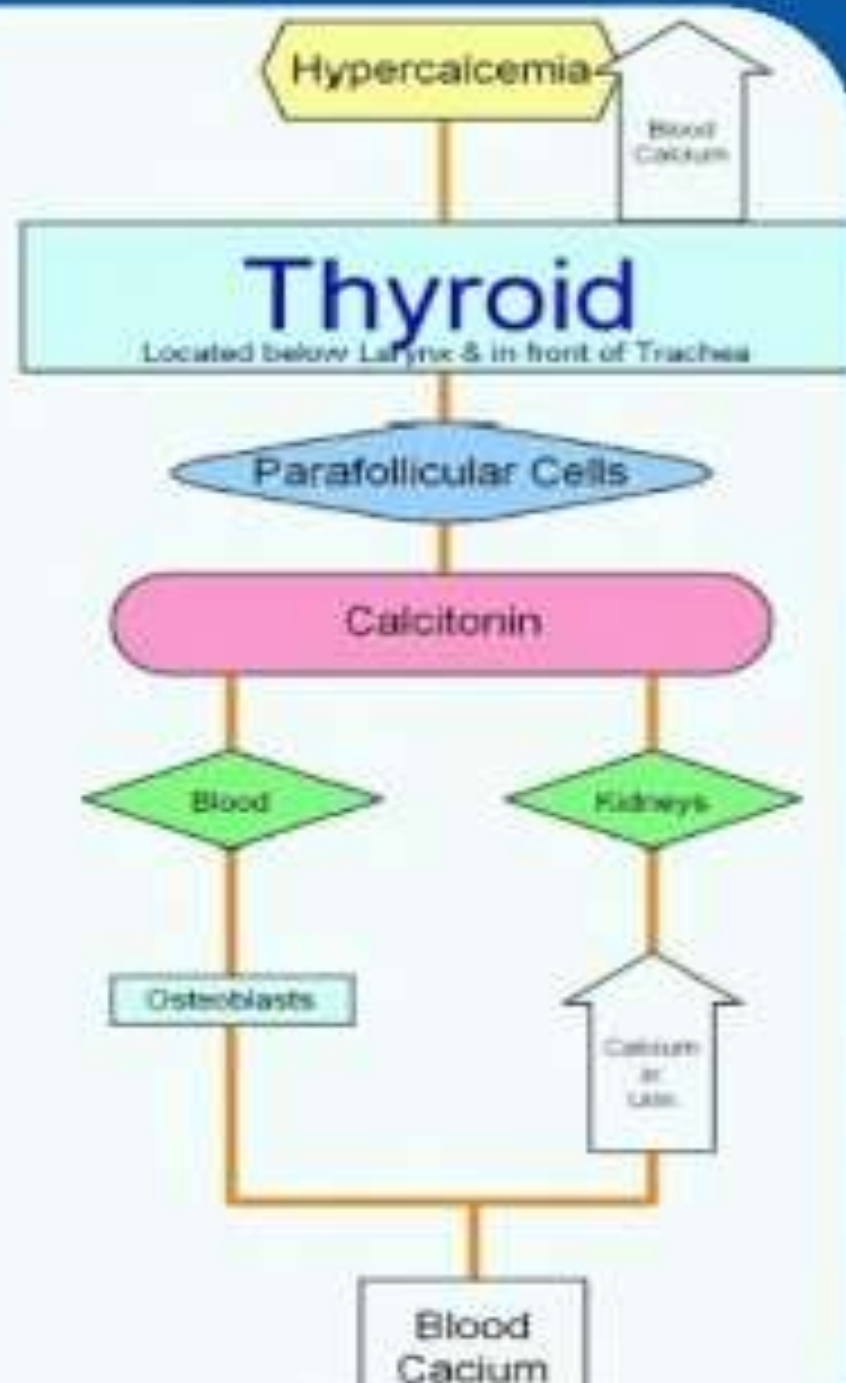
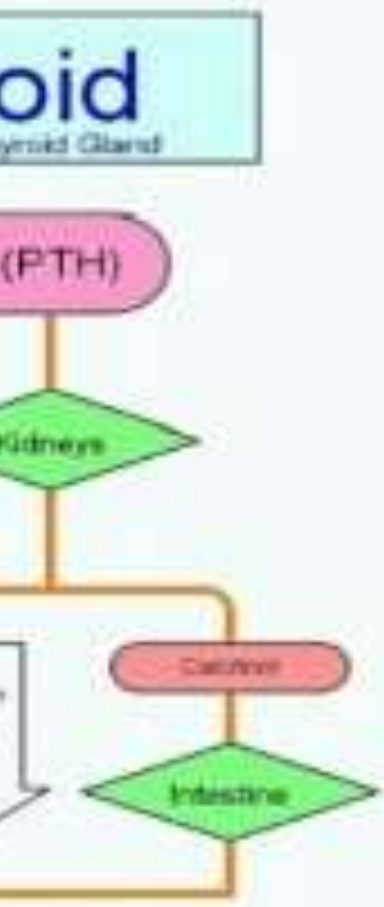
Effects of PTH on bones

- Inhibits osteoblasts.
- Stimulates osteoclast.
- Bone is broken down releasing calcium ions into the blood stream.



PTH vs. Calcitonin

Humoral



Calcium

Functions:

and bones.

clotting.

and muscle
action.

regulation.

omatic activity

use of
transmitters

Normal calcium level in blood

8.5-10.5 mg/dl

Normal phosphorous level in blood.

2.5-4.5 mg/dl

Normal PTH level in blood.

20-60 mg/dl

CONT.