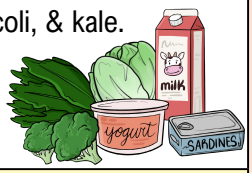
TOPIC: MAJOR MINERALS: CALCIUM AND PHOSPHORUS

Calcium (Ca)

RDA (Adults):	1,000 mg
RDA (F 51+, Adults 70+):	1,200 mg

UL (Adults 19-50):	2,500 mg
UL (Adults 50+):	2,000 mg

- **Main bodily functions:**
  - Forms hydroxyapatite w/ phosphorus; hard part of bones and _____.
  - Muscle _____ & _____ signals.
  - Maintaining blood _____.

Food Sources	Deficiency	Excess/Toxicity
Sardines (w/ bones), milk, dairy, cabbage, broccoli, & kale. 	*Acute*: ◆ Calcium _____ from storage in bones. *Chronic*: Hypo_____ ◆ Poor bone development. ◆ Bone loss/osteoporosis.	_____calcemia: ◆ _____ stones. ◆ Gastric upset (constipation, bloating, gas). ◆ Can interfere with other mineral absorption.
Things That Limit Absorption Oxalates & phytates → _____ Lack of vitamin _____		
Main dietary concern: 30% of males & 60% of females deficient in calcium → _____ & fractures.		

EXAMPLE

On the lines below, write one outcome of hypocalcemia and hypercalcemia.

a. Hypocalcemia: _____

b. Hypercalcemia: _____

PRACTICE

Why is spinach not a great source of calcium?

a) The oxalates in spinach limit the calcium absorption.

b) It lacks the fats necessary for calcium absorption.

c) The zinc in spinach interferes with calcium absorption.

d) The calcium is not in the bioavailable heme form.

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Calcium Balance in the Body

◆ Calcium in the blood is regulated by the _____ and _____thyroid glands.

Calcium too high:

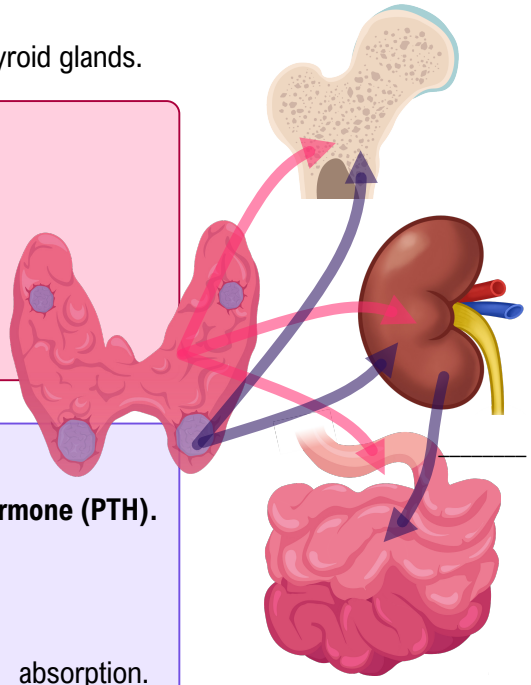
◆ **Thyroid gland releases _____.**

- Bones _____ ___ calcium from blood.
- Kidneys _____ calcium.
- Intestines ___ absorption.

Calcium too low:

◆ **Pararthyroid glands release _____ hormone (PTH).**

- Bones _____ calcium into blood.
- Vitamin D activated in kidneys.
  - Kidneys _____ calcium. Intestines ___ absorption.



EXAMPLE

Fill in the following table on calcium balance.

Blood Calcium	Gland → Releases	Bone Response	Kidney Response	Intestine Response
Low	Parathyroid → _____ (_____)	_____ Ca	_____ Ca Activate _____	___ Ca absorption
High	Thyroid → _____	_____ Ca	_____ Ca	___ Ca absorption

PRACTICE

If a person has low calcium for many years, how would you expect their body to respond?

a) The intestines would decrease calcium absorption.

b) The bones would lose density since calcium is pulled from the bones.

c) The kidneys would become calcified from filtering out excessive calcium.

d) The thyroid would release excess calcitonin leading to hypothyroidism.

TOPIC: MAJOR MINERALS: CALCIUM AND PHOSPHORUS

Phosphorus (P)

RDA (Adults): 700 mg

UL (Adults): 4,000 mg

- **Main bodily functions:**
  - Forms hydroxyapatite w/ _____ (bones & teeth).
  - Used in energy storage molecules (_____).
  - Balances pH in _____.
  - Component of DNA and RNA (phosphate _____), and _____lipid membranes.

Food Sources	Deficiency (Rare)	Excess/Toxicity (Rare)
Animal products, legumes, & seeds. → higher in _____ sources. 	Hypophosphatemia: typically only in cases of _____. ◆ Muscle weakness. ◆ Bone pain.	Hyperphosphatemia: associated with kidney issues. ◆ Calcification of soft tissues.
Main dietary concern: none.		

PRACTICE

Which food sources are especially high in phosphorous?

a) Whole grains. b) Animal products. c) Vegetables. d) Fruits.

PRACTICE

Which mineral does phosphorous combine with to create hydroxyapatite, the hard component of bones and teeth?

a) Sodium. b) Calcium. c) Magnesium. d) Copper.