D.PHARM • SECOND YEAR

जैव रसायन एवं नैदानिक विकृति विज्ञान

अध्याय 9

खनिज

हिंदी अध्याय नोट्स



DIPLOMA IN PHARMACY

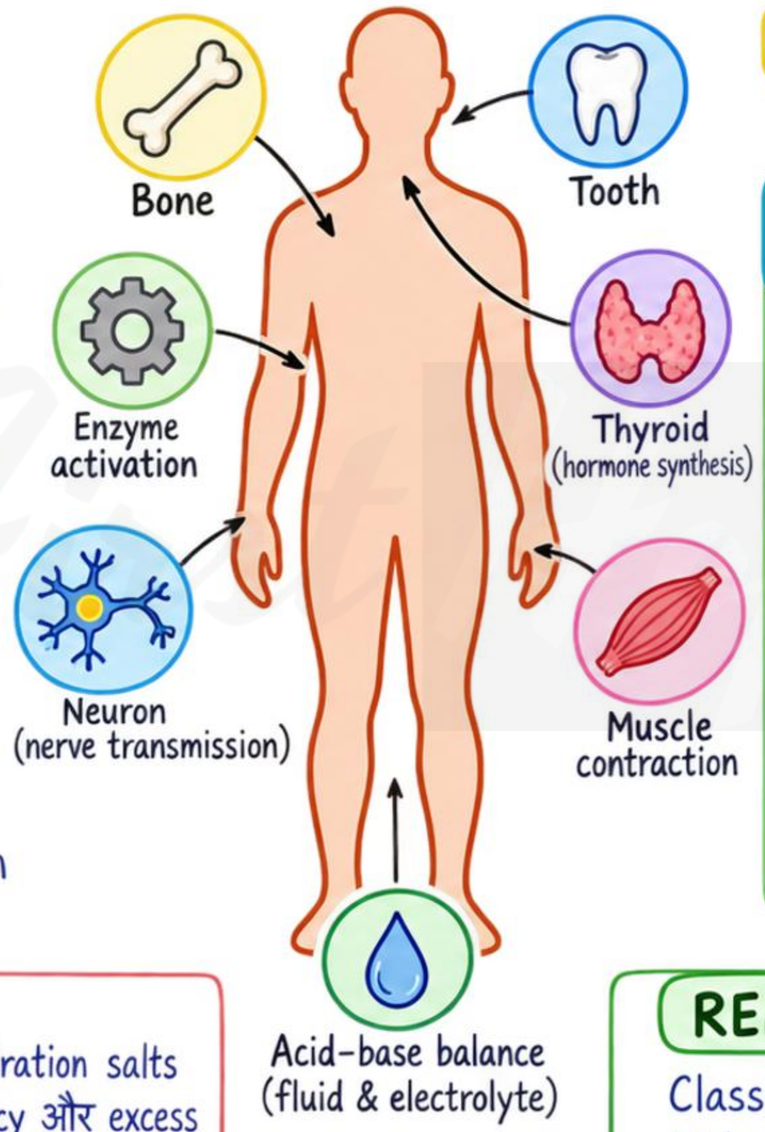
MINERALS: DEFINITION & CLASSIFICATION

DEFINITION

Minerals ऐसे inorganic elements हैं जो normal physiological और biochemical functions के लिए आवश्यक हैं। Body इन्हें बना नहीं सकती, इसलिए ये food, water या suitable supplements से लेने पड़ते हैं।

WHY MINERALS ARE NEEDED

- bones और teeth
- enzyme activation
- hormone synthesis और action
- nerve transmission और muscle contraction
- fluid, electrolyte और acid–base balance
- oxygen transport और cellular respiration



CLASSIFICATION BY DAILY REQUIREMENT

MACROMINERALS / MAJOR MINERALS

100 mg/day से अधिक मात्रा में चाहिए।

- Calcium
- phosphorus
- potassium
- sodium
- chloride
- magnesium
- sulfur

MICROMINERALS / TRACE ELEMENTS

100 mg/day से कम मात्रा में चाहिए।

- Iron
- zinc
- iodine
- copper
- selenium
- fluoride
- chromium
- manganese
- molybdenum
- cobalt

PHARMACY LINK

Minerals oral supplements, antacids, oral rehydration salts और intravenous fluids में use होते हैं। Deficiency और excess दोनों harmful हो सकते हैं।

REMEMBER

Classification required amount पर based है— biological importance पर नहीं।

MACROMINERALS: SOURCES & FUNCTIONS

Ca CALCIUM

Sources: milk, cheese, leafy greens।



Bones और teeth; muscle contraction; blood clotting; neurotransmitter release।

P PHOSPHORUS

Sources: meat, dairy, legumes।



Bones; ATP, DNA, RNA और phospholipids; acid-base buffering।

Mg MAGNESIUM

Sources: nuts, whole grains, legumes।



सैकड़ों enzyme reactions का cofactor; ATP use; nerve और muscle function।

Na SODIUM

Sources: table salt और processed foods।



Major extracellular cation; fluid balance, nerve impulses और acid-base balance।

K POTASSIUM

Sources: bananas, potatoes, spinach।



Major intracellular cation; muscle function, nerve impulses और cardiac rhythm।

Cl CHLORIDE

Sources: salt, tomatoes और olives।



Major extracellular anion; fluid ब acid-base balance; gastric HCl formation।

S SULFUR

Sources: protein-containing foods।



Methionine, cysteine, thiamine और biotin में present; proteins मैं disulfide bonds बनाता है।

KEY IDEA

Macromineral का अर्थ larger daily requirement है, larger molecule नहीं।

TRACE MINERALS: SOURCES & FUNCTIONS



ZINC — Zn

Meat, dairy, nuts → enzyme action, DNA/protein synthesis, immunity और wound healing।

IRON — Fe

Red meat, beans, spinach → haemoglobin, myoglobin और cytochromes; oxygen transport।

IODINE — I

Iodised salt, seafood → thyroid hormones T_3 और T_4।

COBALT — Co

Animal foods → vitamin B_{12} का part।

COPPER — Cu

Shellfish, nuts, seeds → iron metabolism, connective tissue और antioxidant enzymes।

MOLYBDENUM — Mo

Legumes, grains, leafy vegetables → xanthine oxidase और sulfite oxidase का cofactor।

SELENIUM — Se

Seafood, Brazil nuts → glutathione peroxidase और thyroid function।

MANGANESE — Mn

Nuts, legumes, whole grains → enzyme cofactor; bone और cartilage formation।

CHROMIUM — Cr

Whole grains, broccoli → insulin action और carbohydrate metabolism support।

FLUORIDE — F

Fluoridated water, tea → tooth enamel strong करता; excess से fluorosis।

REMEMBER Trace requirement छोटी है, पर deficiency या toxicity के effects बड़े हो सकते हैं।

CALCIUM, PHOSPHORUS & MAGNESIUM

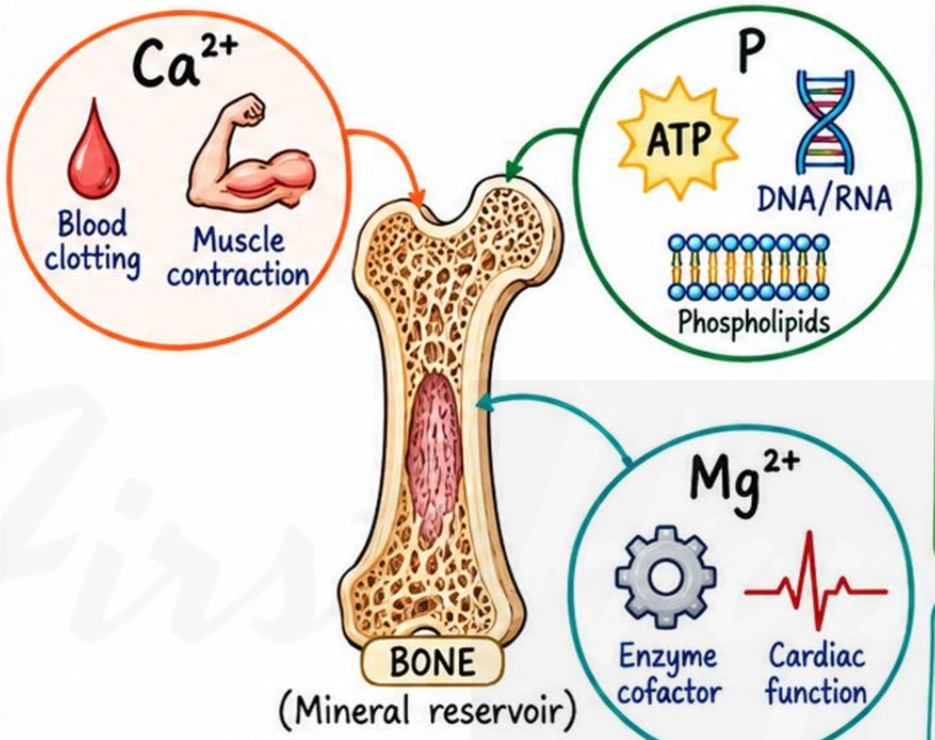
CALCIUM — Ca^{2+}

Main roles: bones और teeth का mineral; blood clotting; muscle contraction; neurotransmitter release और enzyme regulation।

Homeostasis: मुख्यत: parathyroid hormone, calcitriol और calcitonin control करते हैं।

Deficiency: tetany; poor bone mineralisation; osteomalacia या osteoporosis।

Pharmacy: calcium salts supplementation, hypocalcaemia और selected antacid preparations में।



PHOSPHORUS — PHOSPHATE

Main roles: bone में hydroxyapatite; ATP और energy transfer; DNA/RNA; phospholipids; buffering।

Deficiency: hypophosphataemia, weakness और bone pain।

Pharmacy: chronic kidney disease में phosphate binders intestinal phosphate absorption घटाते हैं।

MAGNESIUM — Mg^{2+}

Main roles: 300 से अधिक enzymes का cofactor; ATP stabilise करता; nerve, muscle और cardiac function support।

Deficiency: cramps, tremor, neuromuscular irritability और cardiac arrhythmias।

Pharmacy: magnesium sulfate eclampsia और magnesium deficiency में; कुछ magnesium salts laxatives या antacids की तरह।

CALCIUM HOMEOSTASIS

PTH raises blood Ca^{2+}

calcitriol increases intestinal Ca^{2+} absorption

calcitonin helps to lower blood Ca^{2+}

NORMAL BALANCE

Kidney, intestine, bone और hormones मिलकर mineral balance maintain करते हैं।

PHARMACY (Overall) | Calcium, phosphorus और magnesium से जुड़ी conditions में विभिन्न pharmaceutical preparations का उपयोग किया जाता हैं।

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