

Hormonal control of calcium & phosphate metabolism

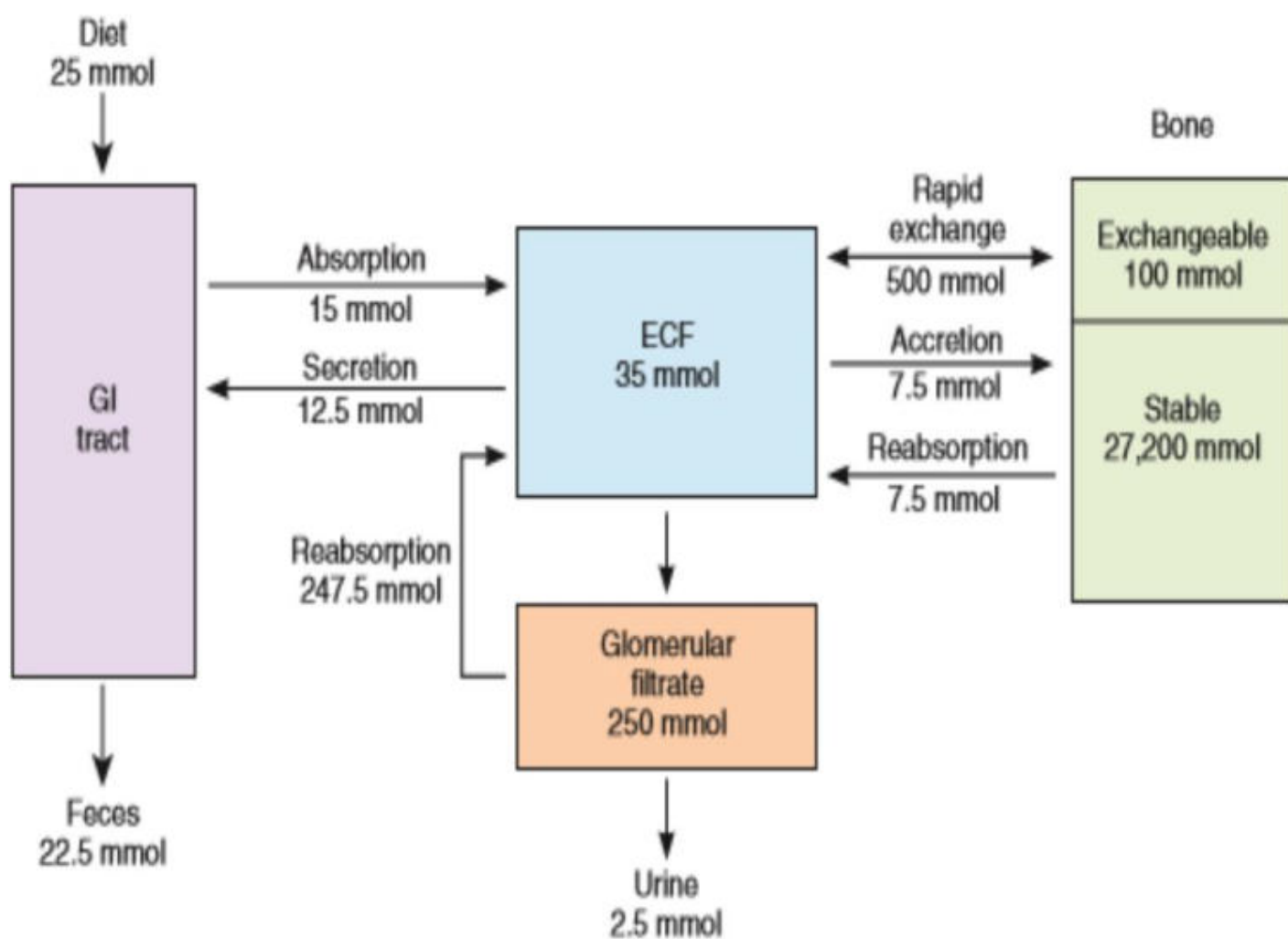
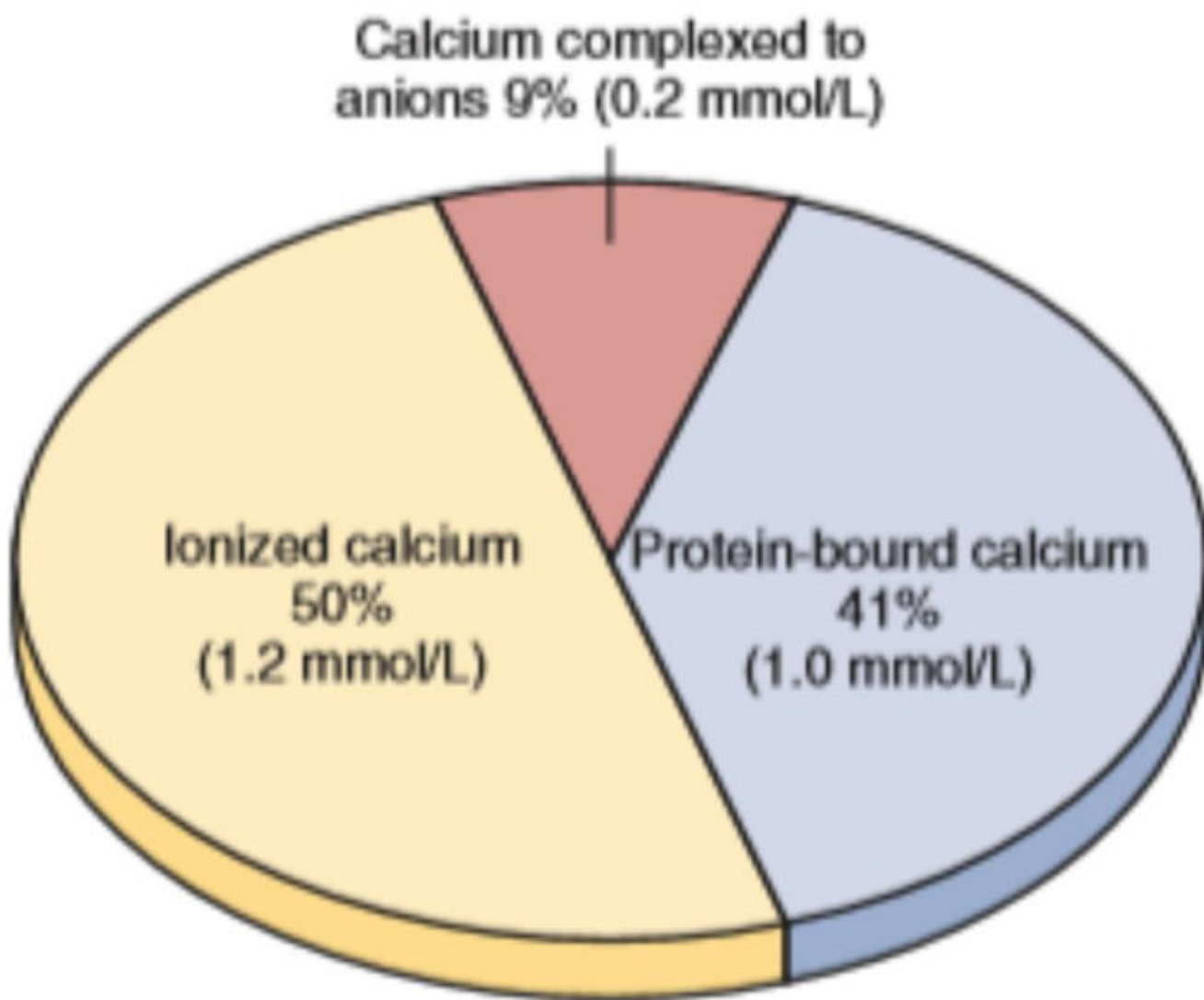
Introduction

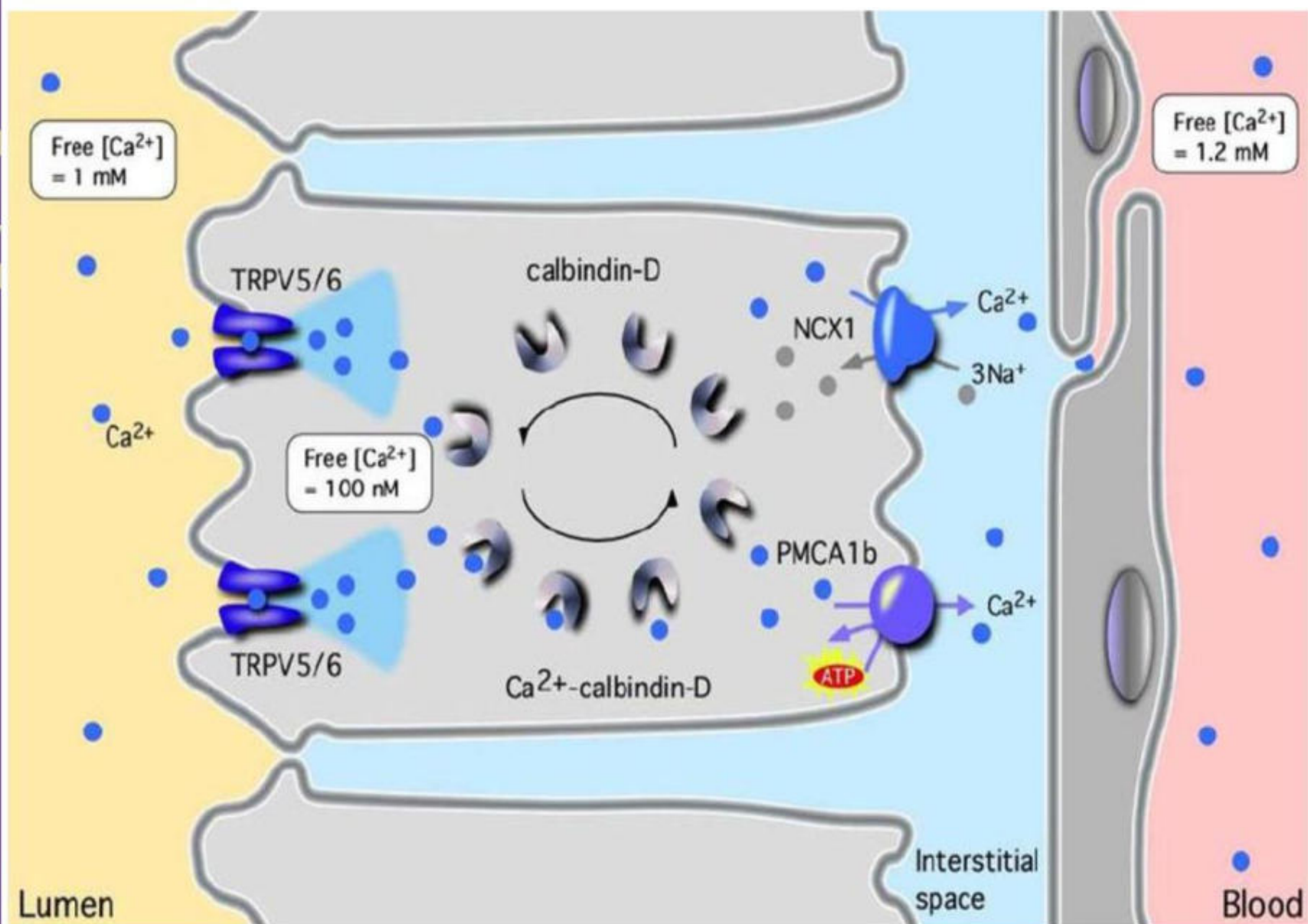
Calcium is an intracellular signaling molecule

1100 gms of calcium is present in the body

99% is in the skeleton

Plasma calcium = 10 mg/dl; is partly bound to proteins and partly diffusible





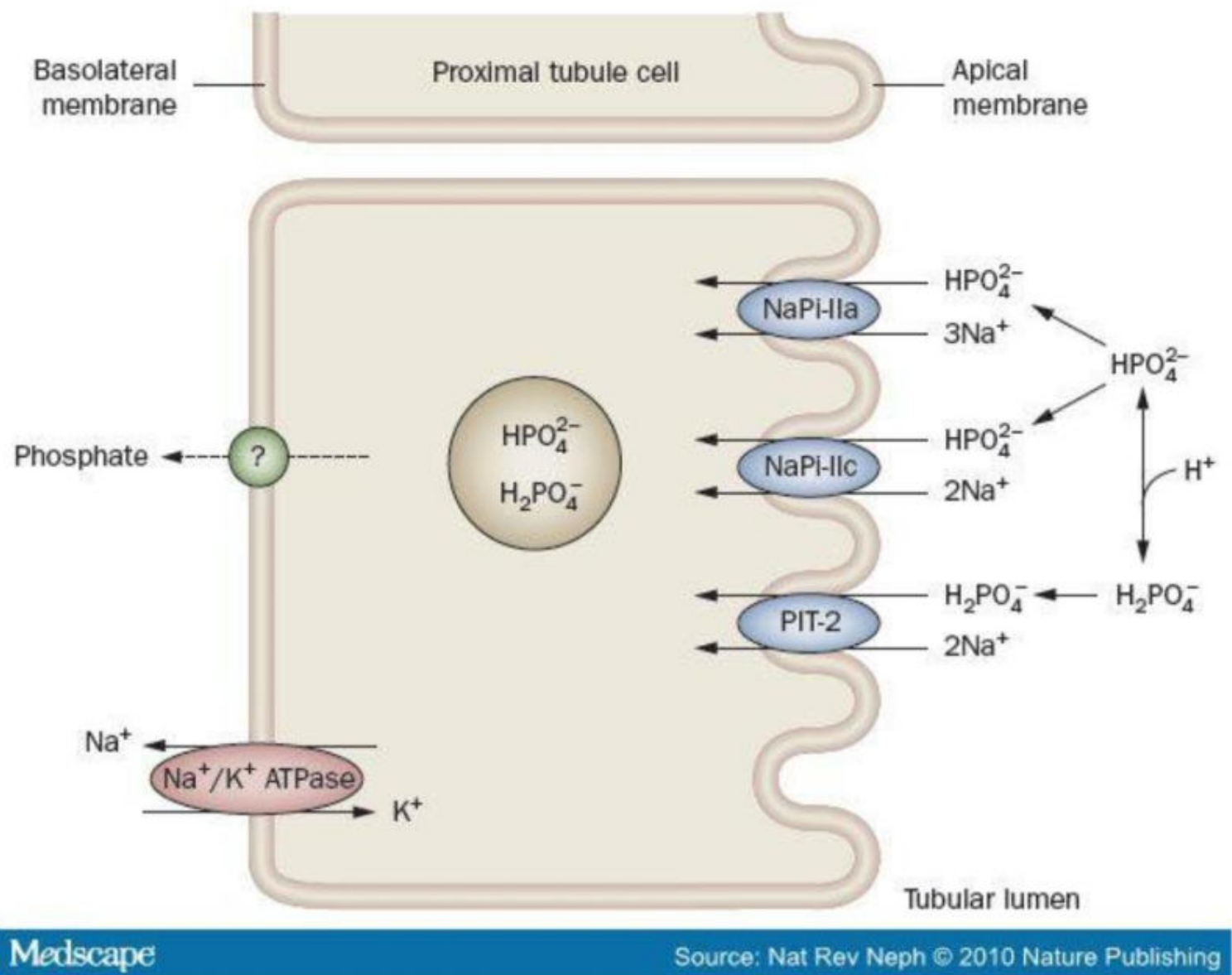
Phosphorus

Found in ATP, cAMP, 2,3-BPG, proteins

Total body phosphorus – 500-800 gm
85-90 % is in the bones

Plasma phosphorus – 12 mg/dl

2/3 of it is organic form and rest in inorganic form- phosphate, hydrogen phosphate and dihydrogen phosphate

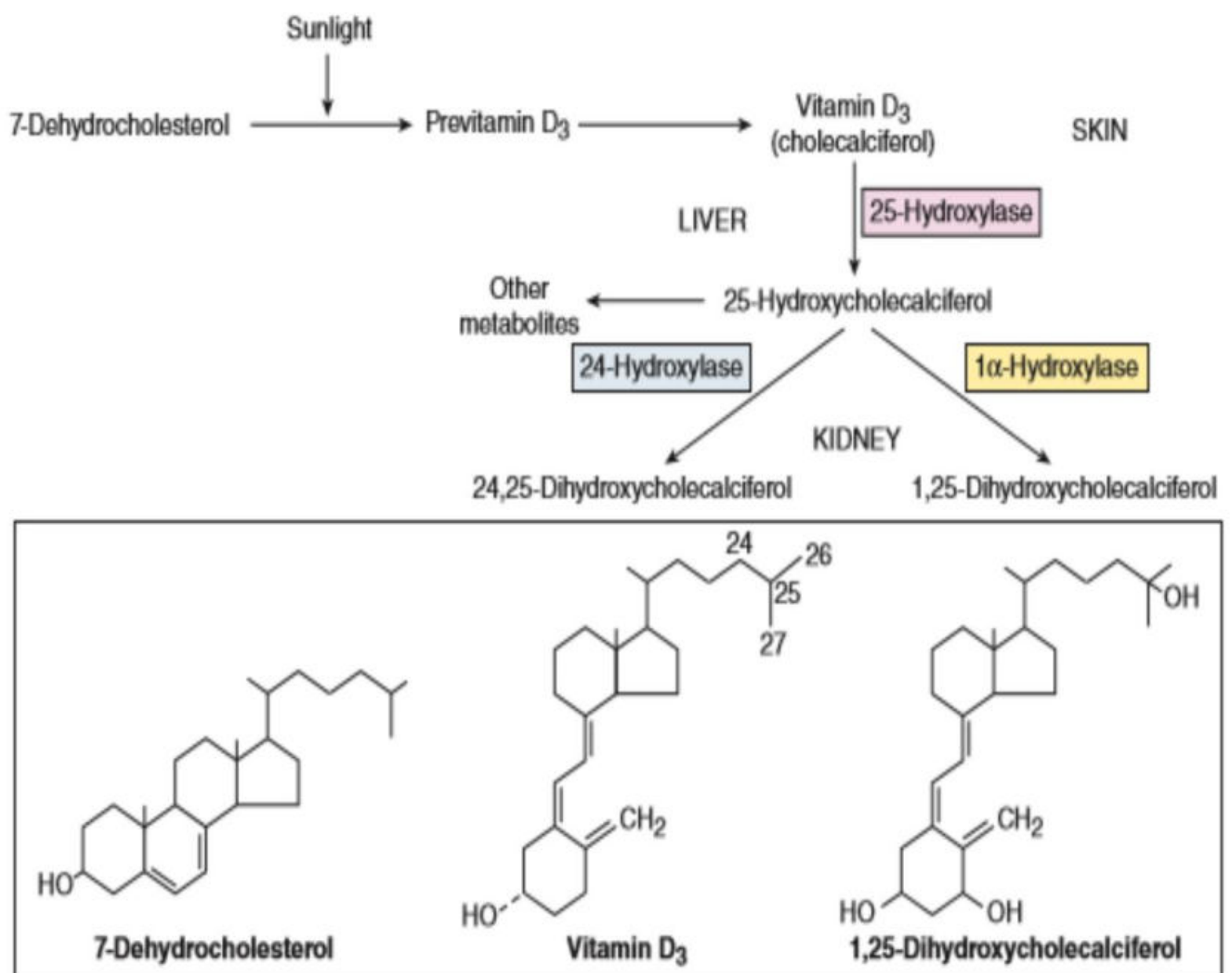


Vitamin D

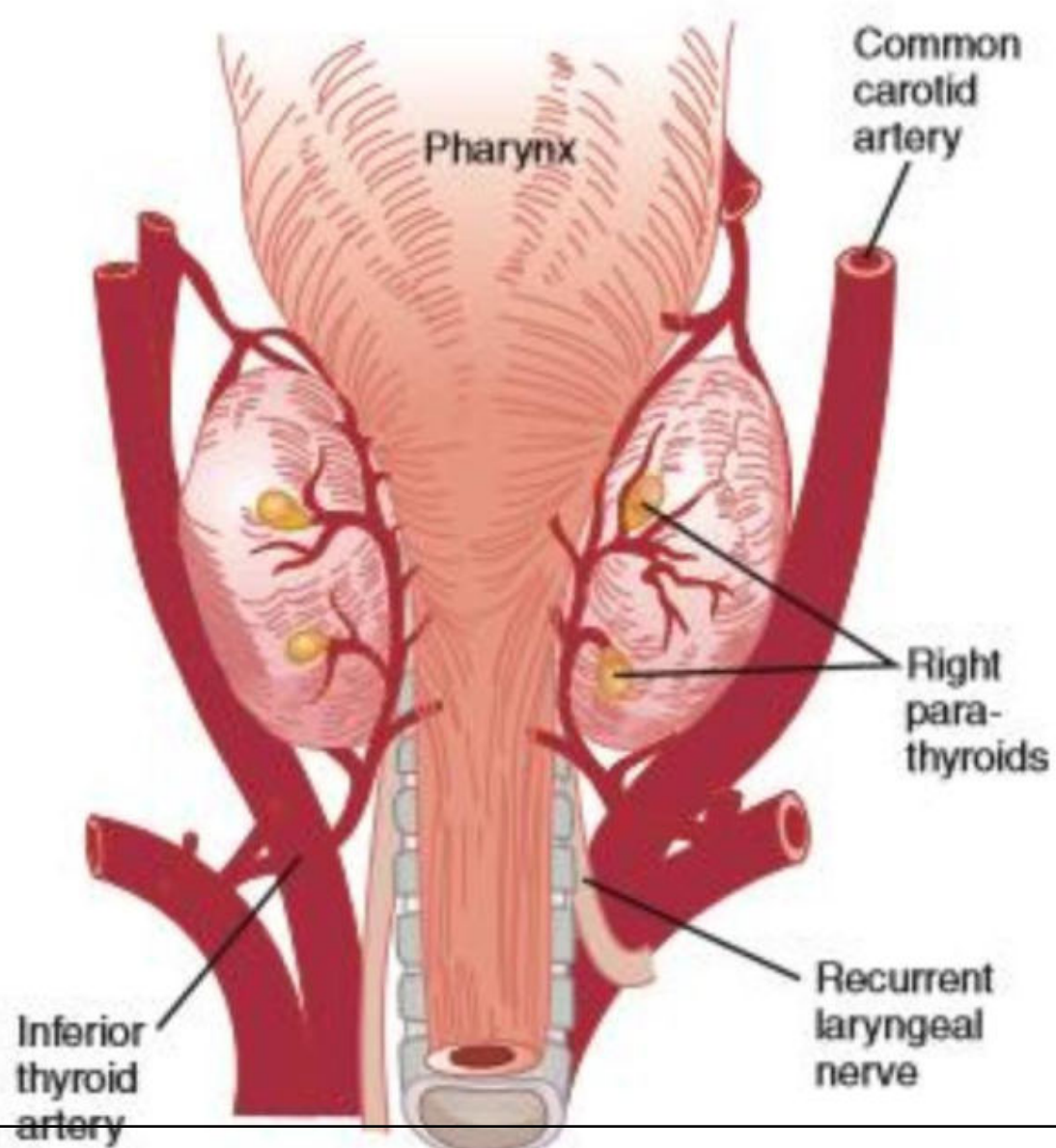
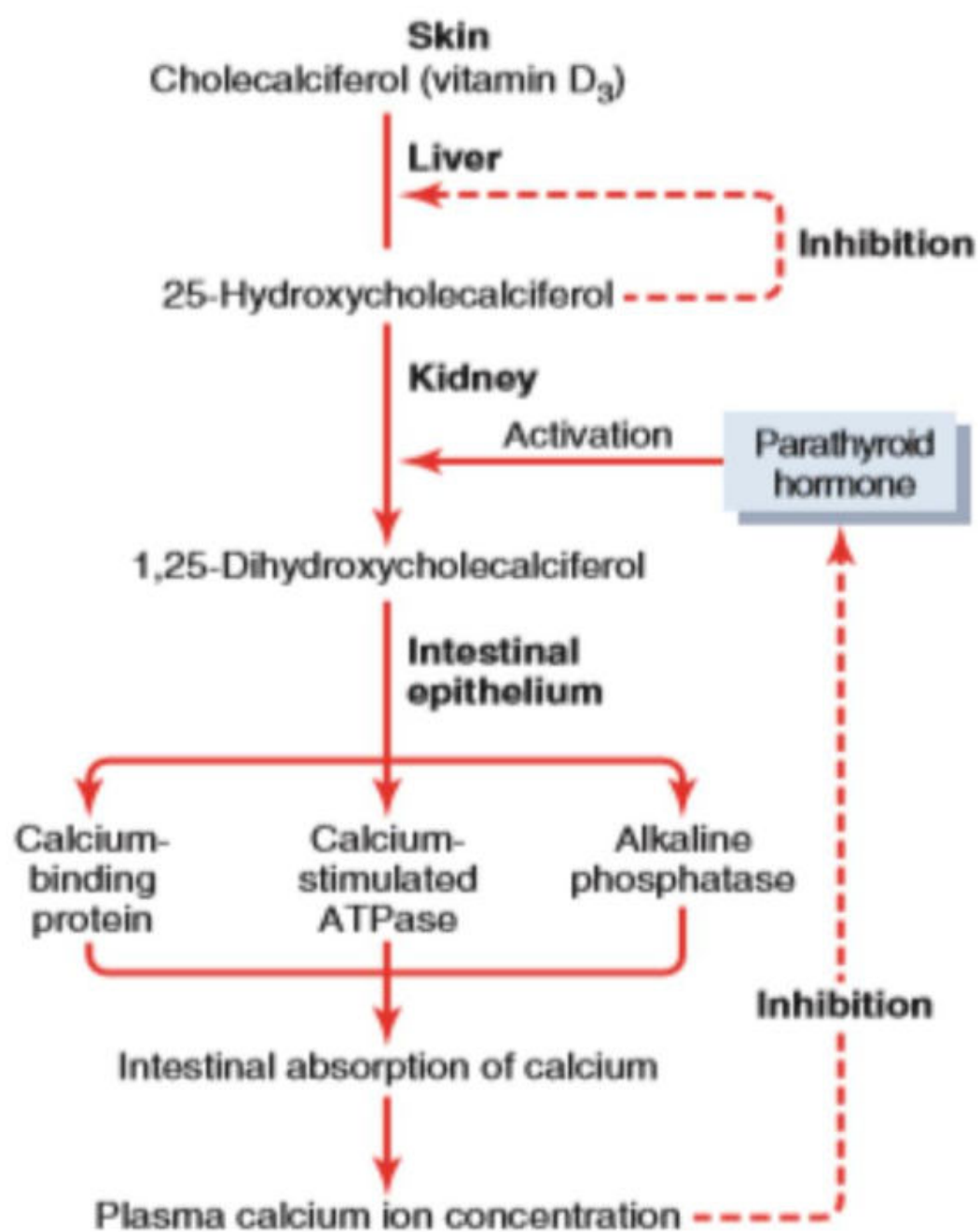
Increases calcium absorption from the intestine

Increases phosphate absorption through intestine

Decreases renal excretion of calcium and phosphate



1,25- dihydroxycholecalciferol is also formed in placenta, keratinocytes in skin and macrophages
Levels are increased in pregnancy

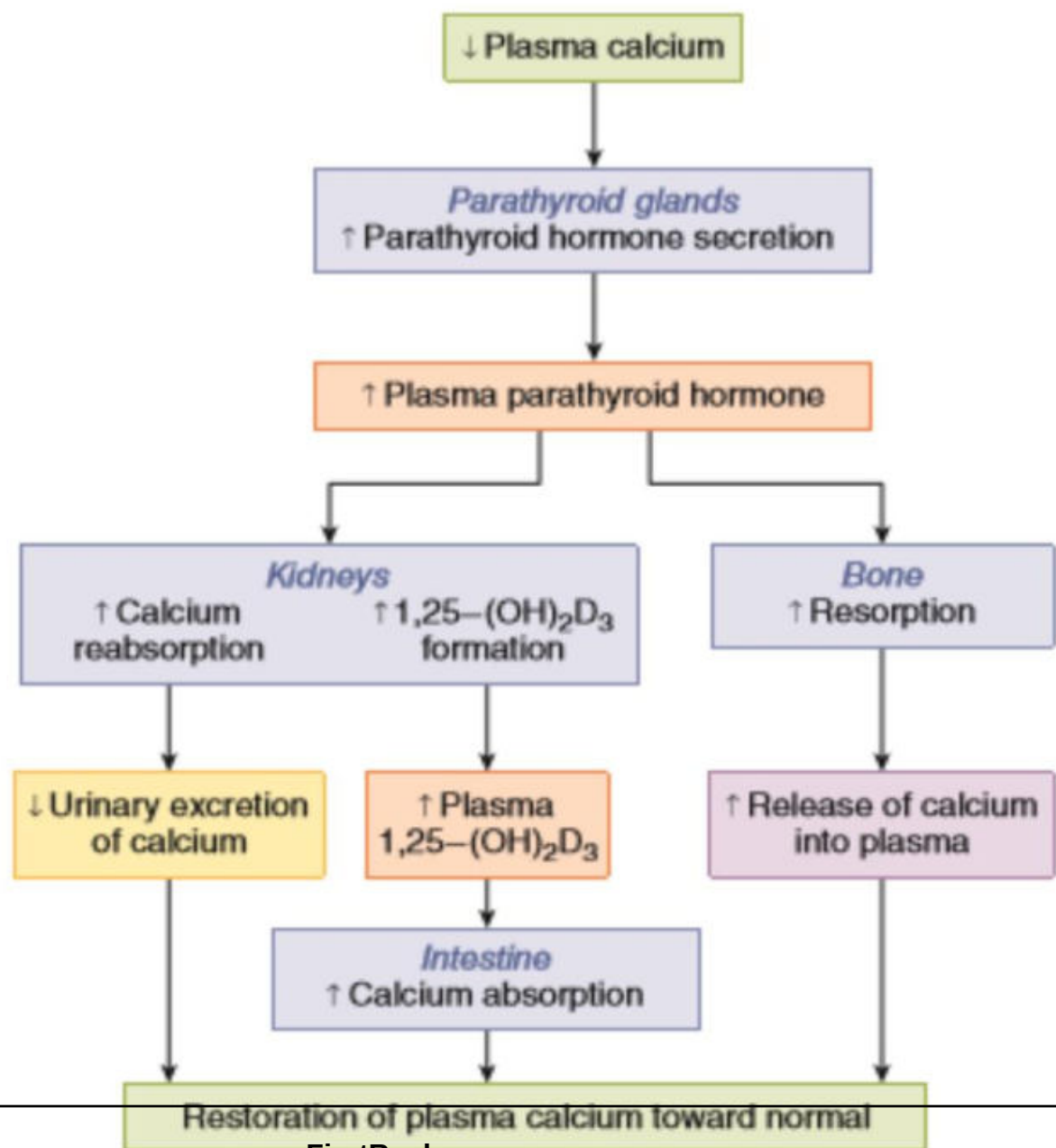


Parathyroid hormone

Increases calcium and phosphate absorption from the intestine

Increases calcium and phosphate absorption from bones

Decreases renal excretion of calcium and increases renal phosphate excretion



Calcitonin

It is proportional to plasma calcium levels

B-adrenergic agonists, dopamine and estrogens stimulate calcitonin secretion

Gastrin, CCK, glucagon and secretin also stimulate

Plasma calcitonin levels are high in Zollinger-Ellison syndrome and pernicious anemia

Calcitonin lowers plasma calcium and phosphate levels

Inhibits bone resorption

Vitamin D Deficiency diseases

Rickets

osteomalacia

Osteopetrosis:

Increased bone density

Osteoporosis:

Decreased bone density

Fractures common