



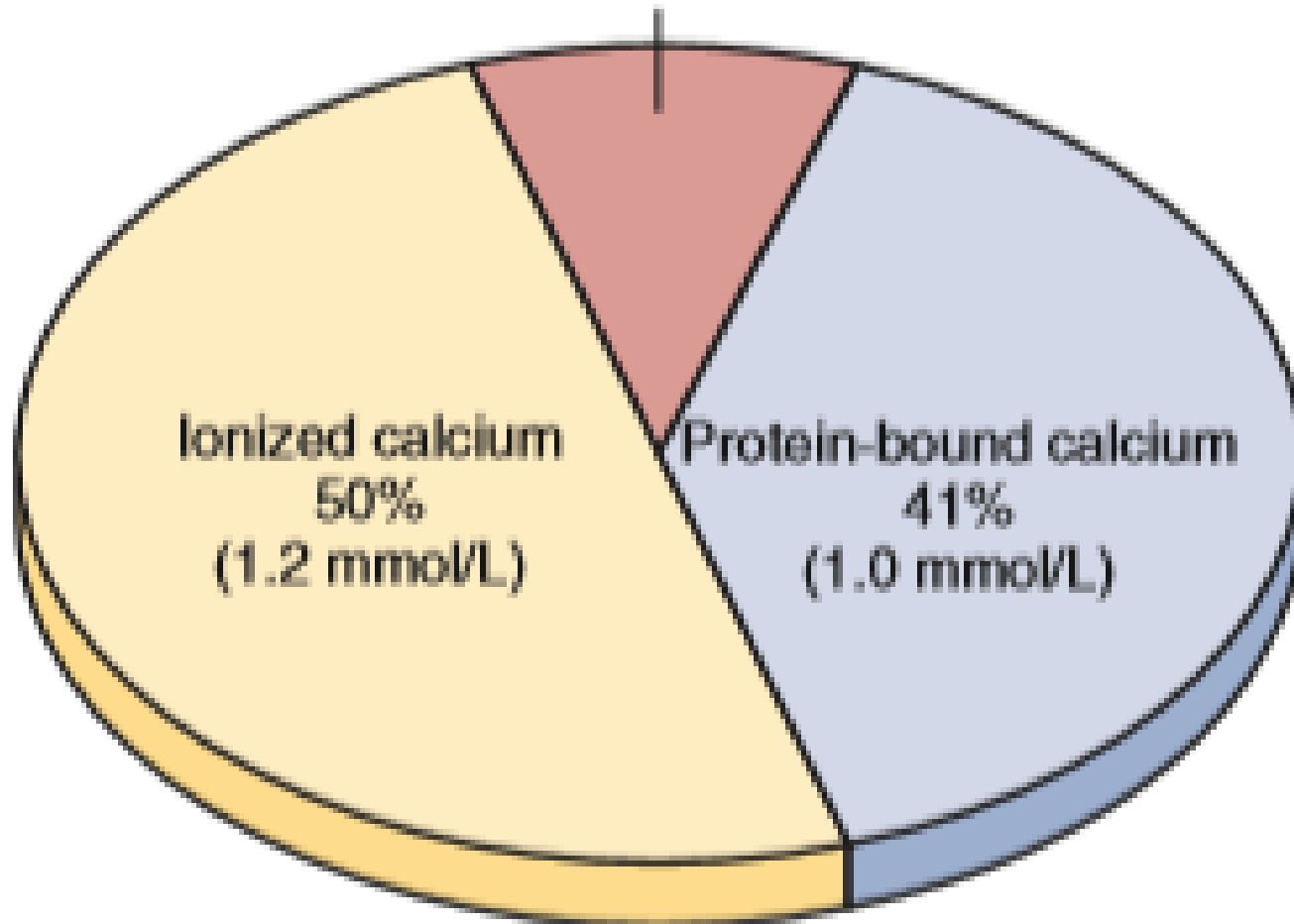
Hormonal control of calcium & phosphate metabolism

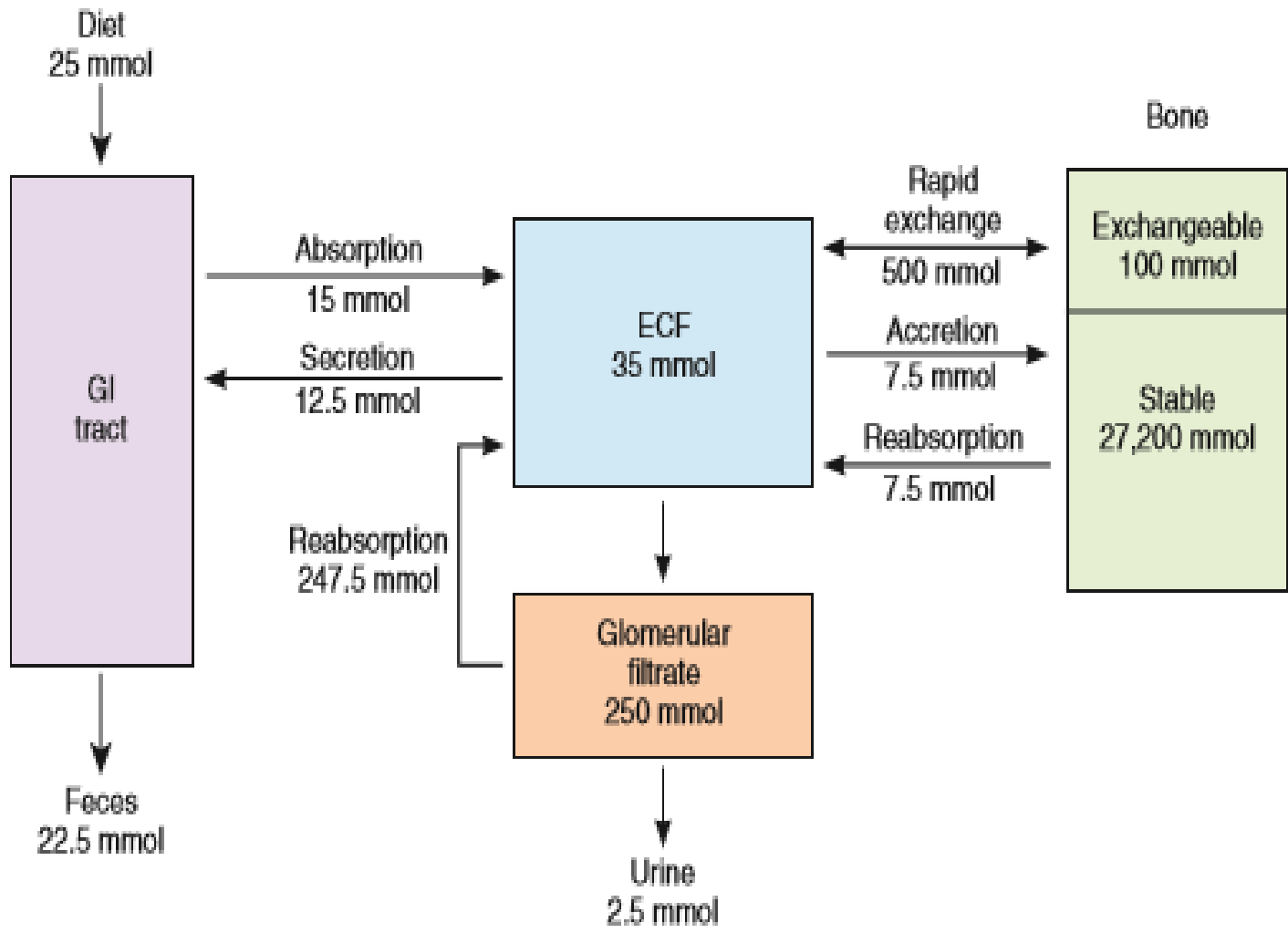
Dr Jayanti Pant

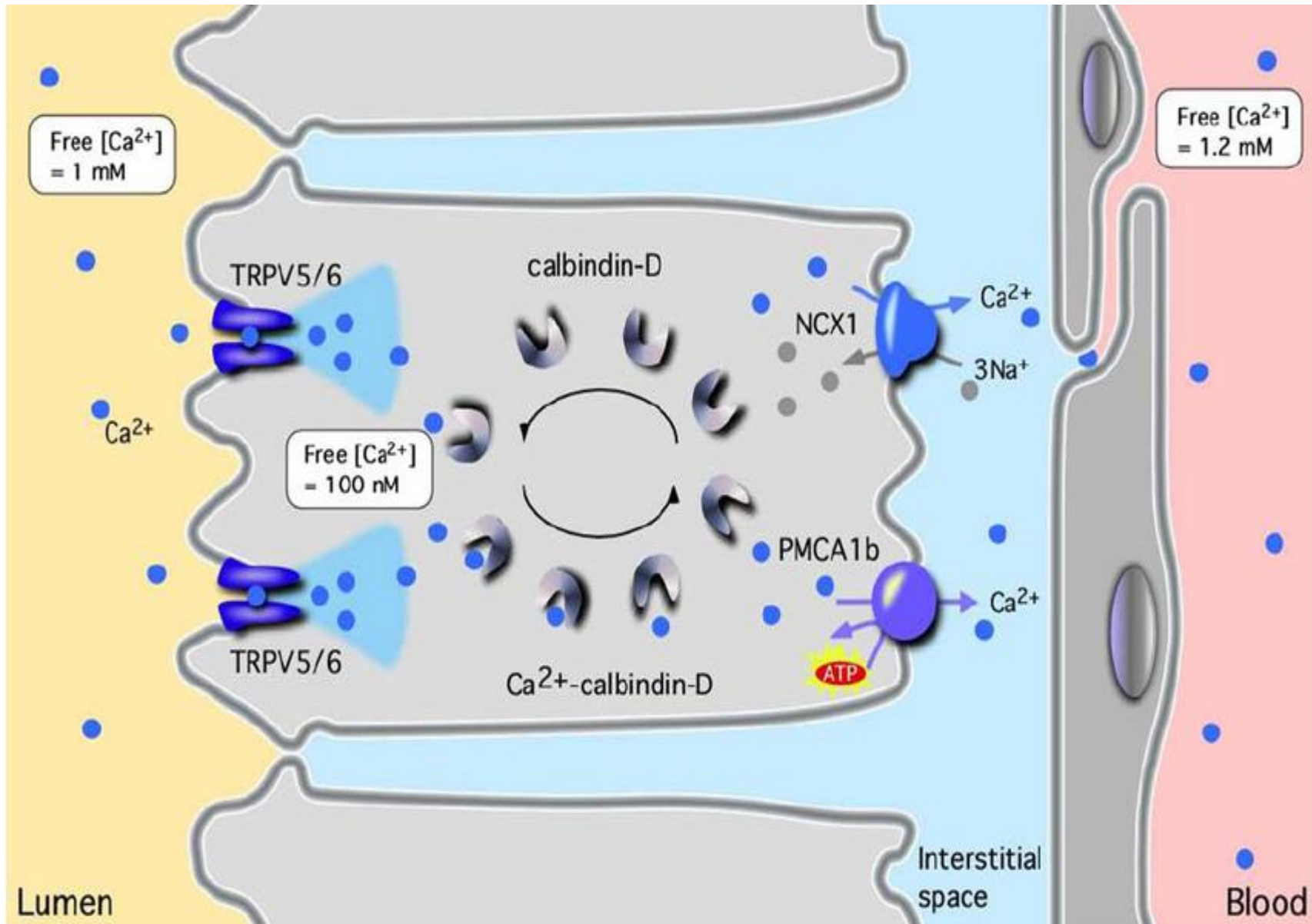
Introduction

- 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

Calcium complexed to
anions 9% (0.2 mmol/L)

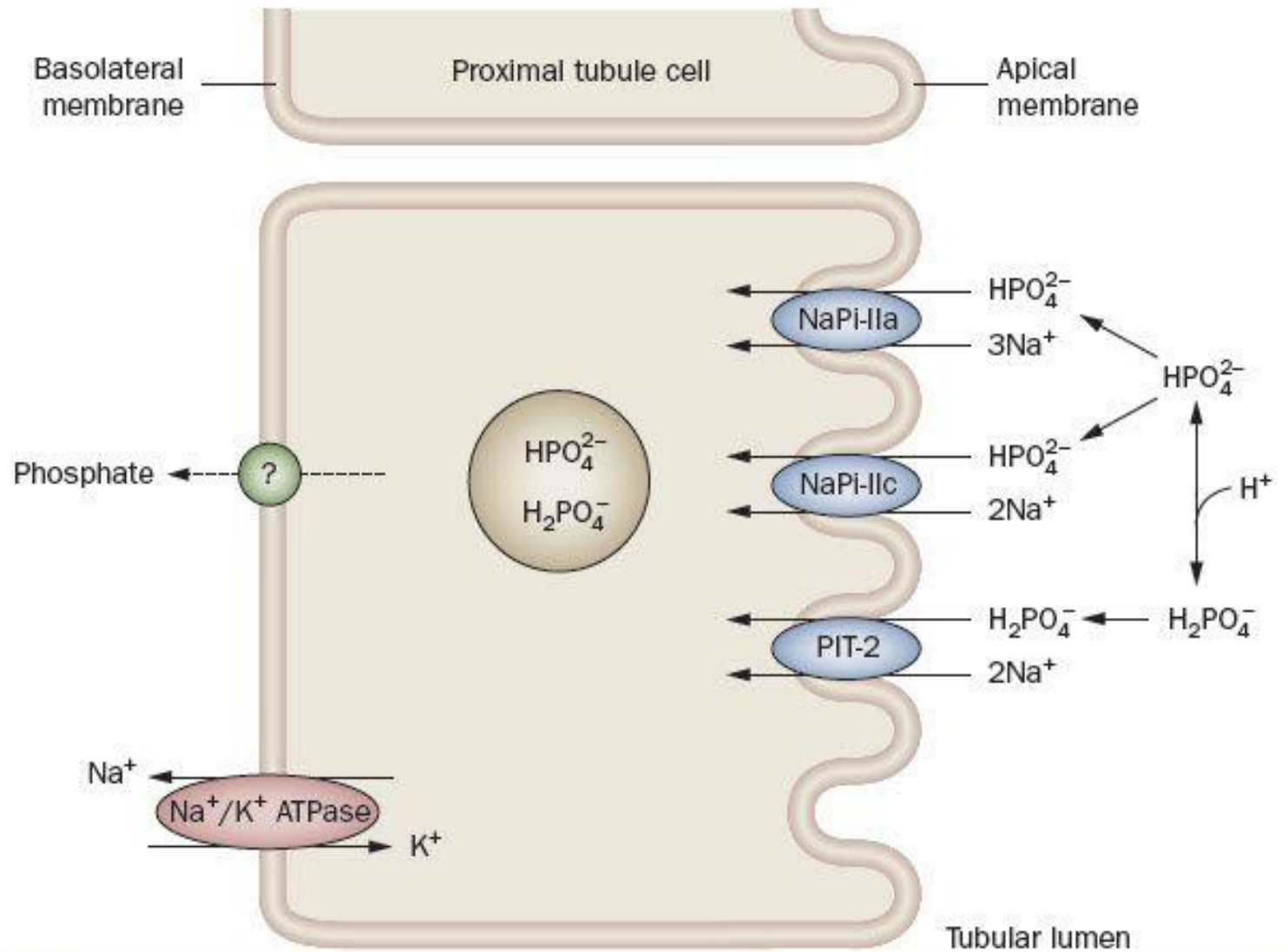






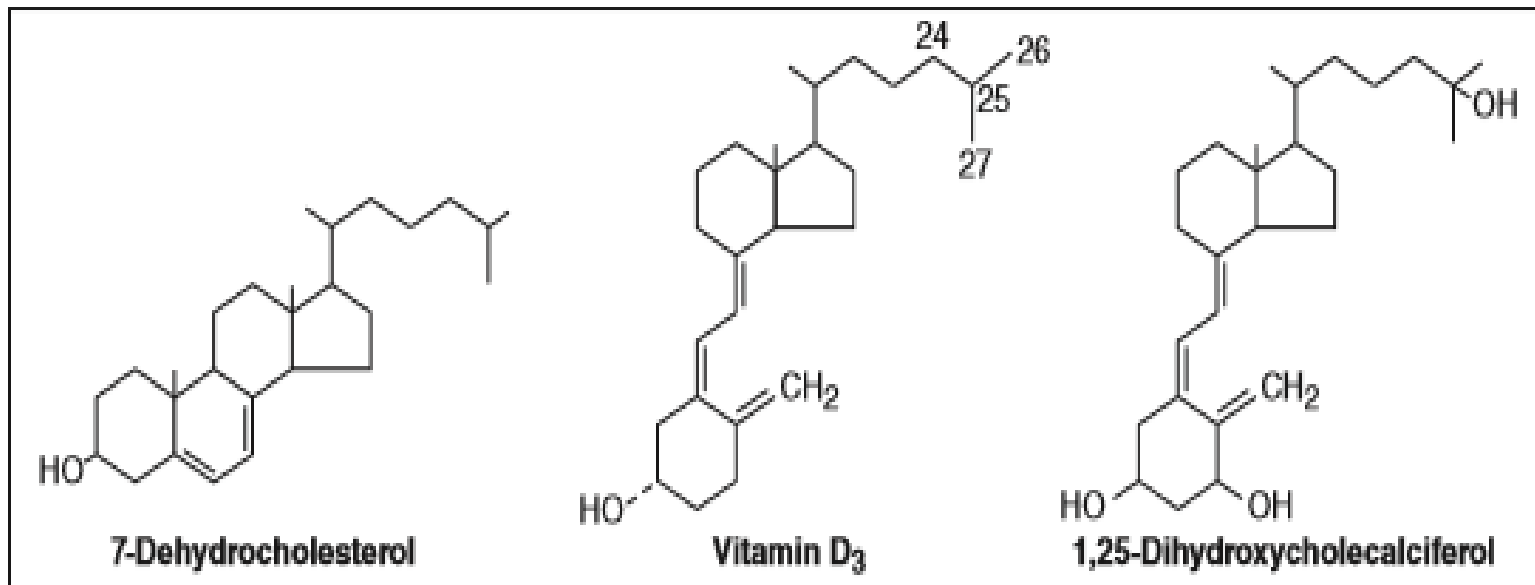
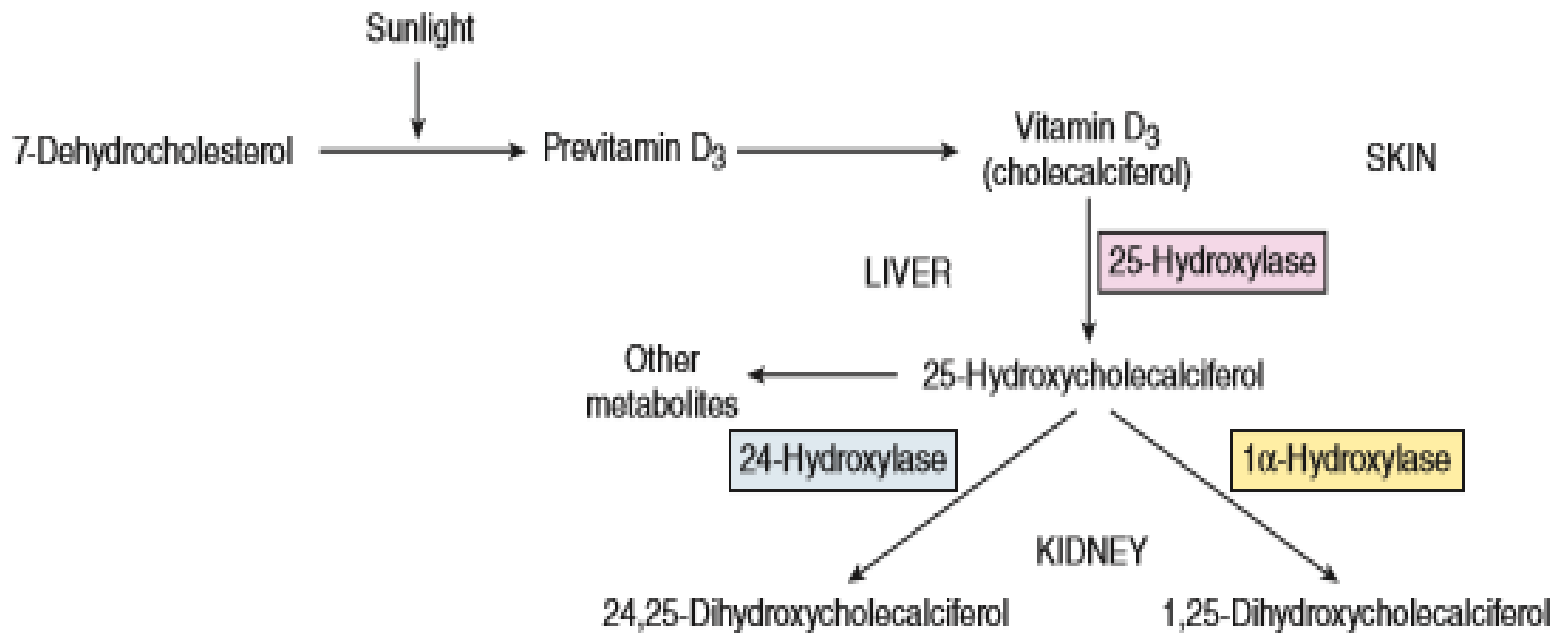
Phosphorus


- Found in ATP, c AMP, 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

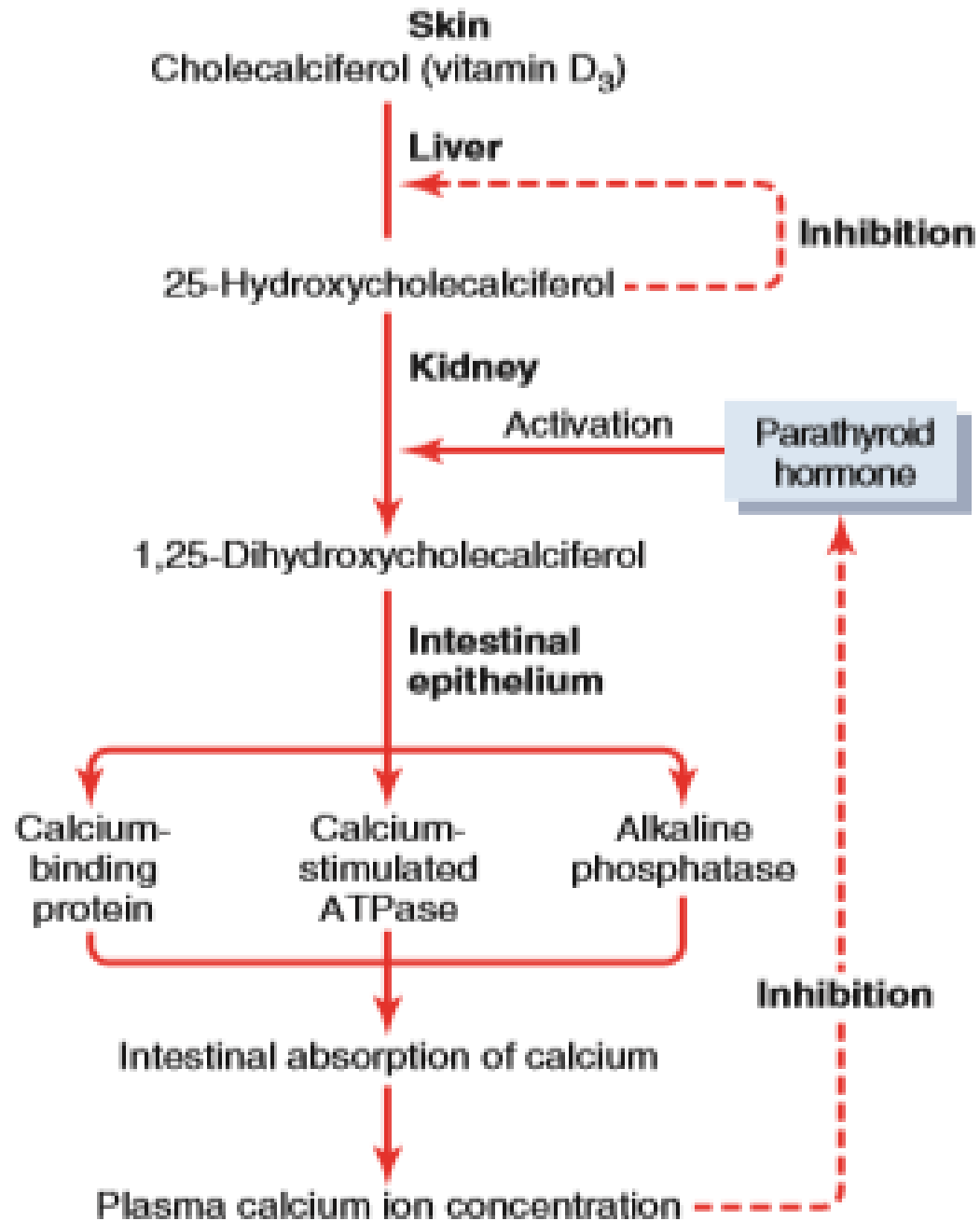


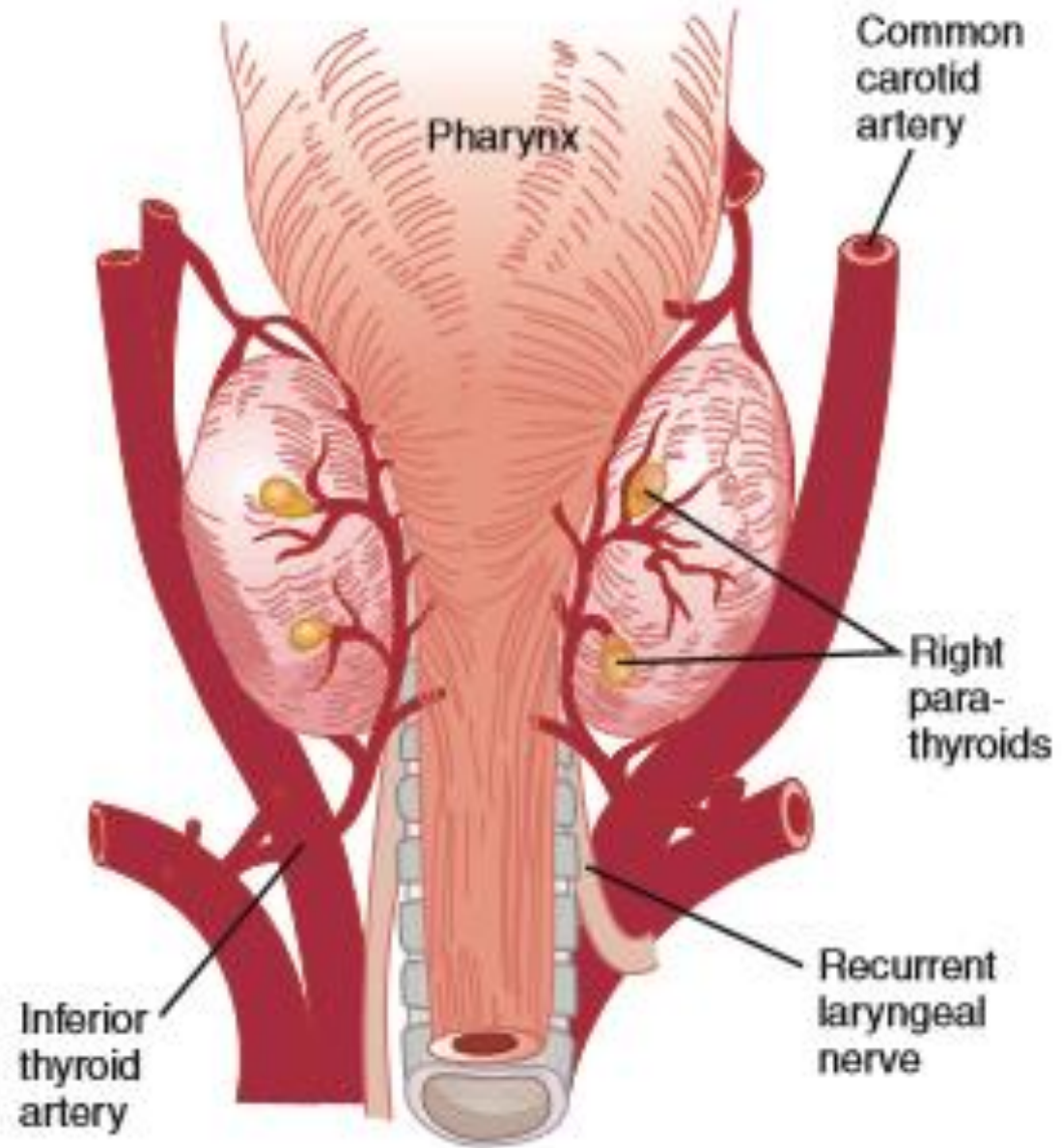
Vitamin D

- Increases calcium absorption from the intestine
- Increases phosphate absorption through intestine
- Decreases renal excretion of calcium and phosphate



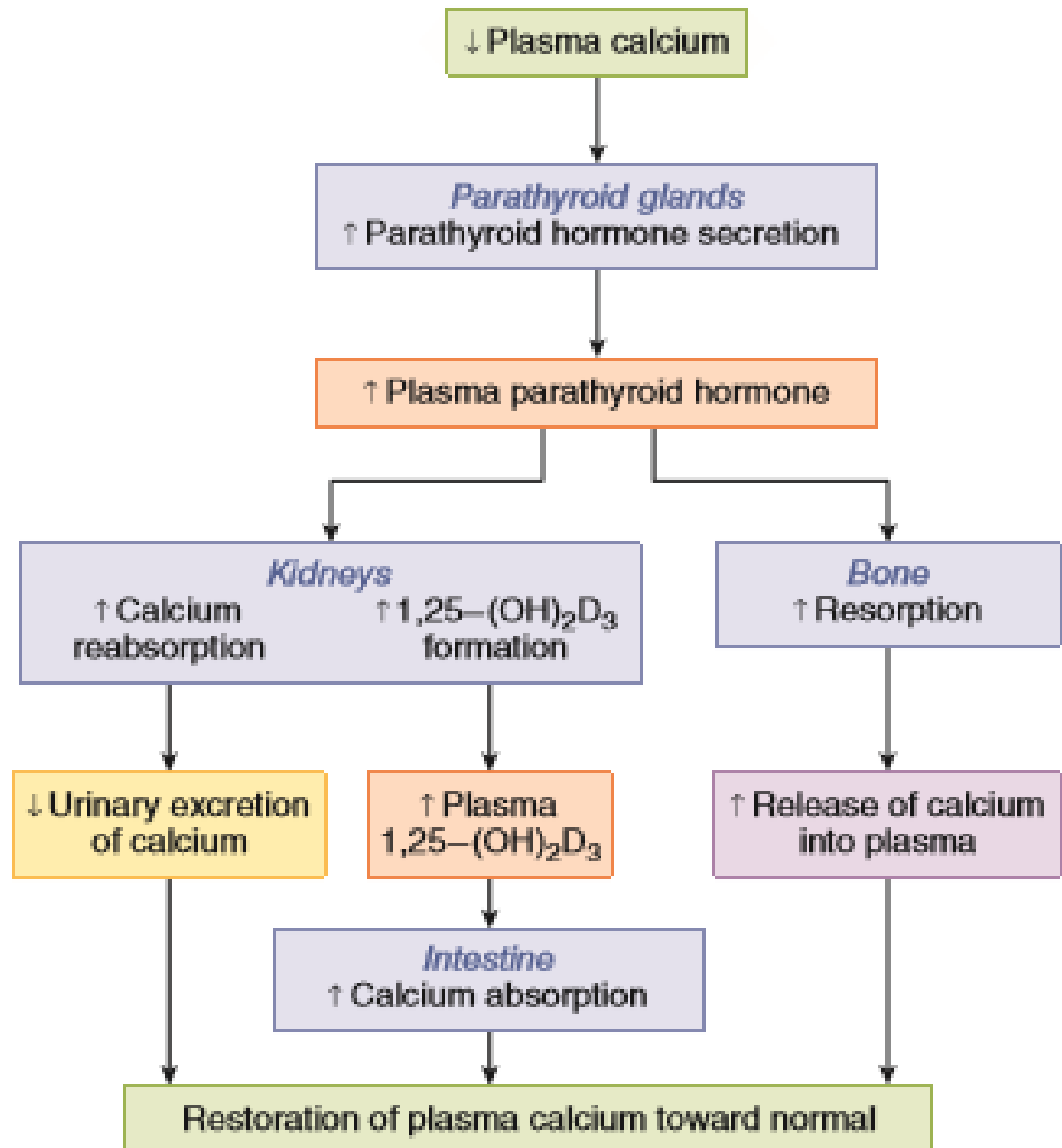
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- 1,25- dihydroxycholecalciferol is also formed in placenta, keratinocytes in skin and macrophages
 - Levels are increased in pregnancy





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

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- Calcitonin lowers plasma calcium and phosphate levels
 - Inhibits bone resorption

Vitamin D Deficiency diseases

- Rickets
- osteomalacia

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- Osteopetrosis:
Increased bone density

 - Osteoporosis:
Decreased bone density
Fractures common