

- Hypoparathyroidism:

Lack of parathyroid hormone causes hypocalcemia and hyperphosphatemia.

- Toxicity of vitamin D:

Like all fat-soluble vitamins, vitamin D can be stored in the body and is only slowly metabolized. High doses can cause loss of appetite, nausea, thirst and stupor. Enhanced calcium absorption and bone resorption results in hypercalcemia, which can lead to deposition of calcium in many organs, particularly the arteries and kidneys.

### Vit D 25 OH Interpretation of Test Results

- <25 nmol/L Deficiency
- 25-50 nmol/L Suboptimal level
- 50-125 nmol/L Sufficiency
- 125-250 nmol/L Potential adverse effects
- >250 nmol/L Toxicity



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# Vitamin D

Biochemistry Laboratory



## Introduction:

The D vitamins are a group of sterols that have a hormone-like function. The active molecule, 1,25-dihydroxycholecalciferol (1,25-diOH-D3), the most prominent actions of 1,25-diOH-D3 are to regulate the plasma levels of calcium and phosphorus.

## Distribution of vitamin D :

### • Diet :

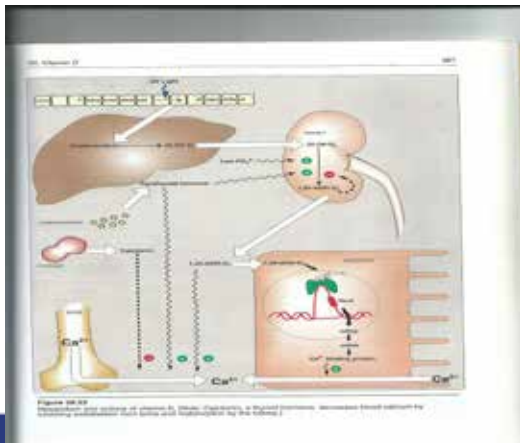
Ergocalciferol (vitamin D2), found in plants, and cholecalciferol (vitamin D3), found in animal tissues, are sources of preformed vitamin D activity.

### • Endogenous vitamin precursor:

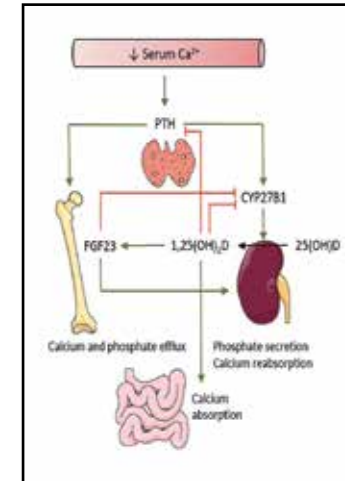
7-Dehydrocholesterol, an intermediate in cholesterol synthesis, is converted to cholecalciferol in the dermis and epidermis of human exposed to sunlight.

## Metabolism of vitamin D:

### • Formation of 1,25-diOH-D3



### • Regulation of 1,25- dihydroxycholecalciferol



## Function of vitamin D :

- **Effect vitamin D on the intestine:** 1,25-diOH-D3 stimulates intestinal cell adsorption of calcium and phosphate.
- **Effect of vitamin D on bone:** 1,25-diOH-D3 stimulates the mobilization of calcium and phosphate from bone by a process that requires protein synthesis and the presence of PTH. The result is an increase in plasma calcium and phosphate.

## Clinical indications:

### • Nutritional rickets:

Vitamin D deficiency causes a net demineralization of bone, resulting in rickets in children and osteomalacia in adults.

### • Renal osteodystrophy :

Chronic renal failure results in decreased ability to form the active vitamin D.