

Vitamin D

&

Rickets



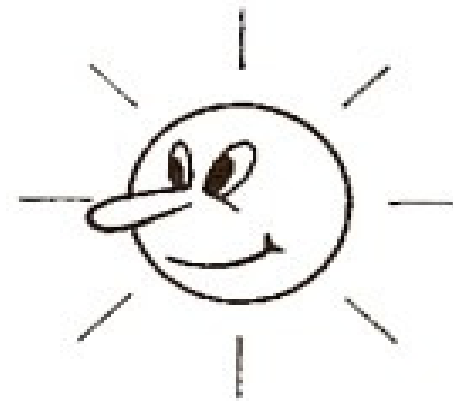
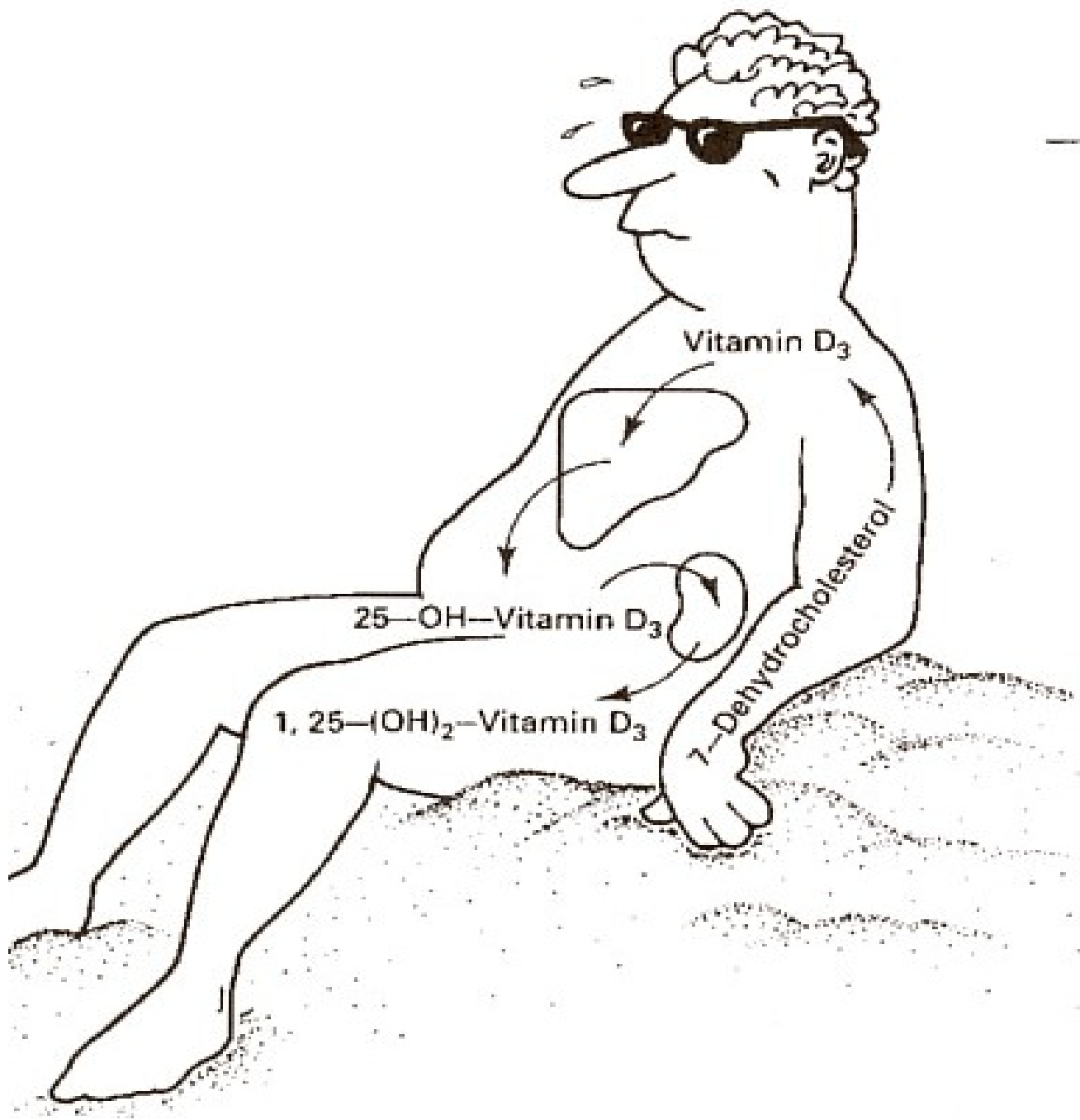
Dr Piyush B Tailor

Associate Professor

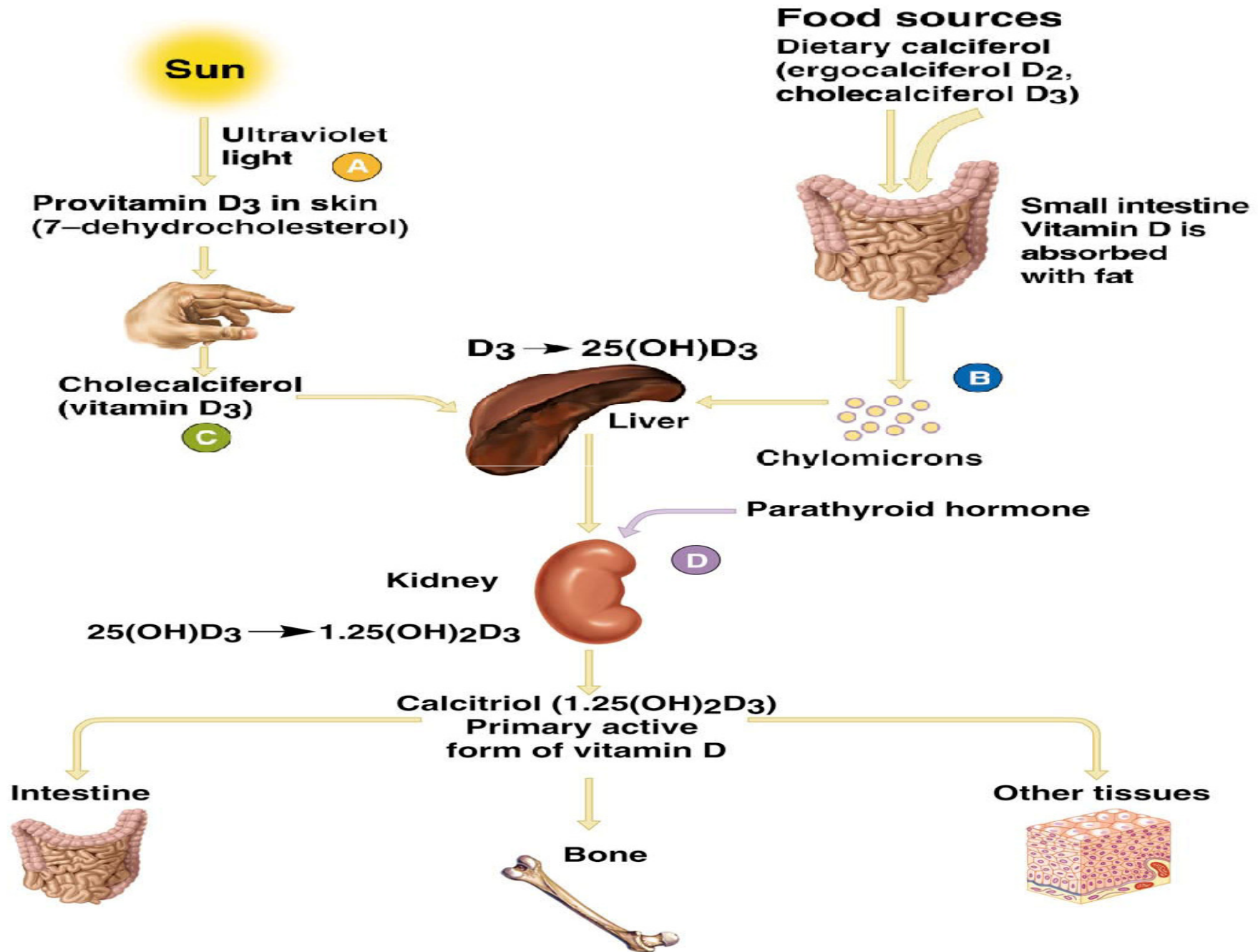
Department Of Biochemistry

Govt. Medical College

Surat



VITAMIN D: FROM SOURCE TO DESTINATION



Formation of Vitamin D

- **Skin (UV light)**

- 7-dehydro cholesterol → Vitamin D₃

- Ergosterol → Vitamin D₂

- **Liver**

- **OH-group added**

- 25-Hydroxy vitamin D₃

- Storage form of vitamin (~3 months storage in liver)

- **Kidney**

- **OH-group added by 1-hydroxylase**

- 1,25-dihydroxy vitamin D₃

- Active form of vitamin D, a “steroid hormone”

- **OH-group added by 24-hydroxylase**

- 24,25-dihydroxy vitamin D₃

- Inactive form of vitamin D, ready for excretion

Function



- Increase absorption of calcium from G.I.T
- Increase reabsorption of calcium from renal tubule
- Increase osteoblastic activity in bone

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Vitamin D deficiency

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Cause of Vitamin D Deficiency

1. Lack of sunshine due to

- Lack of outdoor activities
- Lack of ultraviolet light in fall and winter
- Too much cloud, dust vapour and smoke

2. Improper feeding

- Inadequate intake of Vitamin D , Calcium & Phosphate

3. Diseases

- Liver diseases, Renal diseases ,Gastrointestinal diseases

4. Drugs

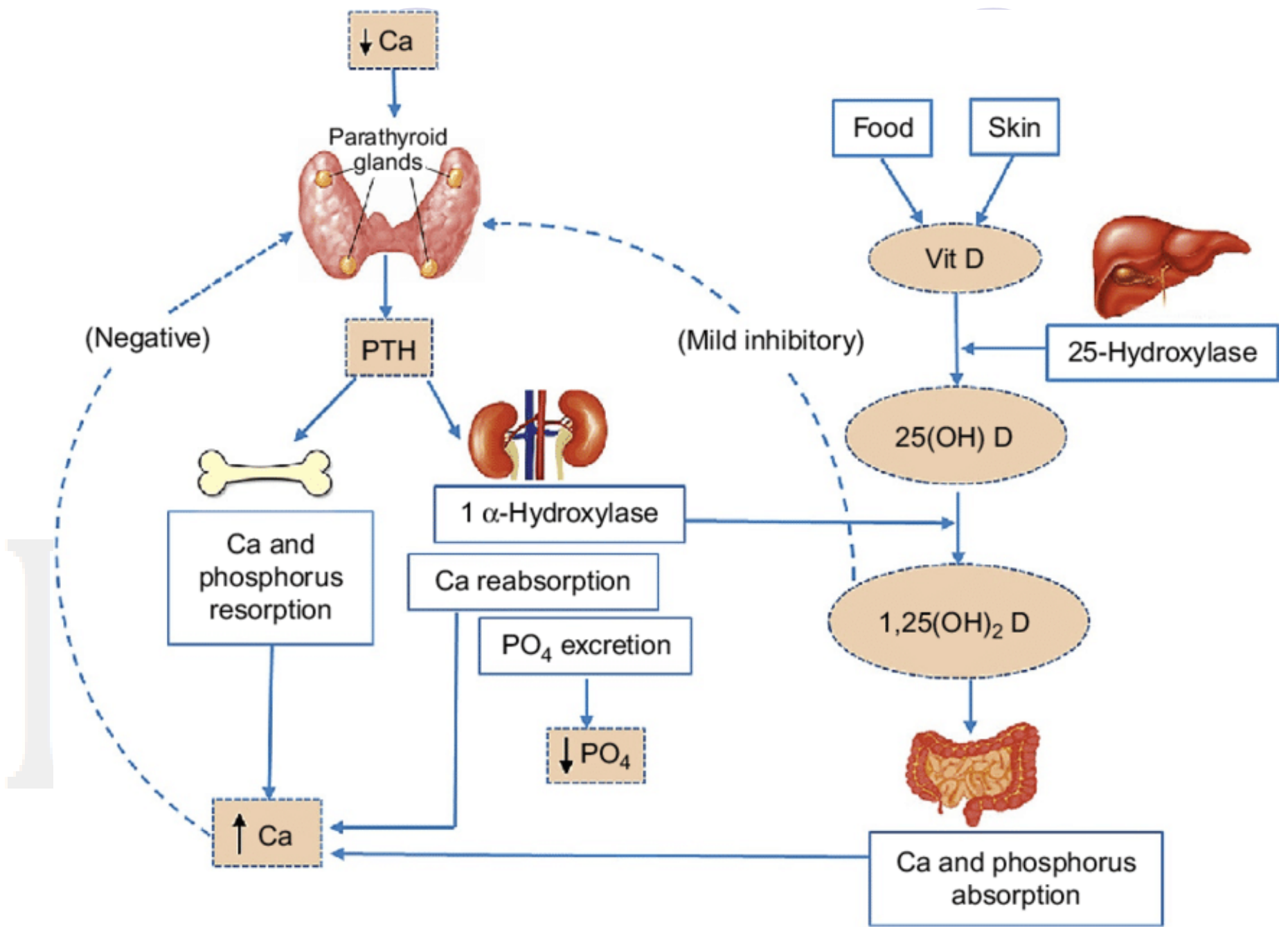
- Antiepileptic
- Glucocorticosteroid

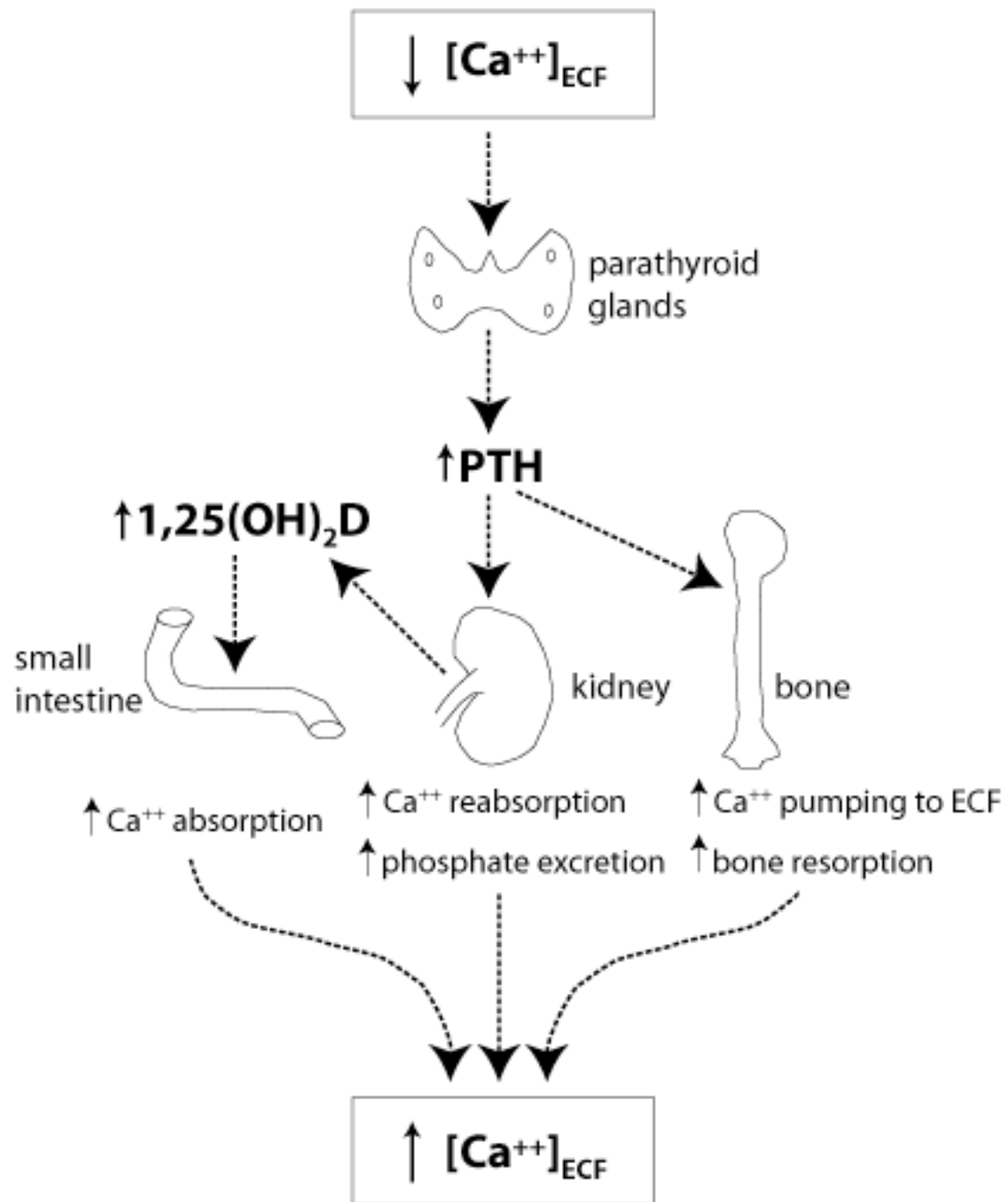


- **Deficiency of vitamin D leads to:**

- **Rickets in small children.**
- **Osteomalacia**
- **Osteoporosis**

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Clinical manifestation

- Mental psychiatric symptoms
 - Irritability, sleepless
- Spinal deformities
 - Scoliosis, Kyphosis & Lordosis
- Extremities
 - Bowlegs, knock knee, greenstick fracture
- Rachitic dwarfism
- Muscular system
 - Potbelly, late in standing and walking
- Delayed Motor development

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Clinical manifestation

Advanced stage

Osseous changes:

Head:

Frontal bossing

Box like appearance of skull

Delayed closure of anterior fontanelle

Teeth:

Delayed eruption

Chest:

Rachitic rosary

Harrison's groove

Pigeon chest,

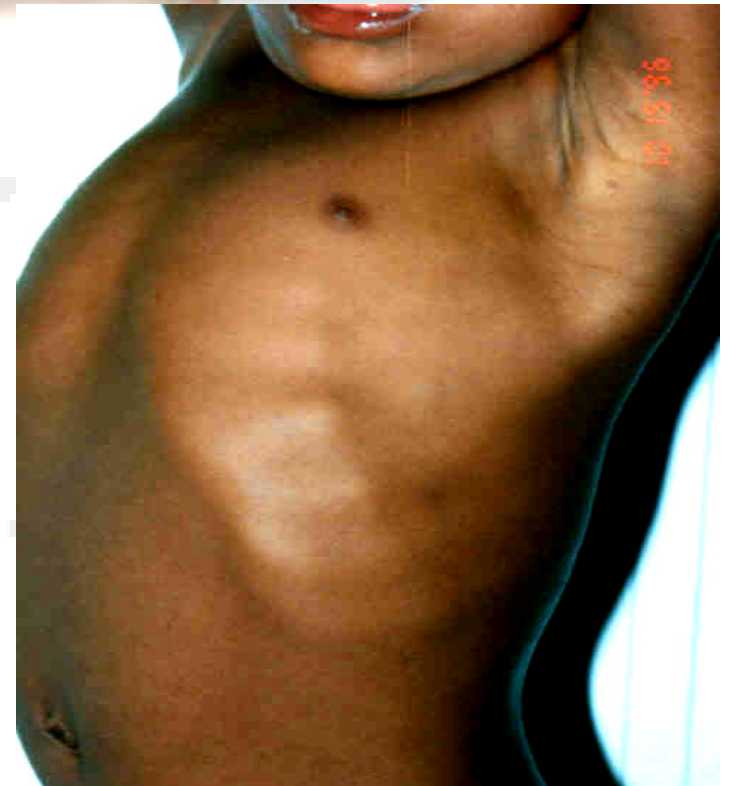
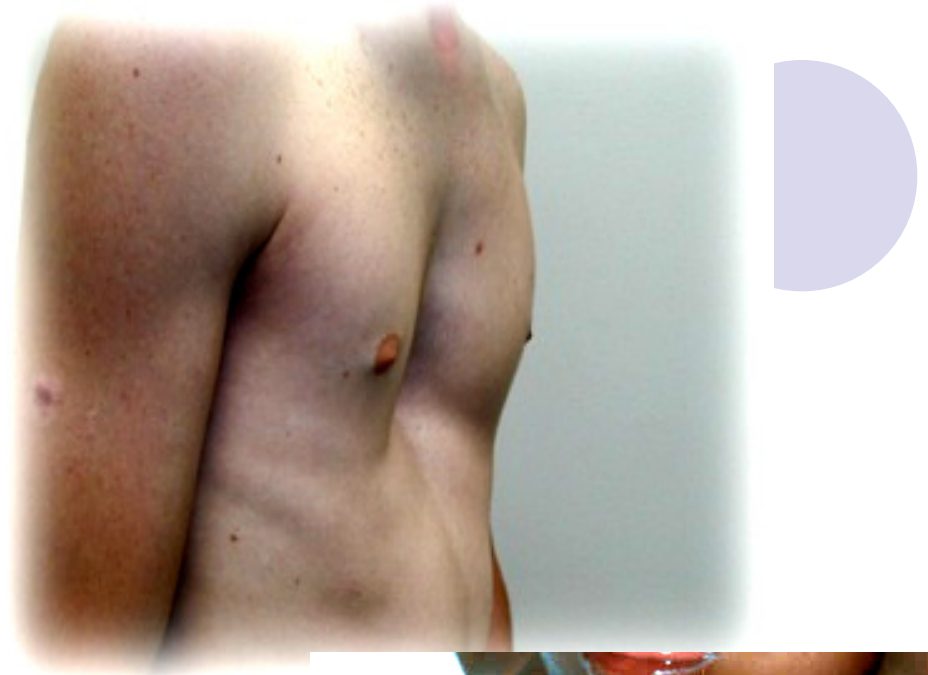
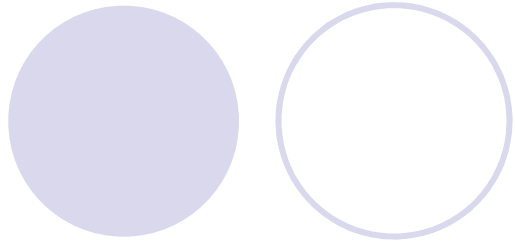
Funnel-shaped chest

X-ray finding in Rickets



- Late appearance of ossification center
- Widening of the epiphyseal cartilage
- thinned cortex of the shaft of long bone

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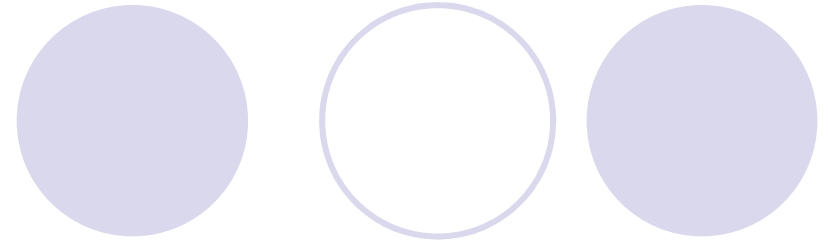
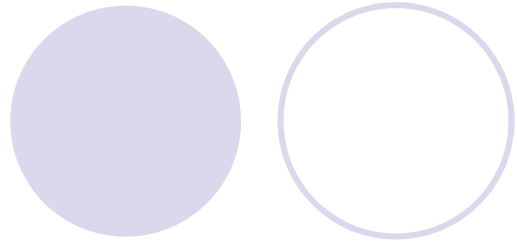
Laboratory findings

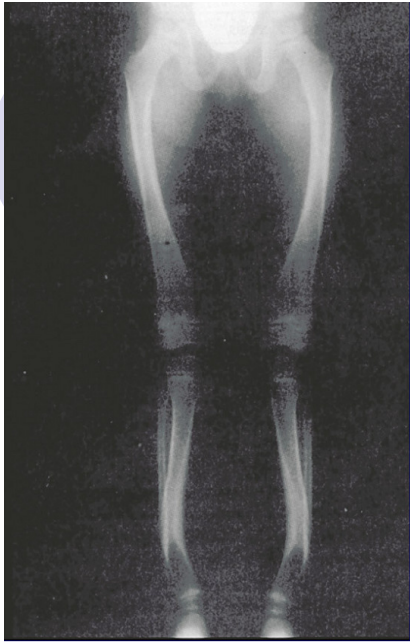


- Serum Calcium - Decrease
- Serum Phosphorus - Decrease
- Serum 1,25-Vitamin-D - Decrease
- Serum PTH - Increase
- Renal function test
- Liver function test

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Diagnosis

- **Assessed according to the followings:**
- **1. History**
- **2. Physical examination**
- **3. Laboratory findings**
- **4. Roentgenographic changes**

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Treatment

Food and nursing care

Prevention of complications

Special therapy

Vitamin D therapy

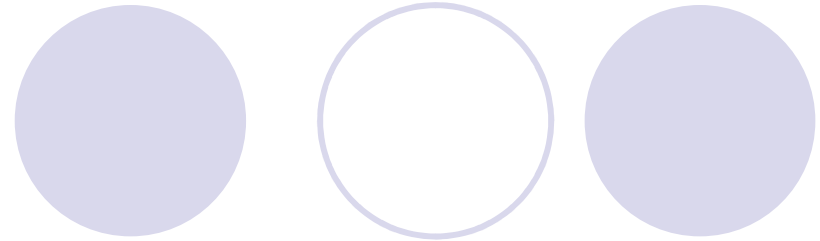
A. General method

B. Vitamin D 2000-4000IU/day for 2-4 weeks, then change to preventive dosage (400IU).

C. Single large dose:

- **Vitamin D3 200000-300000IU, I.M.**

Calcium supplement



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Sources of Vitamin D

- **Sunlight is the most important source**
- **Fish liver oil**
- **Fish & Sea food (herring & salmon)**
- **Eggs**
- **Plants do not contain vitamin D3**

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