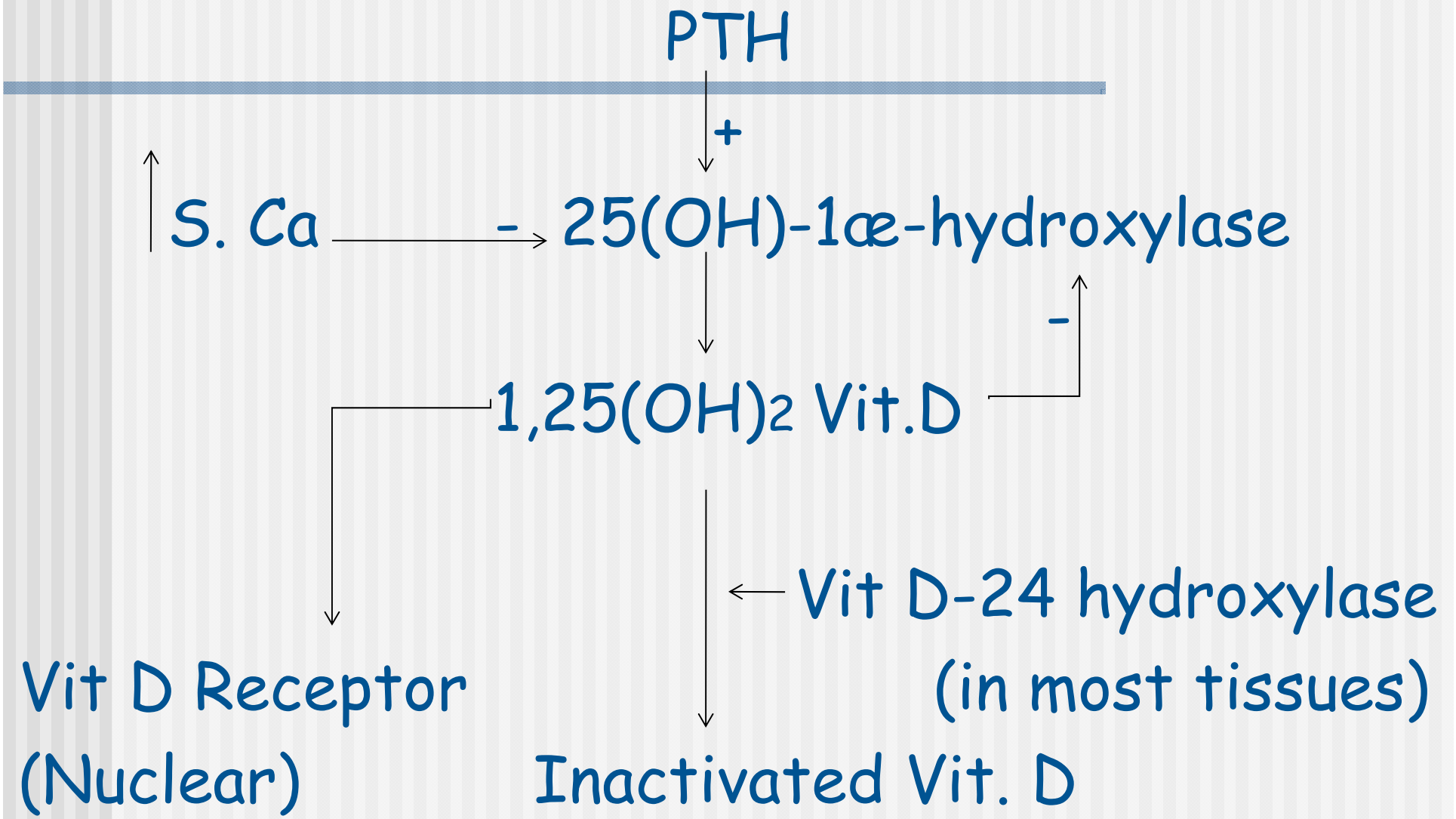
Vitamine D disorders

Vitamine D

- 7- DehydroCholesterol $\xleftrightarrow[\text{UV light}]{}$ Vitamine D_1
- Vitamine D_2: Plant source
- Vitamine D_3: Animal source
- Vitamine D_2 n D_3....equally effective
- 25(OH)D.the major circulating n storage form

Vitamine D metabolism



Vitamine D deficiency states

- Reduced Vit D

Intake…..dietary inadequacy

Production….sun exposure

Absorption…..malabsorption syndrome

- Excessive loss of Vit D

Catabolism….Phenytoin, R-cin, Barbiturates

Hepatobiliary circulation….small bowel ds or resection

Vitamine D deficiency states

- Impaired metabolism
  - 25-hydroxylation: Liver ds, INH
  - 1œ-hydroxylation: CKD, Hypoparathyroidism
    - 1œ-hydroxylase mutations
    - X-linked hypophosphatemic rickets
  - Target organ resis: VDR mutations

Vitamine D deficiency

- Clinical manifestations:
  - Hypocalcemia, tetany, seizures
  - Osteopenia, rickets, osteomalacia
  - Proximal myopathy
  - Pathologic bone fractures
- Diagnosis:
  - 25(OH)D (< 15 ng/mL)
  - Raised S. PTH
  - Low S. Ca, ↑ALP (bone-specific)
  - X-ray…Osteopenia, Pseudofractures

- Treatment:
  - Therapeutic dose = 40,00 IU/d
  - Prophylactic dose = 800 IU/d
  - Various formulations n doses

1. Clacitriol ($1,25(OH)_2D_3$) = 0.25-0.5 µg/d
2. Doxecalciferol ($1(OH)D_2$) = 2.5-5.0 µg/d
3. Calciferol (Vit D_2) = 50,000 IU wkly X 3 mth f/b 800 IU/d
4. Inj. Vit D = 2.5 MU deep i/m Biannually

- Always add Ca with Vit D supplementation
- Normocalcemia (<1 wk); ALP n PTH in 3-6 mth

Vit.D intoxication

1. Dietary Vit.D intoxication

- Chronc ingestion of Vit.D > 50,000 U/d (upper limit of normal dietary intake =2000)
- Δ: 25(OH)D > 100 ng/mL
- Treatment:

i. Stop Vit.D suppl n restrict dietary Ca

ii. Hydrocrtisone < 100mg/d if ↑ S. Ca > 4 wks (* substantial fat stores of Vit D)

Vit.D intoxication

2. Chr granulomatous dr

- Sarcoidosis, TB, Fungal infxns
- Excess Vit.D synthesized by Macrophages (25(OH)D --→ 1,25(OH)2D)
- No negative feed-back from S. Ca or PTH
- Treatment:

➢ Treat underlying condition

➢ Avoid sunlight exposure, limit dietary Ca n Vit.D; may use steroids

Parathyroid disorders

Parathyroid disorders

- Hyperparathyroidism:

1. Pr. Hyperparathyroidism

Solitary adenoma (80%)

MEN 1 (Wermer's synd: Pitutary n Pancreas)

MEN 2A (Medullary Ca thyroid + Pheochromo)

MEN 2B (Multiple Neuromas + MCT + PCC)

2. Sec. → CKD, Lithium therapy

- Familial hypocalciuric hypercalcemia

Pr. Hyperparathyroidism

- Clinical features:

i. Asymptomatic

ii. Bone, Stone, Groan, Mone

- Bone→ high turnover bone ds
  - → Osteitis fibrosa cystica
  - → X-ray: subperiosteal resorption
  - → Histo: multinucleated osteocasts at bone surface pits
  - → Formatio/Resorption markers: ALP, Procollagen/Collagen telopeptide

Pr. Hyperparathyroidism

- Stone → Nephrocalcinosis
  → Nephrolithiasis
- Groan → Refractory gastritis
  → Zollinger-Ellison syndrome
  → Pancreatitis
- Mone → Neuropsychiatric manifestations
  → Neuropathy, Parathyroid myopathy

Pr. Hyperparathyroidism

- Diagnosis: Hypercalcemia with î S. PTH
- Treatment: Medical or Surgical ?

- Medical→ SERMs (Raloxifene)
  → Calcimimetics (CaSR +)

- Annual S. Creat, DEXA scan n Biannual S. Ca

Pr. Hyperparathyroidism

- Surgery

I. Severe hyperCa (>15 mg%)
   or hypercalciuria (>400 mg/d)
II. Asymp hyperPTH with age < 50 yrs
III. T-score < -2.5 at any site
IV. CCL reduced by 30% or more

- Radiolabelled Tec SPECT & intra-operative S. PTH sampling

Familial hypocalciuric hypercalcemia

- Mutation in CaSR in PTH gland n Kidney
- Usually asymptomatic
- Must be differentiated from Pr. hyperPTH as medical therapy or surgery not useful (*K)


L
C D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