

## Vit D

Structure	A steroid hormone
Synth reg.	-strictly controlled by PTH (used for hydroxylation)
Synth steps	1) formation of <u>cholecalciferol</u> "Vit D3" subcutaneously by sun 2) liver uses 25-hydroxylase to convert cholecalciferol into <u>25-hydroxyCholecalciferol</u> 3) kidneys use 1-a-hydroxylase to convert 25-hydroxyCholecalciferol to <u>1,25-DiHydroxycholecalciferol</u>
Molecular info	-cholecalciferol: derived from 7-DeHydroCholesterol (which is derived from cholesterol) -1,25-DiHydroxycholecalciferol: binds to blood Gc-globulin Pr as a transporter
Active form	1,25 DiHydroxyCholecalciferol (aka: calcitriol)
Vit D2	-derived from ergosterol -taken from animals & plants -structure: ergocalciferol -both Vit D2 & 3 are clinically available as sup
Fun	-along PTH & calcitonin, they regulate Ca homeostasis -Ca & PO <sub>4</sub> (phosphate) absorption in SI & renal tubules -bone resorption during hypocalcemia -bone mineralization
Ca regulation	-directly: Vit D -indirectly: PTH

Path			
	Osteomalacia	Rickets	Osteoporosis
<b>Epidim</b>	-Adults	-children	-
<b>Is</b>	No bone mineralization	No bone or cartilage mineralization	Less <u>bone</u> mass (matrix is preserved)
<b>Incidence</b>	Rare due to food <u>Ca &amp; Vit D</u> supp nowadays		<u>primary</u>
<b>Etiology</b>	All diseases in regard of Vit D and/or Ca homeost.		-Postmenopausal
<b>Symptoms</b>	-weak bones -weak muscles -bone pain -frequent fractures  -vertebra compression	-weak bones -weak muscles -bone pain -frequent fractures  -skeletal deformity (bowed legs) -dental deformity -growth deformity	<u>secondary</u> -Meds -OH -immobilization -smoking -cushing -hypertsm -gonads failure -GIT diseases
<b>Lab</b>	-Low blood <u>25-hydroxyCholecalciferol</u> -hypocalcemia (rare) -inc blood PTH (rare) -inc blood alkaline phosphatase (rare)		-hydroxyproline (causes bone resorp) -osteocalcin (caises bone formatin)
<b>Diagnosis</b>	-Low blood <u>25-hydroxyCholecalciferol</u> -low blood <u>PO4</u>	-high blood <u>PTH</u> -high blood <u>Alkaline phosphatase</u>	<u>-no lab tests!</u> -measuring bone density (radio)

Osteoporosis	
Prevention	-good diet & exercises -hormone replacement therapy in menopausal women
Treatment	(very hard) -weak treators: oral Ca, estrogens & fluorides

Rickets	
Etiology	Genetics
Types	1 & 2