

## REFERENCE SHEET:

# Vitamin D

## Pronunciation

Vitamin D3 (cholecalciferol, koh-luh-kal-sif-uh-rawl)

Vitamin D2 (ergocalciferol, er-go-kal-sif-uh-rol)

## Summary

Vitamin D is a prohormone and a non-essential vitamin. Small quantities are found in fish liver oils, the skin of fatty fish, beef liver, cheese, and egg yolks, primarily in the form of vitamin D3 and its metabolite 25(OH)D3. Another form, vitamin D2 is found in variable amounts in mushrooms. Vitamin D3 is synthesized through UV irradiation of 7-dehydrocholesterol found in the skin, whereas D2 derives from the exposure of ergosterol to UV radiation.



## Main Medical Uses

The most important role of vitamin D may be to promote general wellbeing. Vitamin D has been studied for many outcomes, covering a diverse range of diseases. Class A evidence suggests that vitamin D may be beneficial for the following:

- Balance sway
- Birthweight and smallness for gestational age
- Body Mass Index (BMI)
- Cognition
- CVD and CVD prevalence
- Dental caries
- Depression and Seasonal Affective Disorder (SAD)
- Hypertension
- Ischaemic stroke and stroke
- Maternal vitamin D levels at term
- Metabolic syndrome prevalence
- Osteoporosis/fractures (with calcium)
- Parathyroid hormone and alkaline phosphatase in CKD requiring dialysis
- Parathyroid hormone in CKD not requiring dialysis
- Type II and gestational diabetes

## Forms

Vitamin D3 (Cholecalciferol):

- Lanolin (from sweat glands of sheep or cod liver): Converts to vitamin D3 after UV-B exposure.
- Lichen (from moss): Plant alternative providing previtamin form of vitamin D3.

Vitamin D2 (Ergocalciferol): Previtamin form that converts to D2 after UV-B exposure.

The two forms differ by the structure of their side chains, though Class A evidence suggests that vitamin D3 is more effective at increasing serum 25(OH)D levels compared with D2.

## Adverse Effects

Adverse effects reported with vitamin D supplementation include nausea, vomiting, upset stomach, diarrhea, constipation, rashes, itchiness, allergic reactions, cardiovascular events, pain, cancer, and mortality. However, Class A evidence demonstrates that there are no significant effects associated in adults with long term administration of doses of 4000 IU or less.

Further, vitamin D supplementation does not increase the risk of non-calcemic adverse effects. Vitamin D supplementation can increase the risk of hypercalcemia, hypercalciuria, and GI events when used in conjunction with calcium supplementation. Single doses up to 200,000 IU can be administered in healthy, elderly populations without side effects, though GI complaints have been reported in some subjects. Doses greater than 500,000 IU have been reported to increase fracture risk, GI discomfort, and alter biochemical markers. Vitamin D toxicity has been reported in mega-doses ranging from 2,220,000-6,360,000 IU administered in an attempt to correct deficiencies.

## Dosing and Administration

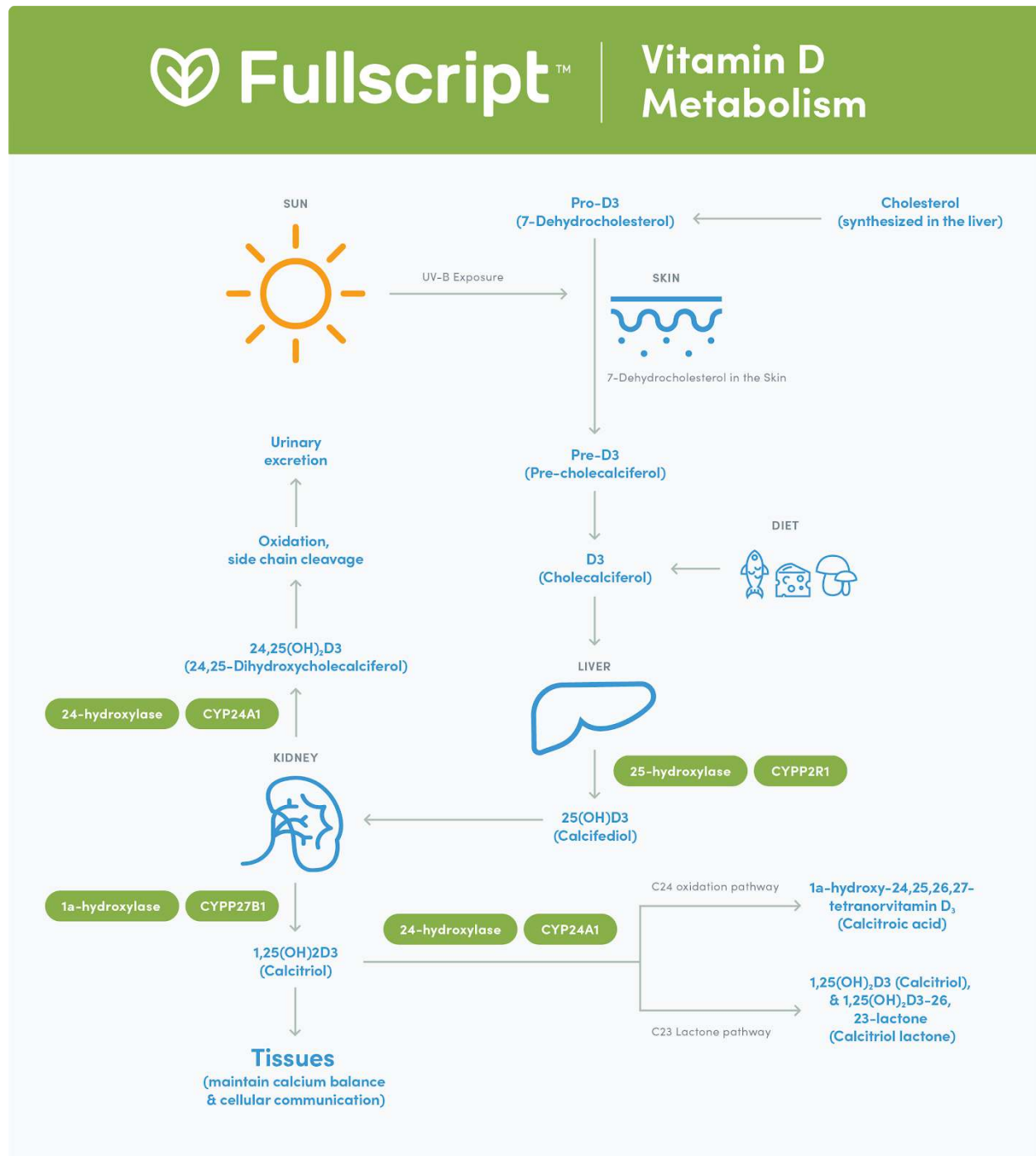
The following table has been adapted from the Endocrine Society Expert Committee.

NOTE: Ongoing doses should commence when 25(OH)D concentrations reach 30 ng/ml.

Life Stage	Daily Requirement (IU per day)	UL (IU per day)	Deficiency Treatment (IU per day)
<b>Infants (&lt;1 years old)</b>	400-1000	2000	2000; or 50,000 once per week (6 weeks) + 400-1000 ongoing
<b>Children (1-8 years old)</b>	600-1000	4000	2000; or 50,000 once per week (6 weeks) + 600-1000 ongoing
<b>Adolescents (9-18 years old)</b>	600-1000	4000	2000; or 50,000 once per week (6 weeks) + 600-1000 ongoing
<b>Adults (&gt;19 years old)</b>	1500-2000	10000	6000; or 50,000 once per week (8 weeks) + 1500-2000 ongoing.
<b>Pregnancy and Lactation (14-18 years old)</b>	600-1000	4000	n/a
<b>Pregnancy and Lactation (&gt;19 years old)</b>	1500-2000	10000	n/a

## Mechanism of Action and Metabolism

The following diagram depicts the metabolism of vitamin D in the body.



## Associated Depletions and Interactions

Class of Drug	Pharmaceutical	Effect	Class of Evidence
<b>Lipase Inhibitors</b>	Orlistat	↓ Vit. D and E within a normal range	B
<b>Statins</b>	Atorvastatin	↓ Atorvastatin and its metabolites, LDL-C and total cholesterol	C

For an explanation of the classes of evidence, please see the [Rating Scales](#) for Evidence-Based Decision Support.

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