

Vitamin D & Athletes

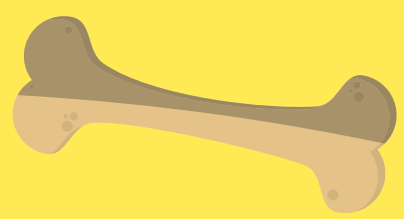


What is vitamin D?

This fat-soluble vitamin is considered a pro-hormone and is unique in that it can be obtained through the diet, but mostly is obtained through synthesis in the skin when exposed to sunlight.

How does vitamin D affect health and performance?

BONE HEALTH



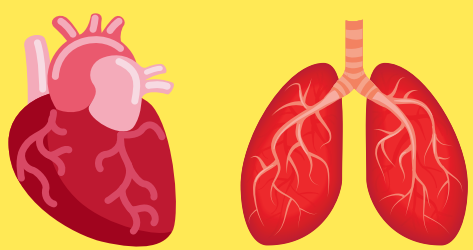
Vitamin D helps with calcium absorption and bone mineralization, or strengthening

IMMUNITY



Vitamin D supports function of both innate and acquired immune systems

HEART & LUNGS



Vitamin D supports a strong, healthy heart and proper lung function

MUSCLE



Vitamin D supports muscle repair after damaging exercise and may support muscle function

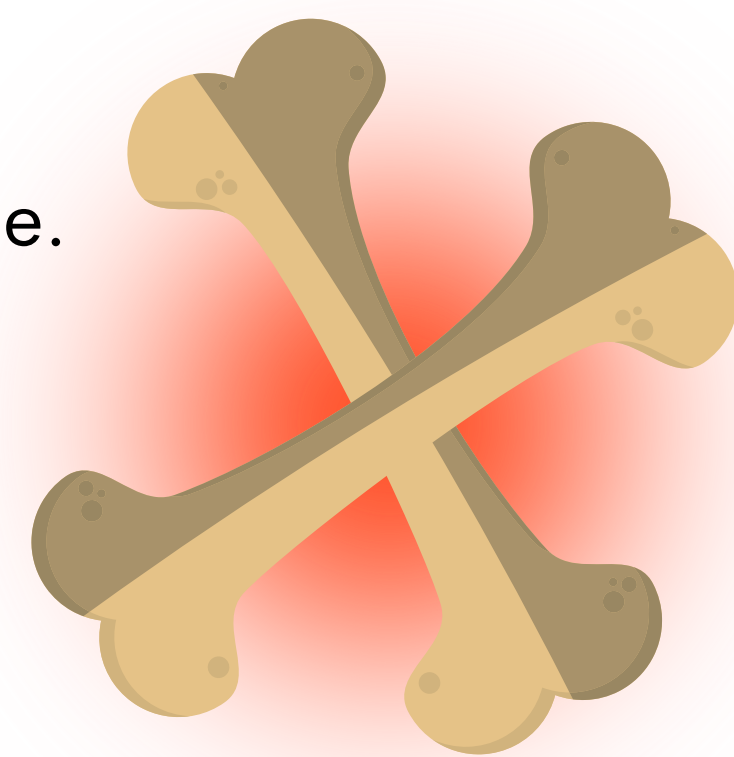
What are the signs of low vitamin D?

Athletes with low or deficient vitamin D status may experience:

Bone fractures or pain, low bone mineral density, frequent illness and fatigue.

Longer term consequences of low vitamin D status include:

Higher risk for cardiovascular disease, some cancers, hypertension, osteoarthritis, depression and inflammatory bowel disease.



ASSESSING VITAMIN D STATUS

Vitamin D status is best determined by testing a blood sample via mass spectrometry for 25-Hydroxyvitamin D (25[OH]D), a vitamin D metabolite. 25[OH]D can be measured as nmol/L or ng/ml. Research to determine optimal vitamin D status is ongoing.

nmol/L 25[OH]D	ng/ml 25[OH]D	Vitamin D status and health outcomes
≤50	≤20	Deficient - high risk of negative health effects
52.5-72.5	21-29	Inadequate - risk of negative health effects
75-97.5	30-39	Adequate - range for positive health outcomes
100-175	40-70	Optimal - likely best range for optimal health

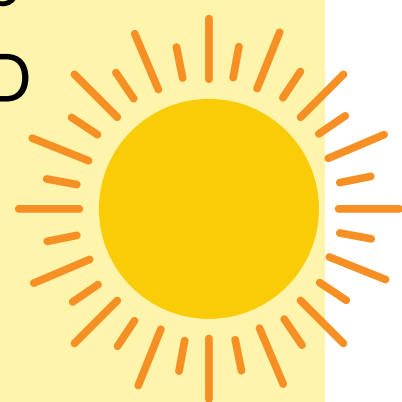
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The 3 ways to get vitamin D:

UVB Light

Exposure to UVB rays from sunlight is the most common way people obtain vitamin D.

Other sources of UVB light, like tanning beds, are effective for vitamin D production as well.



How much?

5-30 minutes for light skinned individuals and up to 60 minutes or more for dark skinned individuals of summer midday sun exposure with arms, legs and ideally trunk exposed can synthesize 10,000-20,000 IU vitamin D.

Food

Meeting vitamin D requirements can be difficult through food alone as few foods contain this nutrient.

How much?

600 IU vitamin D daily for males and females aged 1-70

Some food sources:

3 oz. cooked salmon = 570 IU

1/2 cup UV exposed mushrooms = 366 IU

1 cup vitamin D fortified milk = 120 IU

1 egg = 44 IU

3 oz. canned tuna = 40 IU



Supplements

When vitamin D needs cannot be met through UVB exposure or foods, a supplement should be considered.



How much?

It is not ideal to supplement without knowing vitamin D status, however 1000 - 2000 IU per day is considered a safe dose to maintain vitamin D status, especially in winter.

What kind?

Always choose a third party tested (like NSF for Sport) brand. Vitamin D3 is usually more effective at raising vitamin D status than D2.

Risk factors that increase risk of low vitamin D status:

- Darkly pigmented skin
- Living at latitudes $>35^{\circ}$ - 40°
- Little time spent outdoors
- Participating in indoor sports
- Participating in winter sports
- Low to no intake of vitamin D containing foods
- Always wearing skin-covering clothing outside
- Always wearing sunscreen outside
- High body fat percentage



Other considerations around vitamin D:

Skin cancer risk or history

People with very fair skin and/or a history of skin cancer are not advised to rely on sun or UVB exposure for vitamin D.

Dark skinned individuals - Dark skinned people often have lower serum 25[OH]D but higher bone mineral density than light skinned people. Researchers are exploring the reason behind this paradox, including if 25[OH]D is the perhaps not the best way to measure vitamin D status, especially in those with dark skin.

More is not better - Increasing vitamin D status above recommended levels is not beneficial and can lead to vitamin D toxicity when serum 25[OH]D is >180 nmol/L or 72 ng/ml. Daily doses of >4000 IU are not recommended unless advised and monitored by a Dietitian or qualified medical professional when treating a diagnosed vitamin D deficiency.