

Vitamin B3 (Niacin)

Niacin, vitamin B3, is an essential vitamin used in energy reactions as a component of NAD. Niacin is created from the amino acid tryptophan and requires vitamin B6 in order to convert the amino acid to niacin. There is a characteristic set of symptoms referred to as pellagra which results from niacin deficiency. The symptoms of pellagra are easily remembered as the 4 D's which include diarrhea, dermatitis, dementia and death. Niacin deficiency often results from depletion of tryptophan as is seen in Hartnup disease and serotonin syndrome. Additionally, niacin can be used as a cholesterol-lowering medication. As a medication, its most significant side effect is a facial flush.



PLAY PICMONIC

Derived from Tryptophan

[Tri-toe-fan](#)

Niacin is derived from the amino acid tryptophan.

Synthesis Requires Vitamin B6

[Viking Bee \(6\) Sax](#)

Vitamin B6 plays a role in the conversion of tryptophan to niacin. Therefore, a deficiency of vitamin B6, which can be caused by isoniazid, can also manifest as a niacin deficiency.

Constituent of NAD+

[NAD+cigarette](#)

Niacin is an essential component of nicotinamide adenine dinucleotide, NAD⁺, which is a coenzyme found in all living cells. This coenzyme is commonly used in oxidation reduction reactions.

Deficiency Causes

Hartnup Disease

[Hard-hat-nut](#)

Hartnup disease is a genetic disease which results in the inability of the kidneys to reabsorb amino acids, including tryptophan. This can cause a niacin deficiency because there is no tryptophan for conversion.

Carcinoid Syndrome

[Cars-in-droid](#)

Carcinoid syndrome results from a metastatic carcinoid tumor, which actively secretes serotonin. Serotonin is also a derivative of tryptophan and can cause a niacin deficiency due to depletion of tryptophan.

Deficiency Symptoms

Pellagra

Pelican

Pellagra is the constellation of symptoms which is associated with severe niacin deficiency. It includes four D's of diarrhea, dermatitis, dementia, and death.

Diarrhea

Toilet

Diarrhea is a characteristic symptom of niacin deficiency.

Dermatitis

Dermatologist examining rash

Dermatitis is a characteristic symptom of niacin deficiency, and composes one of the "three D's" of pellagra.

Dementia

D-man

Dementia is a characteristic symptom of niacin deficiency, and composes one of the "three-D's" of pellagra.

Glossitis

Tongue-on-fire

Glossitis can also be seen in niacin deficiency, as well as other B vitamin deficiencies.

Excess Symptoms

Flushing

Flashlight

Facial flushing is a common adverse reaction seen with patients taking niacin as medication. The flushing can be prevented with aspirin therapy.