

## 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.



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### 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<sup>+</sup>, 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.