# 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+, 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.

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**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.

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