

# NUTRIENTS

## Vitamins: Vitamin B6

### What is it?

Vitamin B6 is a water soluble vitamin that exists as a family of 3 compounds: -

- pyridoxine
- pyridoxal
- pyridoxamine, and each has a phosphate derivative

The general vitamin name is pyridoxine. It performs a variety of functions in the body and is essential for health.

### Functions - what does it do?

The coenzymes of vitamin B6 are needed for the activity of several enzymes involved in carbohydrate, protein, and fat metabolism. For example, vitamin B6 functions as a coenzyme for glycogen phosphorylase, an enzyme that causes the release of glucose stored in the muscle as glycogen.

**Amino amino metabolism.** One of the most important functions of vitamin B6 is its role in protein metabolism as the vitamin B6 coenzymes are required to metabolise amino acids. The coenzymes participate in reactions that allow a cell to synthesize nonessential amino acids.

**Red blood cell production.** Your body needs vitamin B6 to make haemoglobin. Vitamin B6 functions as a coenzyme in the production of haeme, a component of haemoglobin. Haemoglobin within red blood cells is critical for the transport of oxygen to tissues. Vitamin B6 is able to bind to the haemoglobin molecule and affect its ability to pick up and release oxygen. A vitamin B6 deficiency can result in a form of anaemia that is similar to iron deficiency anaemia.

**Haemoglobin.** The iron containing part of red blood cells that carries oxygen to cells.

**Nervous system function.** The synthesis of many neurotransmitters requires enzymes that uses vitamin B6 as a coenzyme. Neurotransmitters allow nerve cells to communicate with each other and other cells.

**Niacin formation.** Vitamin B6 aids the conversion of the amino acid, tryptophan, to niacin.

**Neurotransmitter.** A compound made by the nerve cells that allows for communication between it and other cells.

## Requirements - How much do we need?

Life-Stage (years)	Recommended Dietary Allowance*	
	(mg/day)	
	Males	Females
0 - 0.5 (0 - 6 months)	0.1a	0.1a
0.5 - 1 (7 - 12 months)	0.3a	0.3a
1 - 3	0.5	0.5
4 - 8	0.6	0.6
9 - 13	1	1
14 - 18	1.3	1.2
19 - 50	1.3	1.3
Ages 51+	1.7	1.5
Life-Stage (years)	Pregnancy	Lactation
18 and younger	1.9	2.0
19 - 30	1.9	2.0
Ages 31 - 50	1.9	2.0

\*The Recommended Dietary Allowance (RDA) is the average daily dietary intake level that is sufficient to meet the nutrient requirements of nearly all (97-98%) healthy individuals in each life-stage and gender group.

aAdequate Intakes (AI) are used as no RDA is established. The AI is a recommended daily intake level based on observed or experimentally determined approximations of nutrient intake by a group of healthy people who are assumed to be maintaining an adequate nutritional state.

## Sources - Where is it found?

Food Groups	Food Sources	Nutrient Density		
		High	Medium	Low
Meat, poultry, fish, dry beans, eggs, and nuts	Meat, Poultry, Fish, Beans, Nuts, Seeds			
Bread, cereals, rice and pasta	Fortified breakfast cereals, Wheat germ (whole-wheat products)			
Vegetables	Potatoes, Spinach, Cauliflower			
Fruit	Avocados, Bananas, Dates, Cantaloupe, Watermelon			
Milk, yoghurt and cheese	Milk, Cottage cheese			
Fats, oils, and sweets				

## Deficiency - When you have too little

Severe deficiency of vitamin B6 is rare. Alcoholics are thought to be most at risk of vitamin B6 deficiency, due to low dietary intake, and alcohol and alcoholic liver disease impairing the metabolism of the vitamin.

## Toxicity - When you have too much

Although vitamin B6 is a water-soluble vitamin and is excreted in the urine, prolonged ingestion of very high dose supplements of the vitamin may result in nerve damage, which is a disease or abnormality of the

nervous system. Symptoms include pain and numbness of the limbs, and in severe cases difficulty in walking.

Intakes of 2 to 6 grams of vitamin B6 per day for 2 or more months can lead to irreversible nerve damage. Even prolonged intakes of 500 mg per day can have the same effects.

Life-Stage (years)	Upper Limit+ (mg/day)	
	Males	Females
0 - 0.5 (0 - 6 months)	ND	ND
0.5 - 1 (7 - 12 months)	ND	ND
1 - 3	30	30
4 - 8	40	40
9 - 13	60	60
14 - 18	80	80
19 - 50	100	100
Ages 51+	100	100
Life-Stage (years)	Pregnancy	Lactation
18 and younger	80	80
Ages 19 - 50	100	100
Ages 51+	100	100

+Upper Limits (UL) = The maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. Unless otherwise specified, the UL represents total intake from food, water, and supplements.

ND = Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts. Source of intake should be from food only to prevent high levels of intake.

**For further, personalized and more detailed information, please contact a dietitian registered with the Health Professions Council of South Africa. References from the scientific literature used to compile this document are available on request.**

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