**VITAMIN B6**

*Also known as pyridoxine. Most active form: pyridoxal 5′-phosphate (PLP)*

**INTRODUCTION**

Vitamin B6 is a water-soluble vitamin that must be consumed in the diet because the human body cannot make it (Vitamin B6, 2014). Its active state is a coenzyme called pyridoxal 5′-phosphate (PLP) and makes up part of the transaminase enzyme which is essential for converting amino acids into forms the body needs for many metabolic functions (Toney, 2005).

**Important functions of Vitamin B6**

- **Maintains healthy brain function** by converting amino acids into neurotransmitters like serotonin, melatonin and dopamine. It is so essential for healthy brain function that the requirement of Vitamin B6 in the central nervous system is a 100-times greater than in other organs (Gibson and Blass, 1999).

- **Red blood cells** have an important protein called haem which allows haemoglobin to carry oxygen through our bloodstream to all our organs. Haem cannot be created without vitamin B6 (Mateljan, 2015).

- **Helps break down carbohydrates for digestion** Vitamin B6 not only helps metabolise the carbohydrates we ingest, but is also involved with the enzyme that pulls glycogen (stored carbohydrates) out of the cell. This is one reason why it plays a role in maintaining good energy levels (Mateljan, 2015; *Office of dietary supplements*, 2011).

- **Healthy liver function** is crucial because along with the kidneys, the liver filters out all unwanted chemicals and toxins from our blood. Toxins must become water soluble before they can be filtered out of the blood and vitamin B6 is one of the most important vitamins involved in this process (Mateljan, 2015).

- **Antioxidants** are important compounds that protect the body from oxidative stress i.e. the damage caused from free radicals during normal metabolic functions. New research has shown that vitamin B6 is a powerful antioxidant in certain areas of metabolism – perhaps even more powerful than vitamin C or E (Mooney *et al.* 2009; *The many uses for Vitamin B6*, 2015).

- **Homocysteine levels**, if too high, can raise risk of cardiovascular disease. Together with B12 and folate, vitamin B6 plays a very important role in converting homocysteine to cysteine therefore keeping homocysteine levels down (Hsu *et al.* 2015; Vitamin B6, 2014).

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**TOP DIETARY SOURCES OF VITAMIN B6**

Enjoy a diet that includes these excellent sources of vitamin B6

<table>
<thead>
<tr>
<th>SERVING SIZE</th>
<th>MG</th>
<th>%RNI</th>
</tr>
</thead>
<tbody>
<tr>
<td>115 g Tuna</td>
<td>1.18</td>
<td>69%</td>
</tr>
<tr>
<td>1 cup Spinach</td>
<td>0.44</td>
<td>26%</td>
</tr>
<tr>
<td>1 cup Cabbage</td>
<td>0.34</td>
<td>20%</td>
</tr>
<tr>
<td>1 cup Bok Choy</td>
<td>0.28</td>
<td>16%</td>
</tr>
<tr>
<td>1 cup Bell Peppers</td>
<td>0.27</td>
<td>16%</td>
</tr>
<tr>
<td>1 cup Turnip Greens</td>
<td>0.26</td>
<td>15%</td>
</tr>
<tr>
<td>6 cloves Garlic</td>
<td>0.22</td>
<td>13%</td>
</tr>
<tr>
<td>1 cup Cauliflower</td>
<td>0.21</td>
<td>12%</td>
</tr>
<tr>
<td>115 g Turkey</td>
<td>0.92</td>
<td>54%</td>
</tr>
<tr>
<td>115 g Beef</td>
<td>0.74</td>
<td>44%</td>
</tr>
</tbody>
</table>

*NOTE: Dietary sources have been taken from *World's Healthiest Foods* which uses a formula that calculates nutrient density based on calories and not just volume (Mateljan, 2015).*
VITAMIN B6 DEFICIENCY

Since vitamin B6 is common in a wide range of foods, severe deficiency due to diet is rare. Secondary deficiency has been detected in certain groups with conditions such as Pyrrole Disorder (Aljamali and Jwad, 2015), Rheumatoid Arthritis and Alcoholism (Office of dietary supplements - Vitamin B6, 2011). Certain drugs can also reduce the level of B6 in the body and are listed under ‘Drug Interactions’ below.

SIGNS AND SYMPTOMS OF VITAMIN B6 DEFICIENCY OR INSUFFICIENCY

Symptoms include: irritability, depression, confusion, inflammation of the tongue, mouth sores or ulcers, and ulcers at the corners of the mouth, morning sickness, asthma, high homocysteine, epilepsy, seborrheic dermatitis, ADHD (Vitamin B6, 2014; Mateljan, 2015).

DRUG INTERACTIONS

Always check with your doctor before taking any supplements

Drugs that reduce the levels of B6 in the body include:
Cycloserine (Seromycin), Hydralazine (Apresoline), Isoniazid, Penicillamine, Theophylline (TheoDur), monoamine oxidase inhibitors (MAOIs), Erythropoietin therapy. If you are on any of these medications, you may want to ask about supplementation of Vitamin B6 with your doctor (Vitamin B6 (Pyridoxine), no date).

Drugs that have negative interactions with Vitamin B6:
Taking Vitamin B6 with the following medications may either reduce their efficacy or cause unwanted side effects: Tetracycline (an antibiotic) Amiodarone (Cordarone) Levodopa (L-dopa), Phenytoin (Dilantin) (Vitamin B6 (Pyridoxine), no date).

THERAPEUTIC USES

Vitamin B6 has been proven effective in the treatment of the following: metabolic diseases where Vit B6 metabolism is impaired e.g. pyridoxine-dependent epilepsy or pyrrole disorders (Aljamali and Jwad, 2015), morning sickness (Wibowo et al. 2011), premenstrual syndrome, depression, and carpal tunnel syndrome (Vitamin B6, 2014). It has also been proven to reduce homocysteine in mice and is believed to have the same effect on humans (Hsu et al. 2015).

Recommended Nutrient Intakes by group

(mg/day)

Infants and children
under 1 year 0.3
1-3 years 0.7
4-6 years 0.9
7-10 years 1.0

Adolescents
Females, 11-14 yrs 1.0
Females, 14-18 years 1.2
Males, 11-14 years 1.2
Males, 14-18 years 1.5

Adults (over 18)
Males 1.4
Females 1.2
Pregnant women 1.2

(Nutrient Intakes, 2014)

TOXICITY

There are no known cases of Vitamin B6 toxicity through diet alone (Mateljan, 2015) and up to 100 mg/day for adults have been proven tolerated. High doses via supplementation can lead to peripheral sensory neuropathy (loss of feeling in the hands and feet) and damage to nerves. These symptoms usually go away when supplementation is stopped, but severe nerve damage cannot be reversed. (Mooney et al. 2009).

It is important to discuss supplementing your diet with any vitamin or mineral with your doctor first.