

A stylized, light teal illustration of a plant with several leaves and a cluster of small, round fruits or berries, positioned on the left side of the page against a darker teal background.

# VITAMIN B6 PYRIDOXINE

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# What is Pyridoxine?

- Pyridoxine, AKA Vitamin B6, is a water-soluble vitamin that is essential for healthy body functioning.
- It is involved in over 100 known enzymatic reactions. Including:
  - Involvement in protein metabolism
  - Cognitive development, especially the formation of neurotransmitters
  - Maintenance of normal levels of homocysteine—a protein amino acid found in blood plasma
  - Involvement in gluconeogenesis and glycogenolysis
  - Hemoglobin formation
  - Needed to utilize certain amino acids
  - Essential for metabolism of tryptophan to niacin
  - Aids in absorption of vitamin B12

# Dietary Sources of Pyridoxine

- Fortified cereals, bananas, chicken, turkey, tuna, salmon, shrimp, beef liver, milk, cheese, lentils, beans, spinach, carrots, brown rice, bran, sunflower seeds, wheat germ and whole-grain flour.
- Dietary supplements.
- Added to many different types of “energy” and “health” beverages.

<b>Supplement</b>		
Serving Size 2 Gummy Bears		
Servings Per Bottle 35		
Amount Per Serving		% Daily Value
Calories 15		
Total Carbohydrate	4 g	**
Sugars	3 g	**
Vitamin A	2100 IU	84%
Vitamin C	20 mg	50%
Vitamin D	400 IU	100%
Vitamin E	16.5 IU	165%
Vitamin B-6	2 mg	286%
Folic acid	140 mcg	70%

Ingredients: Glucose syrup, sucrose, natural flavors, citric



# -Pyridoxine-

## Other Therapeutic Uses Beyond Nutritional Supplements

- Used to treat “morning sickness” during pregnancy
- Age-related macular degeneration (taken with vitamin B12 and folic acid)
- Depression
- Premenstrual Syndrome symptoms
- Carpal tunnel symptoms
- Rheumatoid arthritis
- Tardive dyskinesia—side effect of chronic antipsychotic drug use involving involuntary muscle movement

# Excessive Pyridoxine Levels

- AKA vitamin B6 toxicity
- Has not been linked to dietary intake, only long-term administration of oral pyridoxine (daily for 12-40 months)
- May cause progressive sensory neuropathy (damage to sensory nerves) with ataxia (lack of voluntary coordination), painful or disfiguring dermatological lesions, photosensitivity, and GI symptoms.
- Infants should only receive pyridoxine from breast milk, formula, and foods.
- The Food and Nutrition Board has developed a Tolerable Upper Intake Levels chart to be used by individuals not receiving medical vitamin B6 treatment. This chart is a great source of reference to help the individual avoid excessive dietary intake of pyridoxine.

Age	Male	Female	Pregnancy	Lactation
Birth to 6 months	Not possible to establish*	Not possible to establish*		
7–12 months	Not possible to establish*	Not possible to establish*		
1–3 years	30 mg	30 mg		
4–8 years	40 mg	40 mg		
9–13 years	60 mg	60 mg		
14–18 years	80 mg	80 mg	80 mg	80 mg
19+ years	100 mg	100 mg	100 mg	100 mg

**TABLE 1: TOLERABLE UPPER INTAKE LEVELS (ULS) FOR VITAMIN B6**

SOURCE: NATIONAL INSTITUTE OF HEALTH OFFICE OF DIETARY SUPPLEMENTS

# Pyridoxine Deficiency

Because it is a water-soluble vitamin, pyridoxine does not remain in the body and therefore must be obtained from the diet on a regular basis to maintain healthy concentrations. It is rare to have a significant deficiency of vitamin B6. However, studies show that children and the elderly are more susceptible to mild deficiencies of pyridoxine. Other factors that may cause increased susceptibility include:

- Certain medications--such as chemotherapy drugs, the antibiotic tetracycline, and the arthritis medication penicillamine
- are impaired renal functioning, autoimmune disorders, celiac disease, Crohn's disease, ulcerative colitis, inflammatory bowel disease, and alcohol dependence.
- Inadequacies are often associated with low concentrations of other B-complex vitamins.

# Pyridoxine Deficiency: Symptoms

- Anemia
  - Electroencephalographic abnormalities
  - Dermatitis with cheilosis (scaling on the lips and cracks at the corners of the mouth) and glossitis
  - Depression and confusion
  - Weakened immune function
  - Neuritis
  - Anorexia
  - Nausea, and vomiting
  - Infants whom are deficient may be irritable, have abnormally sharp hearing, and may also suffer from convulsive seizures.
- ❖ For individuals with mild deficiencies, there may be no signs or symptoms for months to even years.



# Dental Considerations for Patient with Pyridoxine Deficiency

- Since it is possible for patients with recognizable pyridoxine deficiency to have anemia, it is important that special dental/medical considerations be taken for patients with a known or suspected pyridoxine deficiency. If the patient has the classic signs and symptoms and anemia is suspected, the patient should be referred directly to a physician for screening. For patients with a confirmed anemic status, confirmation of the patients' stability should be obtained from their physician.
- Delay in treatment may be required.
- Appointments should be kept short and long complicated procedures should be avoided.
- Preventative care should be approached aggressively, including oral hygiene instruction, diet control, tooth-brushing and flossing, and fluoride application.
- Oral infection should be avoided as much as possible, and prophylactic antibiotics should be used for all major surgical procedures.
- Patients with anemia should have their pulse oximetry (O<sub>2</sub> saturation within the body) monitored throughout treatment procedures.
- Nutritionally caused anemia may cause atrophic changes to the oral mucosa, and burning and sore tongues may be reported in patients.



# Closing Words

THOUGH VITAMIN B6 IS MOST OFTEN/EASILY OBTAINED IN THE NEEDED AMOUNT THROUGH A BALANCED DIET, IT IS IMPORTANT TO NOTE THAT DEFICIENCIES DO EXIST IN SOME PATIENTS AND SUPPLEMENTATION MAY BE INDICATED IN SUCH CASES. IT IS ALSO IMPORTANT THAT WE RECOGNIZE THAT NOT ALL PERSONS NEED SUPPLEMENTATION. LIKE MOST DIETARY SUPPLEMENT BOTTLE LABELS SAY PATIENTS SHOULD ALWAYS CONSULT THEIR PHYSICIAN BEFORE TAKING SUPPLEMENTS.

# Citations

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\*All Photos taken by Grace Schroeder, 2014