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MICRONUTRIENTS

VITAMINS,
MINERALS
& MORE

VITAMIN B
PART ONE
B1, B2, B3, B5

DR PAUL APPROVED- VOLUME 2

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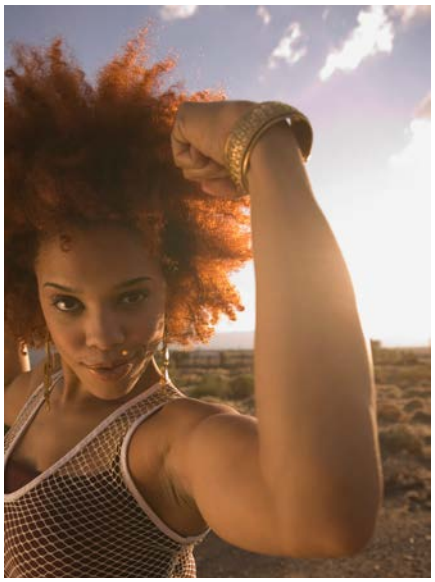
Supplement Recommendation

Check Vitamin Levels At Home:
https://trylgc.com/paulthomasvitamin

THIAMIN OR THIAMINE



This was the first vitamin isolated in the 1930's, a water soluble B vitamin that is found in the body as free thiamin or in phosphorylated forms:

- TMP (thiamin monophosphate)
- TTP (thiamin triphosphate)
- TPP (thiamin pyrophosphate also known as thiamin diphosphate). To make TPP from thiamine requires magnesium, ATP and the enzyme thiamin pyrophosphokinase.

WHY IS IT IMPORTANT?

Clearly this is a very important nutrient (vitamin). In addition to the above enzyme function roles, thiamin triphosphate (TTP) is located in large quantities in nerve and muscle cell membranes where it plays a key role in nerve impulses and muscle contraction and acetylcholine synthesis. Clearly this is a nutrient you would not want to be deficient in.

Thiamin is used by cells to help make energy from food, with TPP being a key cofactor for the dehydrogenase enzymes:

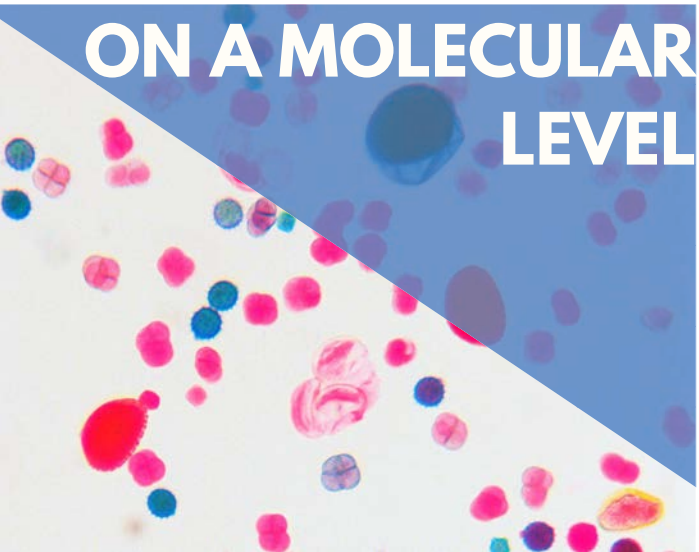
- pyruvate dehydrogenase
- alpha-ketoglutarate dehydrogenase
- branch chain ketoacid dehydrogenase.

These dehydrogenase enzymes also require niacin, riboflavin and lipoic acid in these complex and important biochemical reactions.

Transketolase is another thiamine dependent enzyme important in the synthesis of:

- ATP (adenosine triphosphate)
- GTP (guanosine triphosphate)
- DNA (deoxyribonucleic acid)
- RNA (Ribonucleic acid)
- NADP(nicotinamide adenine dinucleotide phosphate).

ON A MOLECULAR LEVEL



RDA (Recommended Daily Allowance)

There is no known toxic dose of this water soluble vitamin.

RAD

- Infants 0.3 mg/day
- Children 1 - 9 years 0.6 mg/day
- Teens/ Adults 1.2 mg/day
- Pregnancy/breast feeding 1.4 mg/day

Fish, pork, nuts, seeds (sunflower, chia, pumpkin, squash), yeasts, wheat germ, rice bran, legumes (peas, beans, soybeans, lentils), squash.

This is such an important nutrient and so available if you eat from the above food groups. Just be sure you are consistently getting a handful of nuts, seeds and a serving of legumes. A teaspoon of wheat germ in your cereal or smoothie will also do the trick. This vitamin will also be included in most multivitamins or any B-complex.

VITAMIN B2
RIBOFLAVIN

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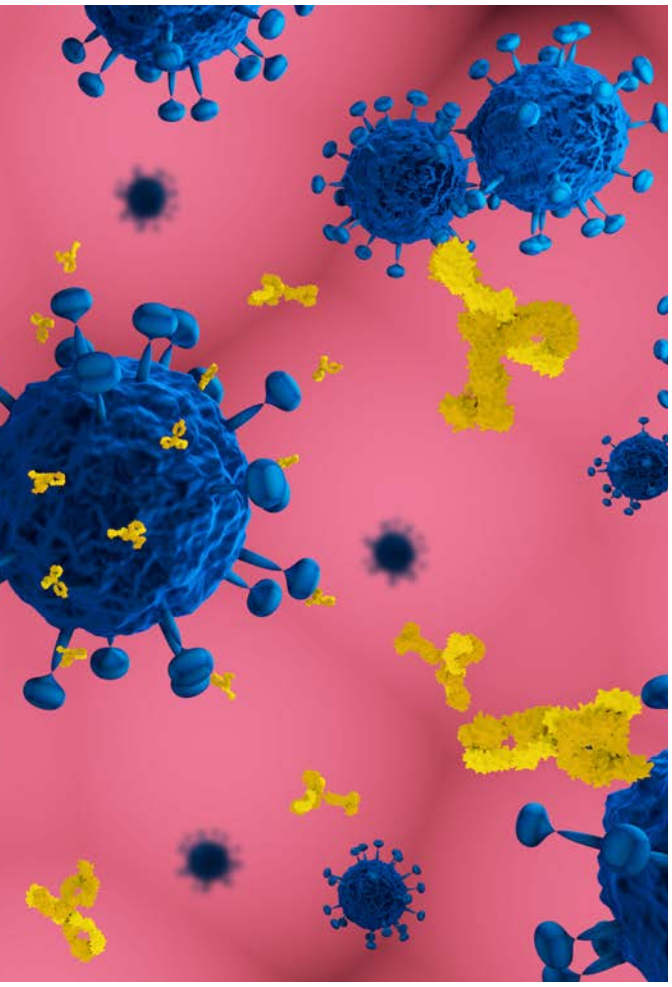


WHY IS IT IMPORTANT?

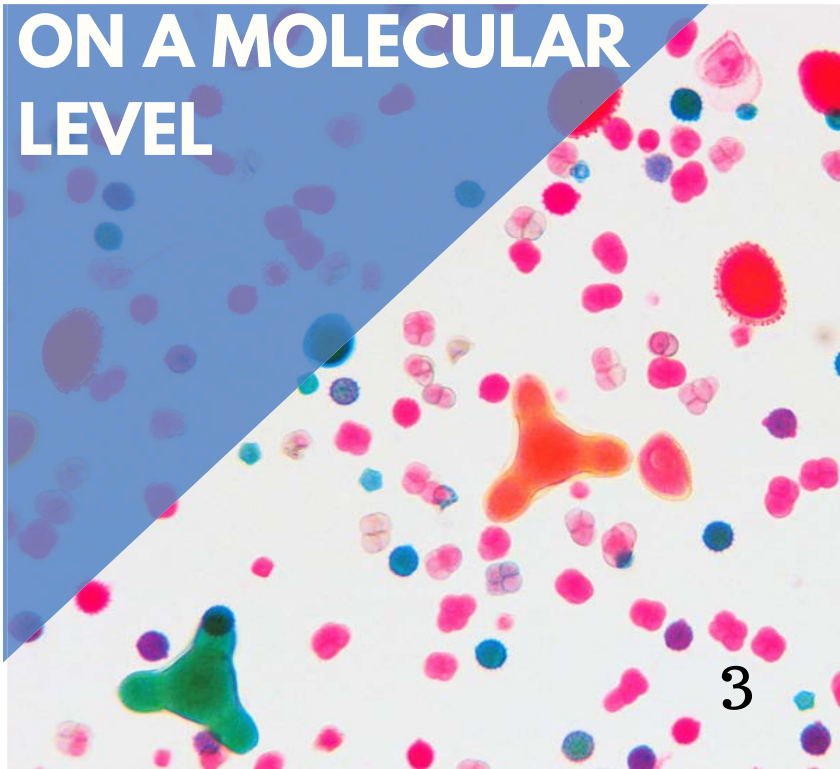
Riboflavin is a key component of the coenzymes:

-FAD (flavin adenine dinucleotide) vital for reducing oxidized glutathione, recirculation of folate for methylation, and energy production.

-FMN (flavin mononucleotide) with FAD, help mitochondrial electron transport and oxidation-reduction for flavoproteins (cell energy).

Vitamin B2 along with B3 stabilizes the MTHFR (methylenetetrahydrofolate reductase) enzyme, so important for proper methylation. Anyone with the MTHFR defect (40% of the population) should be sure they are getting enough of this nutrient.

ON A MOLECULAR LEVEL

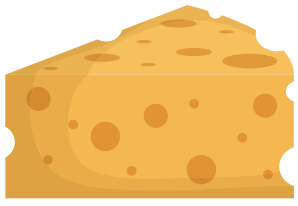


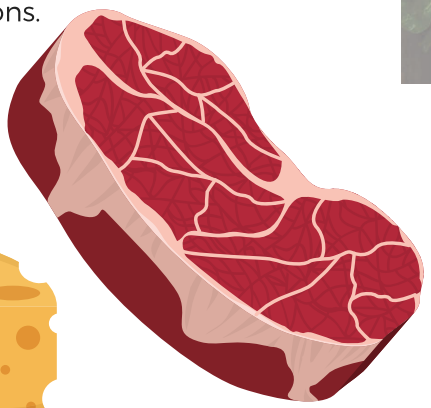
SYMPTOMS OF DEFICIENCY

Rarely are you just deficient with riboflavin, but also may be deficient in niacin (B3) and pyridoxine (B6) thus deficiency symptoms usually overlap with those of B3, and B6 deficiency.

Main symptoms of B2 (riboflavin deficiency seem to be

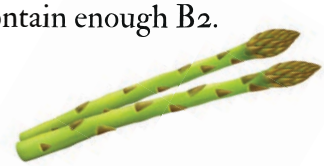
- Inflammation around the mouth with cheliosis (cracks or sores on the outside of the lips)
- Angular stomatitis (redness or sores at the corners of the mouth)
- Red or sore tongue or throat, seborrheic dermatitis (red skin).
- Vascularization of the cornea (new blood vessels formed on the white part of the eye)
- Anemia (reduced red blood cells) has been reported.
- There has been some association with cataracts and migraine headaches, with replacing riboflavin improving these conditions.





FOOD SOURCES

The best sources for Vitamin B2 (riboflavin) are fortified cereals, dairy, eggs, meat and fish, almonds, asparagus, broccoli and green leafy vegetables, and nutritional yeasts. Most multivitamins contain enough B2.



SAFETY AND TOXICITY

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RDA (Recommended Daily Allowance)

The adult RDA for riboflavin is 1.1 - 1.8 mg daily. Taking about 2 mg daily for adults ensures maximal protection against cataracts.

No toxic or adverse events have been reported for this very safe water soluble B-vitamin.

There have been reports of increased need for those taking oral contraceptives and those on antispychotic chlorpromazine, tricyclic antidepressants, phenothiazides, the anti-malarial drug quinacrine and the chemotherapy agent adriamycin.

NIACIN

WHY IS IT IMPORTANT?

Niacin (nicotinic acid and nicotinamide) is water soluble and required to form the coenzymes:

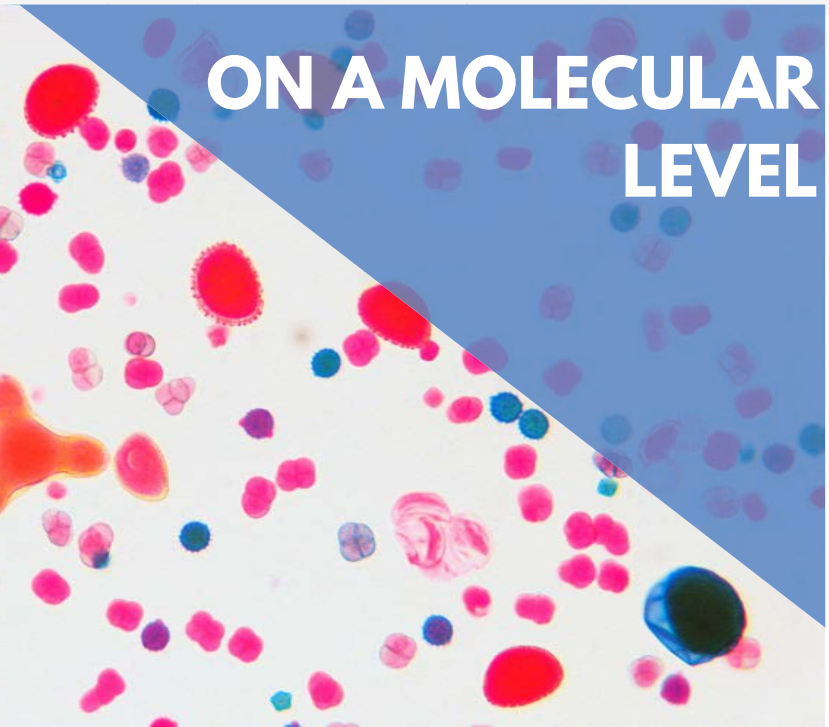
- NAD (nicotinamide adenine dinucleotide)
- NADP (nicotinamide adenine dinucleotide phosphate).

NAD and NADP are required for the proper function of over 200 enzymes in the body mainly to donate or accept electrons in redox reactions. They are essential for the breakdown of carbohydrates, fats, proteins and alcohol for energy and in the synthesis of fatty acids and cholesterol.

NAD is also required for the formation of two key enzymes:

- mono-ADP-ribosyltransferases
- poly-ADP-ribosepolymerase - involved in cell-signaling and DNA replication, repair and cell differentiation
- ADP-ribosyl cyclase involved in cell signaling through the release of calcium ions.

ON A MOLECULAR LEVEL



Niacin can be formed in the body from tryptophan. 60 mg of tryptophan can be converted to 1 mg niacin if there is enough B6 and riboflavin (B2).

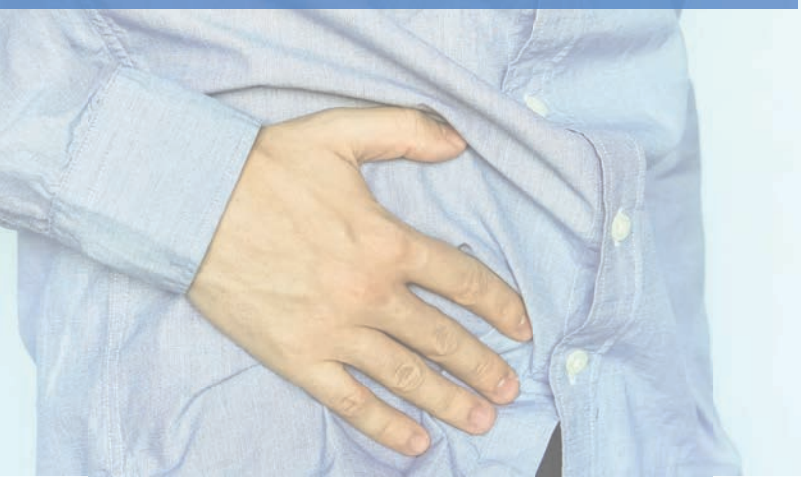
There are conflicting results that higher doses (3 gms a day in adults) of nicotinamide can protect the beta-cells in the pancreas for new onset diabetics. Large doses (up to 3 gms daily) of nicotinic acid but not nicotinamide, reduce cholesterol and serum Lp(a) lipoprotein, shifting lipoproteins to the larger more beneficial sizes and increasing the protective HDL (high-density lipoproteins).

SYMPTOMS OF DEFICIENCY

Pellagra is the classic disease of niacin deficiency, which we learned in medical school as the 4 D's:

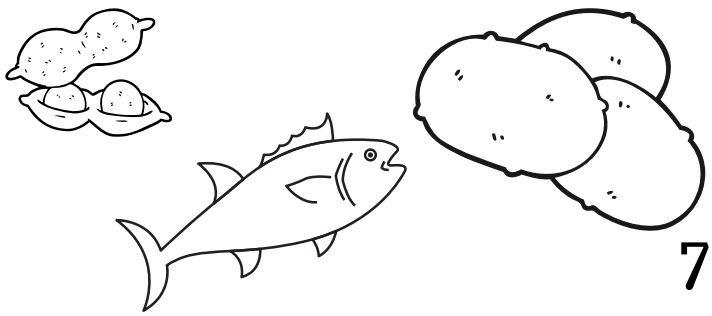
- Dermatitis (thick scaly rash with increased pigment in the sun exposed surfaces)
- Diarrhea (GI symptoms include diarrhea, red tongue and vomiting)
- Dementia (neurological sx include disorientation, memory loss, apathy, depression, headache and fatigue)
- Death - rare and only in severe untreated cases

Niacin deficiency is typically only seen where diets are almost exclusively refined corn. Those with Hartnup's disease (defective tryptophan absorption) or carcinoid syndrome (increased serotonin and other catecholamines from tumors) and those on prolonged isoniazid (antituberculosis medication) can also develop niacin deficiency.



FOOD SOURCES

Great food sources are whole grains or fortified cereals, fish and meats, legumes including peanuts, seeds, potatoes, yeasts, and nutritional supplements.



SAFETY AND TOXICITY

RDA (Recommended Daily Allowance)

Tolerable Upper Limits

Infants	not established
children	10 - 20 mg/ day
teens/adults	30 mg/day

Use of the high doses mentioned for treating diabetes or high cholesterol, should be supervised by a physician with monitoring of liver functions.

Nicotinic acid - causes skin flushing, itching and sometimes nausea and vomiting. Elevated liver function or even hepatitis, has been seen typically at doses above 3 grams a day but as low at 500 mg daily.

Nicotinamide is generally better tolerated with less flushing of the skin but liver toxicity has been seen with prolonged doses above 3 grams a day.

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http://lpi.oregonstate.edu/infocenter/vitamins/niacin/

PANTOTHENATE

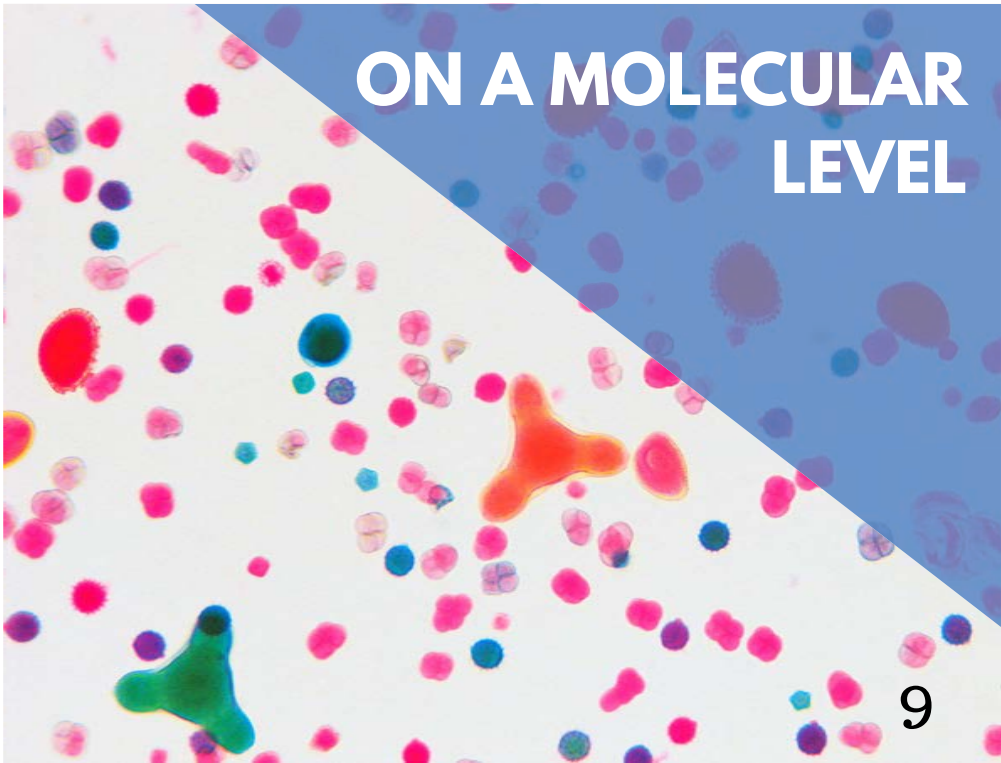
VITAMIN B5

WHY IS IT IMPORTANT?

The acyl-carrier protein requires pantothenate and is essential for making fatty acids,and myelin sheaths important in nerve conduction and the phospholipids of all cell membranes. While little known, this nutrient is essential for life.

Pantothenate has been shown to help wound healing and seems to have a cholesterol lowering effect.

Pantothenate is essential as a component of coenzyme A (CoA) - required to generate ATP (adenosine triphosphate) from food and to make cholesterol, fats and steroid hormones, acyl carrier protein, the neurotransmitter acetylcholine, the manufacture of heme for hemoglobin. It also has a role in DNA replication and transcription of messenger RNA.



ON A MOLECULAR LEVEL

SYMPTOMS OF DEFICIENCY

Deficiency is very rare as this vitamin in present in many foods.

Initial symptoms, usually associated with malnutrition, include feeling tired and listless.

- There can be numbness and tingling in the feet or a burning sensation.
- Headache, fatigue and insomnia have been reported.

If you have any of these symptoms but have a good diet, I doubt it is due to pantothenate deficiency, however if you have also been found (perhaps by micronutrient testing) to be deficient, then supplementing this nutrient might be in order.

RDA (Recommended Daily Allowance)

Usual daily dose needed for optimal function is 5 mg a day. It has been known to be well tolerated at doses up to 1200 mg daily.

Highest amounts are found in avocados, dairy, chicken, sweet potatoes, eggs, legumes, mushrooms and broccoli. There is some in sea food and meat, seeds, wheat germ, whole grains, yeast, nuts, vegetables and supplements. It seems that our intestinal bacteria also produce pantothenate.

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FOOD SOURCES

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DR. PAUL'S SUPPLEMENT RECOMMENDATIONS

(Visit wellevate.me/drpaul
to get 25% discount)

B Complex Liquid (Children)

Stress B-Complex 60 cap

Active B Complex

Disclaimer: Please check with your health care provider to see if this supplement is appropriate for you and what dose to use.