LOGANSPORT Memorial HOSPITAL

embracing your health

Nutrition 102 – Class 3

Angel Woolever, RD, CD

LOGANSPORT Memorial HOSPITAL

embracing your health

Nutrition 102

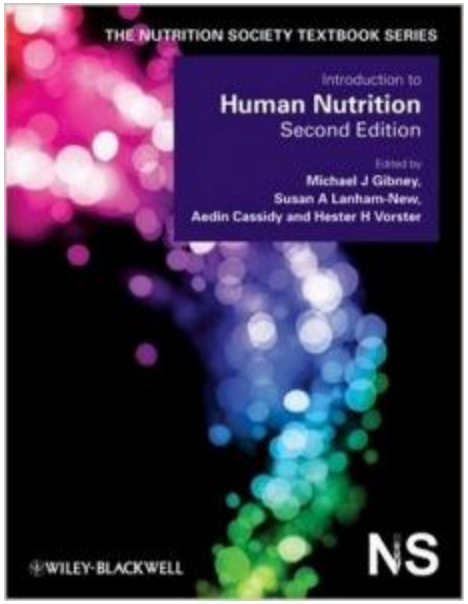
- "Introduction to Human Nutrition" second edition

  Edited by Michael J. Gibney, Susan A. Lanham-New, Aedin Cassidy, and Hester H. Vorster

  May be purchased online

  but is not required for

  the class.



LOGANSPORT Memorial HOSPITAL

embracing your health

Technical Difficulties

Contact:
Erin Deichman
574.753.1706
edeichman@logansportmemorial.org

LOGANSPORT Memorial HOSPITAL

embracing your health

Questions

- You may raise your hand and type your question.
- All questions will be answered at the end of the webinar to save time.

LOGANSPORT Memorial HOSPITAL

embracing your health

Review from Last Week

- Vitamins E, K, and C
  - What it is
  - Source
  - Function
  - Requirement
  - Absorption
    - Deficiency
    - Toxicity

- Non-essential compounds
  - Bioflavonoids: Carnitine, Choline, Inositol, Taurine, and Ubiquinone
  - Phytoceuticals

LOGANSPORT Memorial HOSPITAL
embracing your health

Priorities for Today's Session

- B Vitamins
  - What they are
  - Source
  - Function
  - Requirement
  - Absorption
    - Deficiency
    - Toxicity

LOGANSPORT Memorial HOSPITAL

embracing your health

LOGANSPORT Memorial HOSPITAL

embracing your health

What Is Vitamin B1

First B Vitamin to be discovered

THIAMINE

VITAMIN B1

LOGANSPORT Memorial HOSPITAL

embracing your health

Vitamin B1 Sources

- Pork – rich source
- Potatoes
- Whole-grain cereals
- Meat
- Fish

LOGANSPORT Memorial HOSPITAL

embracing your health

Functions of Vitamin B1

- Converts carbohydrates into glucose for energy metabolism
- Strengthens immune system
- Improves body's ability to withstand stressful conditions

LOGANSPORT Memorial HOSPITAL
embracing your health

Thiamine Requirements

Groups:	RDA (mg/day):
Infants	0.4
Children	0.7-1.2
Males	1.5
Females	1
Pregnancy	2
Lactation	2

LOGANSPORT Memorial HOSPITAL

embracing your health

Thiamine Absorption

- Absorbed in the duodenum and proximal jejunum
- Alcoholics are especially susceptible to thiamine deficiency
- Excreted in urine, diuresis, and sweat
- Little storage of thiamine in the body

LOGANSPORT Memorial HOSPITAL
embracing your health

Barriers to Thiamine Absorption

- Lost into cooking water
- Unstable to light
- Exposure to sunlight
- Destroyed by sulfites
- Polyphenols destroy thiamine

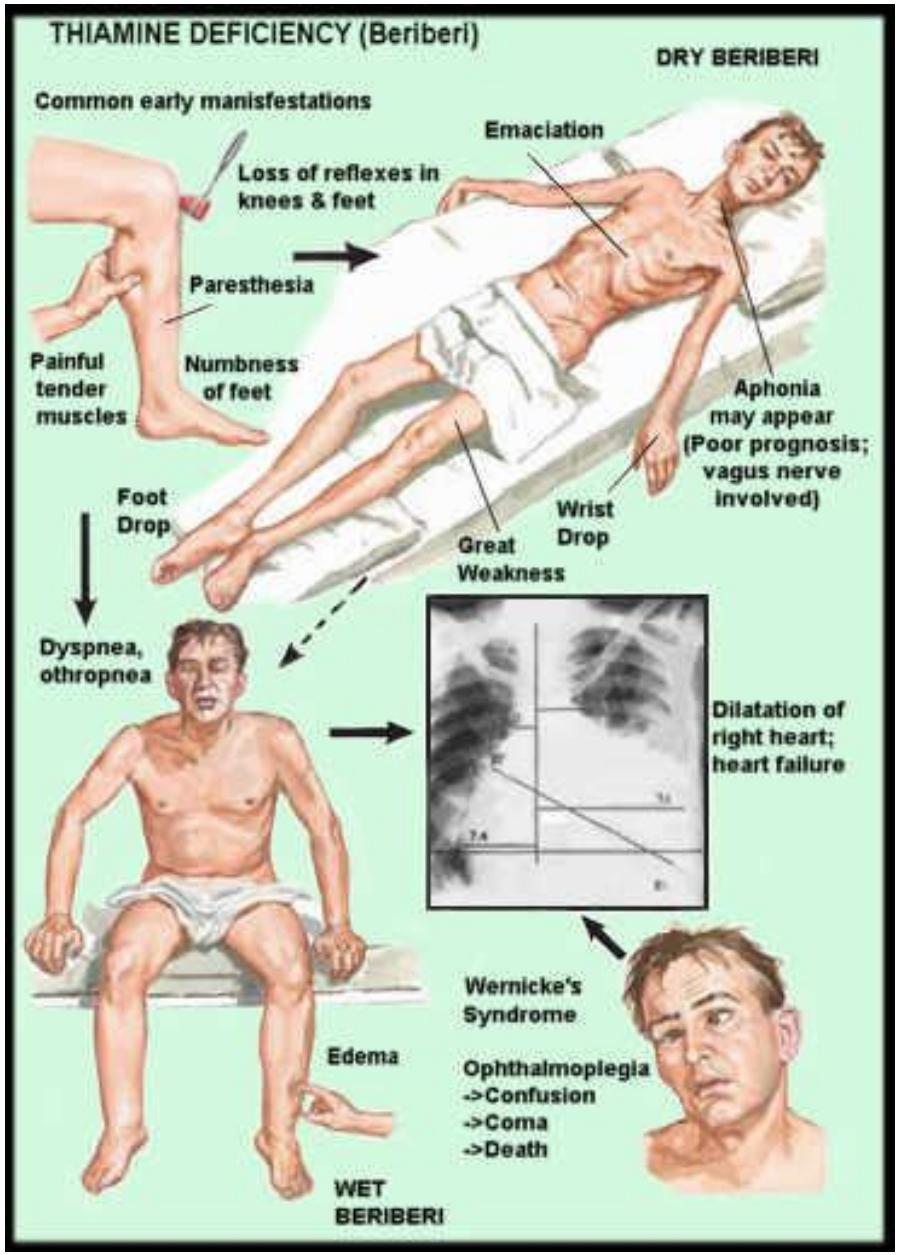
LOGANSPORT Memorial HOSPITAL
embracing your health

Thiamine Deficiency

- Chronic peripheral neuritis, beriberi
  - May not be associated with heart failure and edema
- Acute pernicious (fulminating) beriberi (shoshin beriberi)
  - Heart failure and metabolic abnormalities predominate with little evidence of peripheral neuritis
- Wernicke's encephalopathy with Korsakoff's psychosis
  - Thiamine-responsive condition associated especially with alcohol and narcotic abuse

LOGANSPORT Memorial HOSPITAL

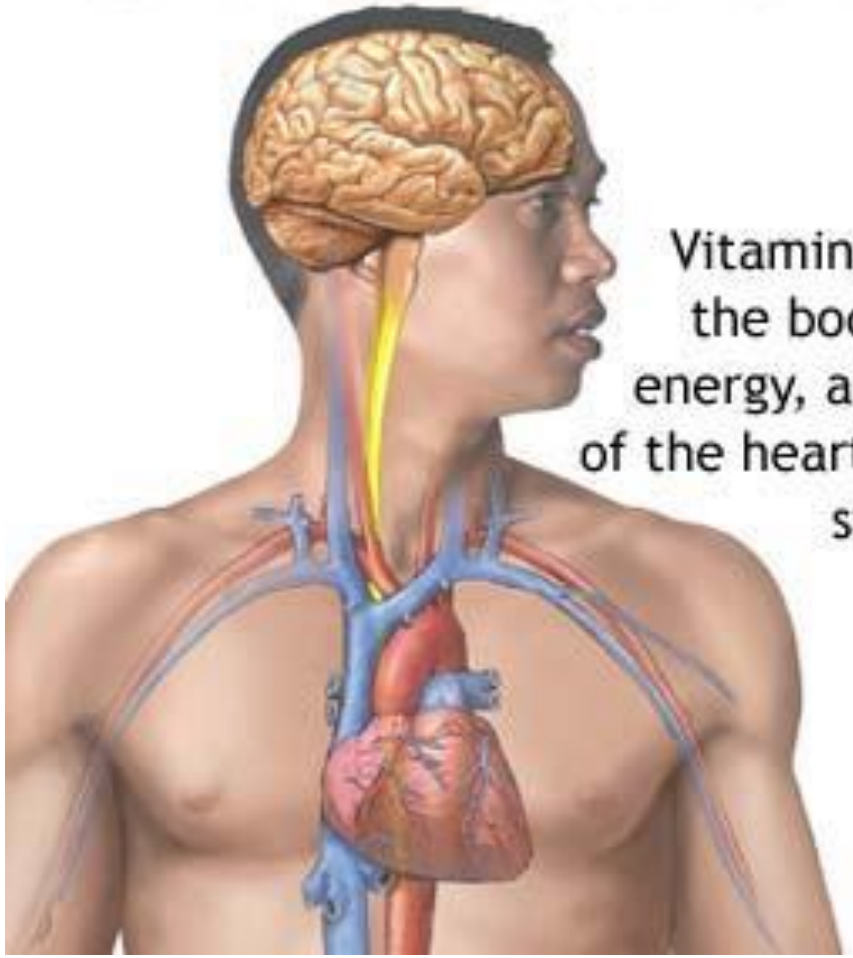
embracing your health



LOGANSPORT Memorial HOSPITAL

embracing your health

Vitamin B1



Vitamin B1(Thiamine) helps the body convert food into energy, and aids the function of the heart and cardiovascular system and the brain and nervous system

RDA: 1.5 mg

Water-soluble

A.D.A.M.

LOGANSPORT Memorial HOSPITAL

embracing your health

What Is Vitamin B2

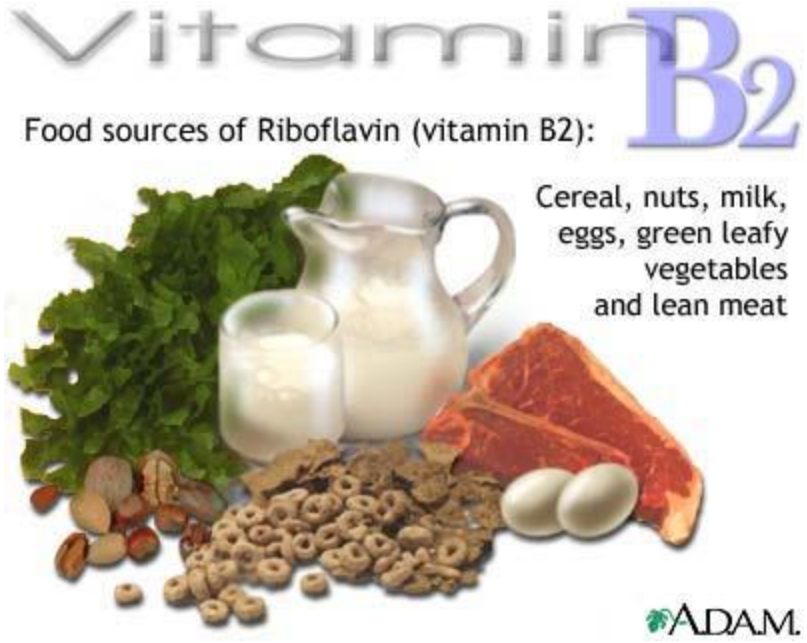
B2

Riboflavin

LOGANSPORT Memorial HOSPITAL
embracing your health

Vitamin B2 Sources

- Milk and dairy products, eggs, meat, fish
- Yellow in color and often used as a food color
- Note, exposure of milk in clear glass bottles to sunlight results in loss of riboflavin

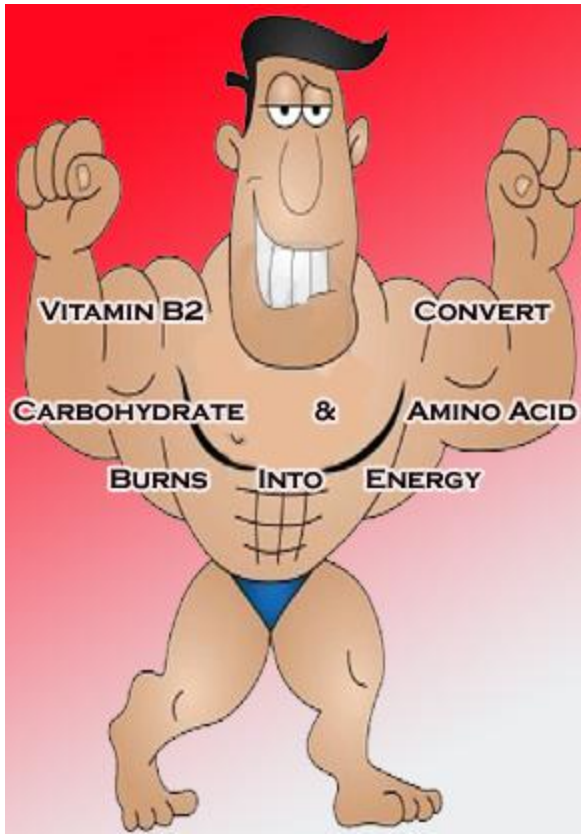


LOGANSPORT Memorial HOSPITAL

embracing your health

Riboflavin Functions

- Central role as a coenzyme in energy-yielding metabolism
- Healthy skin
- Healthy red blood cell production



LOGANSPORT Memorial HOSPITAL
embracing your health

Riboflavin Requirements

Recommended Dietary Allowance (RDA) for Riboflavin			
Life Stage	**Age**	**Males (mg/day)**	**Females (mg/day)**
Infants	0-6 months	0.3 (AI)	0.3 (AI)
Infants	7-12 months	0.4 (AI)	0.4 (AI)
Children	1-3 years	0.5	0.5
Children	4-8 years	0.6	0.6
Children	9-13 years	0.9	0.9
Adolescents	14-18 years	1.3	1.0
Adults	19 years and older	1.3	1.1
Pregnancy	all ages	-	1.4
Breast-feeding	all ages	-	1.6

LOGANSPORT Memorial HOSPITAL

embracing your health

Riboflavin Absorption

- No storage
- Absorption is limited
- Surplus intake is excreted rapidly in urine

LOGANSPORT Memorial HOSPITAL

embracing your health

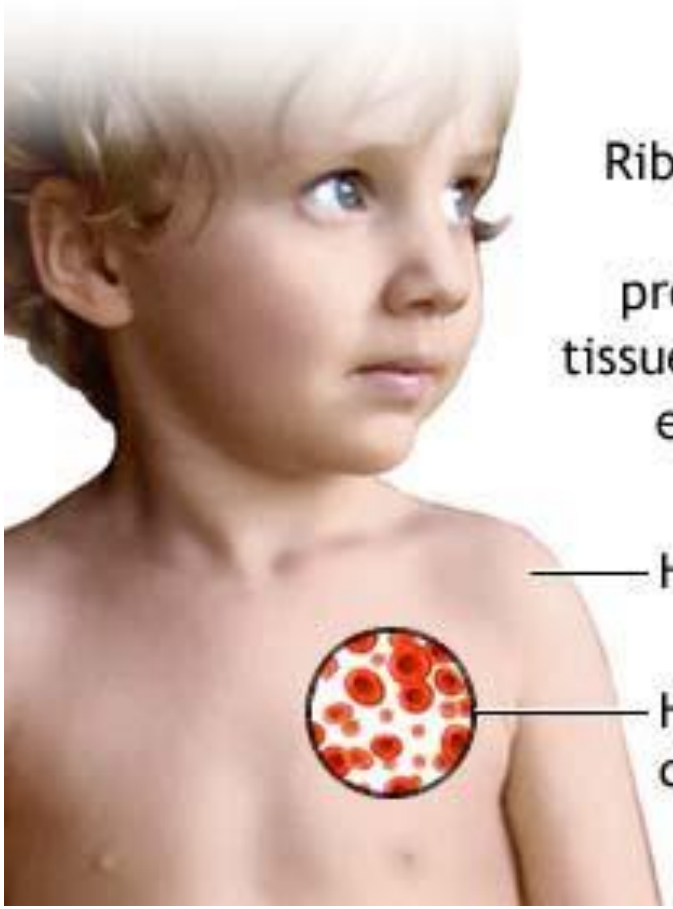
Riboflavin Deficiency

- Characterized by lesions of the lips and corners of the mouth
- Magenta tongue
- Seborrheic dermatitis
- Conjunctivitis with vascularization of the cornea and opacity of the lens
- Hypochromic anemia

LOGANSPORT Memorial HOSPITAL

embracing your health

Vitamin B2



Riboflavin (vitamin B2) works with other B vitamins to promote healthy growth and tissue repair, and helps release energy from carbohydrates

Healthy skin

RDA: 1.7 mg

Water-soluble

Healthy red blood cell production

A.D.A.M.

What Is Vitamin B3 – Niacin

- Can be synthesized from tryptophan
- Discovered during studies of pellagra
- Vitamers
  - Nicotinic Acid
  - Nicotinamide

LOGANSPORT Memorial HOSPITAL

embracing your health

Sources for Niacin

- Dairy
- Poultry
- Fish
- Lean meat
- Eggs
- Nuts

LOGANSPORT Memorial HOSPITAL

embracing your health

Niacin Functions

- Metabolism of metabolic fuels
- Hormone production
- Improves circulation
- Healthy skin, nerves and digestive system
- Healthy blood cholesterol levels

LOGANSPORT Memorial HOSPITAL
embracing your health

Niacin Recommendations

Groups:	RDA (mg/day)
Infants	8
Children	12
Males	20
Females	15
Pregnancy	17
Lactation	20

LOGANSPORT Memorial HOSPITAL
embracing your health

Niacin Deficiency - Pellagra

- Diets high in maize, lack tryptophan, preformed niacin is not biologically available
- Inability to absorb niacin or amino acid tryptophan

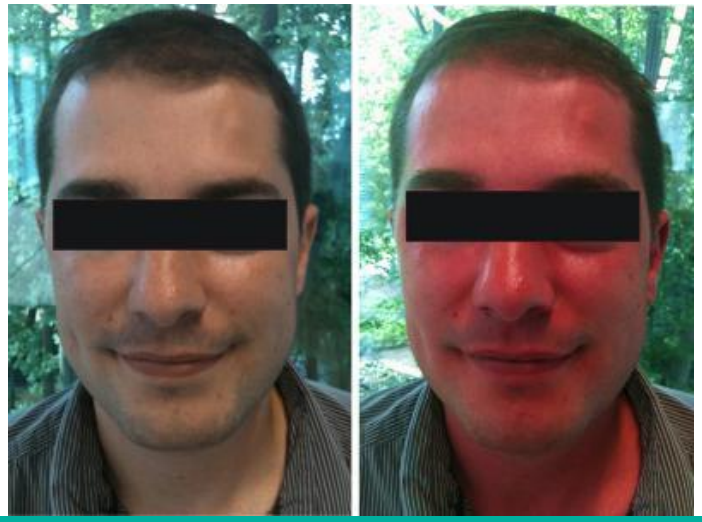
- Butterfly pattern sunburn on face
- Scaly skin
- Advanced pellagra – dementia (depressive psychosis) and diarrhea
- Untreated pellagra is fatal

LOGANSPORT Memorial HOSPITAL

embracing your health

Niacin Toxicity

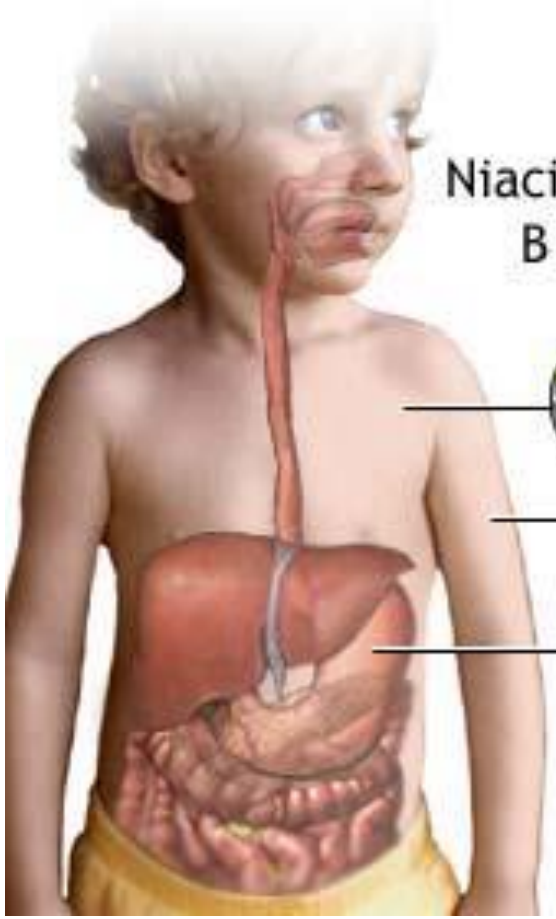
- Usually seen in treatment of hyperlipidemia
- Dilatation of blood vessels and flushing, with skin irritation, itching and a burning sensation
- >500 mg/day → liver damage →liver failure



LOGANSPORT Memorial HOSPITAL

embracing your health

Vitamin B3



Niacin (vitamin B3) works with other B vitamins to help release energy from carbohydrates

Healthy nerves

Healthy skin

Healthy digestive system

Adult RDA: 19 mg

Water-soluble

A.D.A.M.

LOGANSPORT Memorial HOSPITAL

embracing your health

What Is Vitamin B6

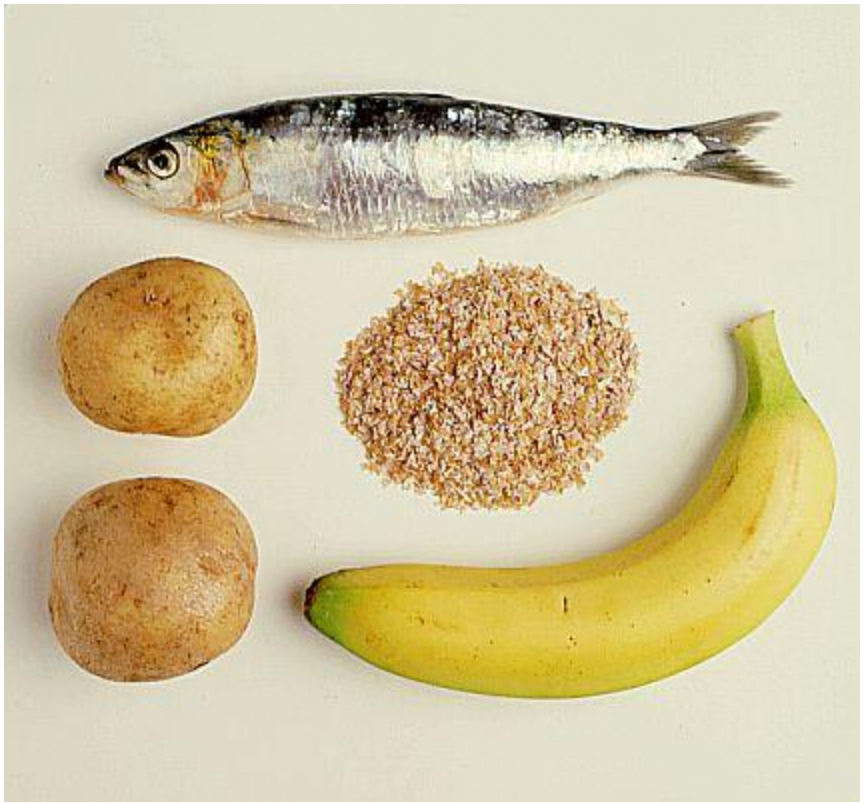
- Pyridoxine
- 6 Vitamers
  - Alcohol pyridoxine, aldehyde pyridoxal, amine pyridoxamine, and their 5'-phosphates
- Vitamers convert to pyridoxal phosphate

LOGANSPORT Memorial HOSPITAL

embracing your health

Vitamin B6 Sources

- Fish
- Beef liver and other organ meats
- Potatoes and starchy vegetables
- Non-citrus fruits



LOGANSPORT Memorial HOSPITAL

embracing your health

Vitamin B6 Functions

- Amino acid metabolism
- Regulates steroid hormones
- Helps make neurotransmitters
- Brain development and function
- Produces serotonin and norepinephrine
- Melatonin production
- Controls levels of homocysteine
- Vitamin B12 absorption

LOGANSPORT Memorial HOSPITAL
embracing your health

Possible Vitamin B6 Functions

- Reduce morning sickness
- Improve PMS symptoms
- Reduce inflammation
- Reduce symptoms of depression
- Reduce macular degeneration

LOGANSPORT Memorial HOSPITAL
embracing your health

RDA for Vitamin B6

LIFE STAGE	AMOUNT OF VITAMIN B6
Adults, 19-50 yrs old	1.3 mg/day
Men, over 50 yrs old	1.7 mg/day
Women, over 50 yrs old	1.5 mg/day
Pregnant women	1.9 mg/day
Lactating women	2.0 mg/day

mg = milligrams

LOGANSPORT Memorial HOSPITAL
embracing your health

Vitamin B6 Deficiency

- Moderate
  - Abnormal amino acid metabolism
  - Increased sensitivity of target tissues to steroid hormone action
- Severe
  - convulsions

LOGANSPORT Memorial HOSPITAL
embracing your health

Toxicity

- 50mg/kg
  - Histological damage to dorsal nerve roots
- 200mg/kg
  - Signs or peripheral neuropathy
  - Ataxia
  - Muscle weakness
  - Loss of balance

LOGANSPORT Memorial HOSPITAL

embracing your health

Vitamin B6

Vitamin B6 (pyridoxine) is important for maintaining healthy brain function, the formation of red blood cells, the breakdown of protein and the synthesis of antibodies in support of the immune system

Adult RDA: 2 mg

Water-soluble

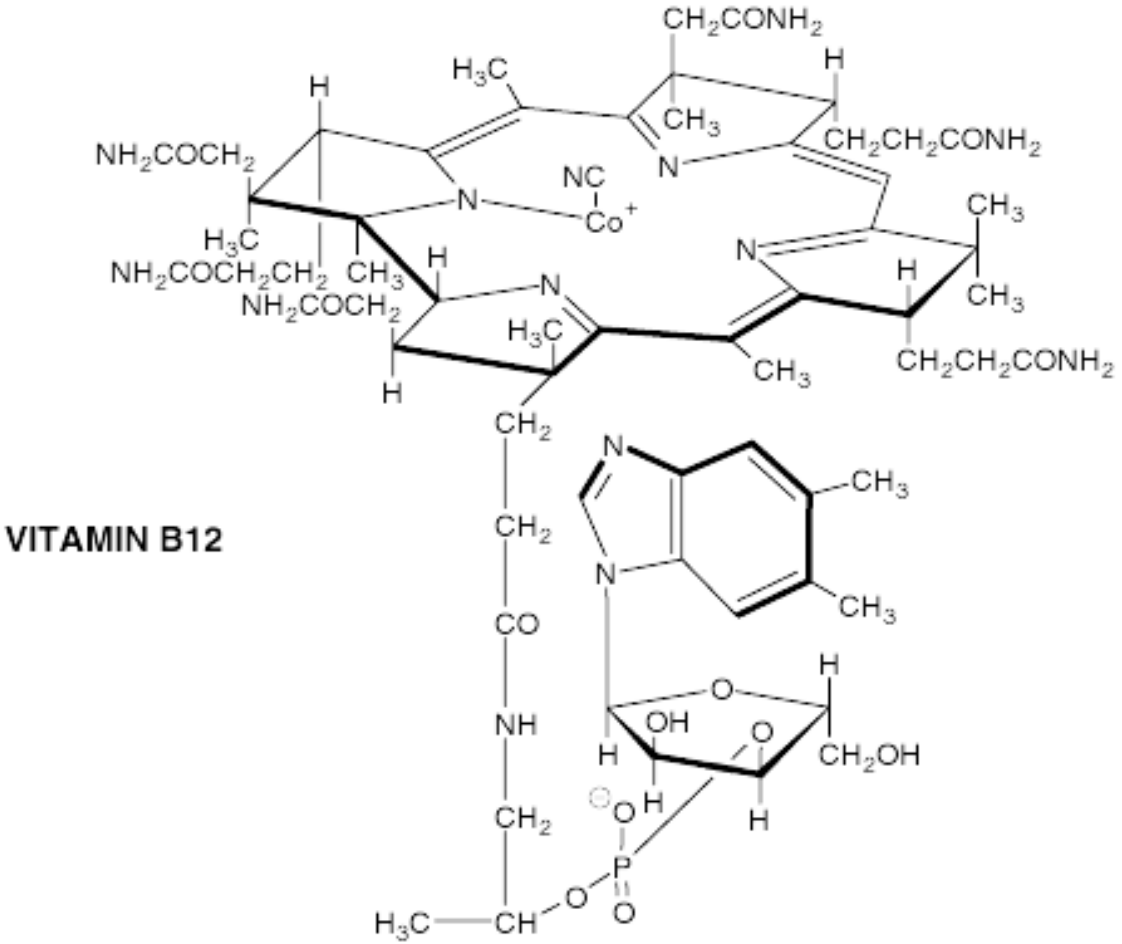
A.D.A.M.

LOGANSPORT Memorial HOSPITAL

embracing your health

What Is Vitamin B12

- Cobalamin
- Largest and most structurally complicated vitamin



LOGANSPORT Memorial HOSPITAL

embracing your health

Vitamin B12 Sources

- Clams
- Beef
- Turkey
- Oysters
- Chicken
- Salmon
- Trout
- Herring
- Crab

LOGANSPORT Memorial HOSPITAL

embracing your health

Functions of Vitamin B12

- Brain and nervous system
- Red blood cells
- Metabolism

LOGANSPORT Memorial HOSPITAL

embracing your health

RDA for Vitamin B12

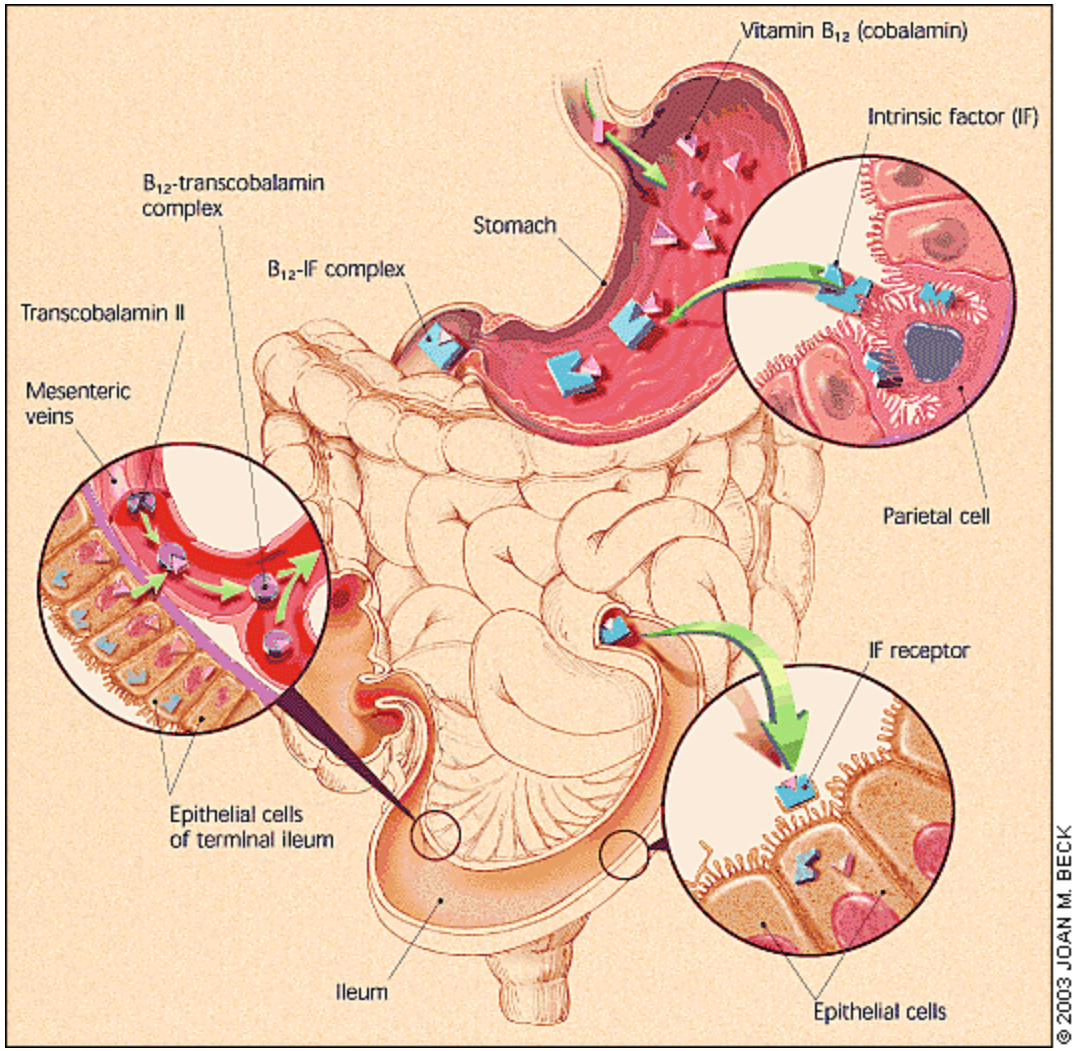
Recommended Dietary Allowance (RDA) for Vitamin B12			
Life Stage	**Age**	**Males (mcg/day)**	**Females (mcg/day)**
Infants	0-6 months	0.4 (AI)	0.4 (AI)
Infants	7-12 months	0.5 (AI)	0.5 (AI)
Children	1-3 years	0.9	0.9
Children	4-8 years	1.2	1.2
Children	9-13 years	1.8	1.8
Adolescents	14-18 years	2.4	2.4
Adults	19-50 years	2.4	2.4
Adults	51 years and older	2.4	2.4
Pregnancy	all ages	-	2.6
Breast-feeding	all ages	-	2.8

LOGANSPORT Memorial HOSPITAL

embracing your health

B12 Absorption

- Attaches to intrinsic factor
- Released by gastric acid and pepsin



LOGANSPORT Memorial HOSPITAL

embracing your health

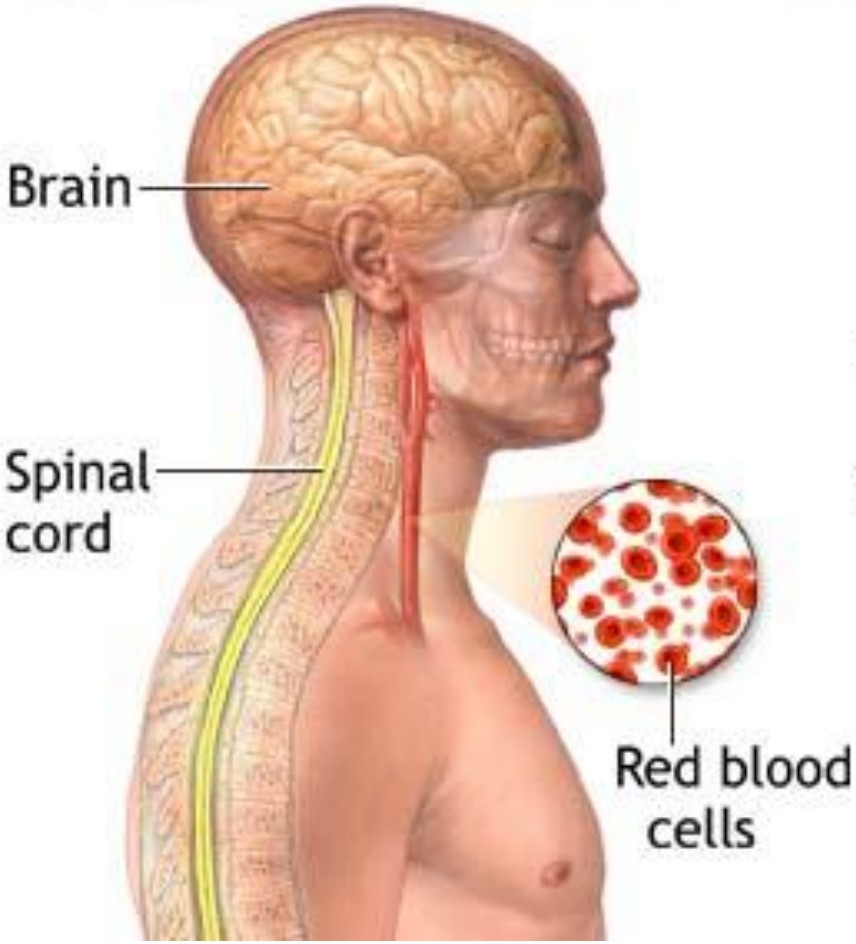
Vitamin B12 Deficiency

- Pernicious anemia
- Functional folate deficiency
- Spinal cord degeneration

LOGANSPORT Memorial HOSPITAL

embracing your health

Vitamin B12



Vitamin B12 is important for metabolism, the formation of red blood cells, and the maintenance of the central nervous system, which includes the brain and spinal cord

A.D.A.M.

LOGANSPORT Memorial HOSPITAL

embracing your health

What Is Vitamin B9

- Metabolically close to Vitamin B12

- Folic Acid
- Folate
- Folinic Acid

LOGANSPORT Memorial HOSPITAL

embracing your health

Functions of Folic Acid

- Helps tissues grow and cells work
- Prevents birth defects and anemia
- Reduces homocysteine levels
- Leucovorin Rescue

LOGANSPORT Memorial HOSPITAL

embracing your health

Folic Acid Sources

- Liver
- Fruits
- Vegetables
- Beans and legumes

LOGANSPORT Memorial HOSPITAL

embracing your health

Folic Acid Requirements

Age (years)	Males and Females (µg/day)	Pregnancy (µg/day)	Lactation (µg/day)
1-3	150	N/A	N/A
4-8	200	N/A	N/A
9-13	300	N/A	N/A
14-18	400	600	500
19+	400	600	500

LOGANSPORT Memorial HOSPITAL
embracing your health

Folate Deficiency:

- Megaloblastic Anemia
- Spina bifida in pregnancy
- Associated with some drugs

folic acid *for a* healthy pregnancy
march of dimes

LOGANSPORT Memorial HOSPITAL

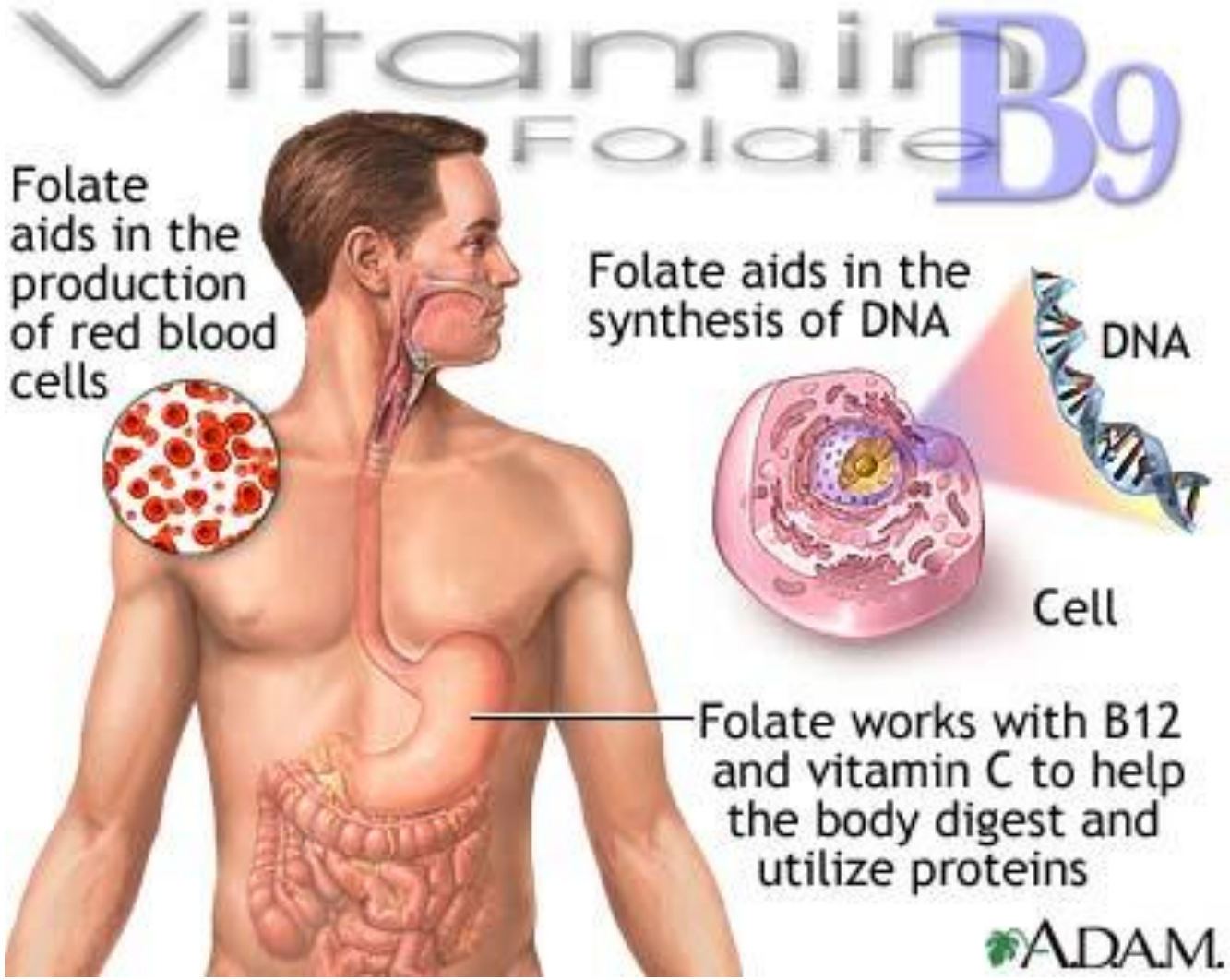
embracing your health

Folate Toxicity

- >400 mcg/day may impair zinc absorption
- irreversible nerve damage
- >1000 ug/day may increase in the frequency of epileptic attacks

LOGANSPORT Memorial HOSPITAL

embracing your health



LOGANSPORT Memorial HOSPITAL

embracing your health

What Is Vitamin B7

- Biotin
- Vitamin H

LOGANSPORT Memorial HOSPITAL

embracing your health

Functions of Biotin

- Healthy skin, hair, and nails
- Nervous system
- Metabolism
- Blood sugar control

LOGANSPORT Memorial HOSPITAL

embracing your health

Biotin Sources

- Brewer's yeast
- Cooked eggs
- Nuts
- Sardines
- Legumes
- Whole grains
- Bananas
- Soybeans
- Intestinal bacteria

LOGANSPORT Memorial HOSPITAL
embracing your health

Biotin Requirements

AGE/GROUP	ADEQUATE INTAKE (AI)
infants 0-12 months	7 mcg*
children	
1-3 yrs	8 mcg
4-8 yrs	12 mcg
9-13 yrs	20 mcg
adolescents 14-18 yrs	25 mcg
adults over 18	30 mcg
pregnant women	30 mcg
breast-feeding women	35 mcg

* mcg - microgram (1/1000 mg):

LOGANSPORT Memorial HOSPITAL

embracing your health

Biotin Deficiency

- Fine scaly dermatitis and hair loss
- Absences of sebaceous glands
- Atrophy of hair follicles
- Hyperglycemia

LOGANSPORT Memorial HOSPITAL

embracing your health

Toxicity

No reported cases

LOGANSPORT Memorial HOSPITAL

embracing your health

Biotin Review

Vitamin B7 (Biotin/Vitamin H) Explained

- *Vitamin B7 (Also Known As Biotin Or Vitamin H) Was Discovered In 1940 By Vincent Du Vigneaud*

- *Vitamin B7's Main Role Is To Help Your Body's Cells Break Down Carbohydrates & Use Them For Energy*

- *Vitamin B7 Can Be Sourced From Egg Yolks, Liver, Milk, Mushrooms & Nuts*

- *The RDA For Vitamin B7 Is 0.03mg For Men & 0.01mg For Women*

LOGANSPORT Memorial HOSPITAL

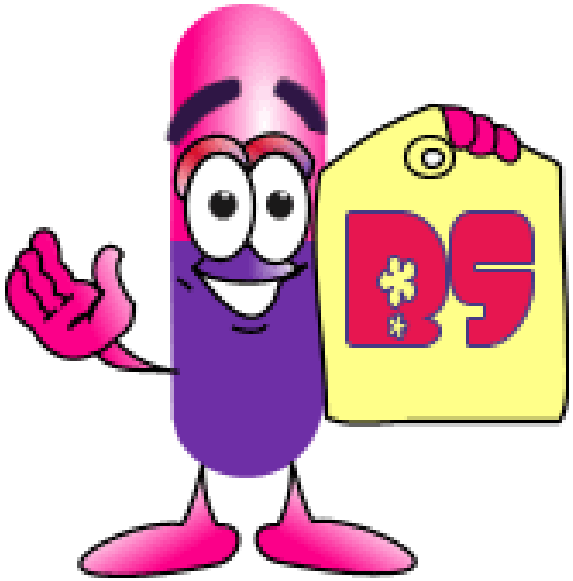
embracing your health

Pantothenic Acid – Vitamin B5

LOGANSPORT Memorial HOSPITAL
embracing your health

Pantothenic Acid Functions

- Synthesize coenzyme A
- Synthesize and metabolize carbohydrates, proteins, and fats
- Improves cholesterol levels
- Enhances wound healing
- May help with symptoms of rheumatoid arthritis



LOGANSPORT Memorial HOSPITAL

embracing your health

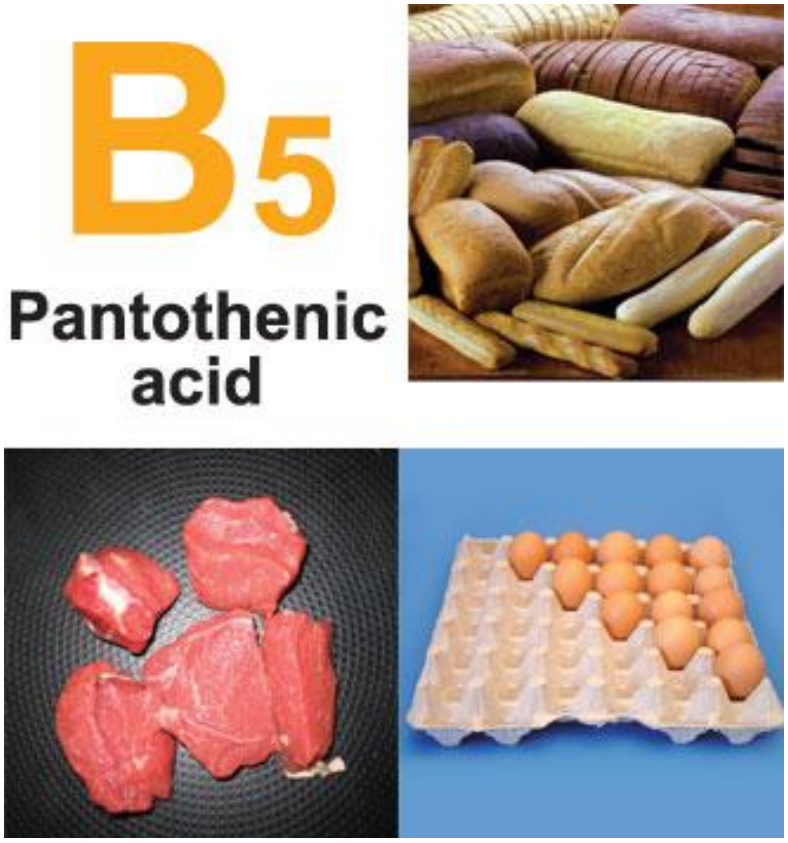
Pantothenic Acid Sources

Name derives from the Greek for “from everywhere”

LOGANSPORT Memorial HOSPITAL
embracing your health

Pantothenic Acid Requirements

3-7 mg/day



LOGANSPORT Memorial HOSPITAL

embracing your health

Pantothenic Acid Deficiency

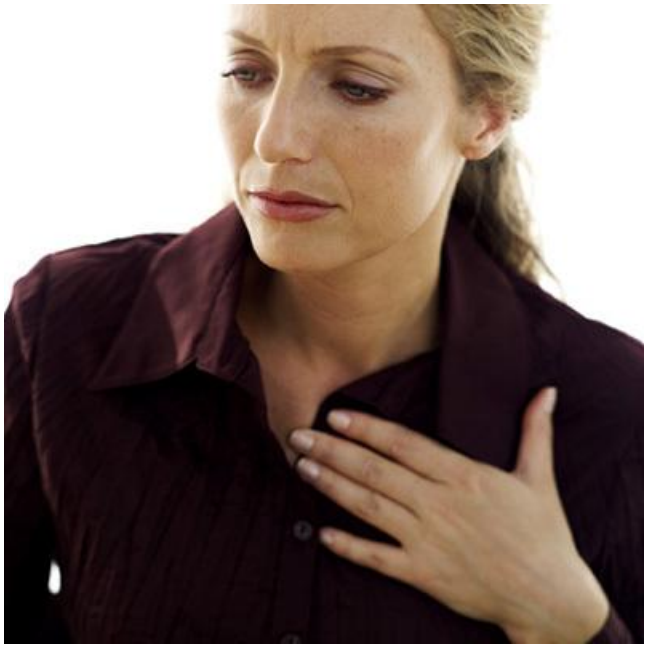
- Rare except in case of severely malnourished

LOGANSPORT Memorial HOSPITAL

embracing your health

Toxicity

- 10-12 g/day – diarrhea
- 1200 mg/day – nausea and heartburn



LOGANSPORT Memorial HOSPITAL

embracing your health

Pantothenic acid

Function

Essential component of Coenzyme A , a key element in aerobic energy production (krebs cycle).

Used for energy release from the macronutrients, synthesis of fat, formation of heme (needed for red blood cells), and synthesis of cholesterol and neurotransmitters

Natural sources

widespread in foods

Results of deficiency

not seen unless induced

Overdose

not a problem

LOGANSPORT Memorial HOSPITAL
embracing your health

Priorities for Today's Session

- B Vitamins
  - What they are
  - Source
  - Function
  - Requirement
  - Absorption
    - Deficiency
    - Toxicity

LOGANSPORT Memorial HOSPITAL

embracing your health

Questions, Comments

LOGANSPORT Memorial HOSPITAL

embracing your health

Nutrition 102 – Class 3

Angel Woolever, RD, CD
(574) 753-1462
dietitian@logansportmemorial.org