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Nutrition 102 – Class 2

Angel Woolever, RD, CD

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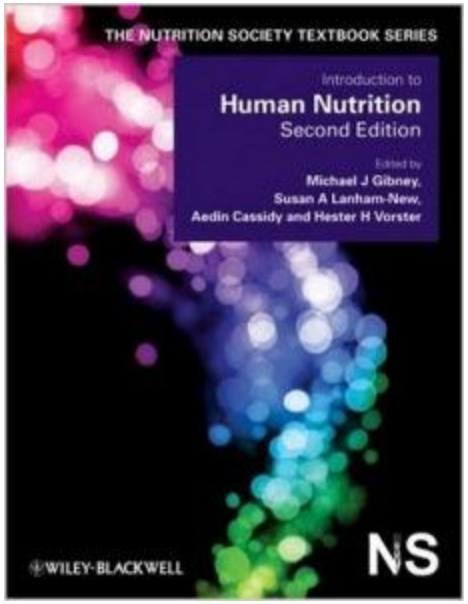
Nutrition 102

- "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.



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Technical Difficulties

Contact:
Erin Deichman
574.753.1706
edeichman@logansportmemorial.org

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Questions

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

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Priorities for Today's Session

- 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

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Vitamin E

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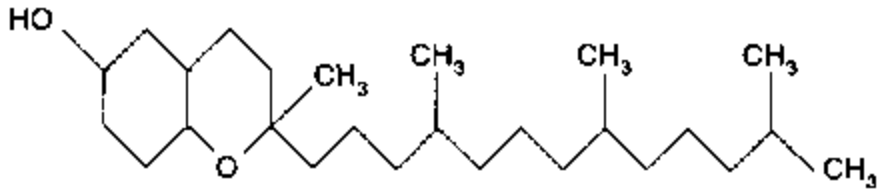
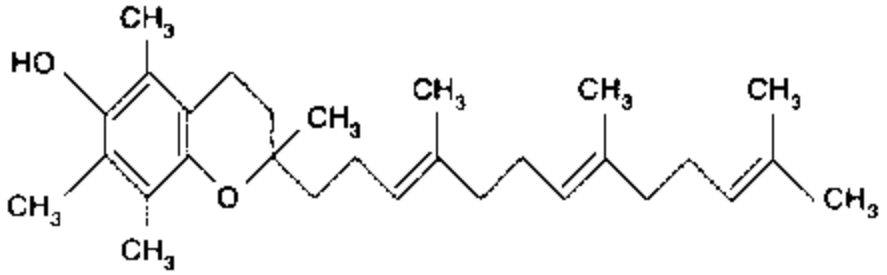
What is Vitamin E

- Vitamers
  - Tocopherols
  - Tocotrienols



Tocopherol



Tocotrienol

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Sources of Vitamin E

- Vegetable oils
- Nuts and seeds
- Fish
- Most green leafy vegetables

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Functions of Vitamin E

- No physiological function has been defined
- Antioxidant
- Anticoagulant
- Lower incidence of cardiovascular disease

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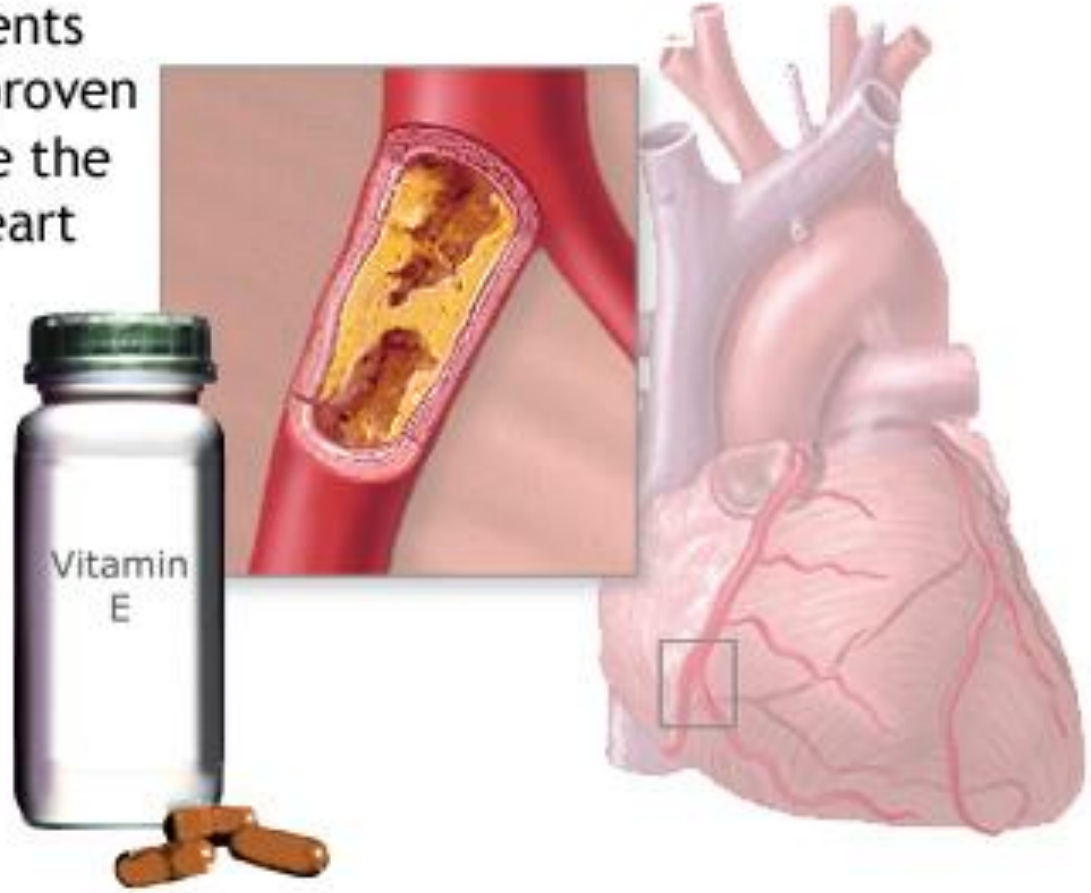
Vitamin E supplements are not proven to reduce the risk of heart disease



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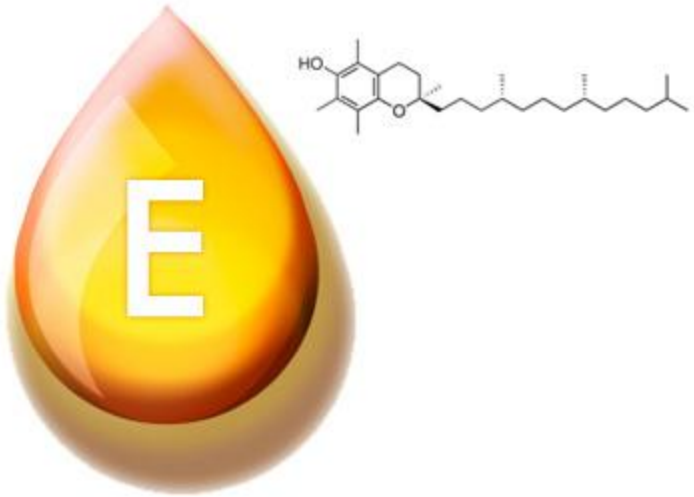
Vitamin E Requirements

- Acceptable intake is 0.4mg a-tocopherol equivalent/g dietary PUFA
- 17-40 mg/day from diet provides the most benefits
- RDA is 10 mg/day



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Adequate Intake for Vitamin E

Age	Males	Females	Pregnancy	Lactation
Birth to 6 months*	4 mg (6 IU)	4 mg (6 IU)		
7-12 months*	5 mg (7.5 IU)	5 mg (7.5 IU)		
1-3 years	6 mg (9 IU)	6 mg (9 IU)		
4-8 years	7 mg (10.4 IU)	7 mg (10.4 IU)		
9-13 years	11 mg (16.4 IU)	11 mg (16.4 IU)		
14+ years	15 mg (22.4 IU)	15 mg (22.4 IU)	15 mg (22.4 IU)	19 mg (28.4 IU)

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Vitamin E Deficiency

- Unknown
- Inability to absorb the vitamin can lead to severe damage to nerve and muscle membranes
- Hemolytic anemia

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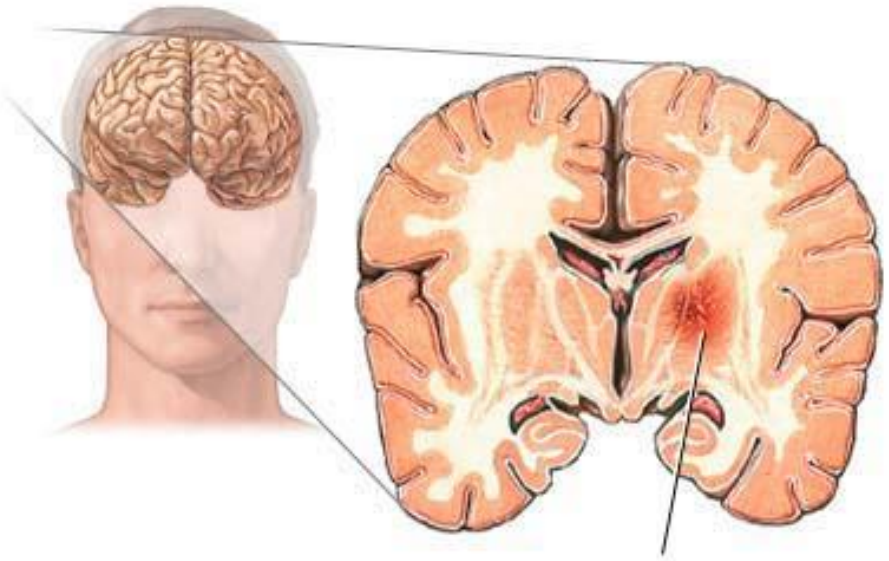
Vitamin E Toxicity

- Risk of bleeding problems
- Hemorrhaging
- Vitamin K deficiency



Intracerebral hemorrhage

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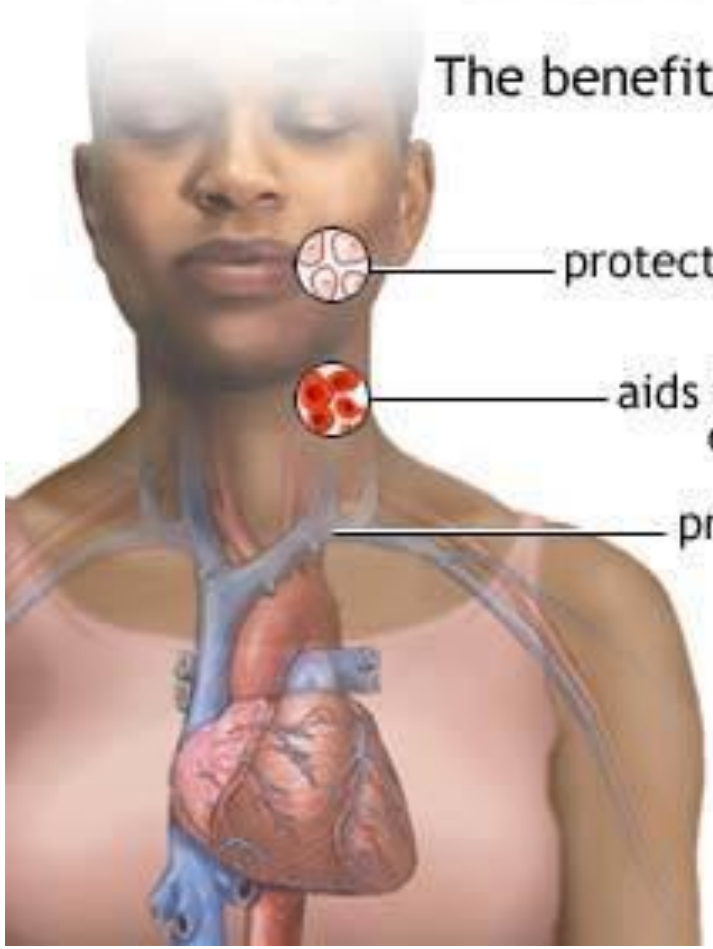
Vitamin E



The benefits of vitamin E:

- protects cell membranes and tissues from damage by oxidation
- aids in the formation of red blood cells and the use of vitamin K
- promotes function of a healthy circulatory system

Adult RDA: 10 mg α-TE

Fat-soluble

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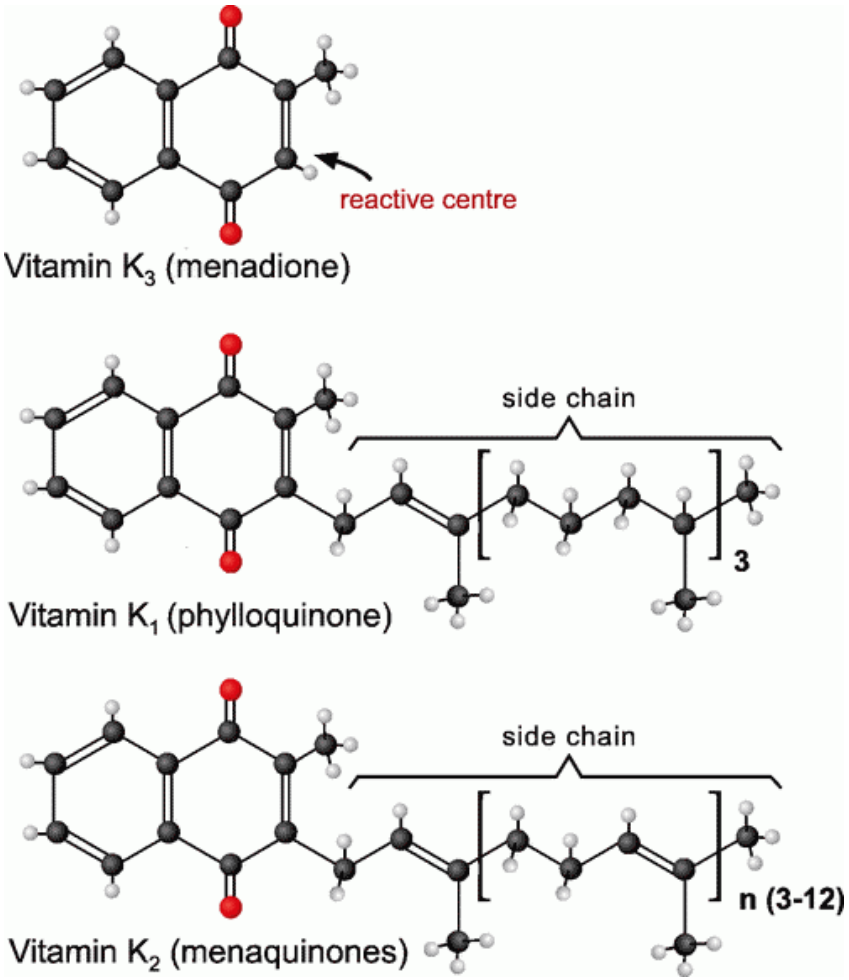
K

Phylloquinone

What Is Vitamin K

- Vitamers
  - Phylloquinone – K1
    normal dietary source
  - Menaquinones – K2
  - Menadiones – K3



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Vitamin K Sources

- All green leafy vegetables
- Spring (collard) greens
- Spinach
- Brussels sprouts
- Soybean, rapeseed, cottonseed, and olive oils

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Vitamin K Function

- Required for blood clotting
- Supports healthy bones

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Vitamin K Requirements

- Based on determination of clotting time, and direct measurement of prothrombin and preprothrombin
- 1 mcg/kg body weight per day
- 65-80 mcg/ day for adults

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Adequate Intake of Vitamin K

Groups	RDA (mcg/day)
Infants	2 - 2.5
Children	30 - 75
Males	120
Females	90
Pregnancy	75 - 90
Lactation	75 - 90

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Vitamin K Deficiency

- Rare
- Hemorrhaging in infants
- Bleeding and bruising in adults

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Toxicity

- No evidence that phylloquinone has any significant toxicity
- Those being treated with warfarin and consuming vitamin supplements with vitamin K and then stop taking the supplements are at a great risk for hemorrhage

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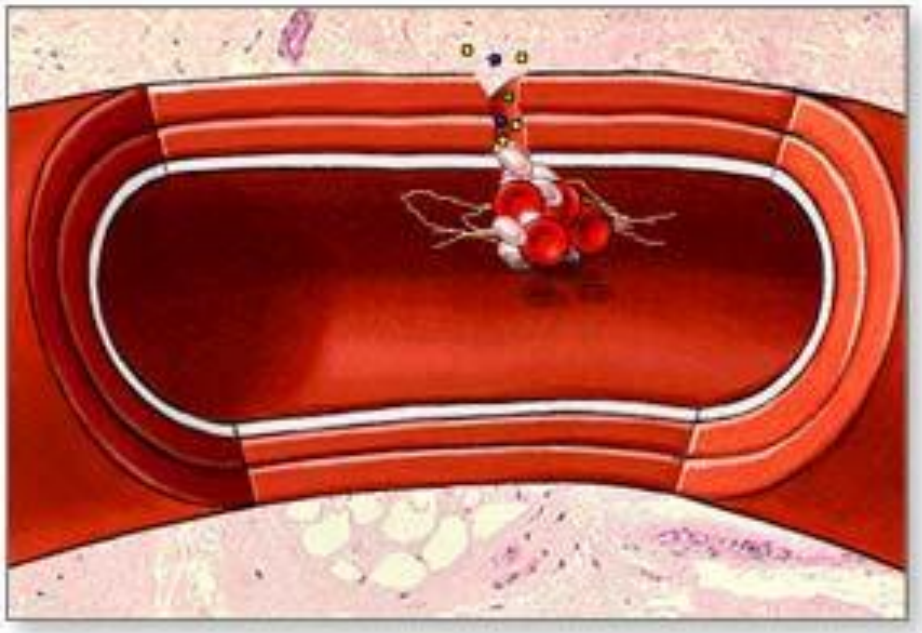
Vitamin K

Vitamin K benefits blood clotting



Adult RDA:
70 µg

Fat-soluble

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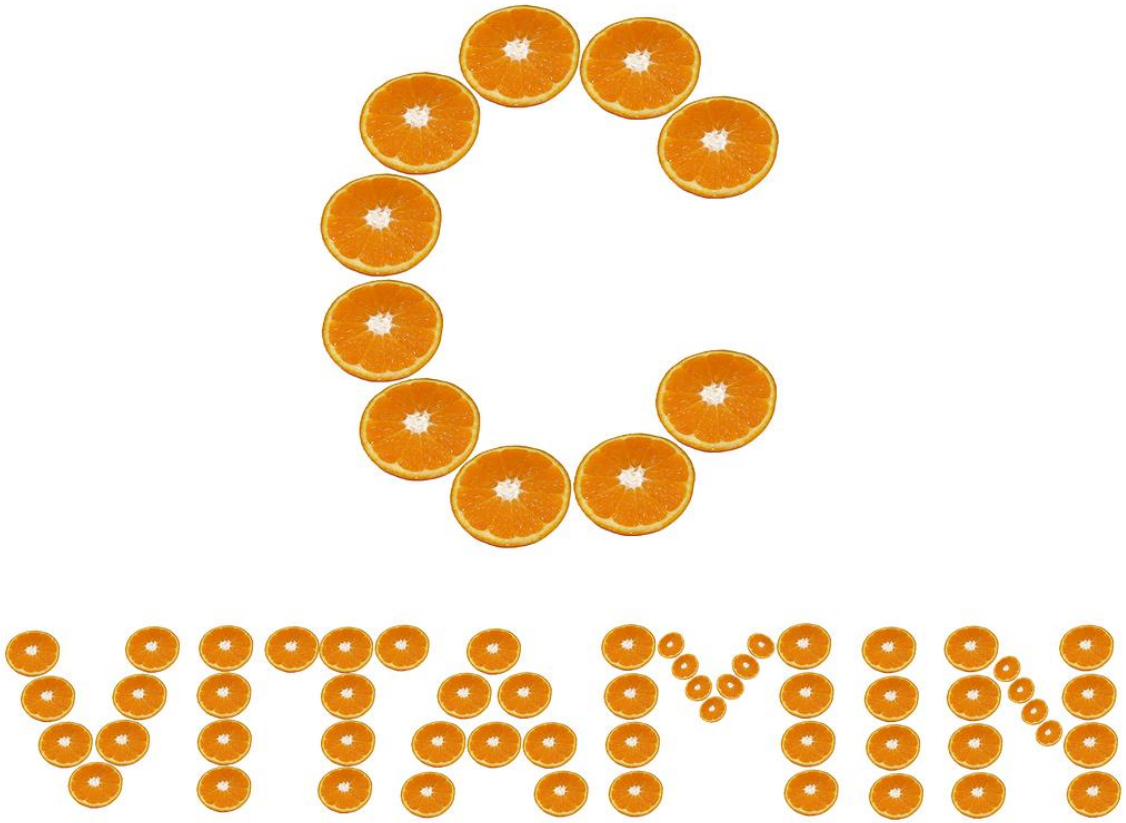

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What Is Vitamin C

- Ascorbic Acid
- Ascorbate
- Water soluble
- Essential nutrient for humans

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Vitamin C Sources

- Kiwi
- Grapefruit
- Orange
- Papaya
- Pummelo
- Strawberries
- Broccoli
- Bell Peppers
- Brussels Sprouts
- Cauliflower
- Hot Chili Peppers
- Mustard Greens

Significant amounts of Vitamin C are lost as vegetables wilt or when they are cut. Vitamin C is also lost in cooking and when foods are left to stand before serving.

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Functions of Vitamin C

- Antioxidant
- Synthesis of collagen
- Aids in absorption of iron
- Spares vitamin E
- Prevents formation of nitrosamines
- Aids in wound healing
- Natural antihistamine
- Reduced all cause mortality
- Immune system
- Reduce duration of cold symptoms?

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Vitamin C Requirements

Recommended Dietary Allowance for Vitamin C		
Age	Male	Female
1-3 years	15 mg	15 mg
4-8 years	25 mg	25 mg
9-13 years	45 mg	45 mg
14-18 years	75 mg	65 mg
19 years and above	90 mg	75 mg
Pregnant		
18 years		80 mg
19 years and above		85 mg
Lactating		
18 years		115 mg
19 years and above		120 mg

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Vitamin C Deficiency

- Anemia
- Bleeding gums
- Decreased ability to fight infection
- Decreased wound-healing rate
- Dry and splitting hair
- Easy bruising
- Gingivitis (inflammation of the gums)
- Nosebleeds
- Possible weight gain because of slowed metabolism
- Rough, dry, scaly skin
- Swollen and painful joints
- Weakened tooth enamel

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Scurvy

Scurvy – used to be common at the end of winter

- Initial
  - Malaise and lethargy
  - Spots on skin
  - Spongy gums
  - Pale and depressed
  - Plugging of hair follicles
- Advanced
  - Open wounds
  - Loss of teeth
  - Jaundice
  - Fever neuropathy
  - Death
  - Intense bone pain

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Vitamin C Toxicity

- Diarrhea and intestinal discomfort
- Increased cardiovascular mortality with vitamin c supplements in diabetics
- Not a risk factor for renal stone formation

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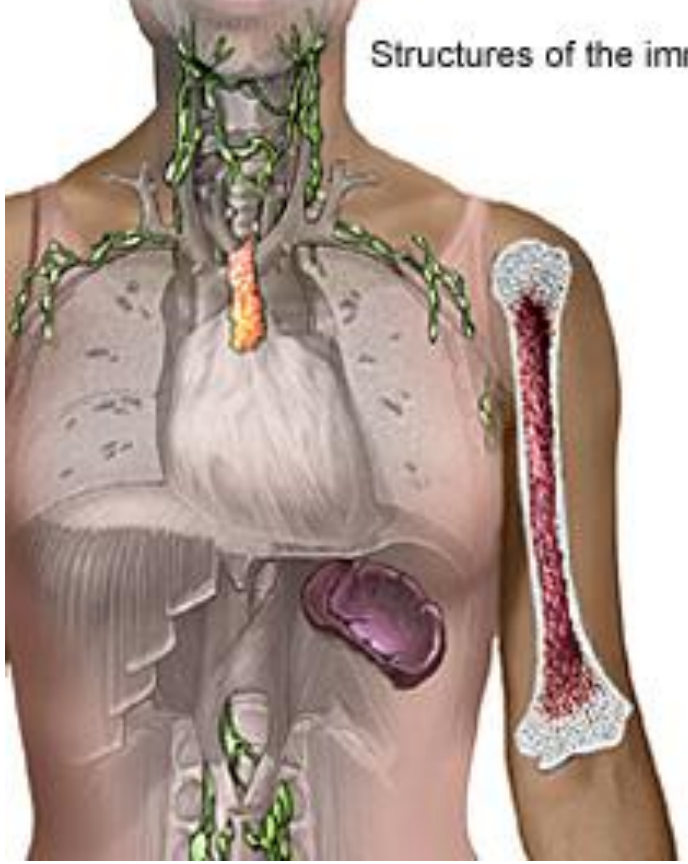
Vitamin C



Vitamin C promotes a healthy immune system, helps wounds heal, maintains blood vessels and connective tissue and aids in the absorption of iron

RDA: 60 mg

Water-soluble

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Bioflavonoids

- Biologically active
- Most fruits and vegetables have large amounts
- Not dietary essentials
- Antioxidant actions
- Intake is inversely related with mortality from coronary heart disease

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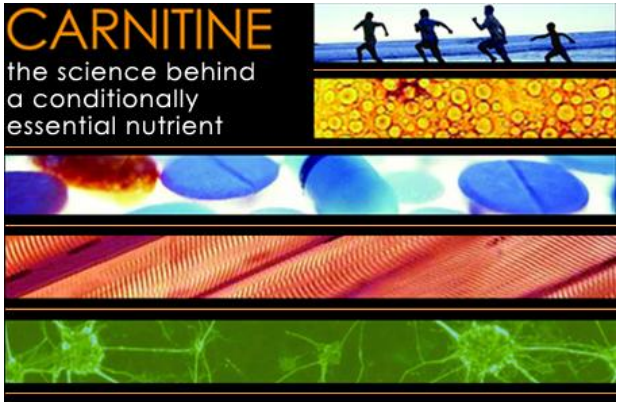
Carnitine

- Central role in the transport of fatty acids across the mitochondrial membrane
- Required for premature infants
- Increases physical work capacity
- Found in meat, especially red meat, vegetables and grains



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Choline

- Important as a base in phospholipids
- No evidence it is a dietary essential for humans
- Eggs and fatty meat are good sources
- Prevents fatty liver

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Inositol

- Found in many foods, cantaloupe and oranges
- Used for diabetic nerve pain, panic disorder, high cholesterol, insomnia, depression, schizophrenia, Alzheimer's, ADHD, autism, promoting hair growth and psoriasis
- Used for PCOS, high blood pressure, high triglycerides, and high levels of testosterone

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Taurine

- Amino acid, best sources are meat and fish
- Improves function of left ventricle
- Lowers blood pressure and calms the sympathetic nervous system
- May improve athletic performance
- Supports neurological development
- Helps regulate water and mineral salts in blood
- Antioxidant properties

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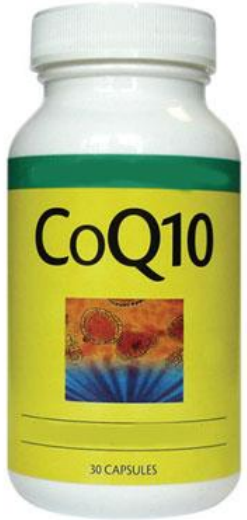
Coenzyme Q10

- "Vitamin Q" – Ubiquinone
- Maintains healthy cardiovascular system
- May help those with migraines
- Lowers blood pressure
- Treating gum disease
- Blood glucose control
- Has not been FDA approved to treat any diseases
- Richest sources are meat and fish



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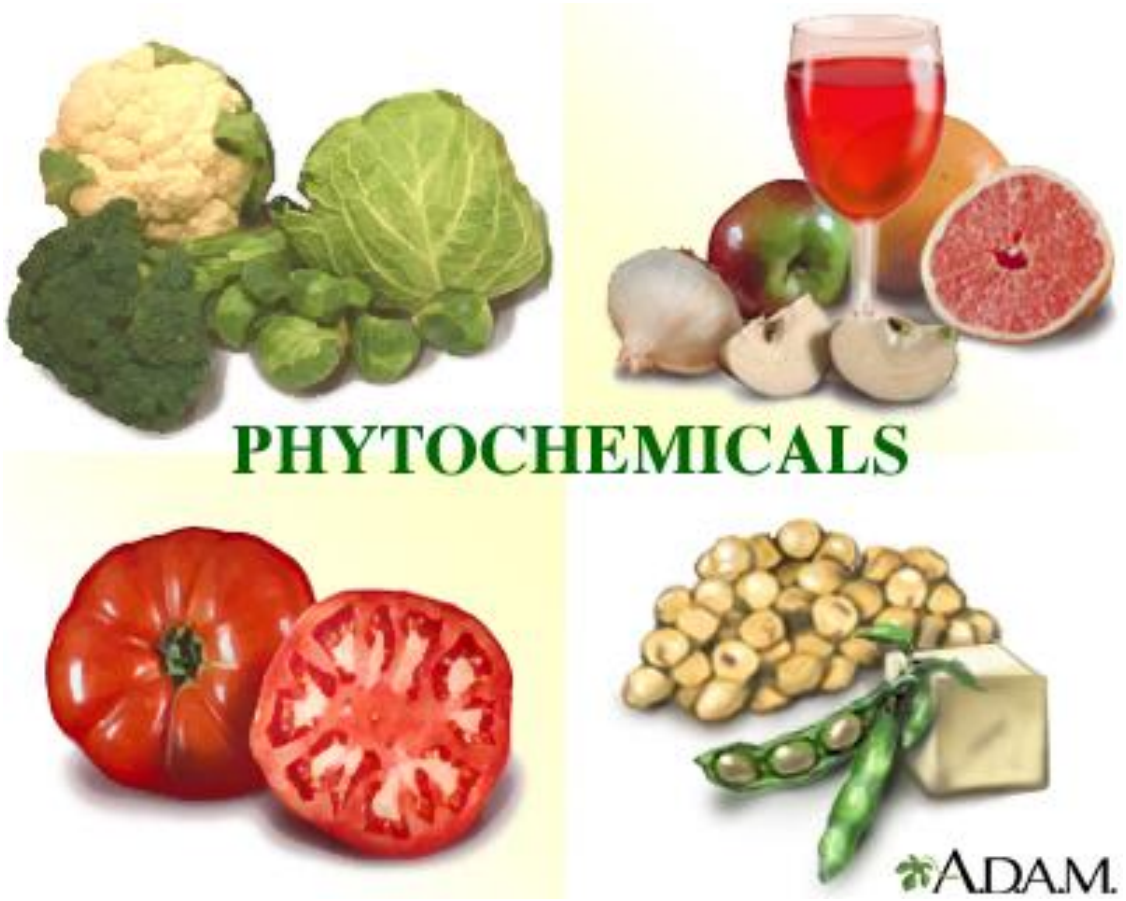
Phytoceuticals

Substances of plant origin with potential pharmaceutical action



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Phytochemicals

- Carotenoids
- Chlorophyll
- Curcumin
- Fiber
- Flavonoids
- Garlic
- Indol-3-Carbinol
- Isothiocyanates
- Lignans
- Phytosterols
- Resveratrol
- Soy Isoflavones

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Priorities for Today's Session

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  - What it is
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  - Requirement
  - Absorption
    - Deficiency
    - Toxicity

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

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Questions, Comments

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