



Vitamins

Presented by
Fred Hardinge, DrPH, RD
It Is Written



What are vitamins?

- * “A vitamin is an organic molecule that is not synthesized (manufactured) in the body and occurs in small amounts in food, and is required to sustain the normal metabolic processes of life.”
- * They are organic chemicals, vital to the support of optimal health and the prevention of deficiency diseases.
- * Vitamins do not yield energy - they act like catalyst.





How vitamins are formed

* Most vitamins are formed by plants with some notable exceptions:

- Vitamin D is formed in the body by the action of the sun on the skin.
- Vitamin B12 is formed by bacteria in the soil and the intestinal tract of animals.



Fat Soluble Vitamins



* **Vitamin A**

- Plants--Beta-carotene
- Animals--Retinol

* **Vitamin D**

- Plant --calciferol- Plant form-ergocaliferol
- Animal form- cholecalciferol

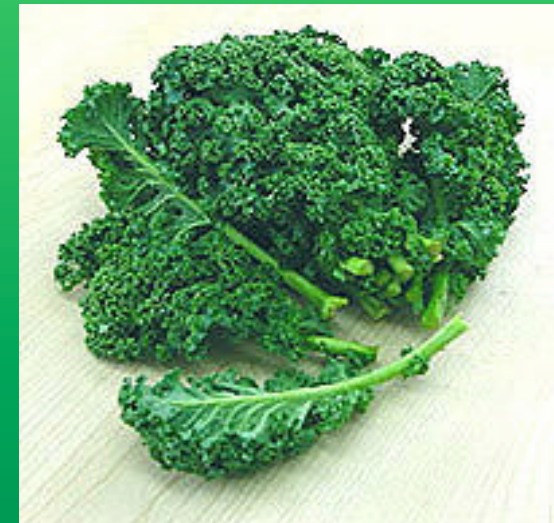
* **Vitamin E- tocopherol**

* **Vitamin K**



Vitamin A

- * Function: Promoting vision-helps maintain cornea and retina health, Promoting and maintaining healthy skin and cells- helps maintain health of epithelial cell-mucous membranes, supports growth and reproduction.
- * Deficiencies: Night and total blindness, increased infections, limits absorption of nutrients in stomach, suppress immune system.





Sources and Recommendations of Vitamin A (Retinol Equivalents in Mcg-RAE)

- * Pumpkin ½ c.-1000 RAE
- * Beef liver (3.5 oz)1000 RAE
- * Carrots ½ c. 750 RAE
- * Sweet potato ½ c. 500 RAE
- * Butternut squash ½ c. 400 RAE
- * Mango (one) 400 RAE
- * Turnip green ½ c. 325 RAE

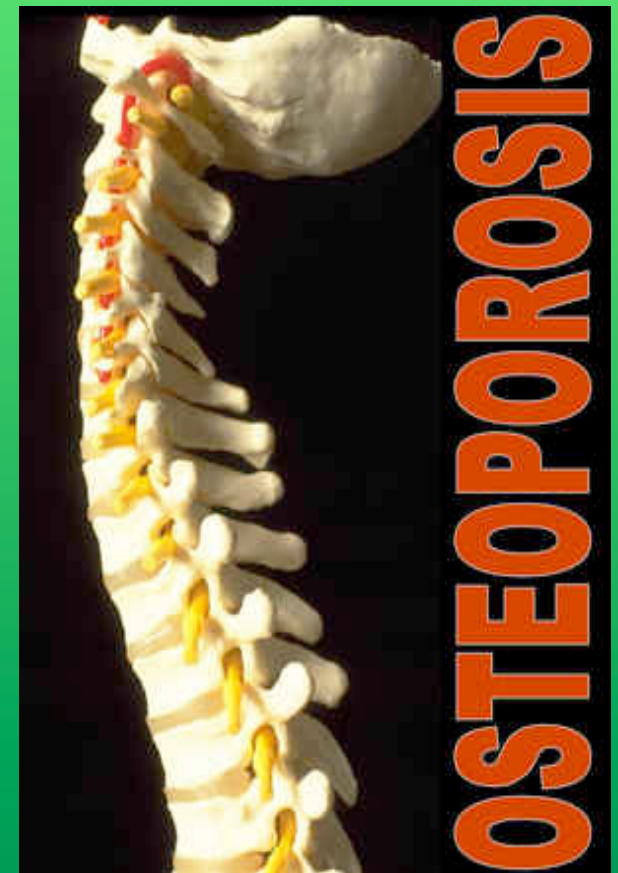
- * **Recommendations:** Adults 1000 to 3000 RAE





Vitamin D- the Sunshine Vitamin

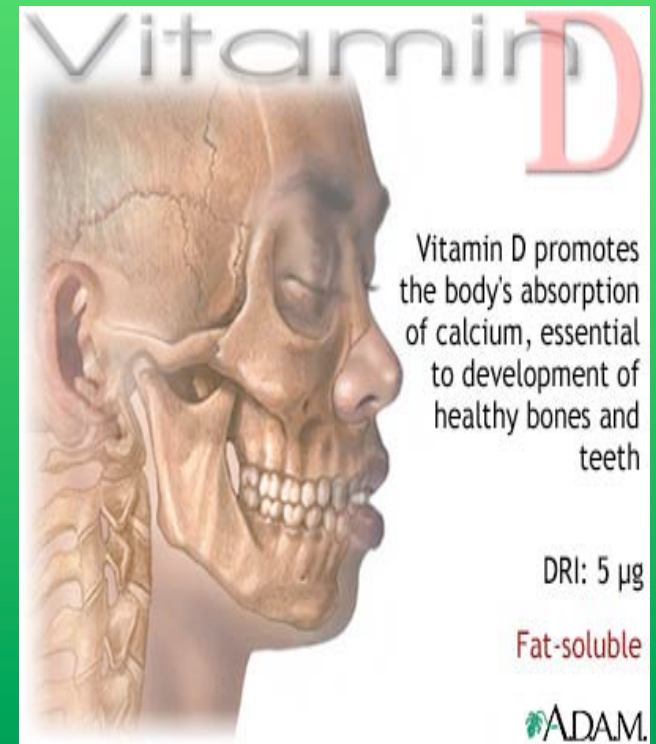
- * Function: Mineralization of the bones by increasing absorption of calcium and phosphorus from the small intestines.
- * Deficiencies: increased calcium excretion, osteomalacia-painful and soft bones, rickets deformities,
- * Risks of fractures-Osteoporosis,
- * Decrease in the intestinal absorption of calcium and phosphorus.





Vitamin D Protection

- * Cancer - Vitamin D has been found to inhibit proliferation of cancerous cell division. ACS
- * There is a positive correlation between low intakes of Vitamin D and Colon, Prostate, Breast and Colorectal cancer.
- * Without adequate D, calcium is not absorbed.





Vitamin D Sources

- * Cholecalciferol D 3 is produced in the skin after exposure to the sun.
- * Ergocalciferol D 2 is made by irradiating and purifying extracted yeast.
- * The Vitamin D Epidemic and its Health Consequences Michael Holick





Factors Effecting Vitamin

- * 1. Inadequate exposure to sun
- * 2. Aging
- * 3. Obesity
- * 4. Increased skin pigmentation
- * 5. Sunscreens
- * 6. Malabsorption



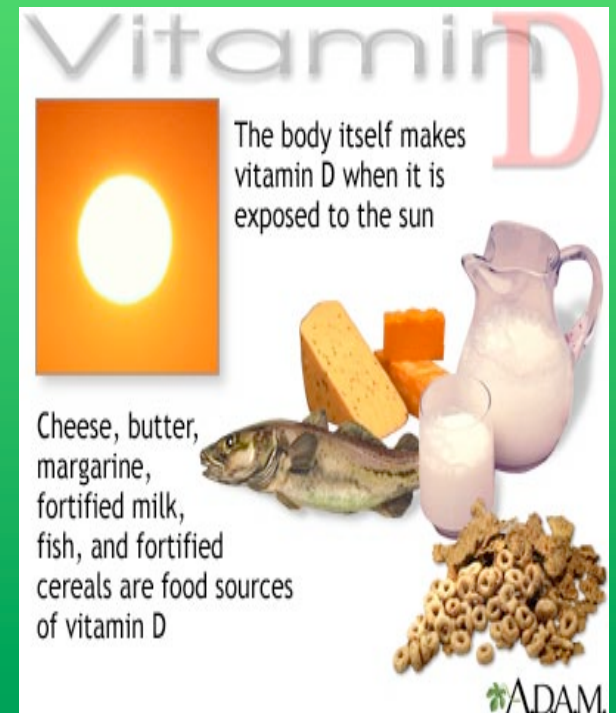


Vitamin D Sources and

* Sources:

- A. Oily fish, salmon, mackerel, herring, cod liver oil, sun-dried mushrooms.
- B. Fortified milks, Cereals, Orange juices.
- Provides 400-500 IU of Vitamin D.C.
- Supplements in capsule, pill or liquid.

* **Recommendations:** 1000 International Units or 25 mcg. Daily for children and adults (IU =0.025 mcg.)





Vitamin E Sources and

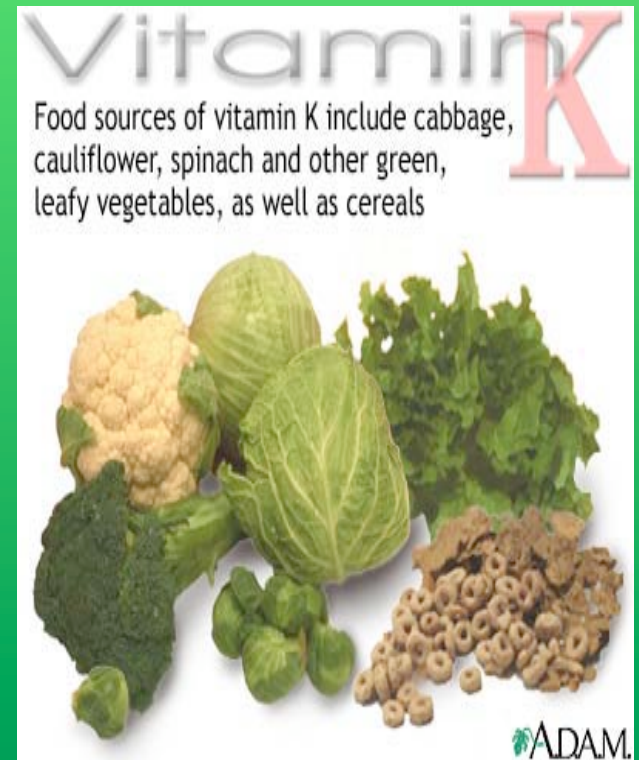
- * Tocopherol Equivalents (TE) or Milligrams)
- * Wheat germ oil | T. > 10
- * Soybean oil | T. > 10
- * Canola oil | T > 10
- * Sunflower seed | oz. > 8
- * Sweet potatoes 1/2 c. > 4
- * Nuts and whole grains are fair sources
- * Recommendations: 8-10 TE per day





Vitamin K

- * **Function:** essential for blood clotting.
- * **Deficiency:** Faulty fat absorption and lack of intake.
- * **Sources:** Green leafy vegetables. Liver, milk. Eggs, cruciferous vegetables.
- * **Recommendations:** Not known but eat a variety foods high in Vitamin K.





Water Soluble Vitamins

- * Vitamin B1 --Thiamin
- * Vitamin B 2 --Riboflavin
- * Niacin--Nicotinic acid-nicotinamide
- * Vitamin B 6-Pyrodoxine
- * Folic acid- Supplement form-Plant form-Folate-
- * Vitamin B 12--cobalimin
- * Biotin
- * Choline
- * Pantothenic acid:
- * Vitamin C--Ascorbic acid





Water Soluble Vitamins – Thiamin (B 1)

- * **Function:** Participates in energy metabolism.
- * **Deficiency:** Beri beri, enlarged heart-cardiac failure, Muscle weakness, loss memory, confusion, and weight loss.





B 1 Sources and Recommendations

* **Plant Sources:** Mg.

| | | |
|-----------------|--------|-------|
| * Brewers Yeast | 1 oz, | 4.6 |
| * Wheat germ | 2 T | 0.26 |
| * Pinto Beans | 1/2 c. | 0.16. |
| * Watermelon | 1 c. | 0.37. |
| * Oatmeal (ck.) | 1/2 c. | 0.22 |
| * White potato | 1 | 0.16 |
| * Corn | 1/2 c. | 0.18 |

* Recommendations: 1.3 mg. per day





Riboflavin (B 2)



* **Function:** Participate in energy metabolism.

* **Deficiency:** Cracks in side of mouth, purple tongue, inflamed eyelids, reddening of cornea, greasy and scaly skin.





B 2 Source and Recommendations

* **Source: Mg.**

| | | |
|-----------------|-------|---------------|
| * Egg | 1 | 0.3 |
| * Milk | 1 c. | 0.4 |
| * Yogurt | 1 c. | 0.5 |
| * Brewers yeast | 2 T. | 1.21 (Torula) |
| * Wheat germ | 2 T | 0.26 |
| * Liver | 3 oz. | 1.60 |

* **Recommendations:** Men 1.3mg. Women 1.1 mg.





Niacin

- * **Function:** Significant in energy metabolism.
- * **Deficiency:** Pellagra- Diarrhea, dementia, dermatitis, death.





Niacin Sources and Recommendations

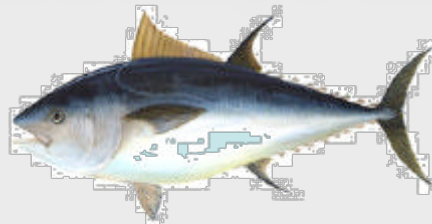


* **Source:**

| | | |
|-------------------|-------|----------|
| * Peanut butter | 2T | 5.8 mg. |
| * Potato | Sm. | 3.0 mg. |
| * Lentils | 1 c. | 2.1 mg |
| * Milk | 1 c. | 2.0 mg. |
| * Sunflower seeds | 2 oz. | 3.0 mg. |
| * Tuna | 3 oz. | 15.0 mg |
| * Brewers yeast | 1 oz. | 10.7 mg. |



* **Recommendations:** M -16.0 mg. W -14.0 mg.





Folic Acid

* **Function:** Folic acid is the form of the vitamin used in supplements. Foliates are the name given to the form found in foods.

- Folate plays a vital roll in DNA metabolism.
- Foliates are required for the synthesis of several amino acids- methionine for one.
- Folic acid, B 6 and 12 help regulate homocysteine.





Folic Acid Deficiencies

- * 400 mcg. of folic acid will prevent 60-100 % of Neural Tube Defects.
- * It is important to understand that a deficiency in a women between the 21th and 27th day of pregnancy will probably cause this defect.



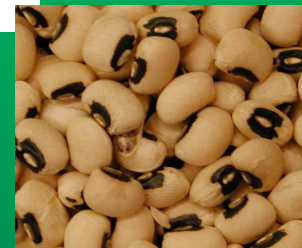
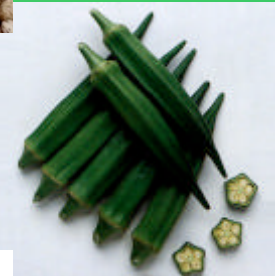


Foods High in Foliates

Food Sources of Foliates:

| | | |
|-------------------------------|--------|----------|
| Black-eyed peas, lentils | ½ c. | 175 mcg. |
| Pinto, kidney, garbanzo beans | 1.2 c. | 150 mcg |
| Okra, asparagus | ½ c. | 125 |
| Brewers yeast | 2 T | 240 |
| Spinach | ½ c. | 131 |

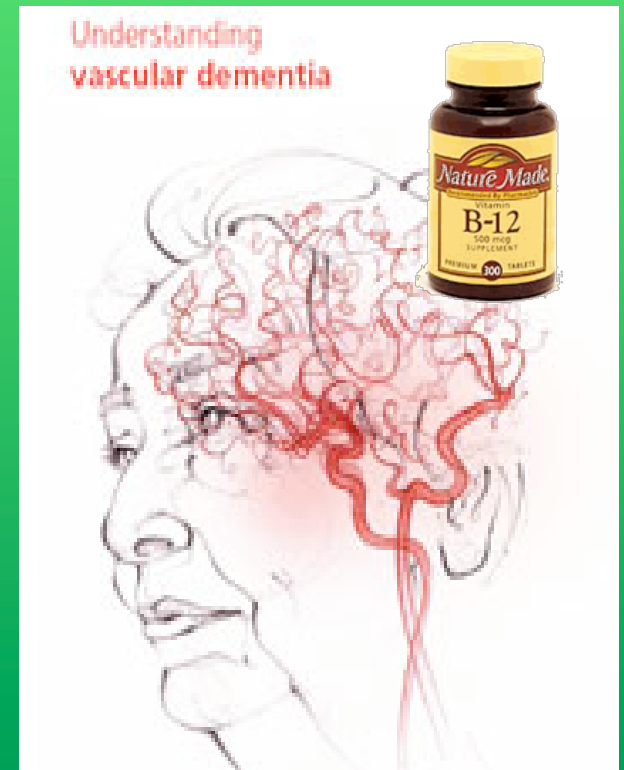
Recommended intakes: 400-1000 mcg. daily





Vitamin B 12 --- Cobalamin

- * **Function:** B 12 plays an important role in DNA synthesis and neurologic functions, active in folate utilization, protects nerve fibers, helps breakdown amino and fatty acids.
- * **Deficiency:** Elevated homocysteine and methylmalonic acid may result in , megaloblastic anemia, sore tongue, dementia, degeneration of nerve cells- neuropathy, paralysis, and death.





Factors Effecting Deficiency

* Increased requirement due to:

- Pregnancy
- Hyperthyroidism
- Increased excretion (alcohol use)

- Age: AJCN 1994, 59 Supl. 12135 - 12225





Vitamin B 12-Risky Practices

1. Inadequate intake of B 12 - Folic acid.
2. Mega doses of vitamin C.
3. Intake of the inactive form.
4. Prolonged iron deficiency.
5. Gastric acid inhibitors.





Vitamin B12

- * “This vitamin is not found in plant foods in any significant amounts as are most other vitamins.” AJCN 1988, Vol. 48, P. 852.
- * There is no active source of B12 in anything that grows out of the ground *ibid.*
- * B12 is not produced genetically by the plants.
- * Any plant that may contain active B12 is the result of bacterial contamination.
- * Adequate amounts of Vitamin B12 are not produced by humans.
- * Pure vegetarians must take supplement.





Excellent Sources of B12 For the Lacto-Ovo Vegetarian

| | | |
|---------------|-------------|-------|
| Milk (8 oz.) | 1 cup | .91 |
| Egg Yolk | 1 | 1.17 |
| Egg beaters | 1/4 cup | 2.39 |
| Brewers yeast | 2 T | 8 mcg |
| B12 tablets | 25-500 mcg. | |

Recommendations 2.6 mcg. Daily





Pantothenic Acid

- * **Function:** A coenzyme involved in over 100 functions of fats, hormones and energy production.
- * **Deficiency** is rare since it is found in a large variety of foods.
- * Good sources are dairy products, avocado, lentil, eggs, sweet, and potatoes.



Lentils -





Vitamin B 6 - Pyridoxine

- * **Function:** Involved in amino acid metabolism, wound healing.
- * **Deficiency:** Depression, and convulsions.
- * **Antagonist:** Heat, alcohol use, TB medication.
- * **Sources:** Bananas (1) 0.6 mg. Watermelon 1.c. 0.4 mg. Potato (1) 0.4 mg. and other fruits and vegetables and meats.
- * **Recommendations :** 1.3 mg. per day





Differences Between Water and Fat Soluble

- **Absorption:** Directly into blood
- **Storage:** Circulate freely in water-filled parts
- **Excretion:** Kidneys remove excess
- **Toxicity:** Not likely
- **Recommendations:** Needed daily

- **Absorption:** First into lymph system
- **Storage:** Require protein carriers
- **Excretion:** Remain in fat storage
- **Toxicity:** Supplement can lead to
- **Recommendations:** Weekly



Factors Effecting Vitamins Status

- * Quantity--Inadequate intake from each of the food groups.
- * Refining of foods.
- * Storage time of food.
- * Exposure to air, heat, and water.
- * Cooking too much or too little.
- * Antagonists: alcohol, oxalic, and phytic acids, etc.
- * Quality provided by food intake.
- * Amount of the vitamin absorbed depends on bioavailability.



Factors Effecting Bioavailability

1. Efficiency of digestion at transit time
2. Previous intake and nutritional status
3. Other foods consumed at the time (antagonists)
4. Method of food prep: Raw, cooked, processed
5. Source of nutrient, synthetic, fortified, natural
6. Mega-doses of competing vitamins or minerals
7. Certain medications





Preserving Vitamins in Preparation

1. Minimize cutting, slicing, and chopping.
2. Use smallest amount of water possible to cook.
3. Cook for as short a time as possible.
4. Do not use sodium bicarbonate in cooking vegetables.
5. Steaming or pressure-cooking conserves vitamins.
6. Serve food as soon as it is cooked.
7. Microwave cooking is equivalent to steaming or pressure-cooking.



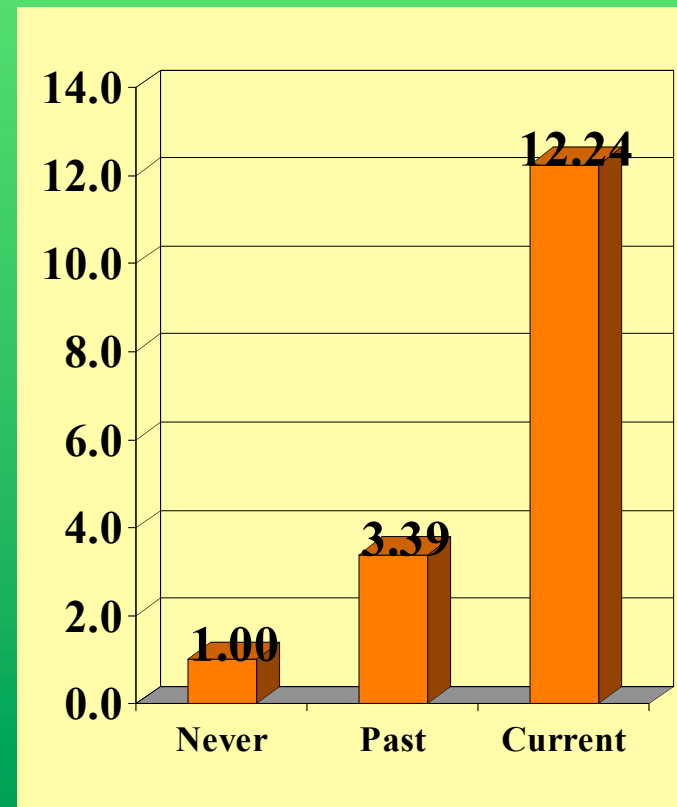
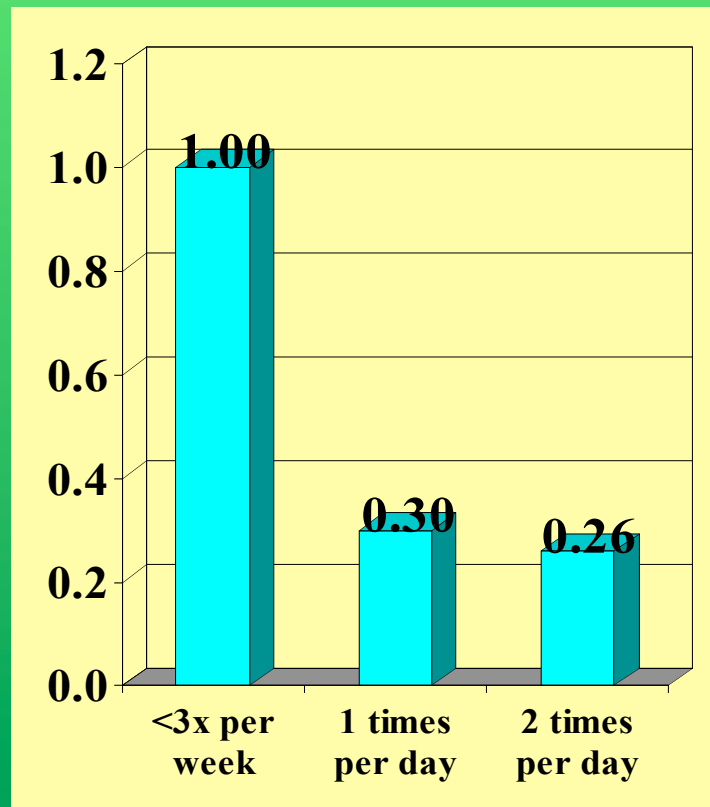
Are Vitamin Supplements Needed?

- ★ Most people do not need them.
- ★ Little research data to support supplementation.
- ★ Dangers of excessive amounts.
- ★ Large doses can interfere with other nutrients.
- ★ The best assurance is a balanced and varied diet with sufficient calories.



Fruit Advantage

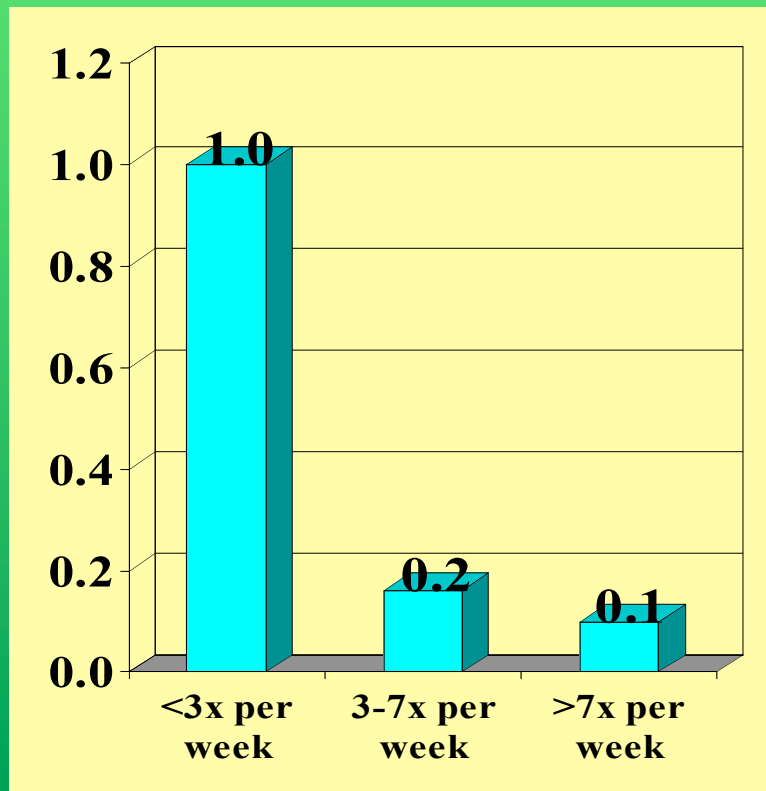
protects against lung cancer
relative risk



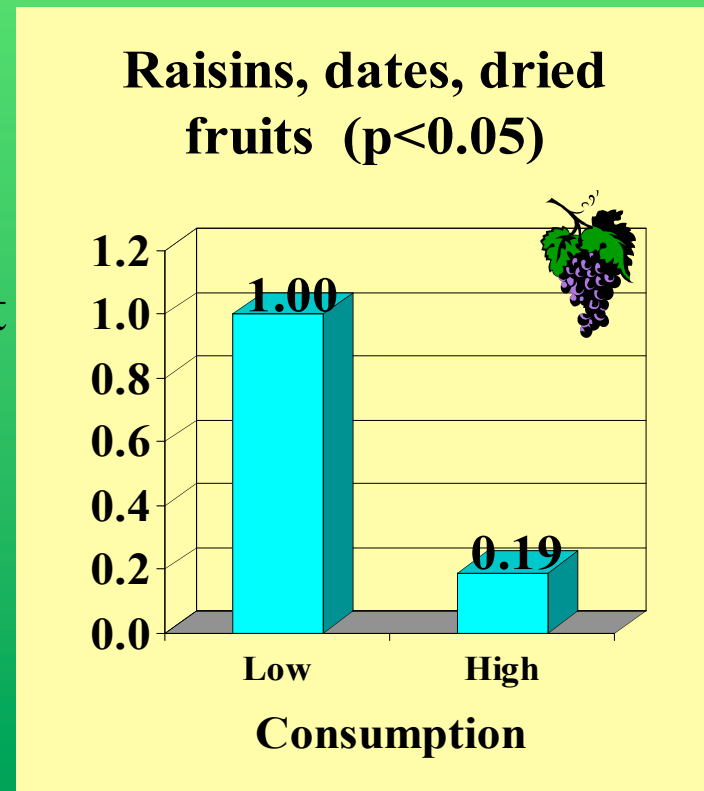


More Fruit Advantages

protects against stomach cancer



Text



Also 40% reduction in prostate cancer.