

VITAMINS

Presented by

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M.Sc II/Sem-III(Natural Product)

What are vitamins ?

- Nutrients that our body does not make on its own. Thus we must obtain them from the foods we eat, or via vitamin supplements.
- They are essential for providing good health and are necessary for many life functions.

Stress & Nutrition of Your Body

- Stress can cause your body to excrete nutrients rather than using them to perform vital functions.
- Stress can also cause the production of free radicals which play a role in the development of cancer, heart disease, and aging.



The B Vitamins

B-1, B-2, B-3, B-6, B-
12

B-1 Thiamin (Vitamin F)

- Important in:
 - Producing energy from carbohydrates
 - proper nerve function
 - stabilizing the appetite
 - promoting growth and good muscle tone
 - ATP production

Sources of B-1

- Pork
- Fish
- Liver
- Legumes
- Nuts
- Whole grain or enriched breads and cereals

B-1 Deficiency

- Loss of appetite
- Weakness & Feeling tired
- Insomnia
- Loss of weight
- Depression
- Heart & Gastrointestinal problems

B-2 Riboflavin

- Important in:
 - energy production
 - carbohydrate, fat, and protein metabolism
 - formation of antibodies and red blood cells
 - cell respiration
 - maintenance of good vision, skin, nails, and hair
 - alleviating eye fatigue

Sources of B-2

- Large amounts in
 - dairy
 - eggs
 - meats
- Small amounts in
 - leafy green vegetables
 - enriched grains

B-2 Deficiency

- Itching and burning eyes
- Cracks and sores in mouth and lips
- Bloodshot eyes
- Dermatitis
- Oily skin
- Digestive disturbances

B-3 Niacinamide & Niacin

- Important in:
 - energy production
 - maintenance of skin and tongue
 - improves circulation
 - maintenance of nervous system
 - health of the digestive track

B-3 Niacinamide & Niacin

- Two Types
 - Niacinamide (Nicotinamide)
 - does not regulate cholesterol
 - Niacin (Nicotinic Acid)
 - highly toxic in large doses
 - Inositol Hexaniacinate is a supplement that gives the cholesterol regulation without high toxicity

B-3 Deficiency

- **Pellegra**
 - disease caused by B-3 deficiency
 - rare in Western societies
- gastrointestinal disturbance, loss of appetite
- headache, insomnia, mental depression
- fatigue, aches, and pains
- nervousness, irritability

B-6 Pyridoxine

- Important in:
 - Production of red blood cells
 - conversion of tryptophan to niacin (B-3)
 - immunity
 - nervous system functions
 - reducing muscle spasms, cramps, and numbness
 - maintaining proper balance of sodium and phosphorous in the body

B-6 Deficiency

- nervousness, insomnia
- loss of muscle control, muscle weakness
- arm and leg cramps
- water retention
- skin lesions

B-12 Cobalamin

- Important in:
 - proper nerve function
 - production of red blood cells
 - metabolizing fats and proteins
 - prevention of anemia
 - DNA reproduction
 - energy production?

B-12 Deficiency

- anemia
- nerve damage
- hypersensitive skin



Vitamin A

What is Vitamin A?

- Fat-soluble
- Retinol
 - One of the most active, usable forms
- Found in animal and plant sources

Where does it come from?

▣ Animal Sources

- ▣ Eggs
- ▣ Meat
- ▣ Cheese
- ▣ Milk
- ▣ Liver
- ▣ Kidney
- ▣ Cod
- ▣ Halibut fish oil

Plant Sources

- Carrots
- Sweet Potatoes
- Cantaloupe
- Pink Grapefruit
- Apricots
- Broccoli
- Spinach
- Pumpkin

Signs of Deficiency

- Night blindness
- Decreased resistance to infections
- Extremely dry skin, hair or nails

Too Much Can Be Toxic!!

- Hypervitaminosis A leads to toxic symptoms:
 - Dry, itchy skin
 - Headaches and fatigue
 - Hair loss
 - Liver damage
 - Blurred vision
 - Loss of appetite
 - Skin coloration

Other Side Effects

- Severe birth defects
 - Women of child-bearing age should not consume more than 8000 IU per day
 - Retin-A (acne cream) or Accutane can cause birth defects
 - Retinol is most dangerous form because the body will not convert as much beta-carotene to vitamin A unless needed but it can still be harmful
- Skin can take on a yellow/orange glow
- Most cases of vitamin A overdose occur from supplements but can occur from diet
- RDA is considering establishing an Upper Limit

Foods High In Vitamin A

Retinol

- Liver (3 oz)
30,325 IU (610% DV)
- Fortified milk (1 c)
1,355 IU (10% DV)

... Foods High In Vitamin A

Beta-Carotene

- | | |
|--|-----------|
| □ Carrot (1 raw)
(410% DV) | 20,250 IU |
| □ Carrot juice (1/2 c)
(260% DV) | 12,915 IU |
| □ Mango (1 raw)
(160% DV) | 8,050 IU |
| □ Sweet Potatoes (1/2 c)
(150% DV) | 7,430 IU |
| □ Spinach, boiled (1/2 c)
(150% DV) | 7,370 IU |
| □ Cantaloupe (1 c)
(100% DV) | 5,160 IU |
| □ Vegetable Soup (1 c)
(60% DV) | 3,005 IU |

Vitamin A, Beta-Carotene, and Cancer

- Surveys suggest that diets rich in vitamin A and beta-carotene can lower the risk for cancer (especially lung cancer)
- However, one study was stopped because subjects with increased beta-carotene had a 46% higher risk of dying from lung cancer
- Another study showed that smokers were **more** likely to develop lung cancer if they took beta-carotene supplements
- Beta-carotene supplements are not advisable except in rare situations



Vitamin E

Vitamin E

What is it?

- Fat soluble
- Antioxidant
 - Reduce the energy of the free radical
 - Stop the free radical from forming in the first place
 - Interrupt an oxidizing chain reaction to minimize the damage of free radicals

Vitamin E

What does it do?

- Protects cell membranes and other fat-soluble parts of the body (LDL cholesterol) from oxidation
 - May reduce the risk of heart disease
 - May also discourage development of some types of cancer
- Promotes normal growth and development
- Promotes normal red blood cell formation
- Acts as anti-blood clotting agent
- Plays some role in the body's ability to process glucose
- Also been known to aid the process of wound healing

Vitamin E

Heart disease:

- Two studies published in the *New England Journal of Medicine* by Harvard researchers
- Of 127,000 health professionals, those who took large doses of Vitamin E had a 40% lower risk of heart disease

Vitamin E

Where does it come from?

- wheat germ oil
- vegetable oils
- nuts and seeds
- whole grains
- egg yolk
- leafy green vegetables

Specific Food Sources

- vegetable oils
 - Corn, cottonseed, and peanut oil
- nuts and seeds
 - Almonds, hazelnuts, sunflower seeds, walnuts, and margarine
- whole grains
 - whole-wheat flour, wheat germ
- Vegetables and fruits
 - Spinach, lettuce, onions, blackberries, apples, and pears

Vitamin E

Other effects:

- ▣ Taking more than RDA of vitamin E improves the immune system in the elderly
 - ▣ Jean Mayer (USDA Human Nutrition Research Center) & Simin Meydani, D.V.M. , Ph.D. (Nutritional Immunology Laboratory)
 - ▣ *The Journal of the American Medical Association*

Vitamin E

Who is likely to be deficient?

- Severe vitamin E deficiencies are rare
- Lack of vitality
- Lethargy
- Apathy
- Inability to concentrate
- Muscle weakness

Vitamin E

Natural foods or supplements?

- Natural form more bioavailable
- Easier to obtain the amount needed from supplements



Vitamin C

Vitamin C


- Ascorbic acid (Toxic to viruses, bacteria, and some malignant tumor cells)
- Antioxidant
- water-soluble

What are C's functions in the body?

- Protects your body from free radicals
- helps form connective tissue that hold your bones, muscles, and tissues together (collagen)
- aids in the healing of wounds
- aids the body in absorbing iron from plant sources
- helps to keep your gums healthy
- helps your body to fight infections
- aids in the prevention of heart disease
- helps prevent some forms of cancer

Harmful effects in larger doses: (over 1000mg/ dose)

- Diarrhea
- gastrointestinal discomfort
- rebound Scurvy
- Avoid chewable tablets (may cause damage to teeth)

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- Since Vitamin C is water-soluble excess amounts that the body does not need will be excreted, but larger doses can cause some problems. . .

Sources of Vitamin C

- Guava, Broccoli, Cantaloupe, Red Bell Pepper, Orange Juice, Strawberries, Tomato Juice, Raw Tomato, Sweet Potato, Tangerine, Spinach, Leafy Greens, Berries, Citrus Fruits
- [LINK](#) (list of fruits & veggies that are good sources of C)
- www.heartinfo.org/nutrition/vitc42898.htm

Deficiency of C causes:

- Weight loss
- fatigue and joint pain
- scurvy (bruising easily, bleeding gums, and tendency for bones to fracture)
- reduced resistance to colds and infections
- slow healing of wounds and fractured bones

Fact or Fiction: Vitamin C causes Kidney Stone formation

- *Department of Nutrition, Harvard School of Public Health*
- Study done on 45,251 men that had no previous cases of kidney stones. Some subjects took up to 30 times the RDA values, and showed no increased risk of kidney stone formation.

Food or Supplement?

- The ***Mayo Clinic*** states that “your body needs macronutrients (proteins, carbohydrates, and fat) for energy and micronutrients (vitamins and minerals) for many functions. Whole foods are an excellent choice.” They also stated that “an orange provides not only vitamin C but also carotene, calcium, and free sugars for energy. A vitamin C supplement is lacking these.”
- The ***American Heart Association*** “recommends that healthy individuals obtain adequate nutrient intakes from food eaten in variety and moderation, rather than from supplements.”



Thank

You