VITAMINS

Vitamins

They are regulator moleculas. They regulate normal growth and development. Vitamin A regulates normal eye function, vitamin D regulates normal growth of bone , and vitamin C is needed for immunity or body defense. They do not provide energy.

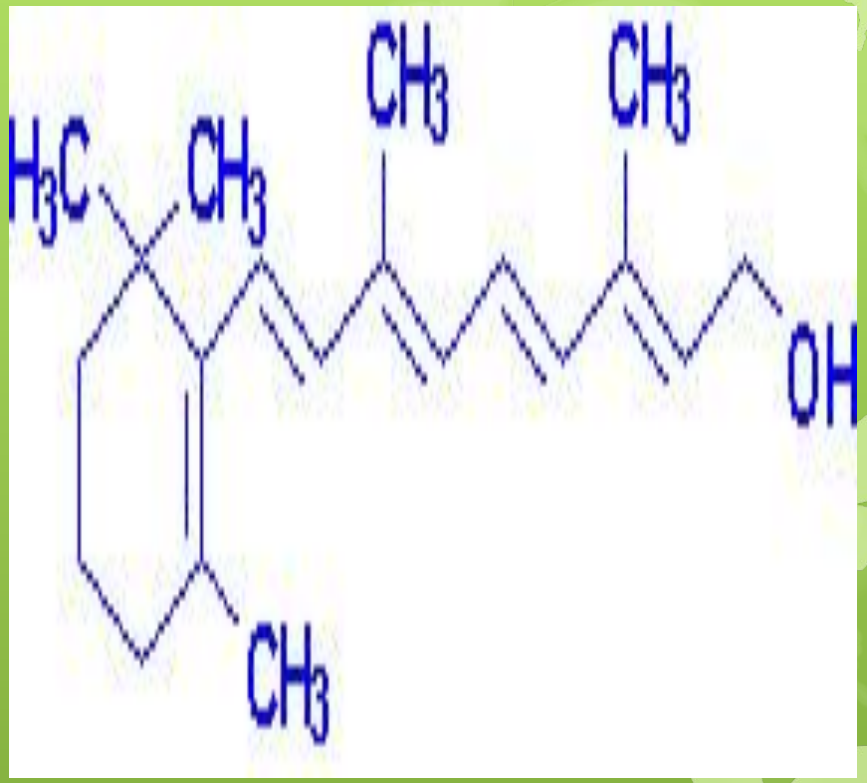
CLASSIFICATION

Water soluble	Fat soluble
Thiamin (B1)	Vitamin A
Riboflavin (B2)	
Niacin (B3)	Vitamin D
Pantothenic acid (B5)	
Pyridoxine (B6)	Vitamin E
Folic acid (B9)	
Cobalamin (B12)	Vitamin K
Ascorbic acid	

VITAMIN A

- Vitamin A consists of three biologically active molecules, retinol, retinal and retinoic acid
- Retinol - “sticky” and light sensitive
- Provitamin A carotenoids – converted to retinol by the body

  ex- Beta (b)-carotene



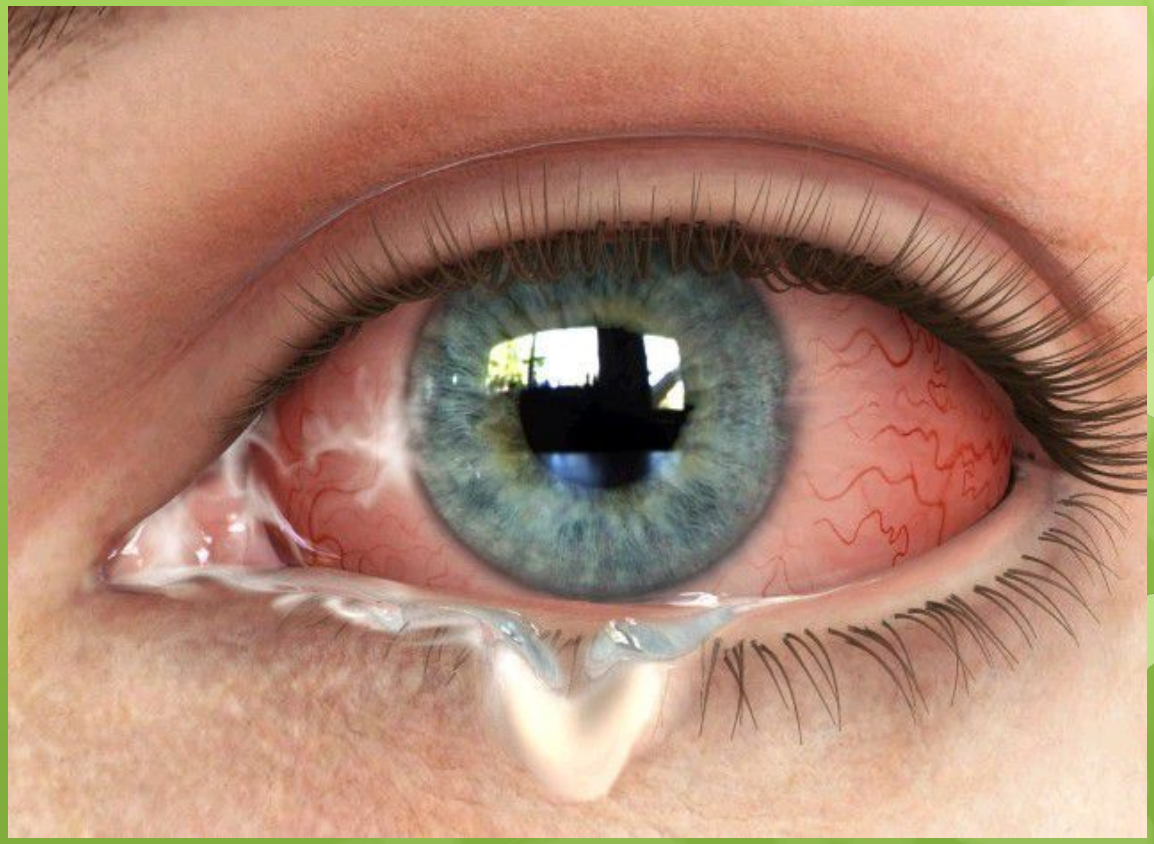
Sources

- milk, cheese, cream, liver, kidney, cod and halibut fish oil milk,
- Beta carotene - carrots, pumpkin, sweet potatoes, winter squashes, cantaloupe, pink grapefruit, apricots, broccoli, spinach and most dark green leafy vegetables

DEFICIENCIES:

Night Blindness,Xeropthalmia

infectious disease – Diarrhea, respiratory diseases



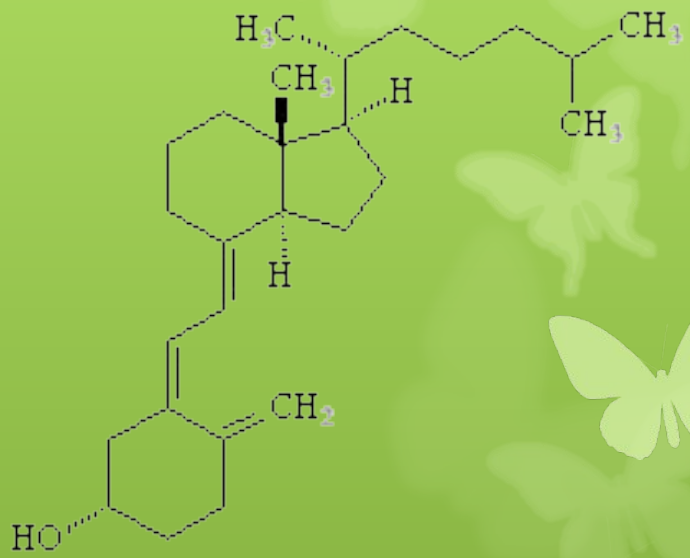
VITAMIN B

- THIAMIN B1
- RIBOFLAVIN B2
- NIACIN B3
- PANTOTHENIC ACID B5
- VITAMIN B6

TYPE	FUNCTION	SOURCE	DEFICIENCY
B1 Thiamin pyrophosphate	•Coenzyme • non – coenzyme function	•Whole grains, cereals, legumes nuts, lean pork, yeast	BERI-BERI
B2 Flavin mononucleotide Flavin adenine dinucleotide	•Oxidation-reduction (redox) reactions •Antioxidant functions	•liver, eggs, cheese, milk and cereals	•damage to eyes, mouth, and genitals

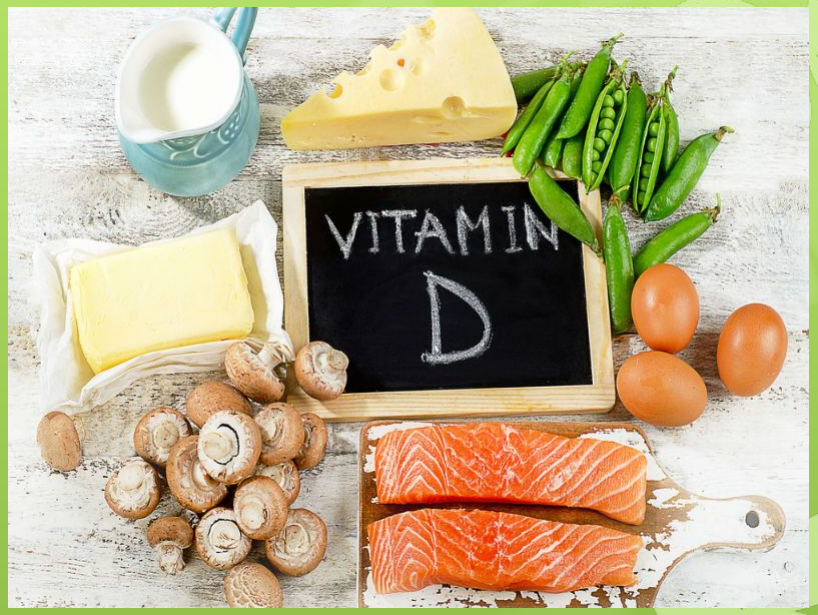
VITAMIN D

- synthesized only when exposed to sunshine.
- Converted to active form, 1a,25-dihydroxyvitamin D
- The 1a,25-dihydroxyvitamin D acts as a hormone, and has a specific nuclear receptor



SOURCES

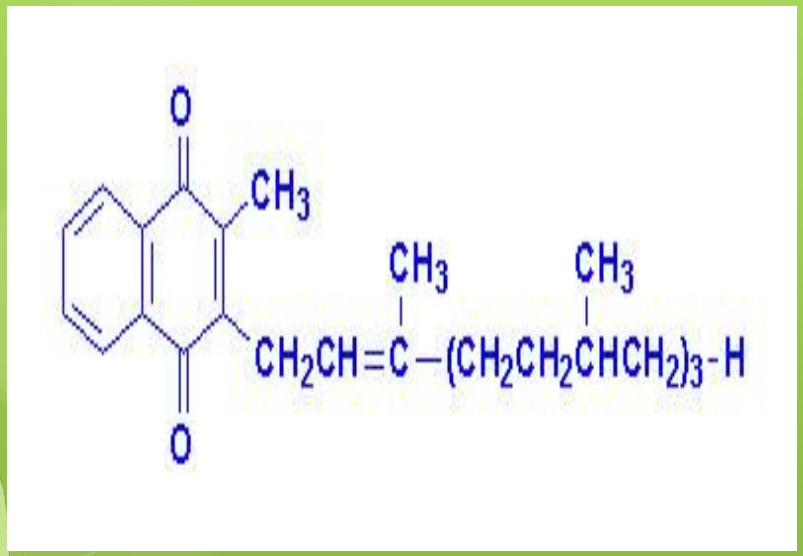
- Sunlight(primary)
- Milk Products:cheese, Butter, Margarine, Cream, Fortified Milk
- Sea Foods :Fish oil
- Egg yolk.



DEFICIENCIES

- Rickets-Bone disorders

VITAMIN K



- The K vitamins exist naturally as K1 (phylloquinone) in green vegetables
- K2 (menaquinone) produced by intestinal bacteria
- K3 is synthetic menadione.

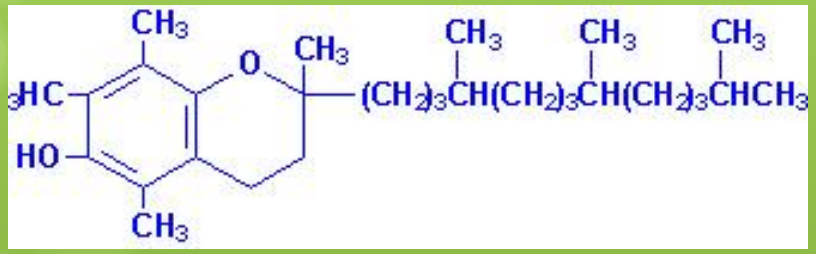
SOURCE

- Spinach, cauliflower and other green leafy vegetables
- chief source of vitamin K is synthesis by bacteria in the large intestine

DEFICIENCIES

- Liver disease
- Poisoning with vitamin K antagonists
- Hemorrhagic disease of the newborn results from vitamin K deficiency in human infants
- Increased risk of fractures or reduced bone density may result from inadequate intake of vitamin K

VITAMIN E



- Describes a family of 8 □alpha, beta, gamma, delta and 4 tocotrienols
- Alpha tocopherol is the only vitamin E that is actively maintained in human body found in tissues and blood
- Maintains integrity of cell membrane and protects fats from oxidation

VITAMIN E

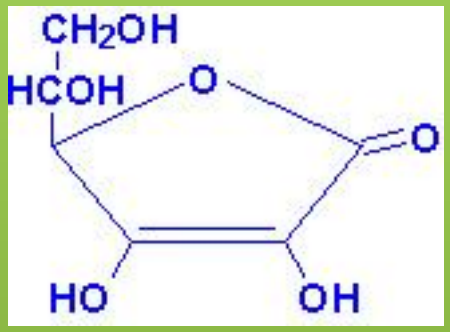
SOURCES:

- Vegetable oils, nuts, egg yolk, Parmesan, chickpeas, wheat germ, oatmeal, olives,carrots, parsnips, red peppers, green leafy vegetables, sweet potatoes, tomatoes, sweet corn

DEFICIENCIES:

- Sever malnutrition
- Genetic defects
- Fat malabsorption
- Neurological symptoms

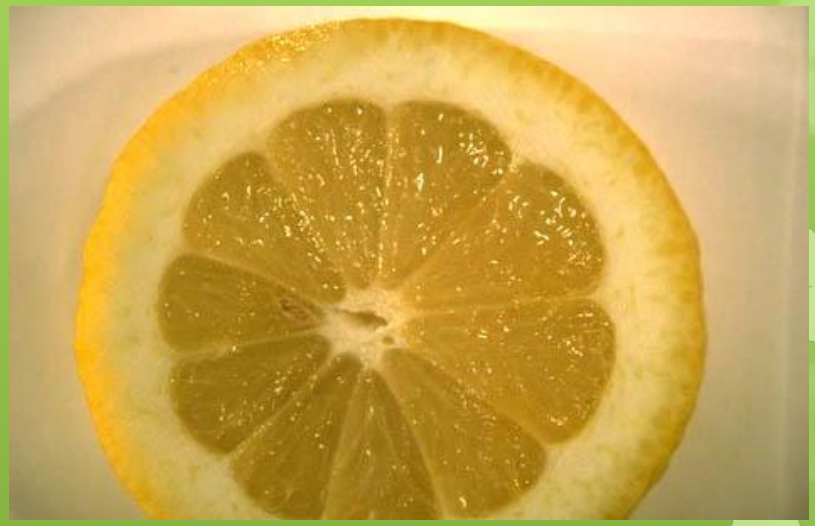
VITAMIN C



- derived from glucose via the uronic acid pathway
- extracted from plant sources such as rose hips, blackcurrants or citrus fruits
- easily oxidised in air

SOURCES

- Broccoli, Brussels sprouts, cauliflower, cabbage, mange tout, green leafy vegetables, red peppers, chilies, watercress, parsley, blackcurrants, strawberries, kiwi fruit, guavas, citrus fruit.



VITAMIN C

FUNCTIONS:

- synthesis of collagen, neurotransmitter, norepinephrine
- protects indispensable molecules
- regenerate other antioxidants such as vitamin E

DEFICIENCY:

- Scurvy