

# VITAMINS

# *Vitamins*

They are regulator molecules. 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.

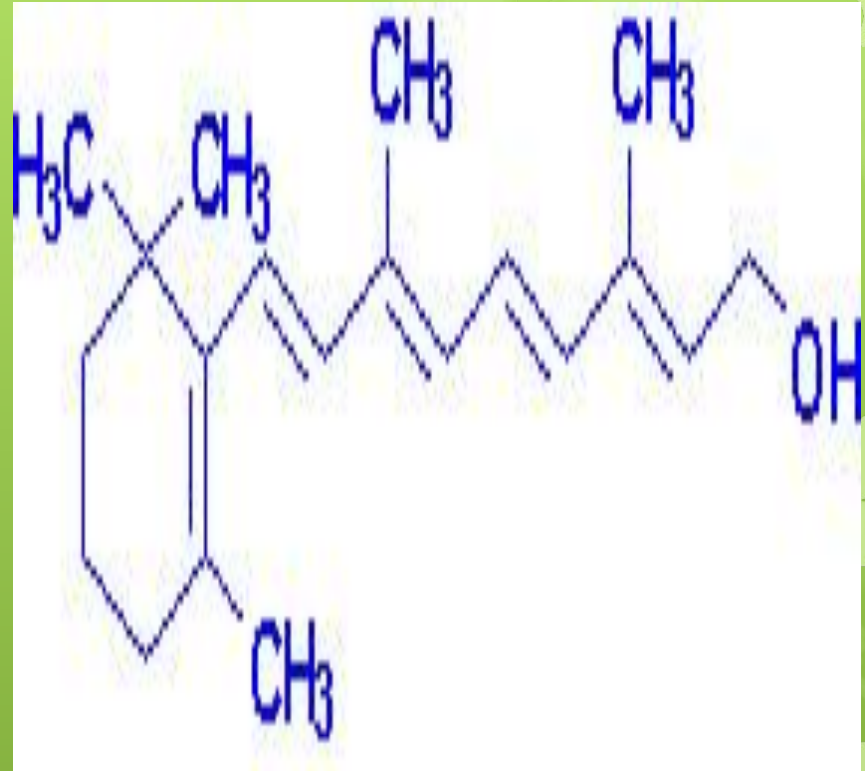


## *CLASSIFICATION*

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

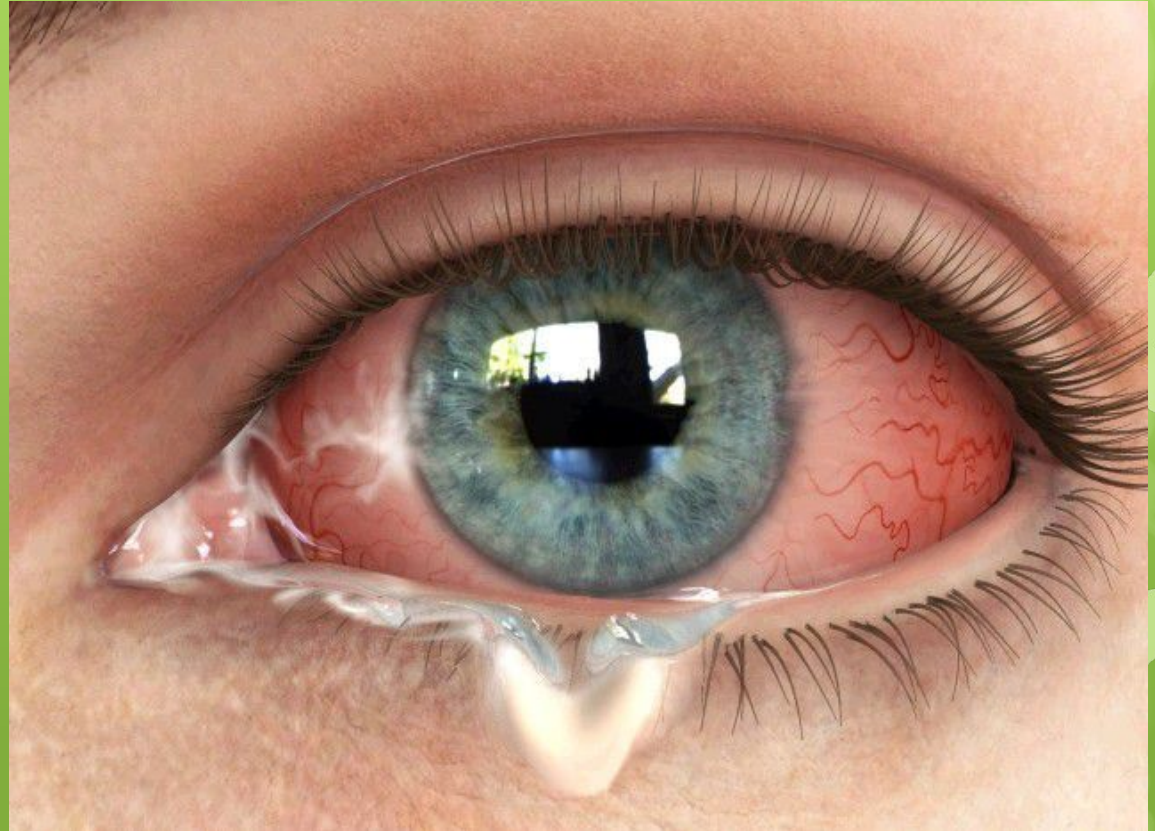


- milk, cheese, cream, liver, kidney, cod and halibut fish oil milk,
- **Beta carotene** - carrots, pumpkin, sweet potatoes, winter squashes, cantaloupe, pink grapefruit, apricots, broccoli, spinach and most dark green leafy vegetables

# DEFICIENCIES:

Night Blindness, Xerophthalmia

infectious disease – Diarrhea, respiratory diseases



# VITAMIN B

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



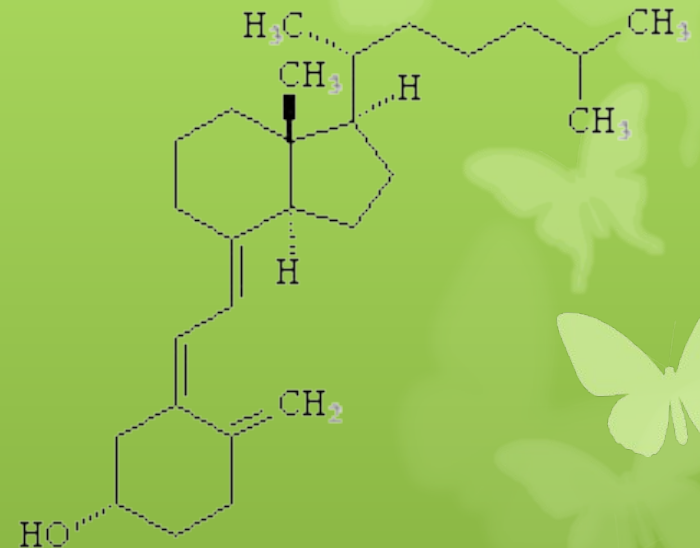


TYPE	FUNCTION	SOURCE	DEFICIENCY
<b>B1</b> <b>Thiamin</b> <b>pyrophosphate</b>	<ul style="list-style-type: none"> <li>• <b>Coenzyme</b></li> <li>• <b>non – coenzyme function</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Whole grains, cereals, legumes nuts, lean pork, yeast</b></li> </ul>	<b>BERI-BERI</b>
<b>B2</b> <b>Flavin</b> <b>mononucleotide</b> <b>Flavin adenine dinucleotide</b>	<ul style="list-style-type: none"> <li>• <b>Oxidation-re duction (redox) reactions</b></li> <li>• <b>Antioxidant functions</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>liver, eggs, cheese, milk and cereals</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>damage to eyes, mouth, and genitals</b></li> </ul>



# 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

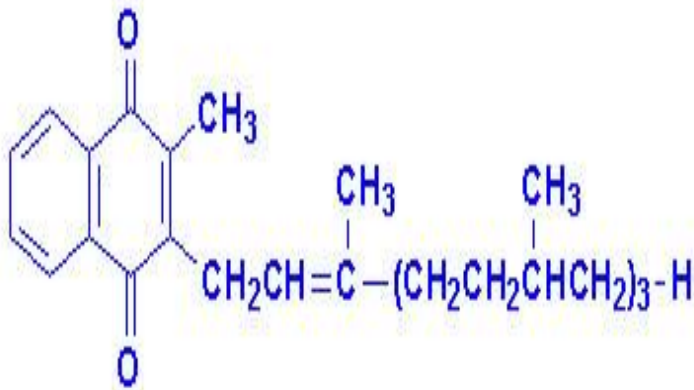
- ☐ Sunlight(primary)
- ☐ Milk Products:cheese, Butter, Margarine, Cream, Fortified Milk
- ☐ Sea Foods :Fish oil
- ☐ Egg yolk.



# 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

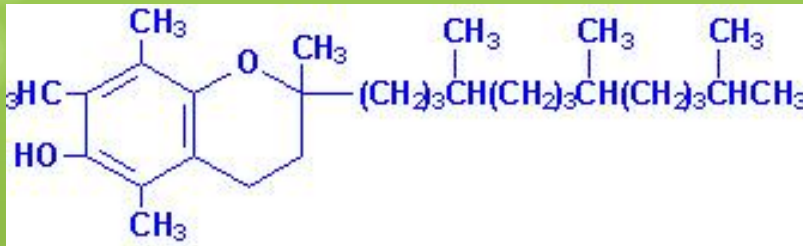




# DEFICIENCIES

- ❑ 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

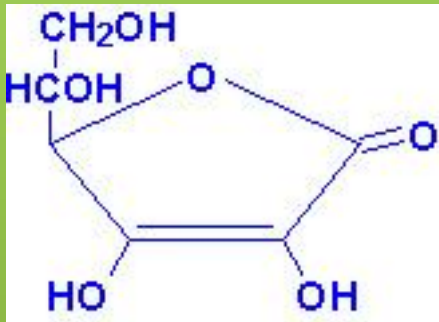
## **SOURCES:**

- ❑ 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

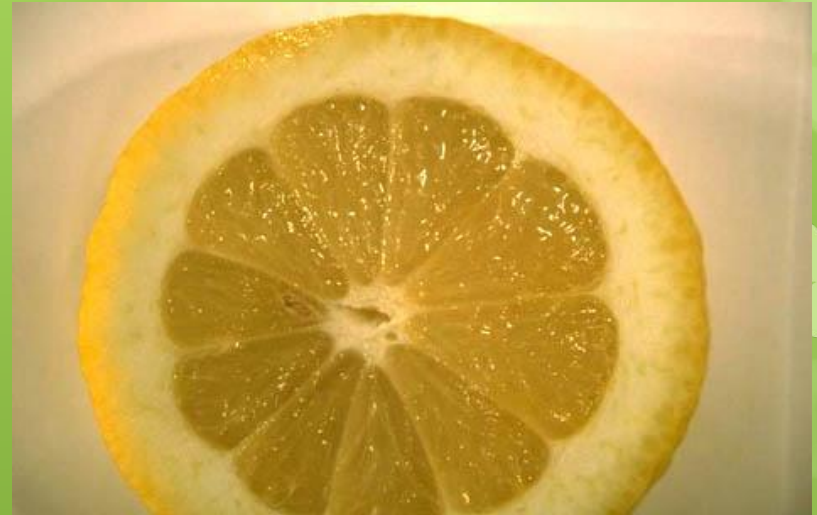


- derived from glucose via the uronic acid pathway
- extracted from plant sources such as rose hips, blackcurrants or citrus fruits
- easily oxidised in air



# 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