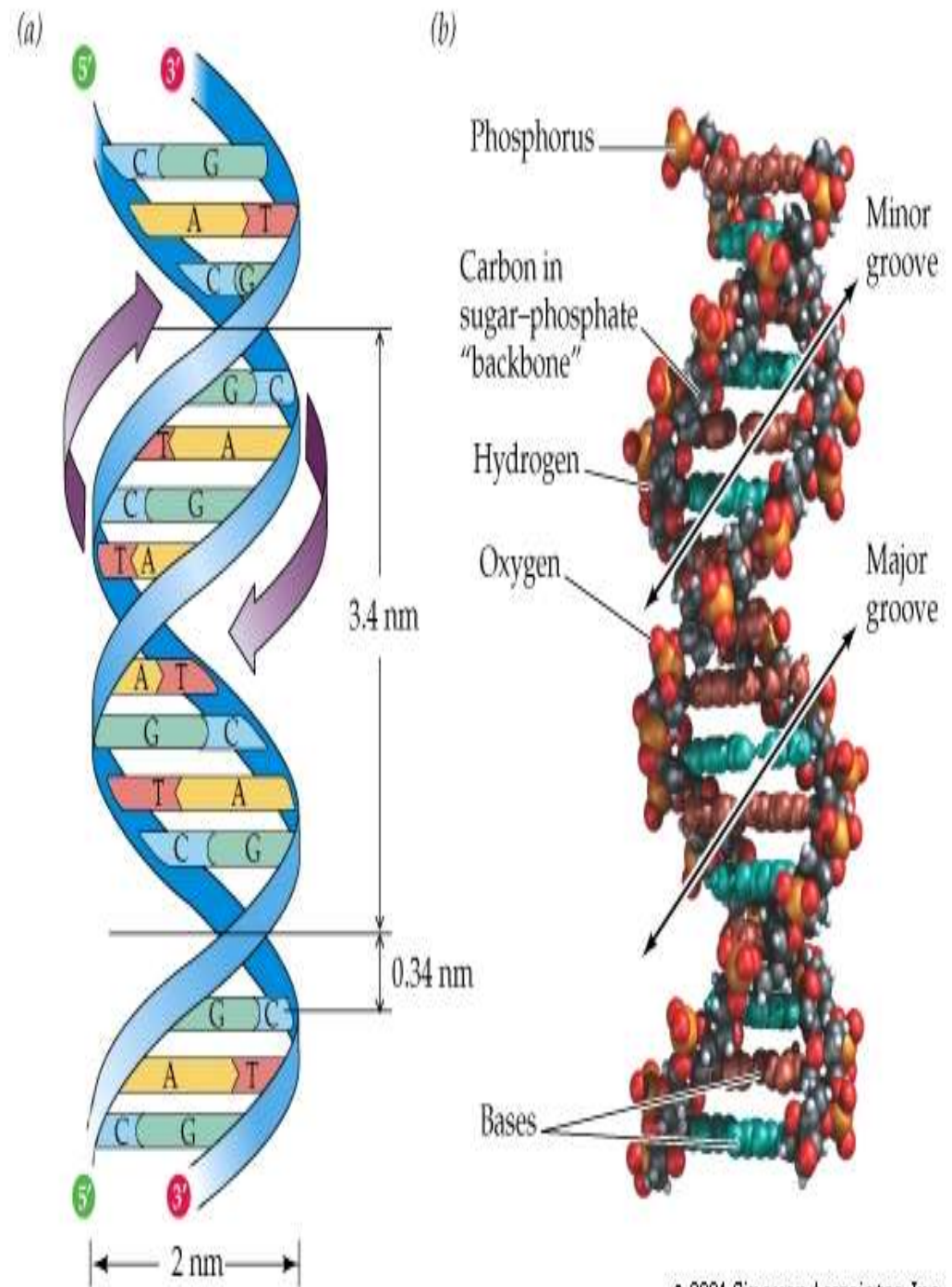


Genetic codes

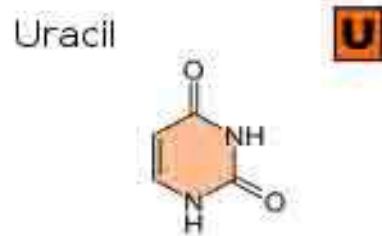
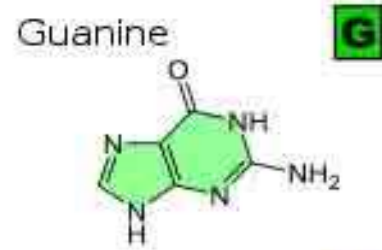
DNA

- Internucleotide linkage by 3,5 phospho diester bond.
- Sum of purine is equal to sum of pyrimidines.
- Three forms of DNA .
- Double helical structure

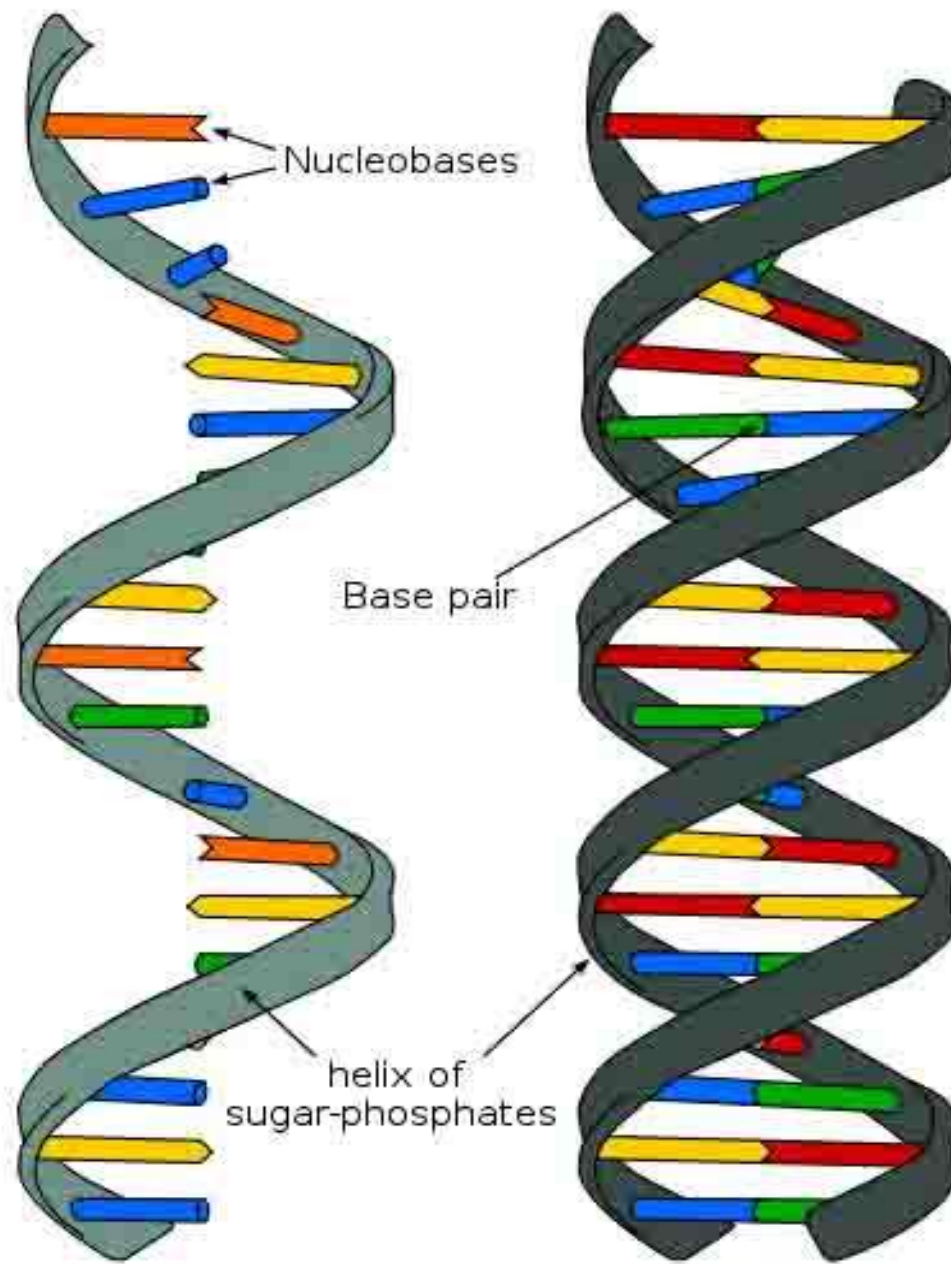


Ribonucleic acid

- Nucleotides linked with 3,5 phosphodiester bond.
- Shares many features with DNA but specific difference.
- Ribose sugar instead of deoxy ribose.
- Uracil in place of thymine.
- Single stranded instead of double stranded.
- Ribosomal transfer and messenger RNA.

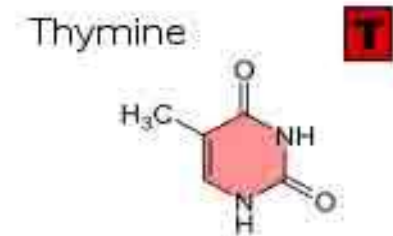
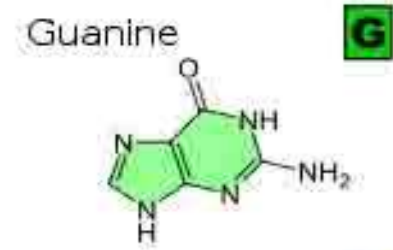


Nucleobases
of RNA



RNA
Ribonucleic acid

DNA
Deoxyribonucleic acid



Nucleobases
of DNA

Vitamins

- Essential for growth and maintenance of organism.
- Distinguished from enzymes and hormones.
- Absence leads to certain diseases.

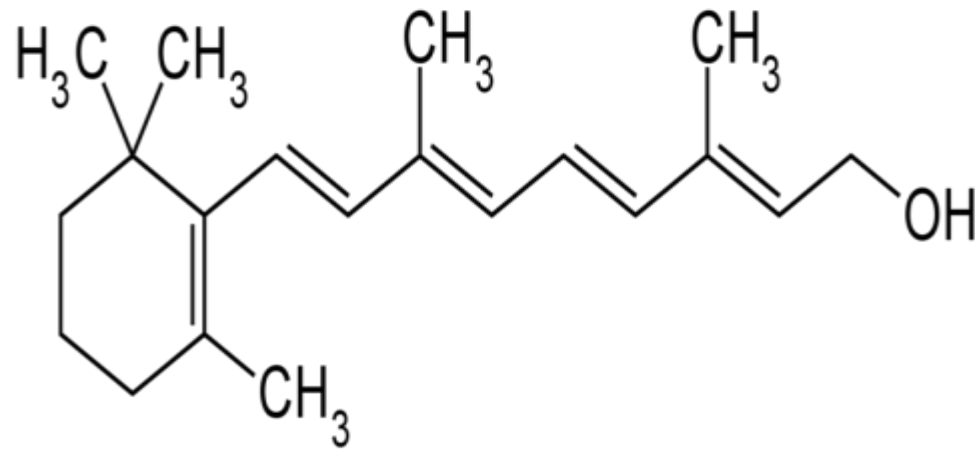
Fat soluble vitamins

- Oily substance not soluble in water.
- Vitamin A D E and K.

Vitamin A

- Also known as retinol, retinal, retinoic acid.
- Have functional roles in vision.
- Plant foods provide carotenoids, such as **beta-carotene**, some of which have **vitamin A activity**

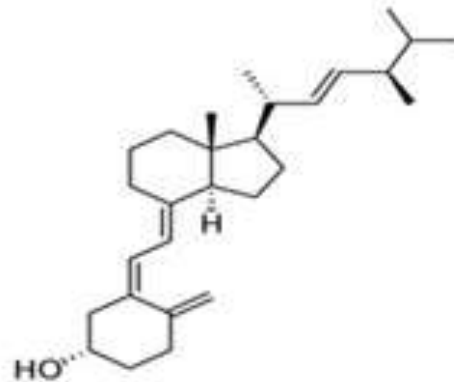
- Animal foods provide compounds that are easily converted to retinol.
- Vitamin A in vision animal source and plant source.
- Deficiency nightblindness, xerophthalmia,
keratomalacia



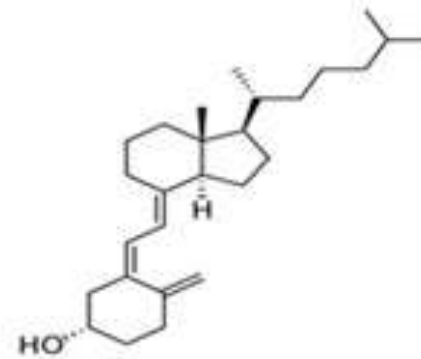
Vitamin D

- Also known as calciferol, calcitriol, vitamin D₃ or cholecalciferol, Vitamin D₂ or ergocalciferol.
- Nonessential nutrient body can make vitamin D with help from sunlight.
- Plant version of vitamin D is called **vitamin D₂** or **ergocalciferol**.
- Animal version of vitamin D is called **vitamin D₃** or **cholecalciferol**.

- Vitamin D in Bone Growth.
- Vitamin D Deficiency, Rickets, **Osteomalacia**



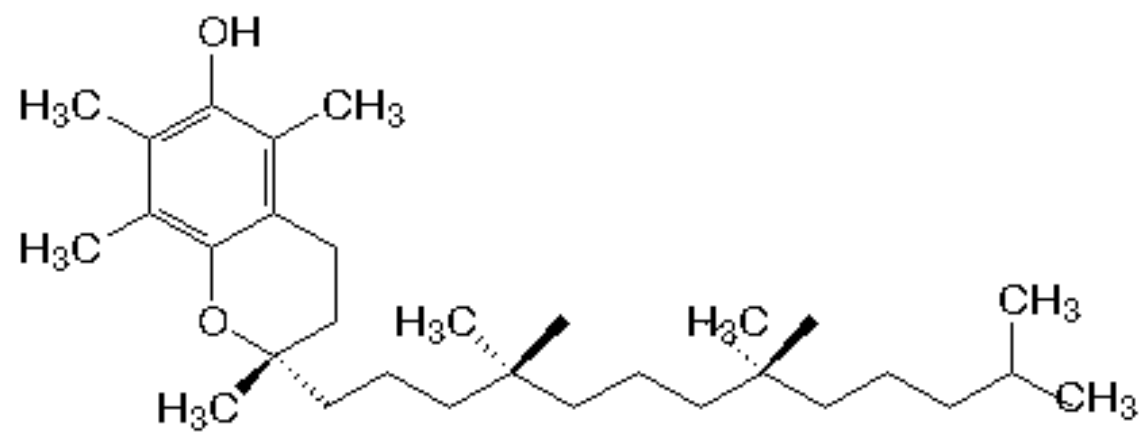
Vitamin D₂



Vitamin D₃

Vitamin E

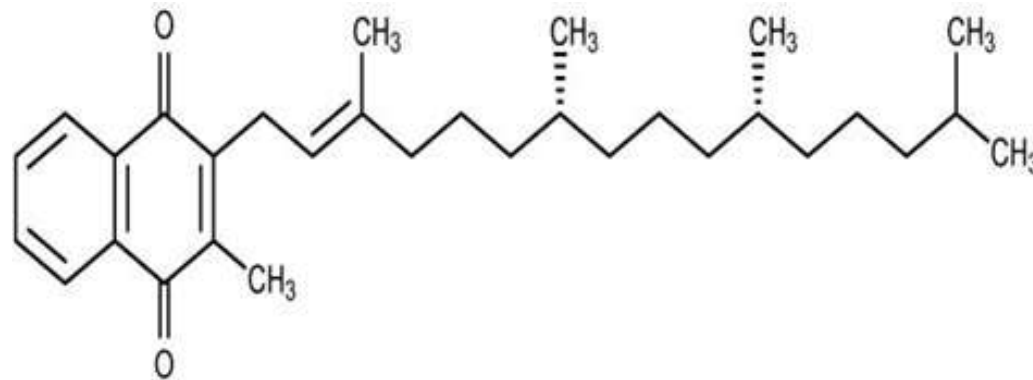
- Also known as alpha-tocopherol.
- Antioxidant Stops the chain reaction of free radicals.
- Protection of polyunsaturated fatty acids and vitamin A
- Protects the oxidation of LDLs



Vitamin E (α -tocopherol)

Vitamin K

- Also known as **phylloquinone**, menaquinone, **menadione**, and naphthoquinone.
- Essential in blood clotting.
- Deficiency leads to hemorrhagic diseases.



Water soluble vitamins

- Soluble in water.
- Vitamin B complex and C.

Vitamin B complex

- Vitamin B₁
- also called as thiamin
- is a part of coenzyme thiamine pyrophosphate
- available in grains and meat
- easily destroyed by heat
- deficiency leads to Beriberi

Vitamin B₂

- Also called as Riboflavin.
- Part of coenzyme FMN (flavin mononucleotide) and FAD (flavin adenine dinucleotide).
- Rich in milk product, grains and meat.
- Mouth related disorders

Vitamin B₃

- Also called as Niacin.
- Part of coenzymes NAD (nicotinamide adenine dinucleotide) and NADP.
- Rich in milk, egg, fish and meat
- Deficient leads to Pellagra

Vitamin B₇

- Also called as Biotin.
- Part of a coenzyme used in energy metabolism, fat synthesis, amino acid metabolism, and glycogen synthesis.
- Grains, meat, egg, GI bacteria

Vitamin B₅

- Also called as pantothenic acid
- Part of coenzyme A, used in energy metabolism
- Meat, vegetable, grains

Vitamin B₆

- Also called as pyrodixine
- Part of coenzymes PLP (pyridoxal phosphate) and PMP (pyridoxamine phosphate) used in amino acid and fatty acid metabolism
- Helps to convert tryptophan to niacin and to serotonin; helps to make red blood cells
- Meat, fish, vegetable and fruits
- Scaly dermatitis; anemia (small-cell type); depression, confusion, convulsions

Vitamin B₉

- Also called as Biotin
- Part of a coenzyme used in energy metabolism, fat synthesis, amino acid metabolism, and glycogen synthesis.
- Deficiency leads to depression

Vitamin B₁₂

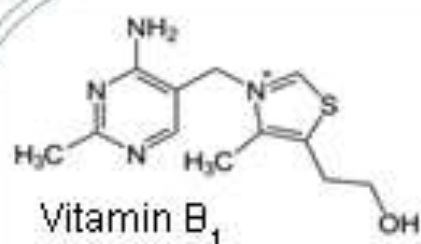
- Also called as cobalamin
- Part of coenzymes methylcobalamin and deoxyadenosylcobalamin used in new cell synthesis; helps to maintain nerve cells
- Reforms folate coenzyme; helps to break down some fatty acids and amino acids
- Foods of animal origin
- Deficiency leads to pernicious anemia

Choline

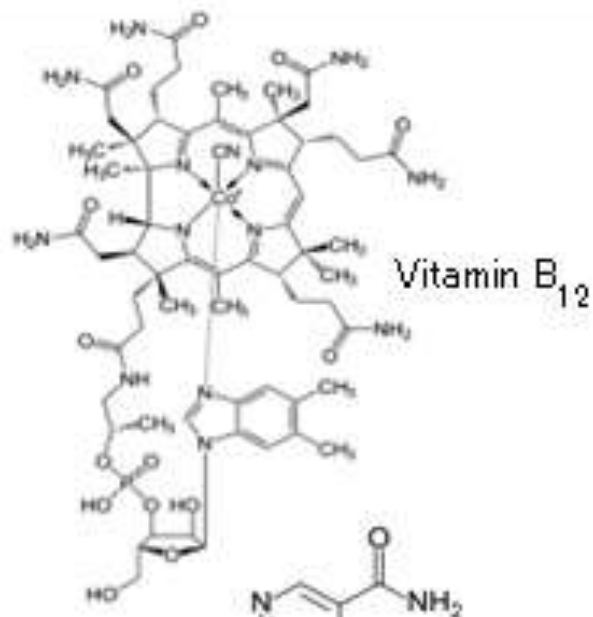
- Needed for the synthesis of the neurotransmitter acetylcholine and the phospholipid lecithin

Vitamin C

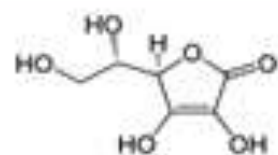
- Also called as Ascorbic acid
- Collagen synthesis
- Citrus fruits, cabbage-type vegetables
- Scurvy



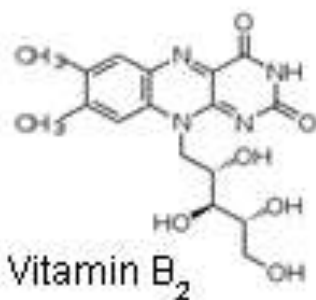
Vitamin B₁



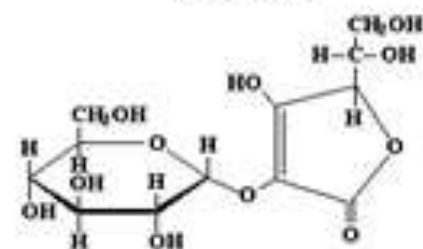
Vitamin B₁₂



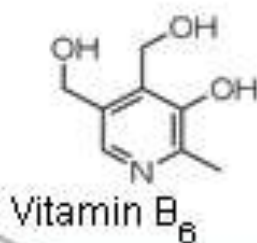
Vitamin C



Vitamin B₂



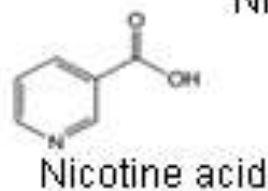
Ascorbic glucoside



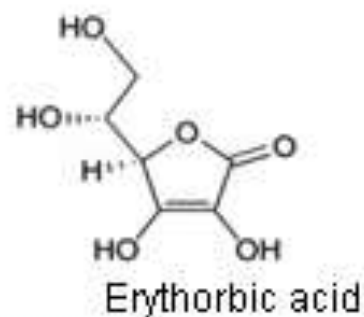
Vitamin B₆



Nicotine amide



Nicotine acid



Erythorbic acid