DEZ AZMA PAJOUH

Vitamins

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LIX. THE NOMENCLATURE OF THE SO-CALLED ACCESSORY FOOD FACTORS (VITAMINS).

By JACK CECIL DRUMMOND.

From the Institute of Physiology, University College, London.

(*Received August 12th, 1920.*)

In 1912 Hopkins published his classical paper in which he described the important influence of certain dietary constituents on the processes of growth and nutrition. These substances he termed the "accessory factors of the diet." At about the same time Funk, who was working on the subject of experimental beriberi, coined the name "Vitamine" for the same class of substances. Since then the literature has been a good deal confused by the great variety of names which have been utilised to denote these or similar dietary constituents (auximones, Bottomley; nutramines, Abderhalden, etc.). The criticism usually raised against Funk's word Vitamine is that the termination "-ine" is one strictly employed in chemical nomenclature to denote substances of a basic character, whereas there is no evidence which supports his original idea that these indispensable dietary constituents are amines. The word has, however, been widely adopted, and therefore until we know more about the actual nature of the substances themselves, it would be difficult and perhaps unwise to eliminate it altogether. The suggestion is now advanced that the final "-e" be dropped, so that the resulting word Vitamin is acceptable under the standard scheme of nomenclature adopted by the Chemical Society, which permits a neutral substance of undefined composition to bear a name ending in "-in." If this suggestion is adopted, it is recommended that the somewhat cumbrous nomenclature introduced by McCollum (Fat-soluble A, Water-soluble B), be dropped, and that the substances be spoken of as Vitamin A, B, C, etc. This simplified scheme should be quite sufficient until such time as the factors are isolated, and their true nature identified.

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Lipid-soluble vitamins

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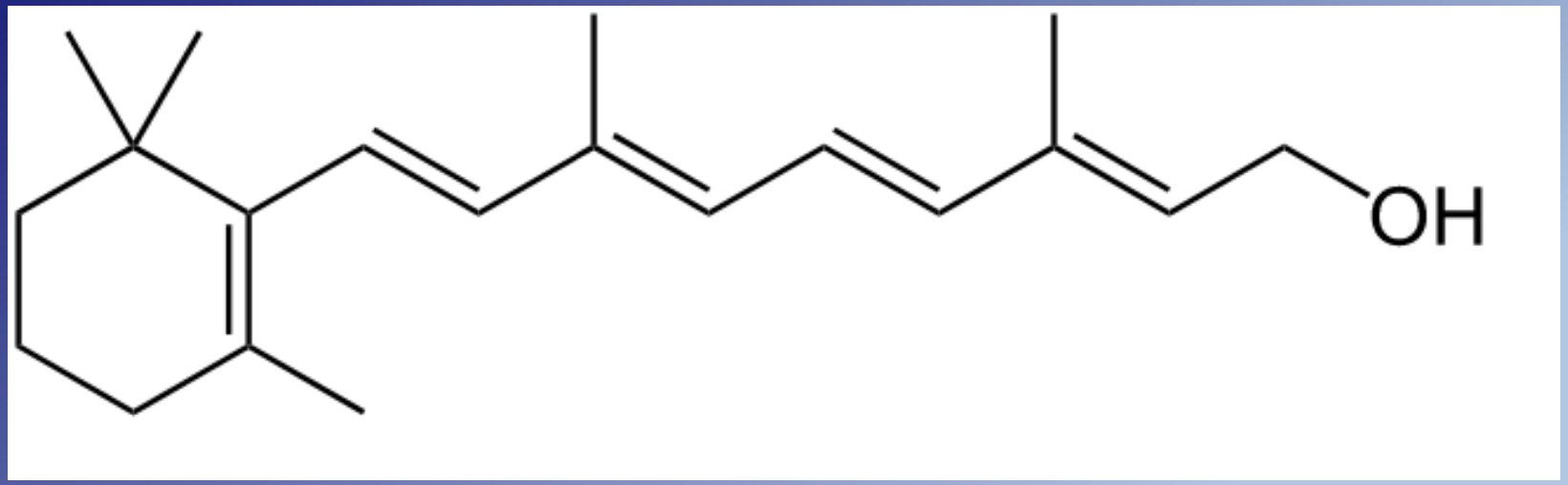
Vitamin A
Retinol, Retinal, Retinoic acid



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Vitamin A

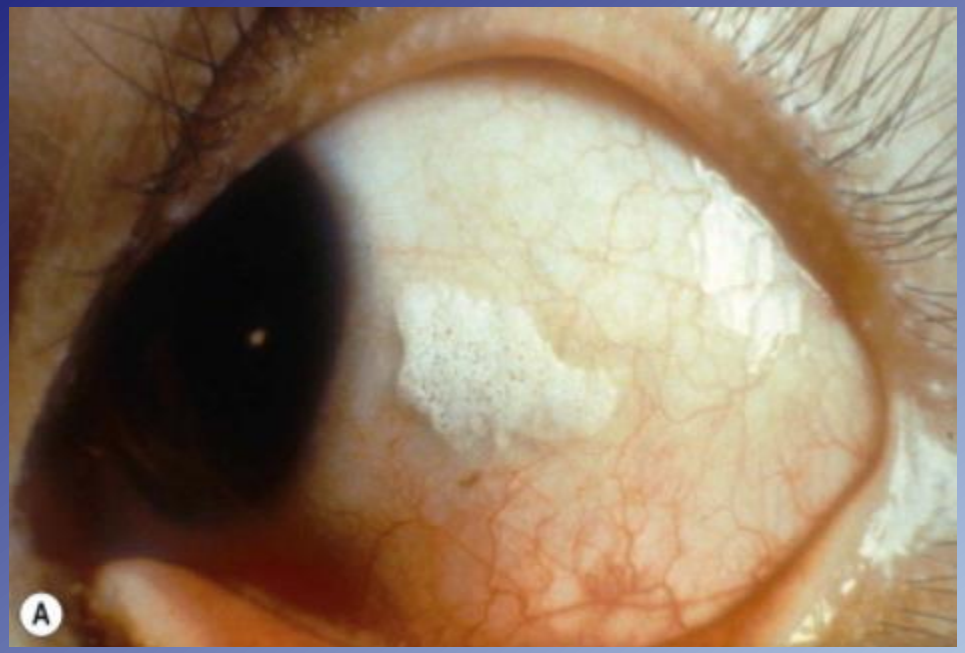
Rhodopsin

Gene expression

Antioxidant

Vitamin A: Nictalopia

Vitamin A deficiency: Bitot's spot



Vitamin A deficiency: keratomalacia

Vitamin A deficiency: blindness

Vitamin D

Name	Chemical composition
Vitamin D_1	Ergocalciferol with Lumisterol
Vitamin D_2	Ergocalciferol
Vitamin D_3	Cholecalciferol
Vitamin D_4	22-Dihydroergocalciferol
Vitamin D_5	Sitocalciferol

Vitamin D

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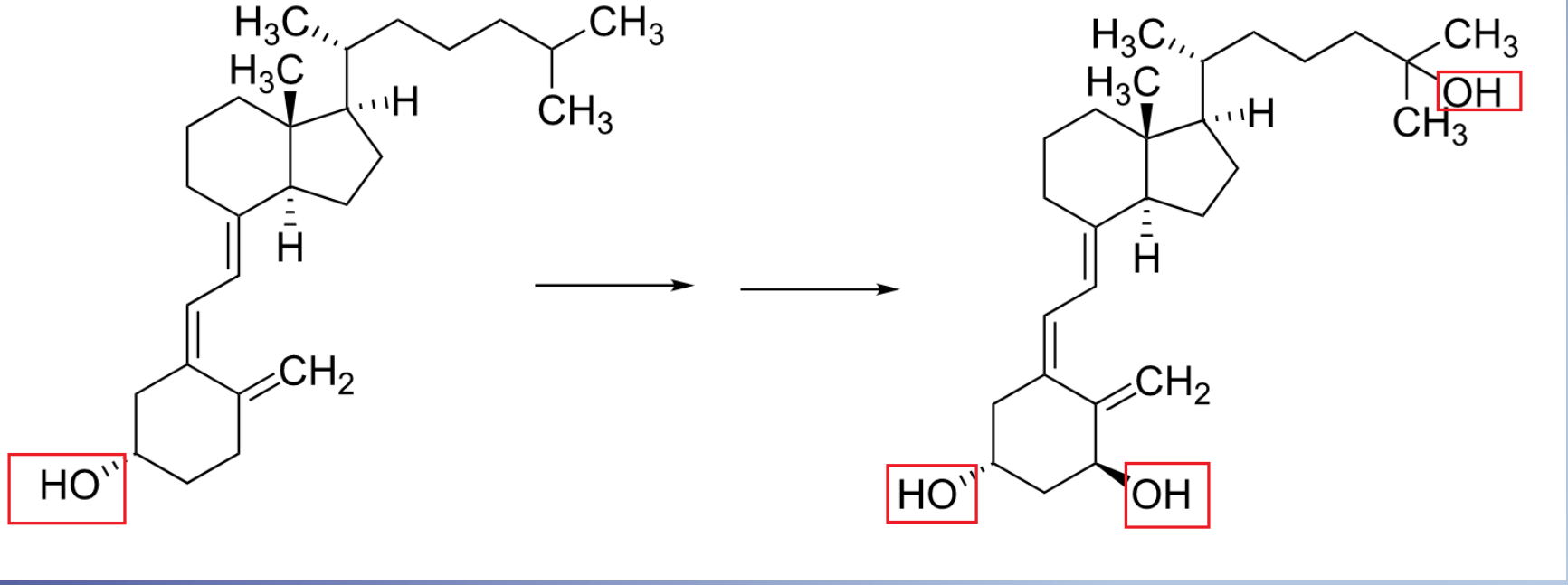
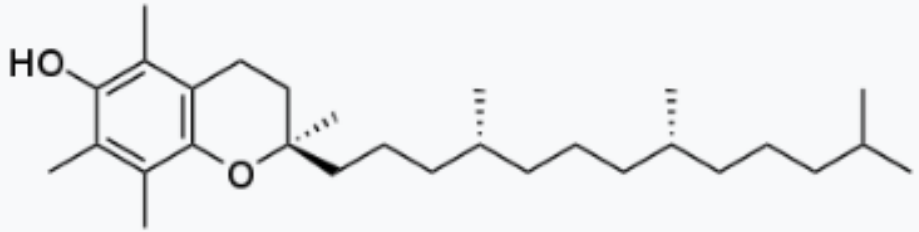
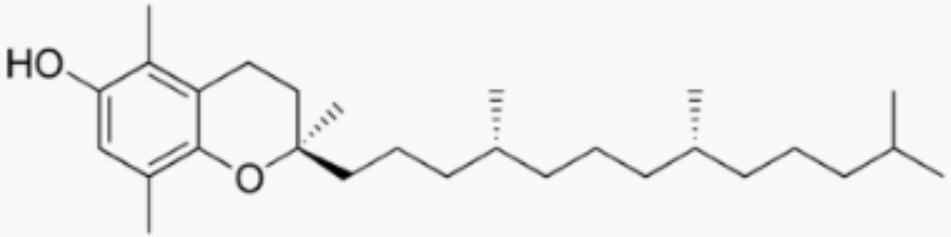
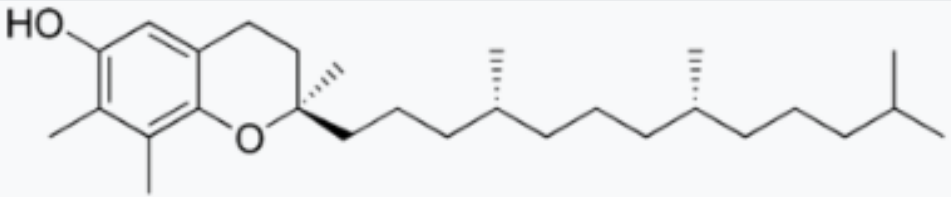
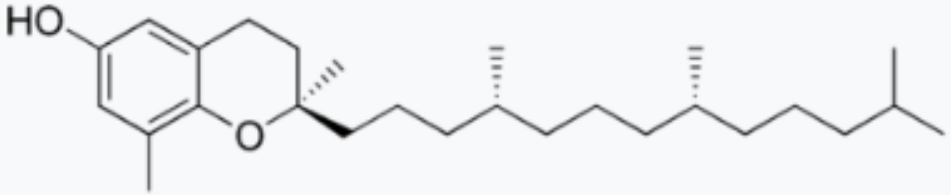
Cholecalciferol Calcitriol



Vitamin D deficiency: Rickets

Vitamin E

Form	Structure
alpha-Tocopherol	
beta-Tocopherol	
gamma-Tocopherol	
delta-Tocopherol	

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Vitamin E

Antioxidant

Signal transduction

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Vitamin E Deficiency

Hemolytic Anemia

Retinopathy

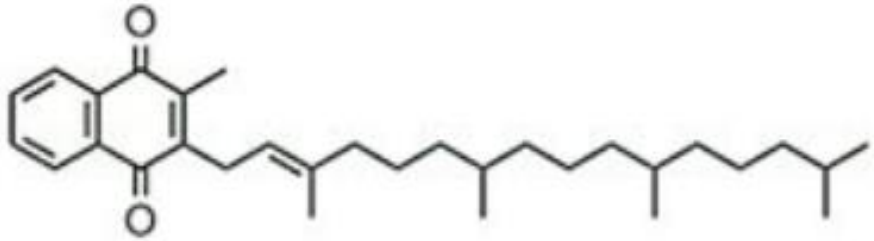
Neural defects

Neuromuscular defects

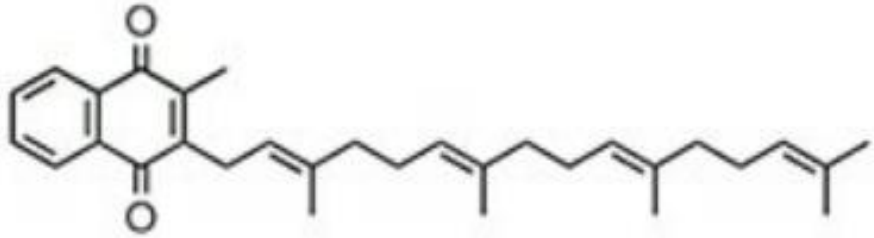
Vitamin K

Phylloquinone, Menaquinone, Menadione

K1



MK-4



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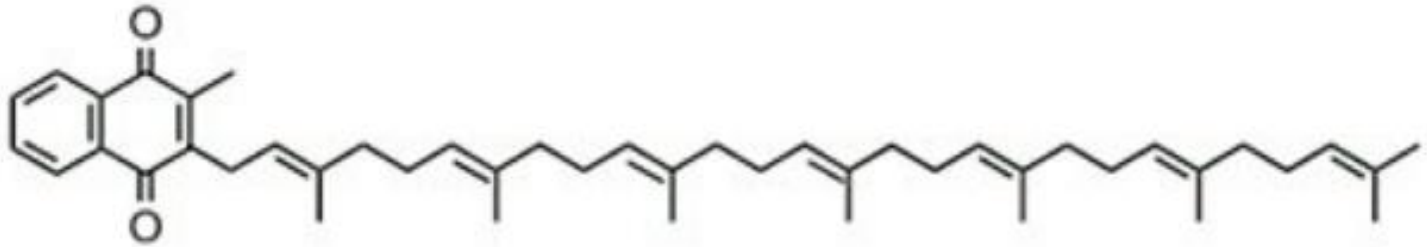

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Vitamin K

Carboxylases:

Liver: Coagulation factors

Bone: Osteocalcin

DEZ
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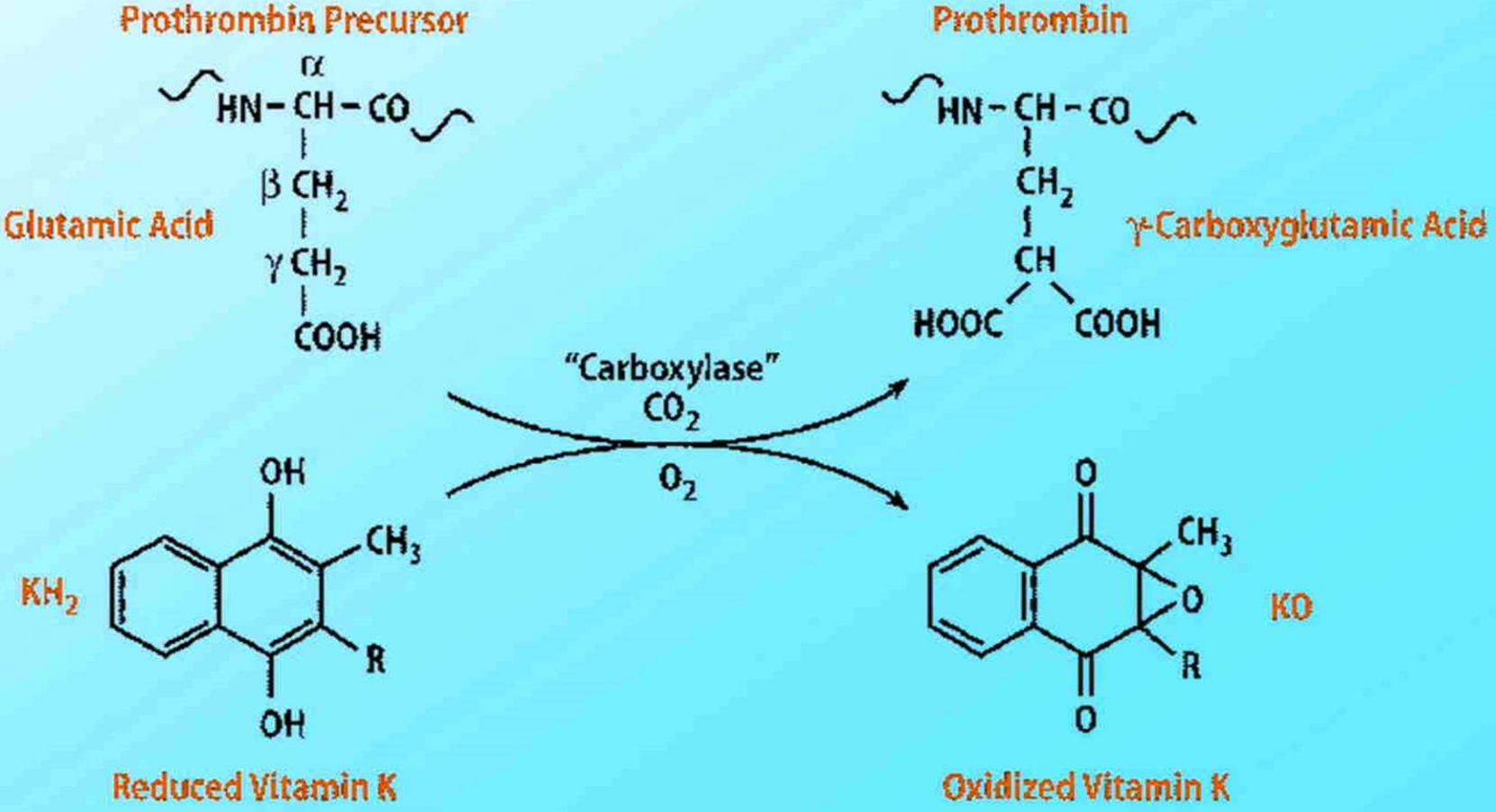

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Vit. K Deficiency

Hemorrhagia

Vit. K Deficiency: Hematoma

Vit. K Deficiency: Petechiae

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Vit. K Deficiency in newborns

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Water-soluble vitamins

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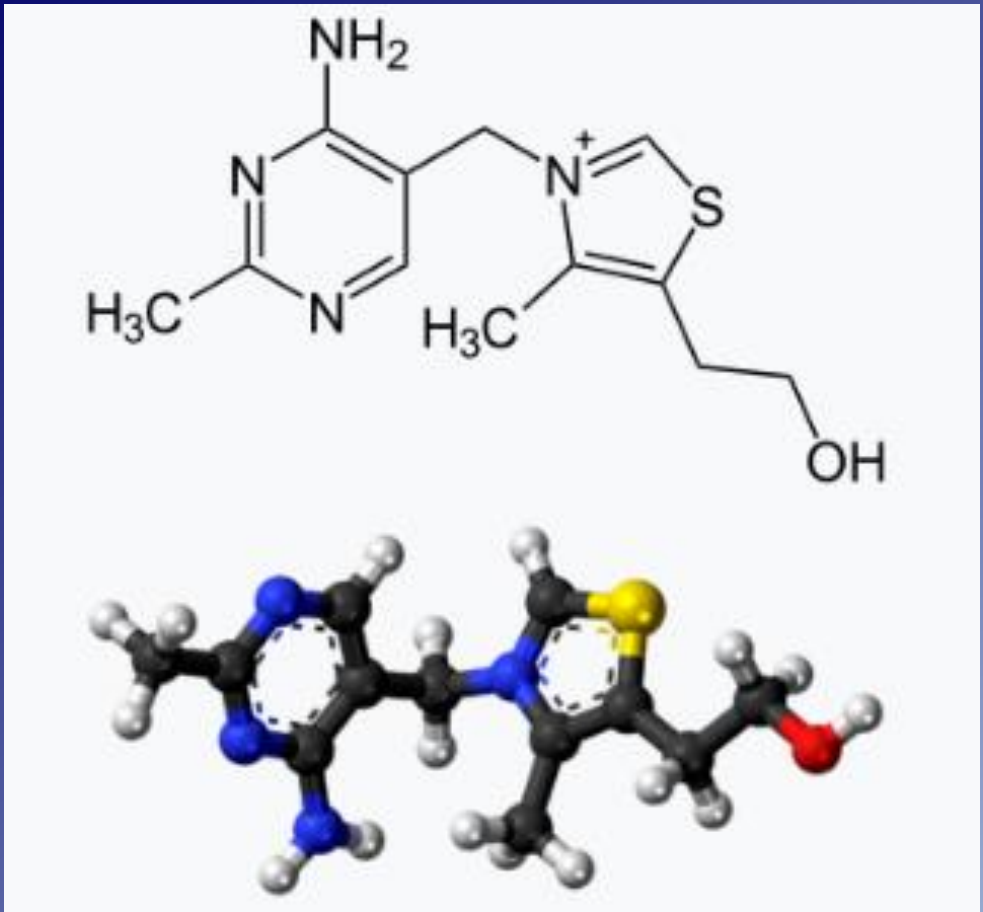
B1: Thiamin,

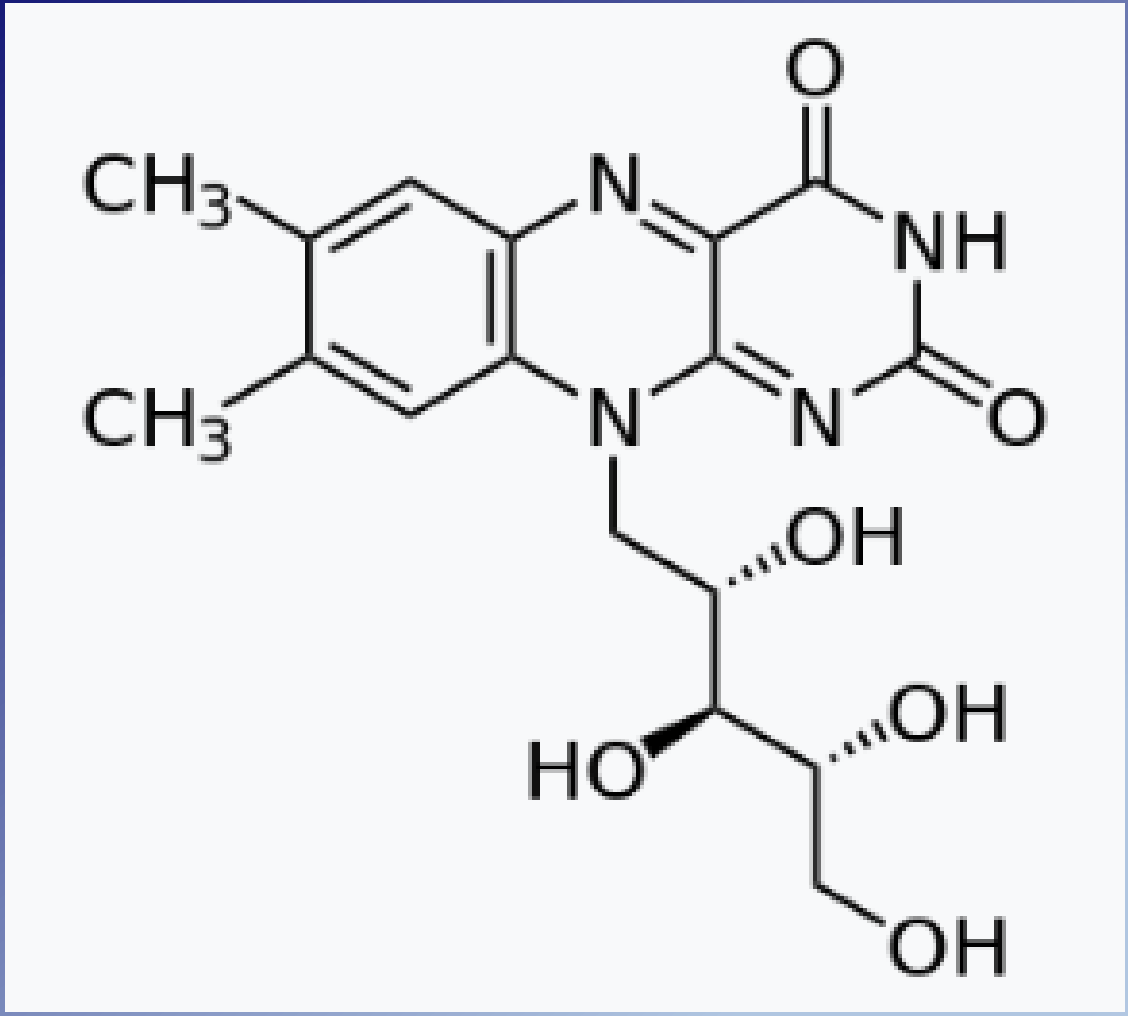


TPP: thiamine pyrophosphate

Decarboxylases

Beriberi

B2, Riboflavin



FAD: Flavine Adenine Dinucleotide

FMN: Flavine Mono Nucleotide

Dehydrogenases

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Angular Cheilitis

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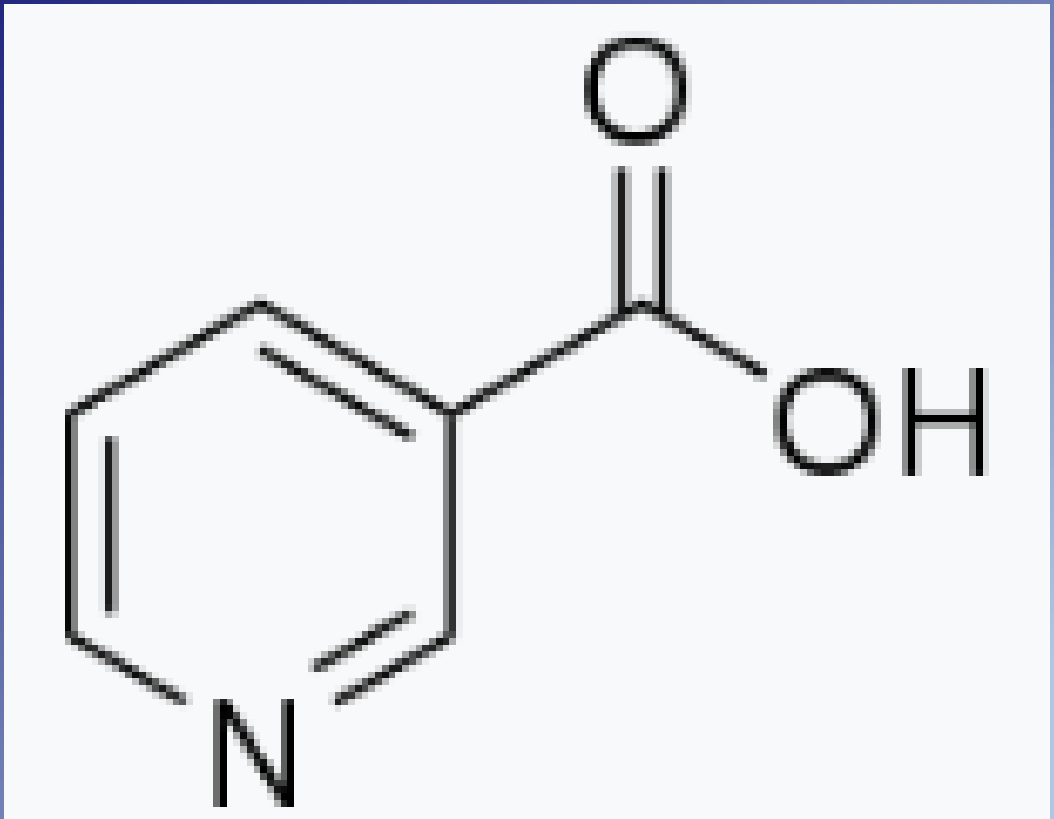
Angular Cheilitis

B3, Niacin



NAD: Niacin Amide Adenine Dinucleotide

NADP: Niacin Amide Adenine Dinucleotide Phosphate

Dehydrogenases

Dermatitis

Pellagra

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Niacin

4D:

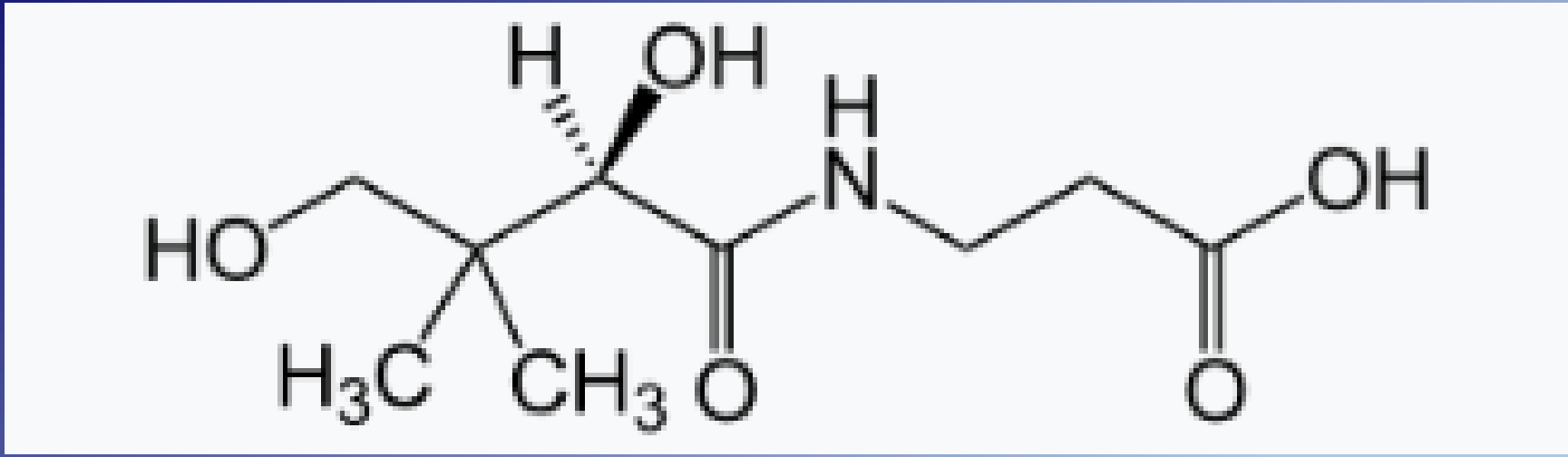
Diarrhea

Dermatitis

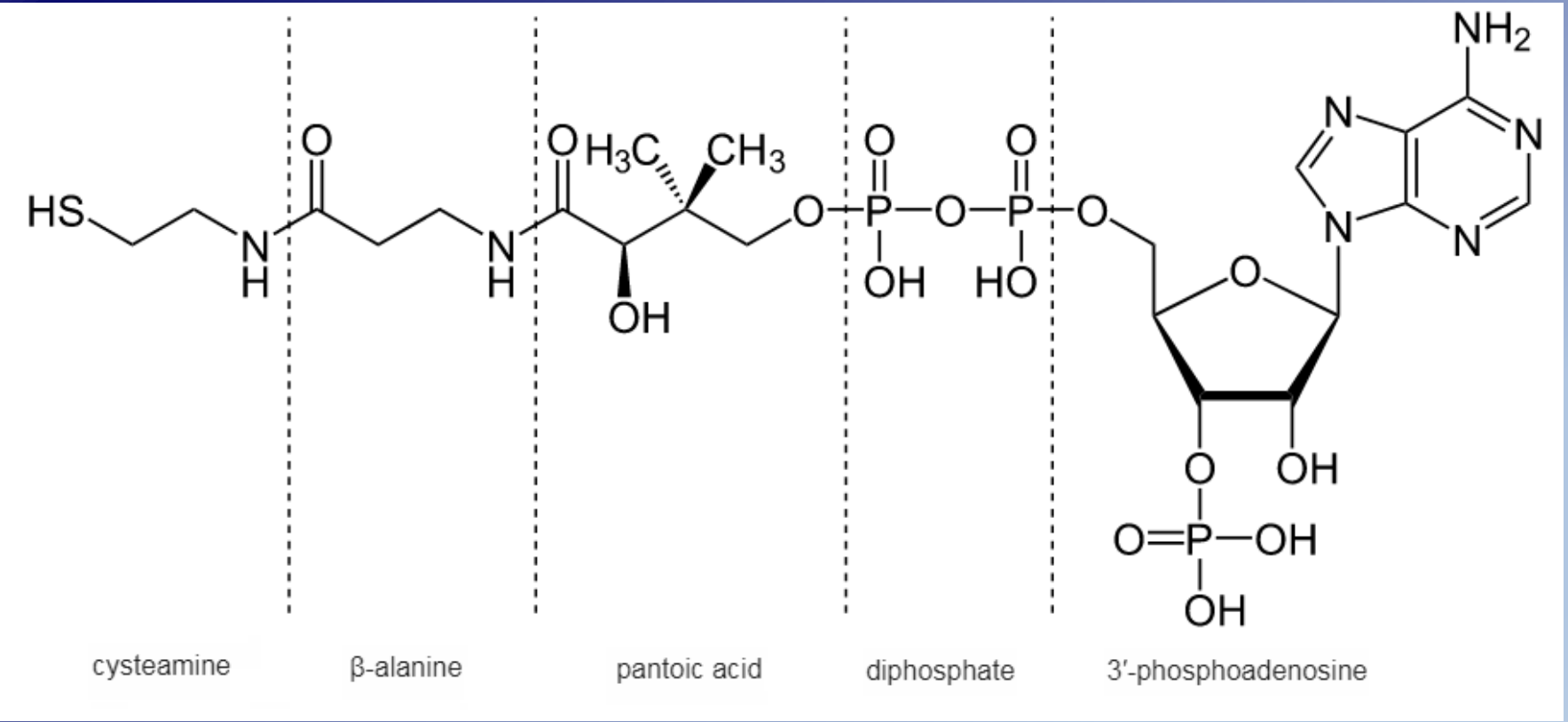
Dementia

Death

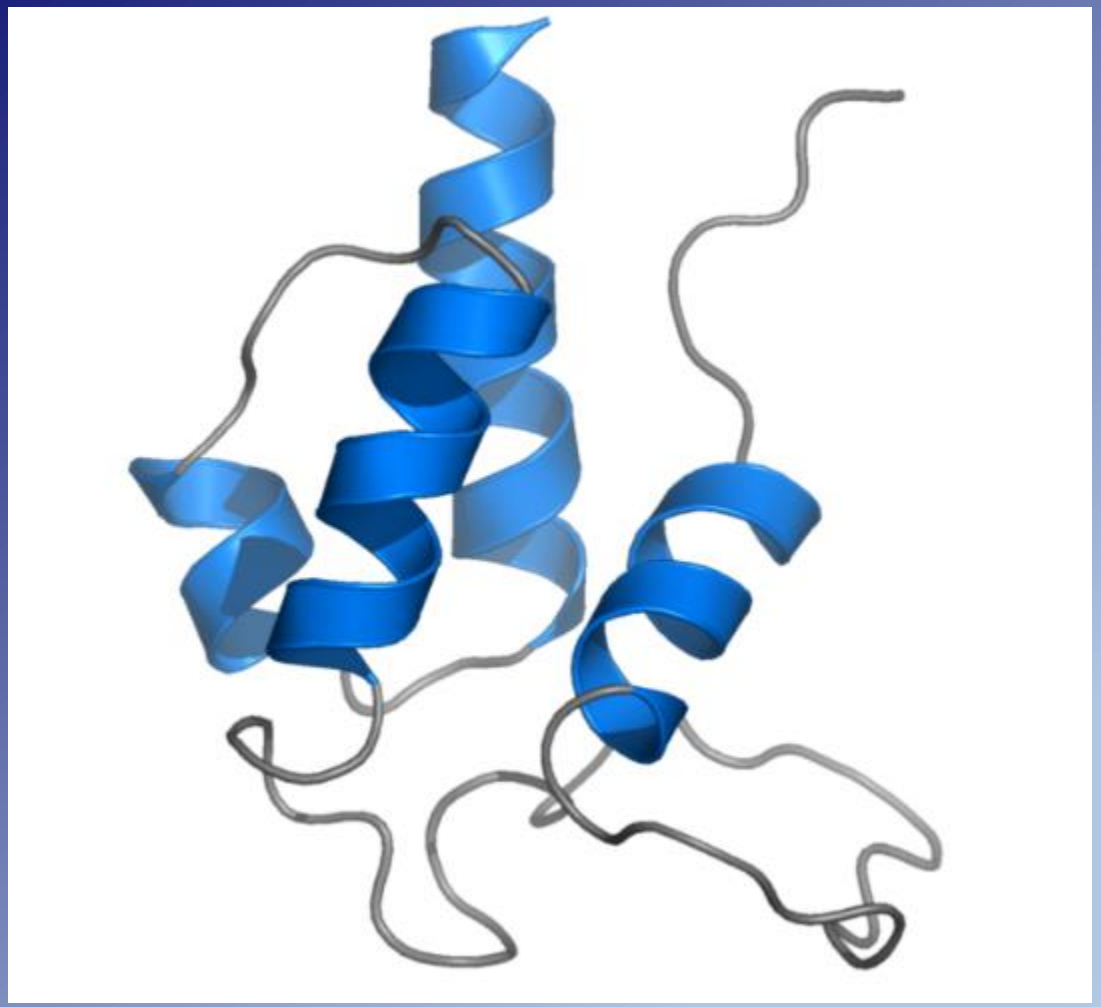
B5
Pantothenic acid



HS CoA:
Acyl Carrier



Acyl Carrier Protein:
Fatty Acid Synthesis



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B6
Pyridoxine, Pyridoxal

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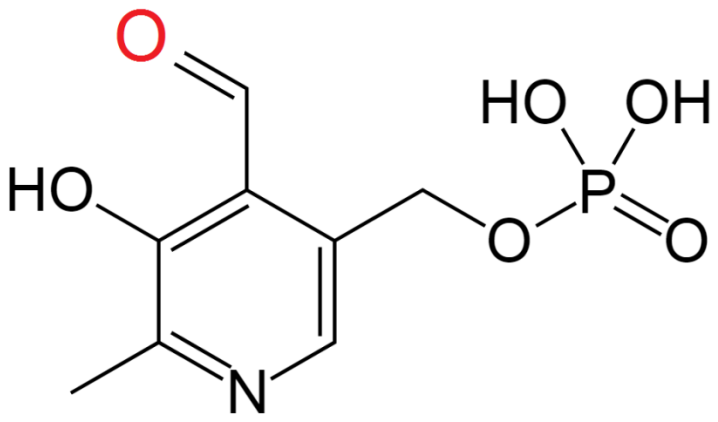
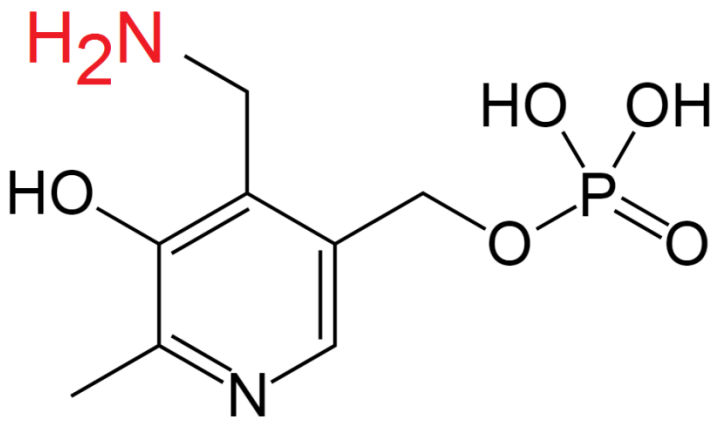
Pyridoxal Phosphate



Pyridoxamine Phosphate



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B6

Anemia

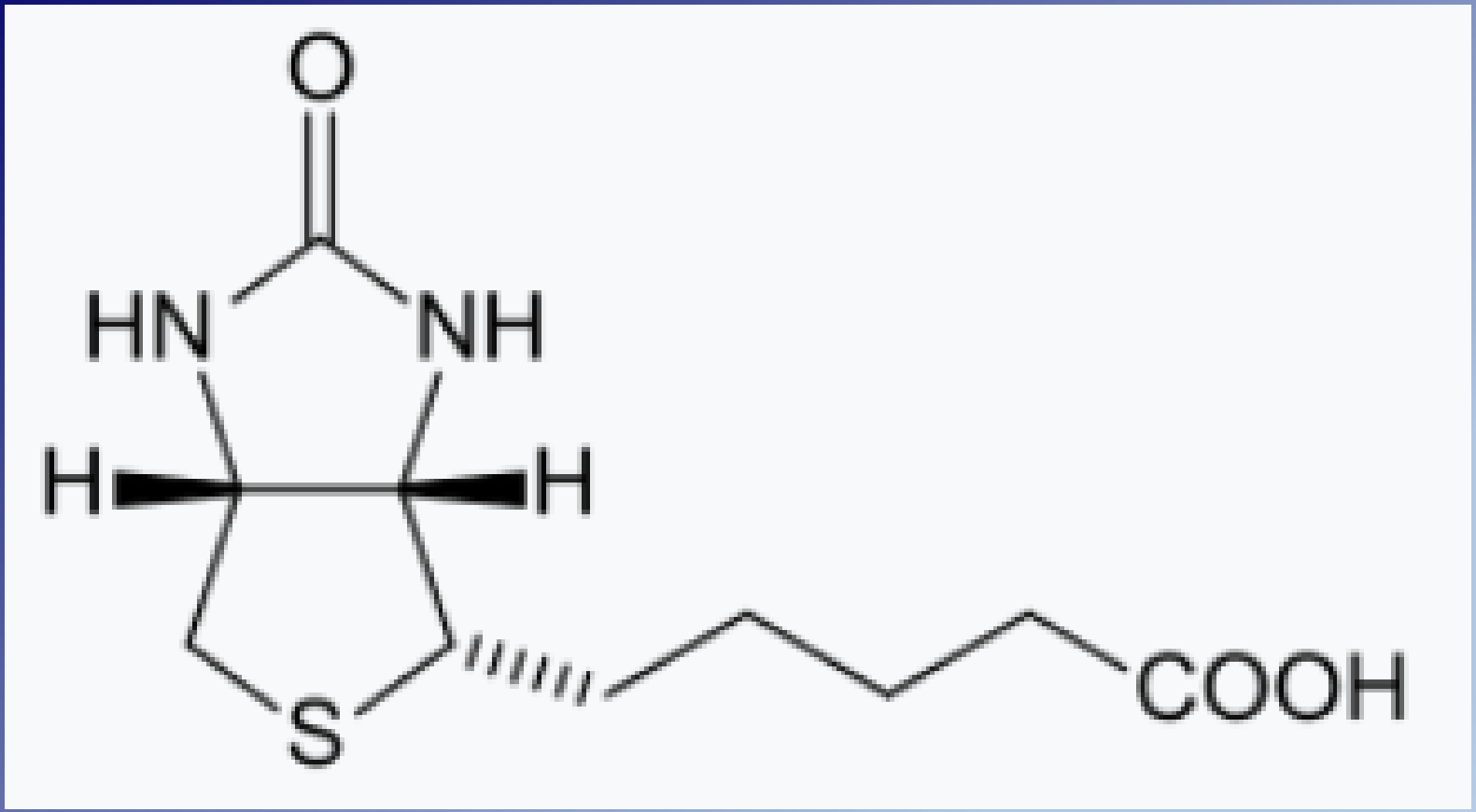
Hair loss

Dermatitis

Fungal infections

B6: Seborrhoeic dermatitis

B7: Biotin



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B7: Biotin

Carboxylases:

Gluconeogenesis

Fatty acid synthesis

B7 (Biotin): Rash

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B7: Biotin

Anemia

Hair loss

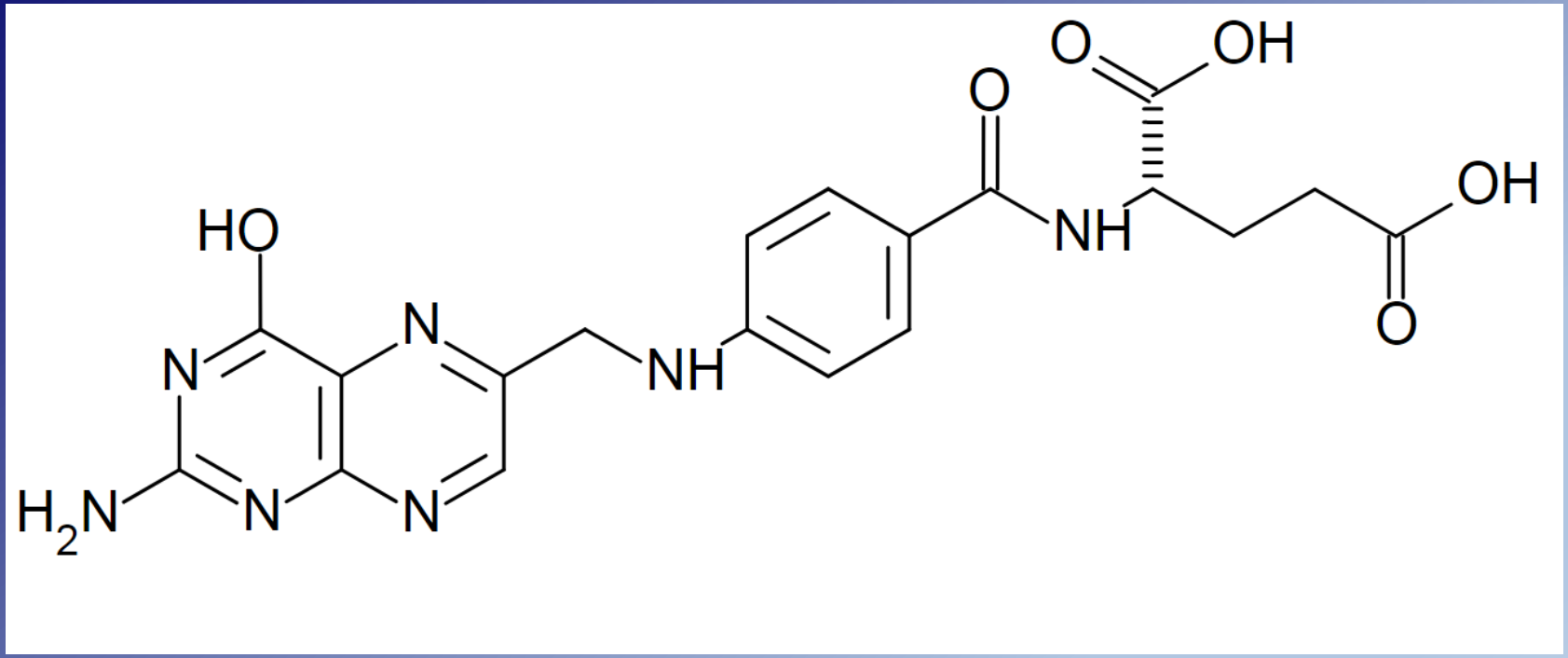
Dermatitis

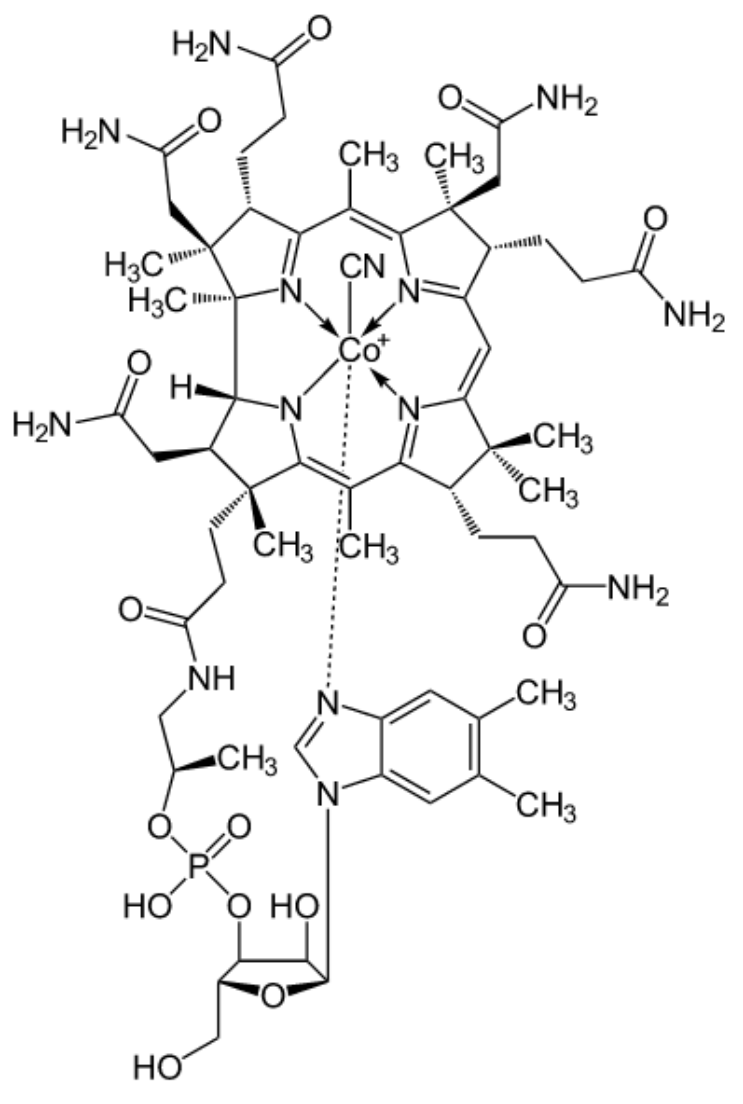
Fungal infections

B9: Folic Acid, Folate

Transfers

reduced one carbon groups groups

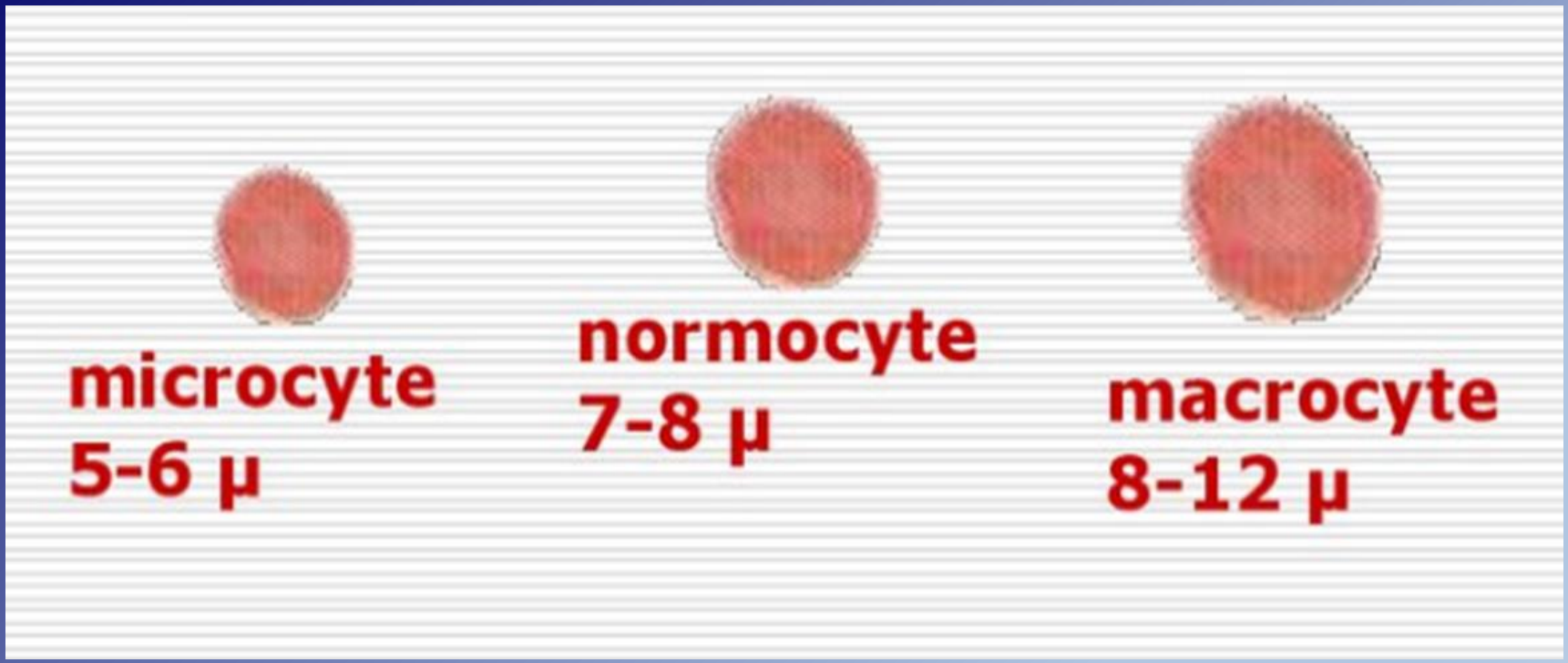




B12:Cyanocobalamine

Reduced one carbon groups

Folic Acid :Microcytic anemia



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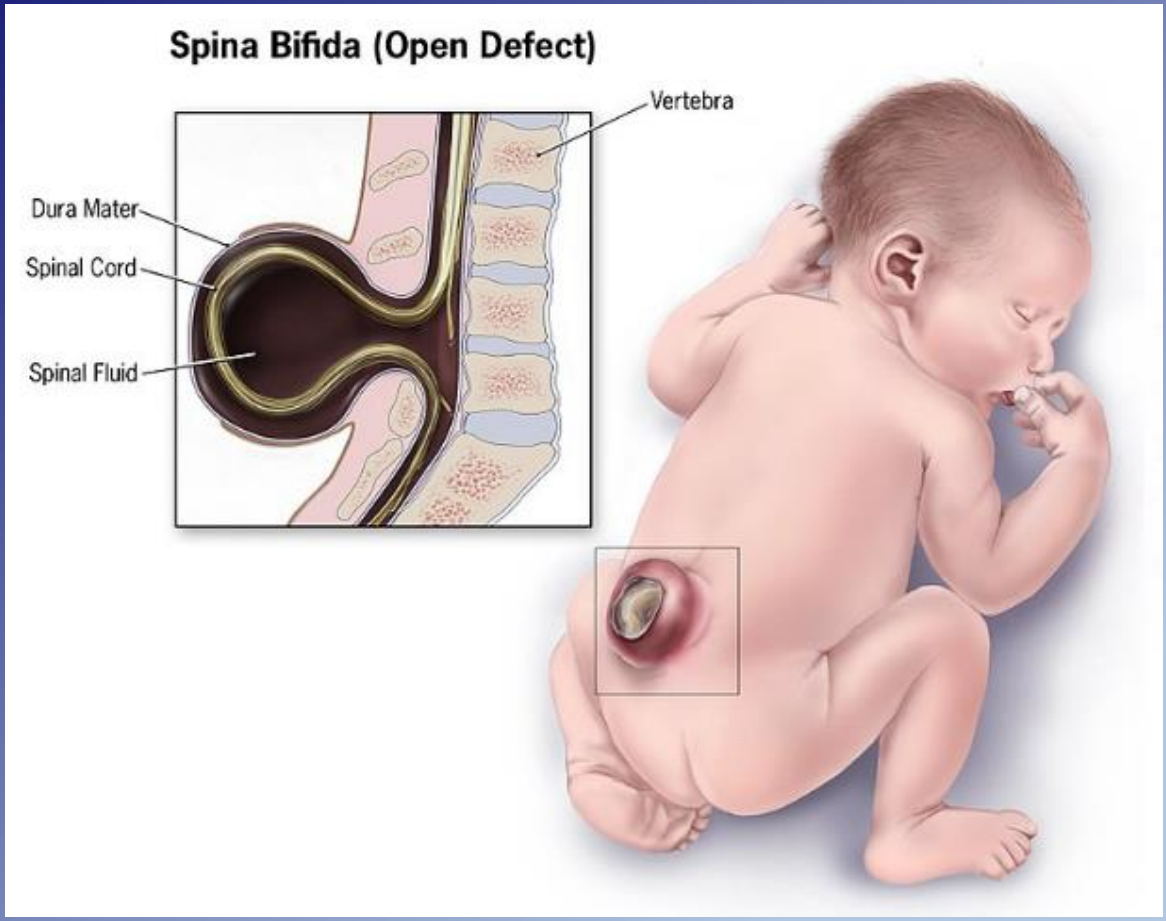
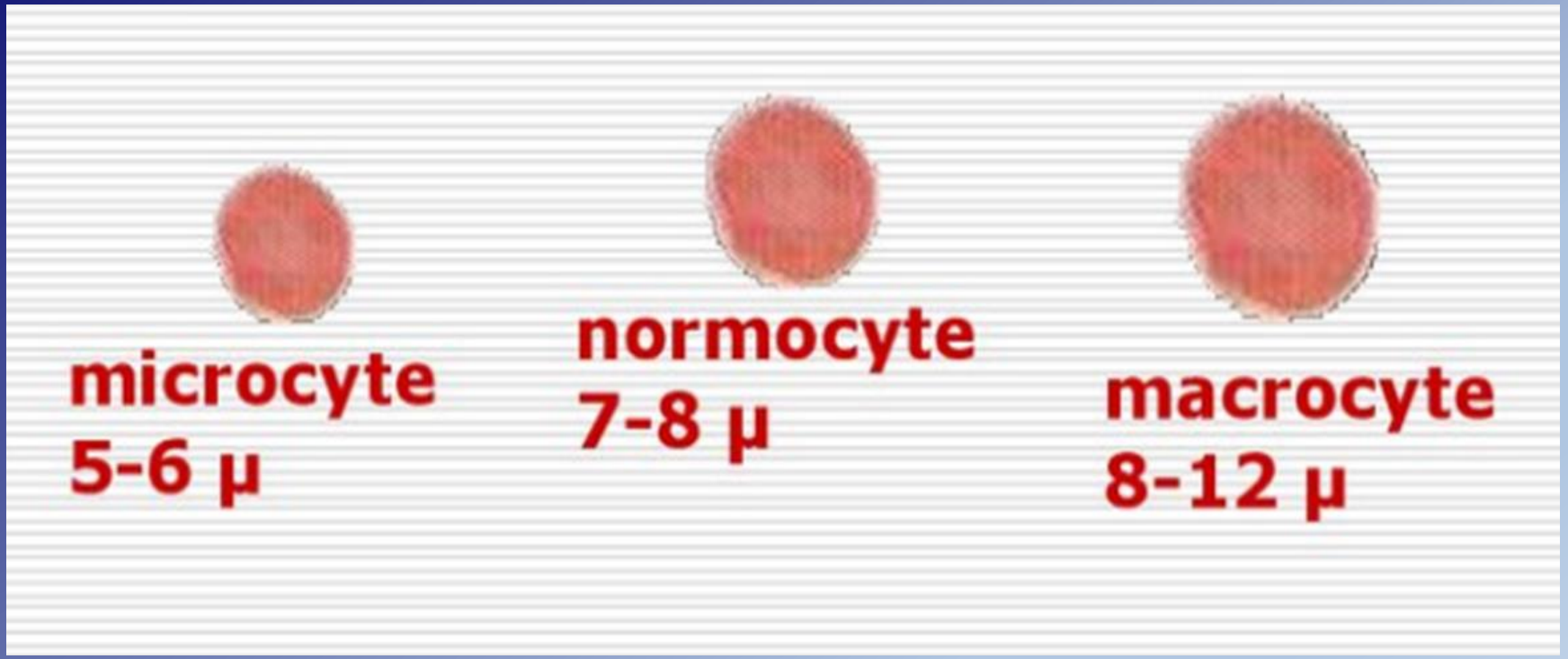
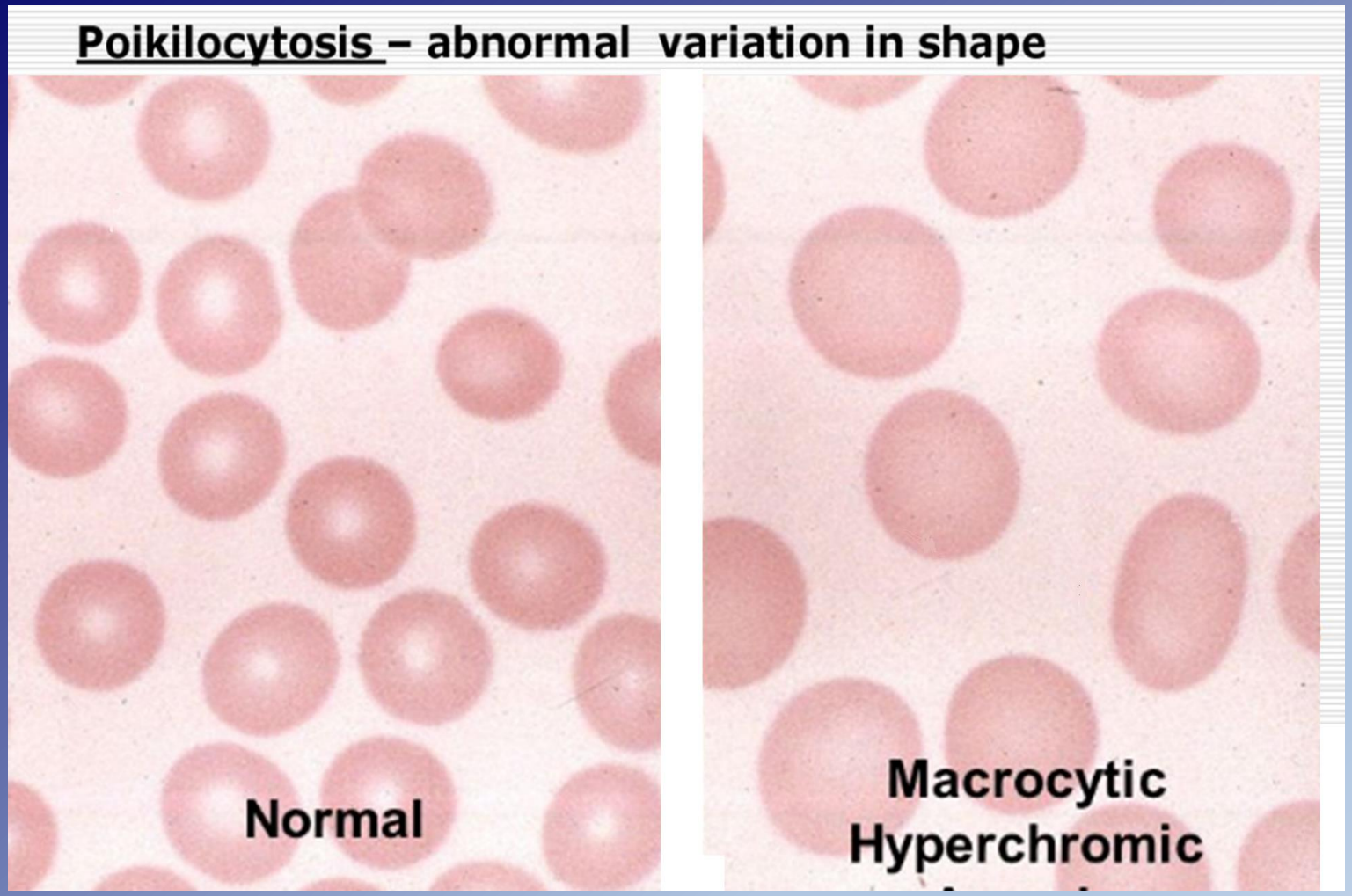
Folic Acid: Neural tube defects



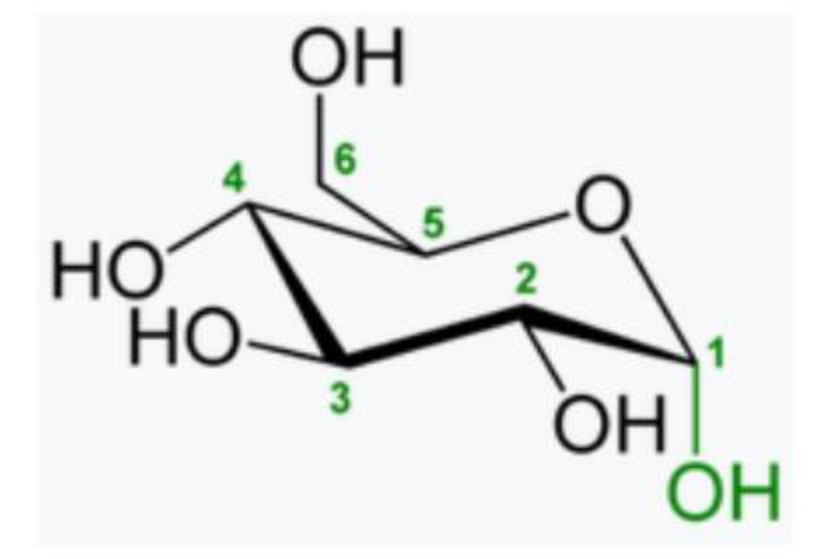
B12 deficiency:
Macrocytic anemia

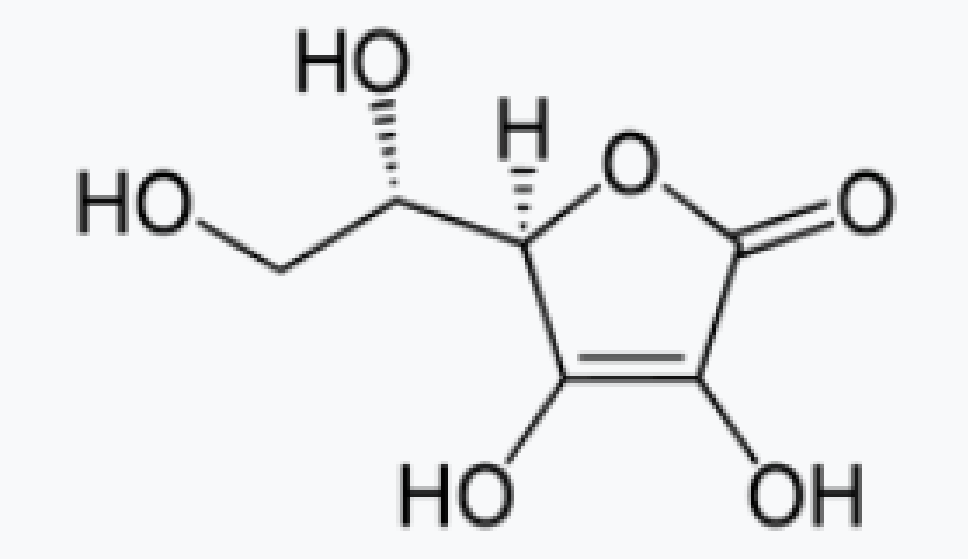


B12 deficiency
Macrocytic anemia

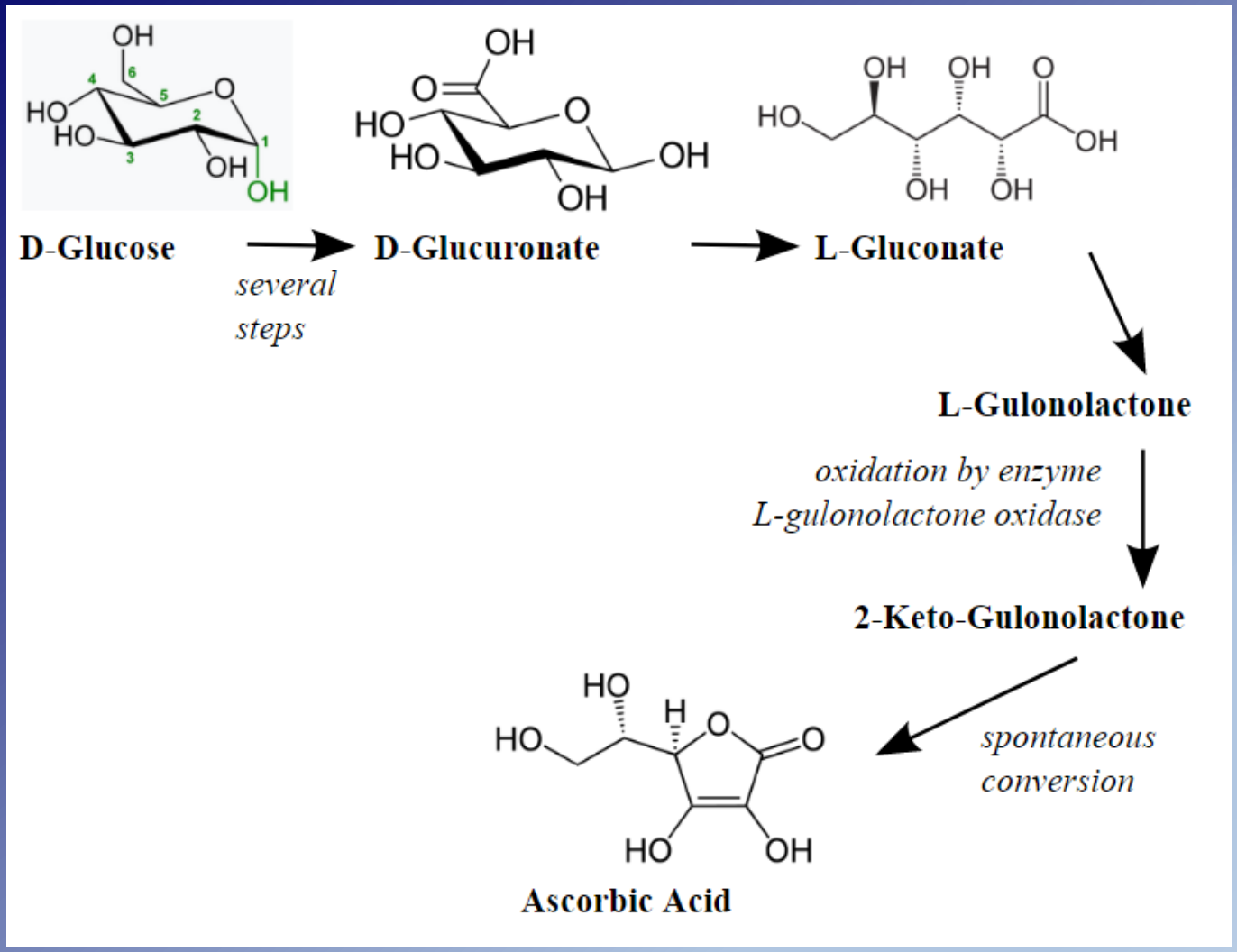


Vitamin C
Ascorbic acid, Ascorbate





Vitamin C


D-Glucose
several steps
D-Glucuronate
L-Gluconate
L-Gulonolactone
oxidation by enzyme L-gulonolactone oxidase
2-Keto-Gulonolactone
spontaneous conversion
Ascorbic Acid

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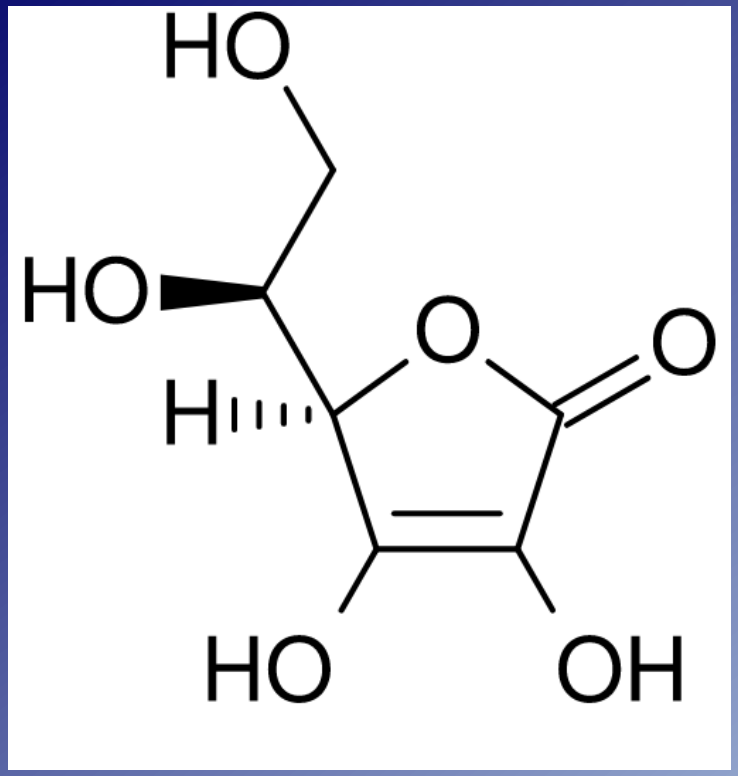
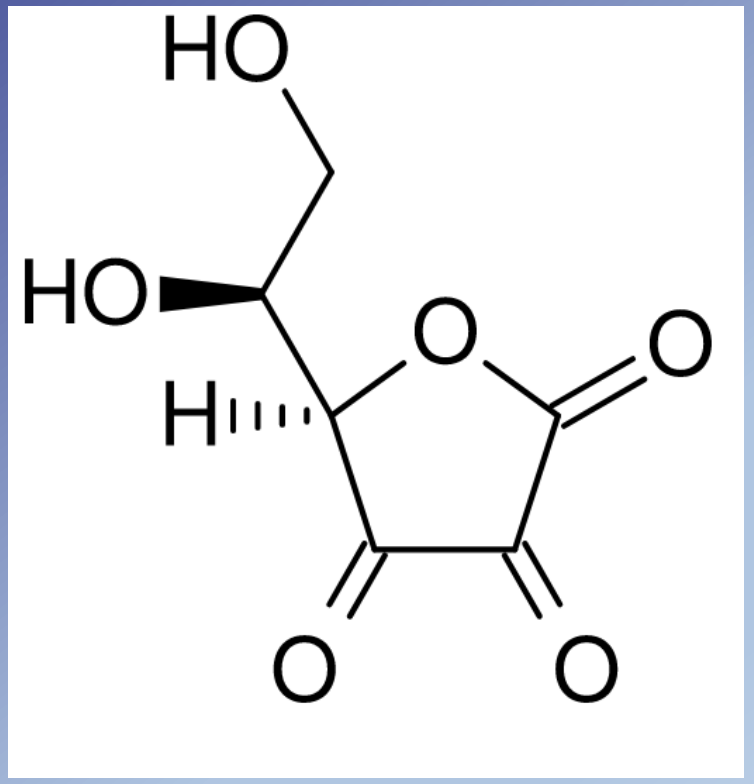
Reduced



Oxidized



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Vitamin C

Hydroxylases

Iron absorption

Antioxidant

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