

Vitamins

General

By the end of XIX century it was known:

Balanced diet

Carbohydrates

Fats

Proteins

Minerals

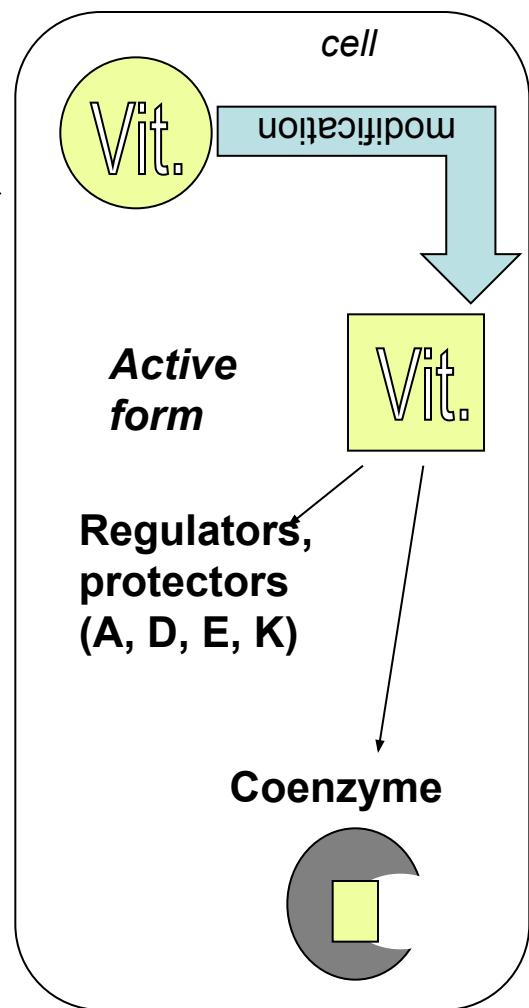
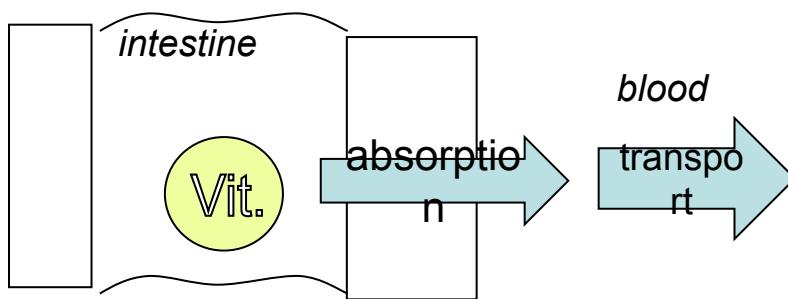
?

- Nevertheless the specific disorders (beri-beri, scurvy, pellagra etc.) were developing

1911 Funk obtained the substance that prevent beriberi from bran of rice and gave it's the name - *Vitamin (vita – life)*

→ **5th element**

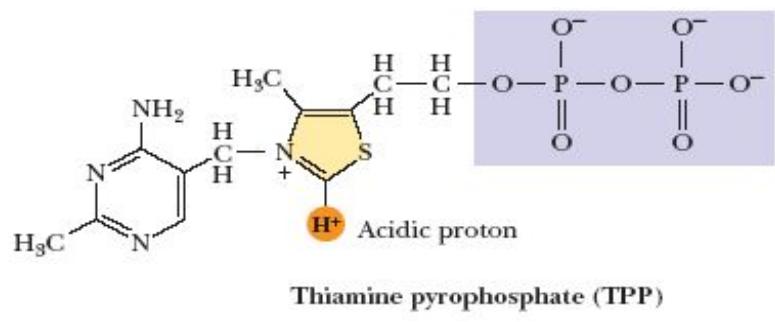
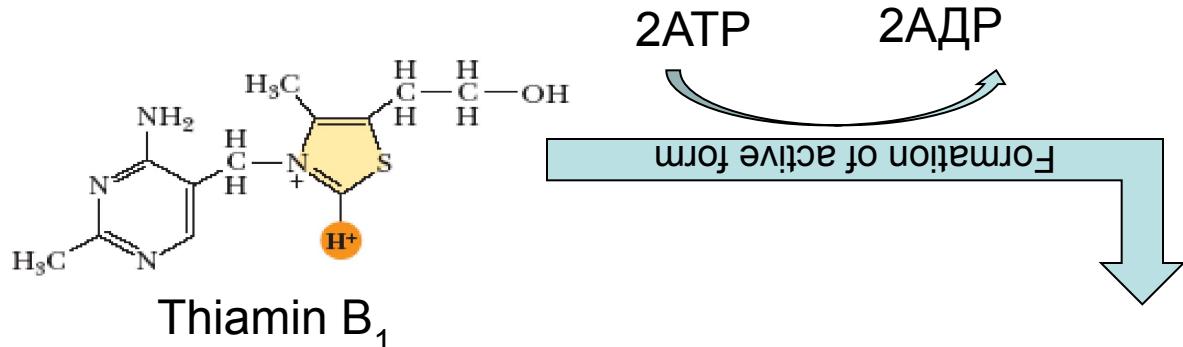
Metabolism and functions



The two main functions:

1. Serve as the coenzyme for the composite enzymes
2. Serve as regulators (D, A), protectors (A, E) and other specific functions (vision)

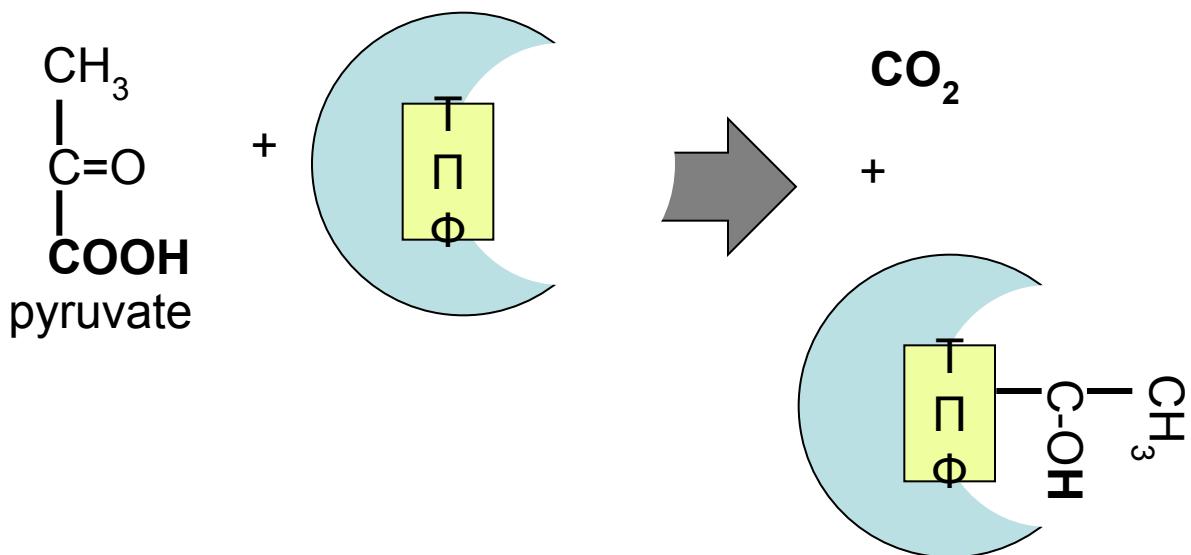
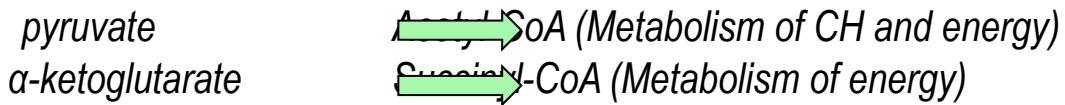
B1 (Thiamine)



Thiamine pyrophosphate (TPP)

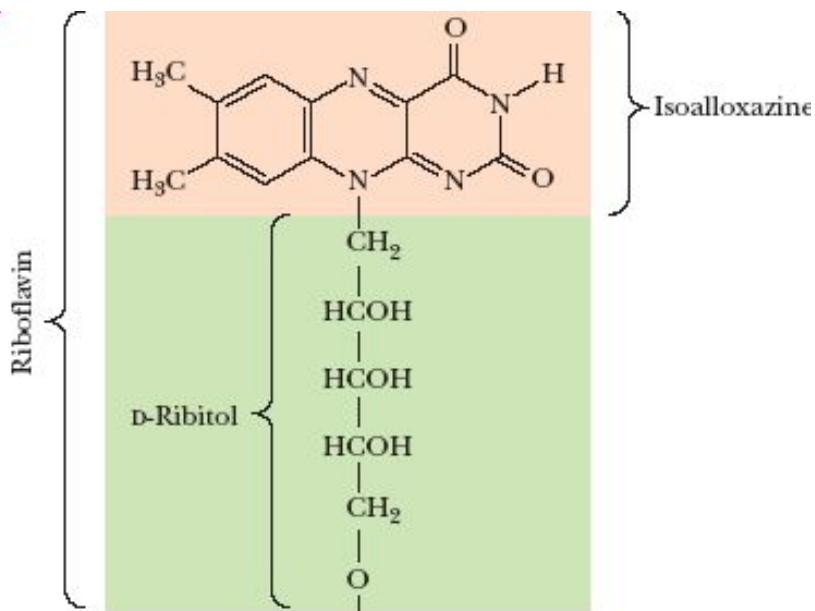
Biological role:

- Oxidative decarboxylation of pyruvate

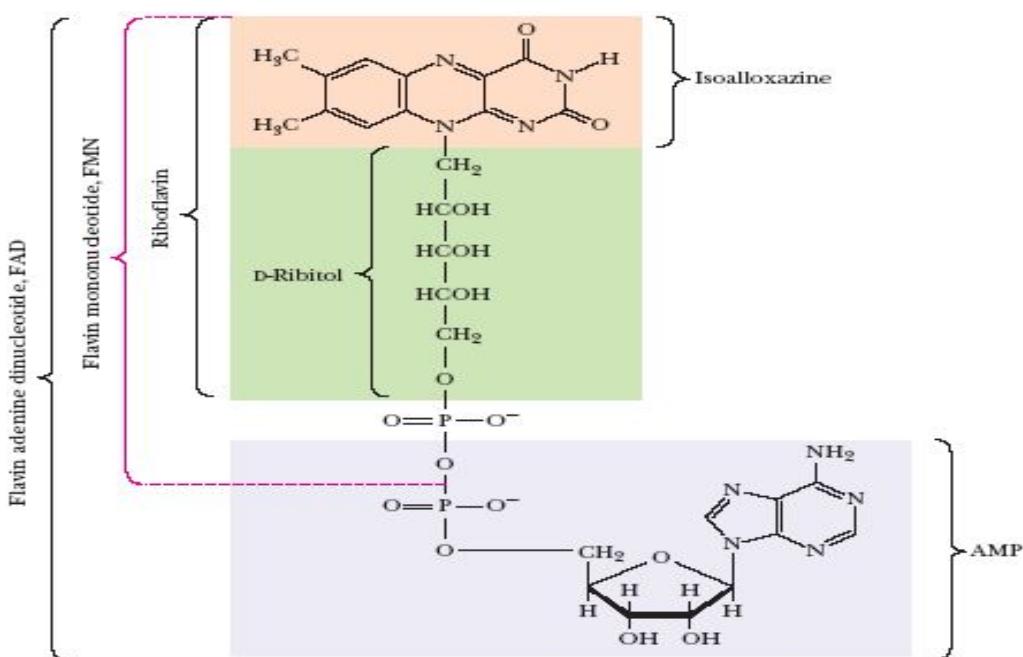


- Interconversions of pentoses (транскетолазная реакция)

B2 (Riboflavin)



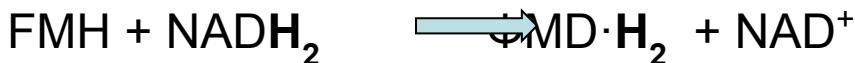
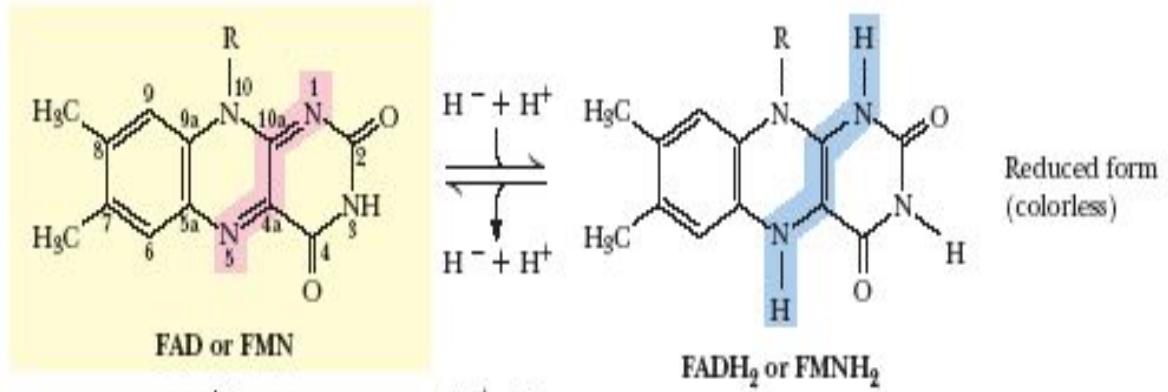
B₂ has 2 coenzyme forms: **FMN** и **FAD**



Vitamin B₂

Biological role:

- Transfer of hydrogen atoms



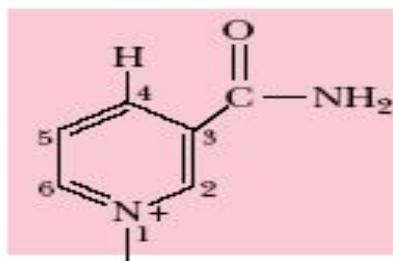
Desorder:

Dermatitis

**stomatitis, glossitis
angular stomatitis
Seborrhea**

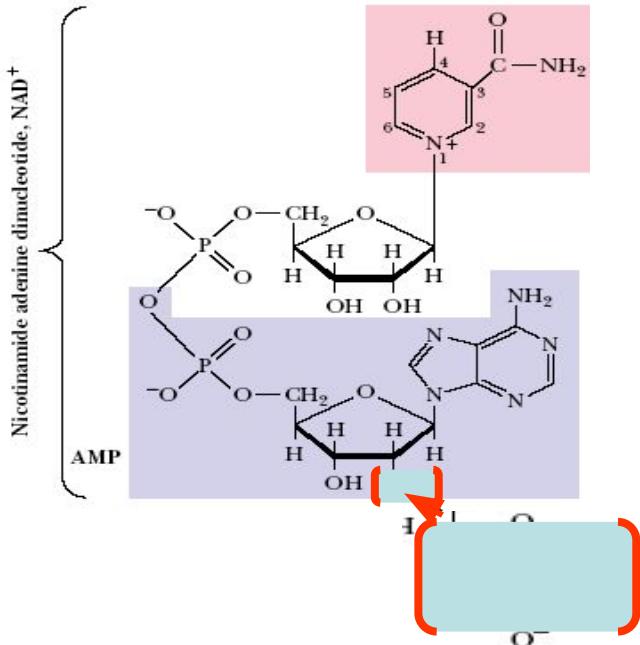
B3 or PP (Niacin)

Nicotinamide
(oxidized form)



Niacin

Nicotinamide
(oxidized form)

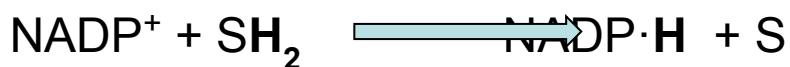
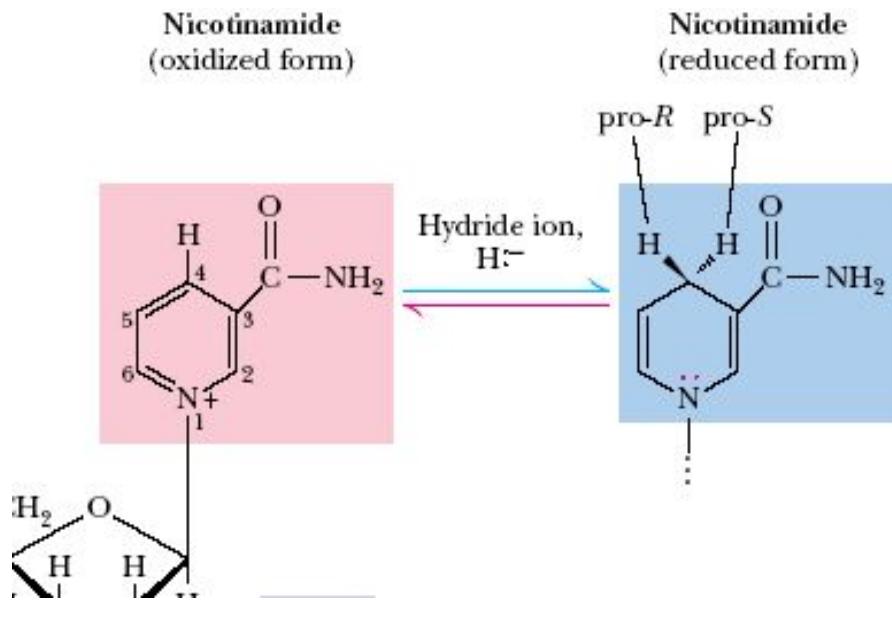


2 coenzyme forms: **NAD⁺** **NADP⁺**

Витамин B_3

Biological role:

- Hydrogen atoms transfer



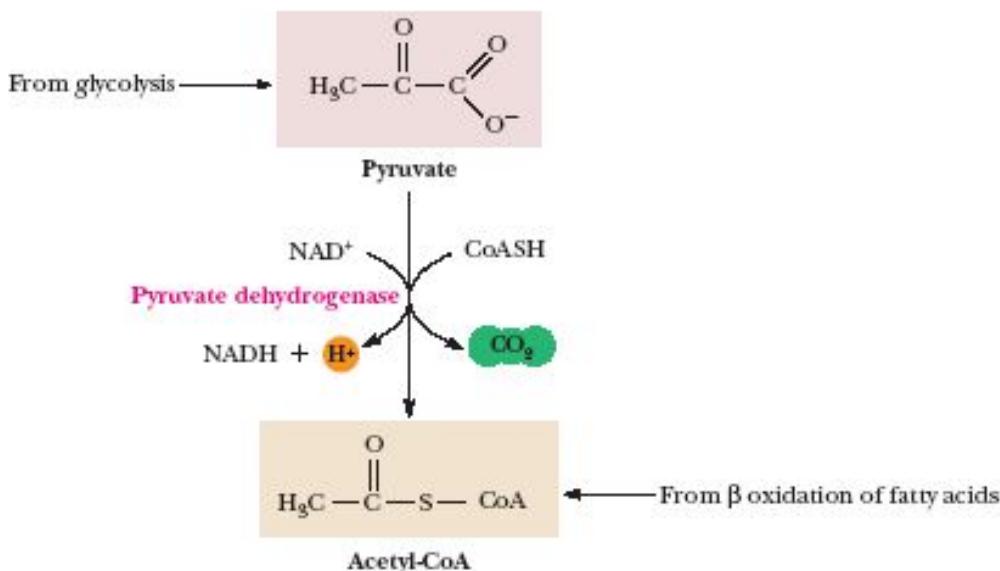
Desorder: pellagra (3 «Д»)

- Dermatitis of the exposed to sunlight sites of skin
- Dementia
- Diarrhea

Витамин В₅

Биологическая роль:

- Перенос ацильных групп (Цикл Кребса, обмен ВЖК и пр.)



Pantos!!!

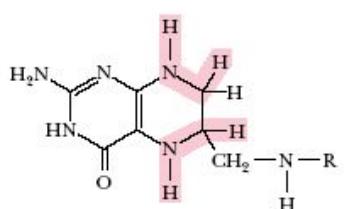
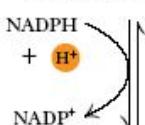
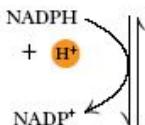
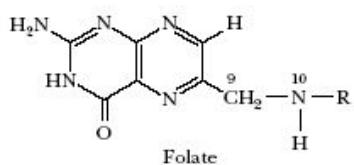
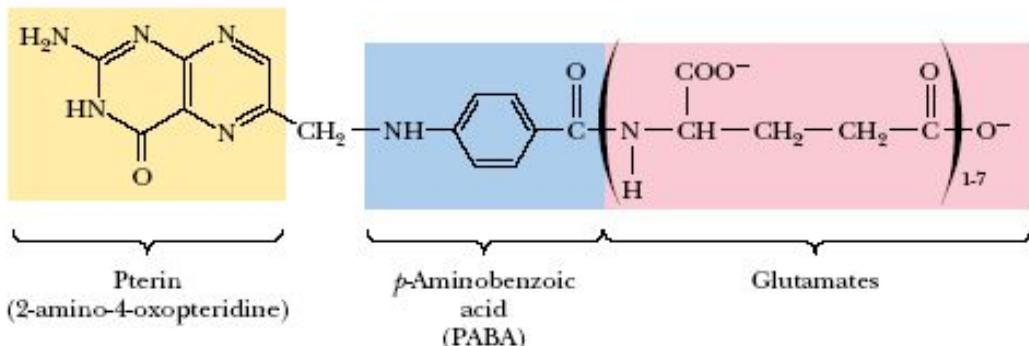
Заболевание:

- Понес
- Дерматит
- Остановка роста
- Поседение шерсти, алопеция
- Повреждение нервной ткани, почек, надпочечников, сердца



Bc (Folic acid)

Folic acid



Coenzyme form:
**Tetrahydrofolic acid
(THFA)**

Tetrahydrofolate

Biological role:

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Oxidation States of Carbon in 1-Carbon Units Carried by Tetrahydrofolate

Oxidation Number*	Oxidation Level	One-Carbon Form [†]	Tetrahydrofolate Form
-2	Methanol (most reduced)	—CH ₃	N ⁵ -Methyl-THF
0	Formaldehyde	—CH ₂ —	N ⁵ ,N ¹⁰ -Methylene-THF
2	Formate (most oxidized)	—CH=O —CH=O —CH=NH —CH=	N ⁵ -Formyl-THF N ¹⁰ -Formyl-THF N ⁵ -Formimino-THF N ⁵ ,N ¹⁰ -Methenyl-THF

- Main source of 1-C units - serine

