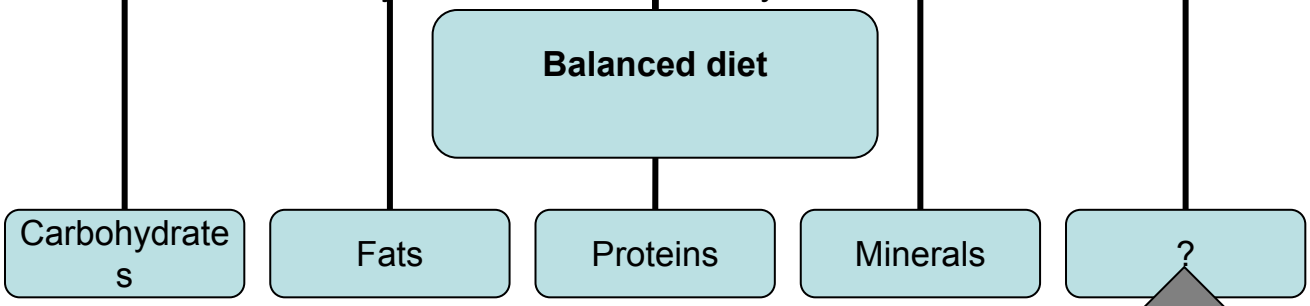
Vitamins

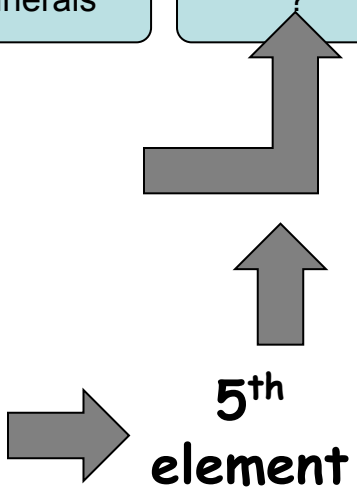
General

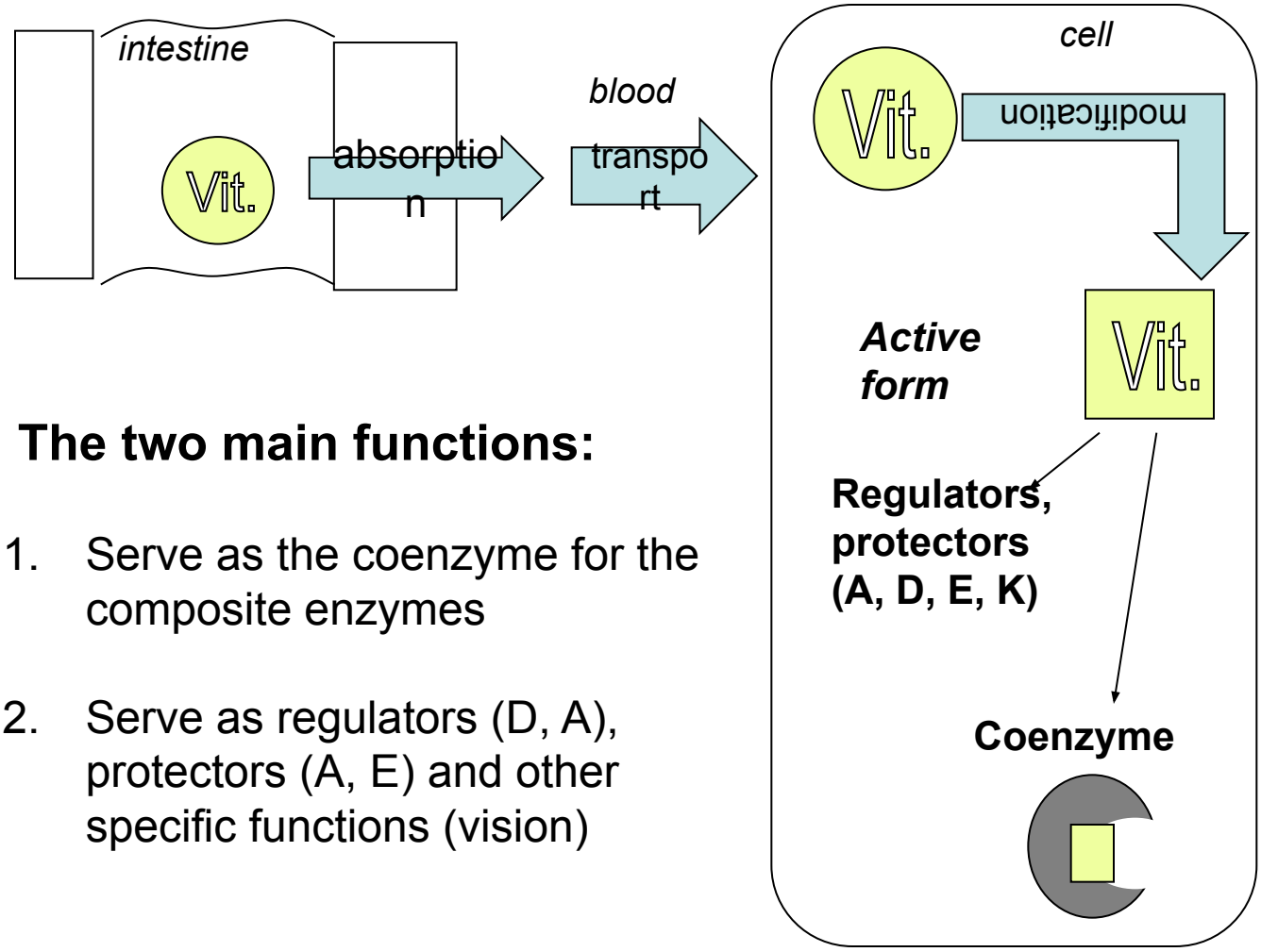
By the end of XIX century it was known:



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

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



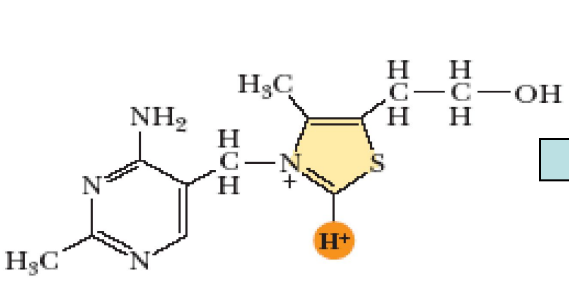


The two main functions:

1. Serve as the coenzyme for the composite enzymes

2. Serve as regulators (D, A), protectors (A, E) and other specific functions (vision)

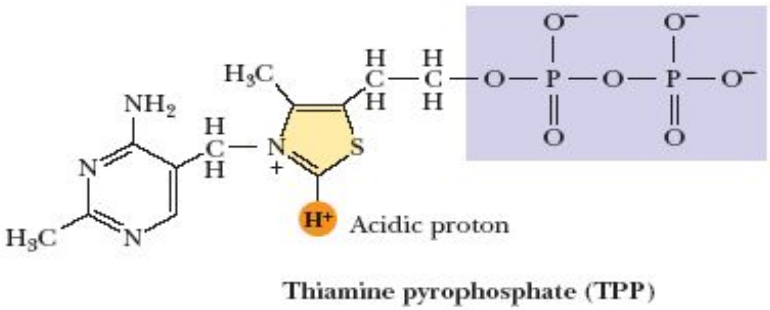
B1 (Thiamine)



Thiamin B_1

2ATP 2АДР

Formation of active form



Thiamine pyrophosphate (TPP)

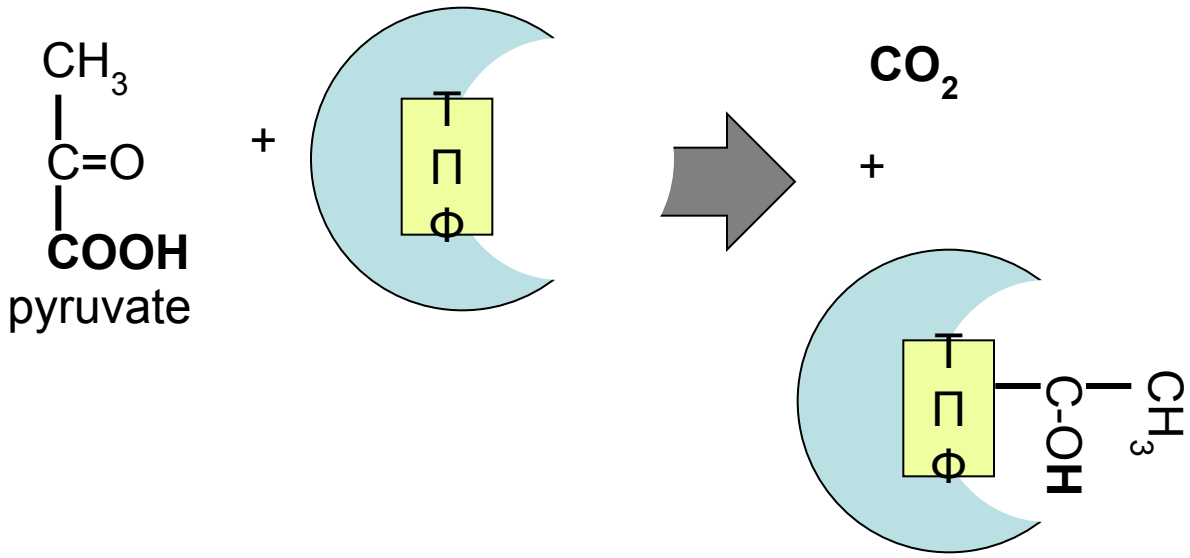
Thiamine pyrophosphate (TPP)

Biological role:

- Oxidative decarboxylation of pyruvate

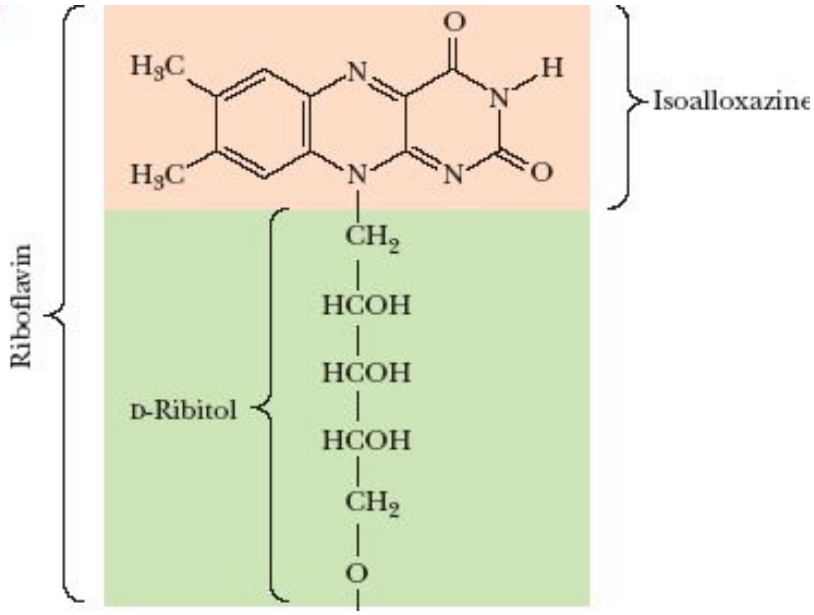
pyruvate → *Acetyl-CoA (Metabolism of CH and energy)*

α-ketoglutarate → *Succinyl-CoA (Metabolism of energy)*

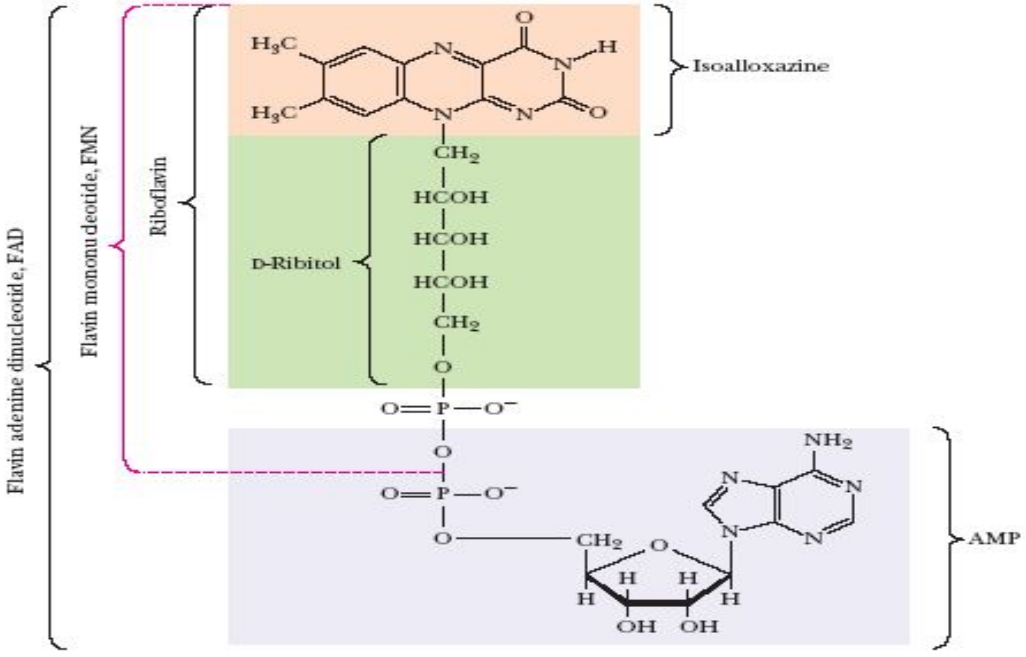


- Interconversions of pentoses (транскетолазная реакция)

B2 (Riboflavine)

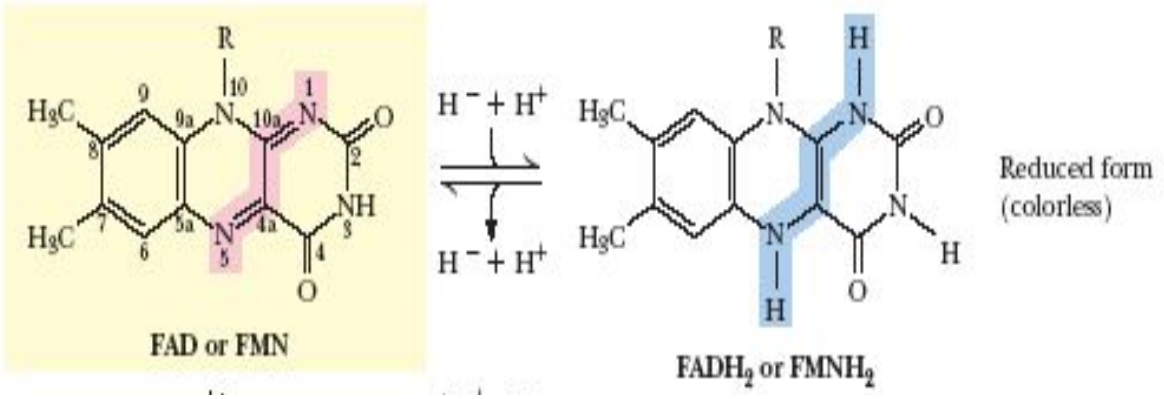


B_2 has 2 coenzyme forms: **FMN** и **FAD**



Biological role:

- Transfer of hydrogen atoms



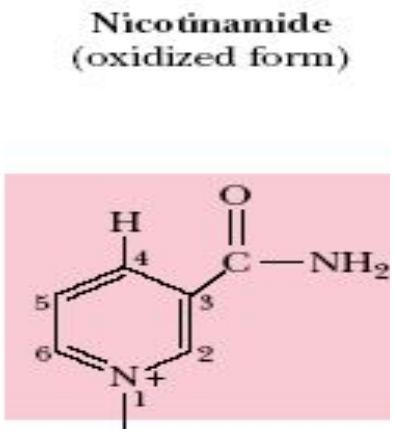
$FAD + SH_2 \rightarrow FADH_2 + S$

$FMH + NADH_2 \rightarrow FMD \cdot H_2 + NAD^+$

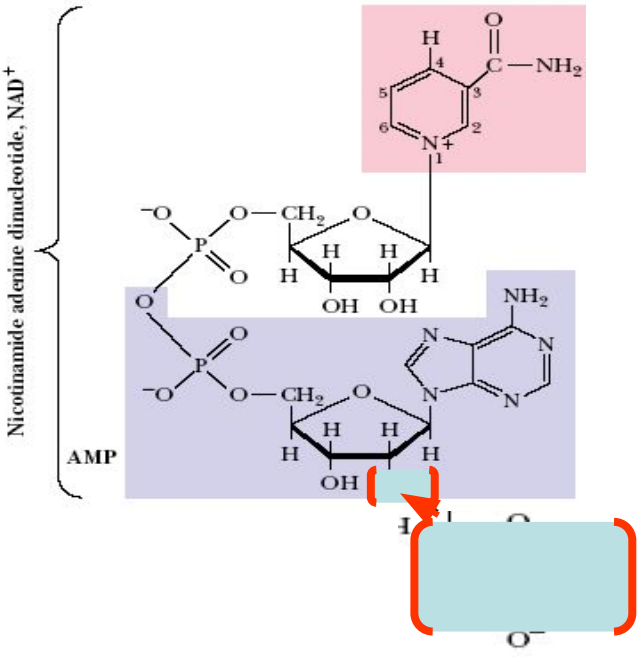
Desorder: **Dermatitis**

stomatitis, glossitis
angular stomatitis
Seborrhea

B3 or PP (Niacin)



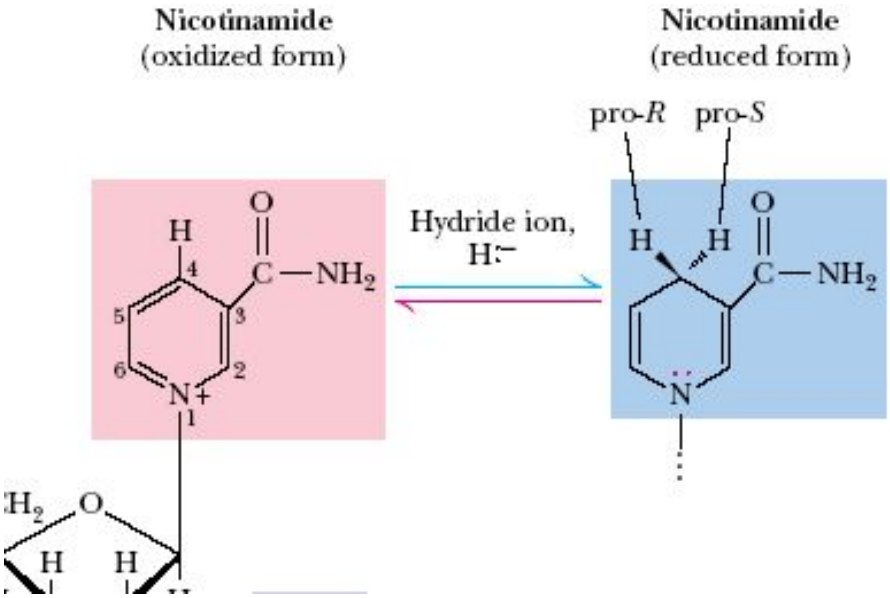
Niacin



2 coenzyme forms: **NAD^+** **$NADP^+$**

Biological role:

•Hydrogen atoms transfer



$NAD^+ + SH_2 \rightarrow NAD \cdot H + S$

$NADP^+ + SH_2 \rightarrow NADP \cdot H + S$

Desorder : **pellagra (3 «D»)**

•Dermatitis of the exposed to sunlight sites of skin

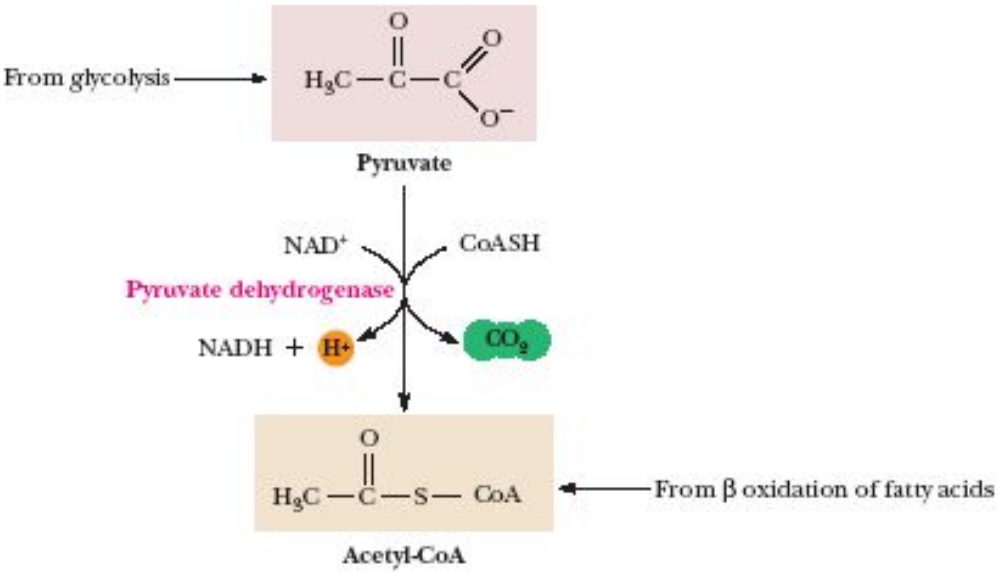
•Dementia

•Diarrhea

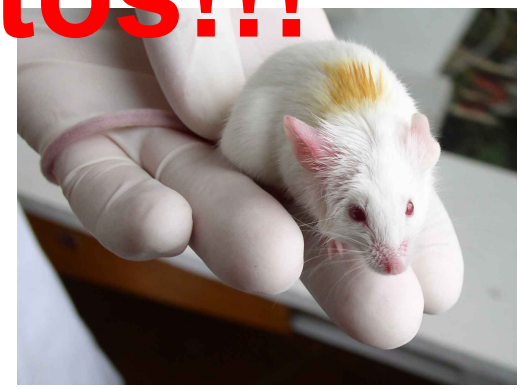
Витамин B_5

Биологическая роль:

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



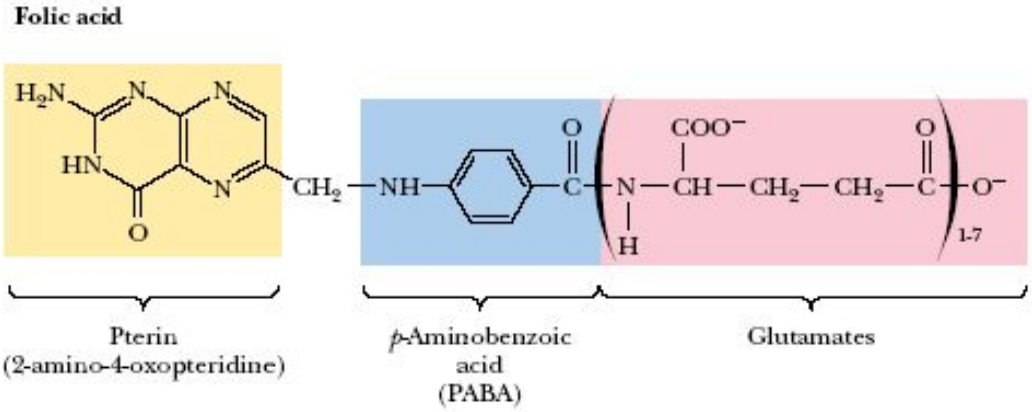
Pantos!!!

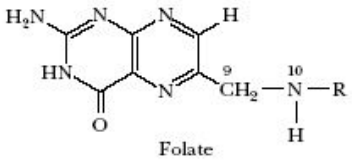


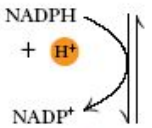
Заболевание:

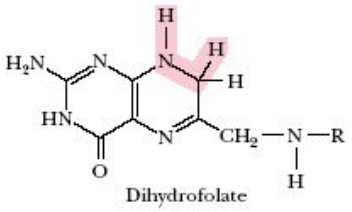
•Понос
•<u>Дерматит</u>
•Остановка роста
•Поседение шерсти, аллопеция
•Повреждение нервной ткани, почек, надпочечников, сердца

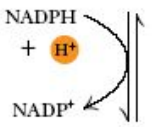
Bc (Folic acid)











Coenzyme form:
Tetrahydrofolic acid (THFA)

Biological role:

•П

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	N^5-Formyl-THF
		—CH=O	N^{10}-Formyl-THF
		—CH=NH	N^5-Formimino-THF
		—CH=	N^5,N^{10}-Methenyl-THF

- **Main source of 1-C units - serine**