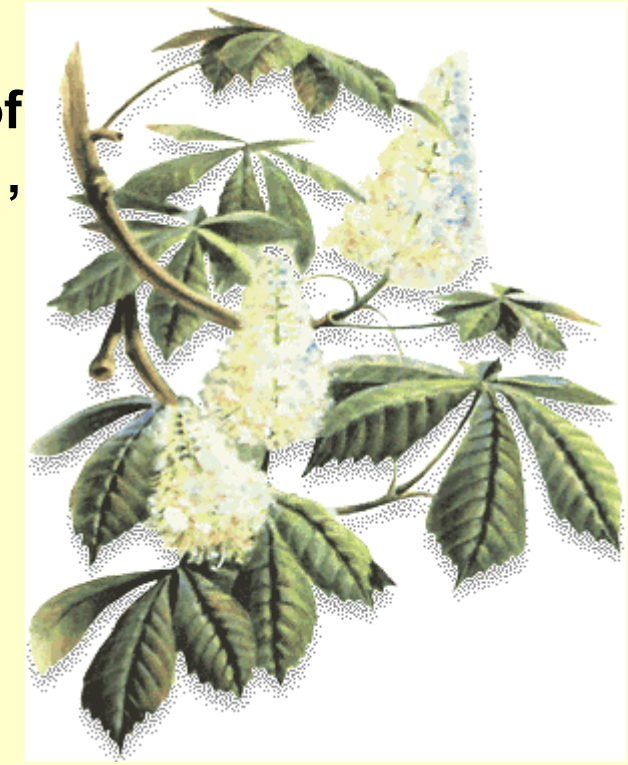
VITAMINS METABOLISM DISTURBANCES INDUCED BY THE EXPOSURE WITH IRRADIATIONAL DOSES

Parkhomenko Yu.M, Donchenko G. V.,

A.V. Palladin Institute of Biochemistry of Ukraine NAS, 9, Leontovicha Str., 01601, Kiev, UKRAINE,

e-mail: yupark@biochem.kiev.ua



Some essential disorders of the status of vitamins of an organism and endocellular metabolism can be identified in conditions an adverse ecological background such as increase in a radioactive background of a various origin.

The supervisions made by us after the ChAES Catastrophy, testified to it .

The change of vitamins A, E, B_1 concentration in the blood serum of persons, who either participated in the Catasrophy liquidation or those ones, who resided in the conditions of the adverse radioactive background, have been discovered.

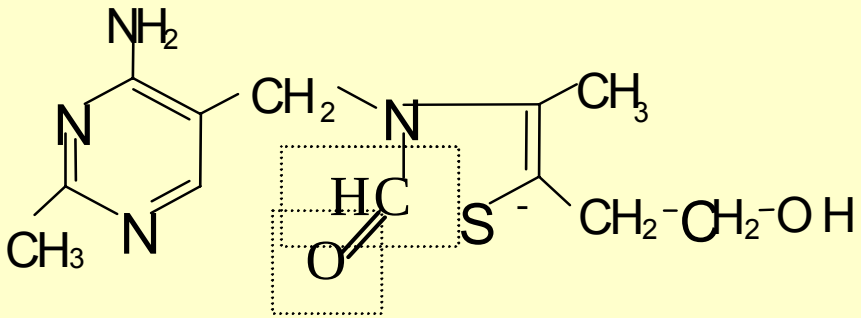
Vitamin B1 appeared the most sensitive to action of external radioactive influence.

Vitamin B1 appeared the most sensitive to action of external radioactive influence.

Decrease in the defined value of some vitamins at an irradiation (the beef forcemeat, total dose - 3 mln phyziol. ekv. roentgen *[Alexander H.D. et al., 1956])*

VINAMIN	Decrease in the value, %
B_1	↓ 60-67
B_2	↓ 8-10
B_6	↓ 24-25
PP	0
Folic acid	0
Choline	0

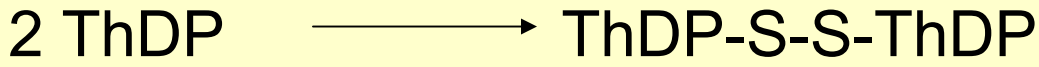
Destruction of thiamine and its phosphates under the acting of radiation is the known fact. It begins with formation of its disulfides, that can be measured by the thiochrom method only after restoration *in vitro*.



anion thiolic form of thiamine (Th-S)

2 Th-S ⟶ Th-S-S-Th (disulfide of thiamine)

As we have established at action of an irradiation ThDP (coenzyme form of thiamine) also can form dithiol:



Both ThDP forms: reduce (ThDP) and oxidize (ThDP-S-S-ThDP) were investigated in the blood of several groups of the liquidators of the ChAES Catastrophy suffering from differtt forms of the nervous system disturbances: vegeto-sosudistaya distiniya (VSD), neuro-circulyarnaya distoniya (NCD), acute radiation sickness first stage (ARS-I) and acute radiation sickness second stagy (ARS-II).

Defined value of ThDP and ThDP-S-S-ThDP (мкг%) in the blood of irradiated persons with disturbances in the nervous system, 1987-88

Defined value	Diagnosis				
	Control (healthy,8)	**NCD** (8)	**VSD** (20)	**ARS –I** (18)	**ARS-II** (4)
ThDP	**12,42 ±3,61**	**8,92 ±1,31**	**4,94 ±2,00**	**8,62 ±1,67**	**2,93* ±1,15**
Total level **ThDP + ThDP-S-S-ThDP**	**12,42 ±3,66**	**12,36 ±2,02**	**10,56 ±5,28**	**12,38 ±2,49**	**12,75 ±2,87**
ThDP-S-S-ThDP	**0**	**3,44**	**5,52**	**3,76**	**9,82**
ThDP-S-S-ThDP (% from total)	**0**	**20,95**	**29,23**	**21,64**	**73,53**

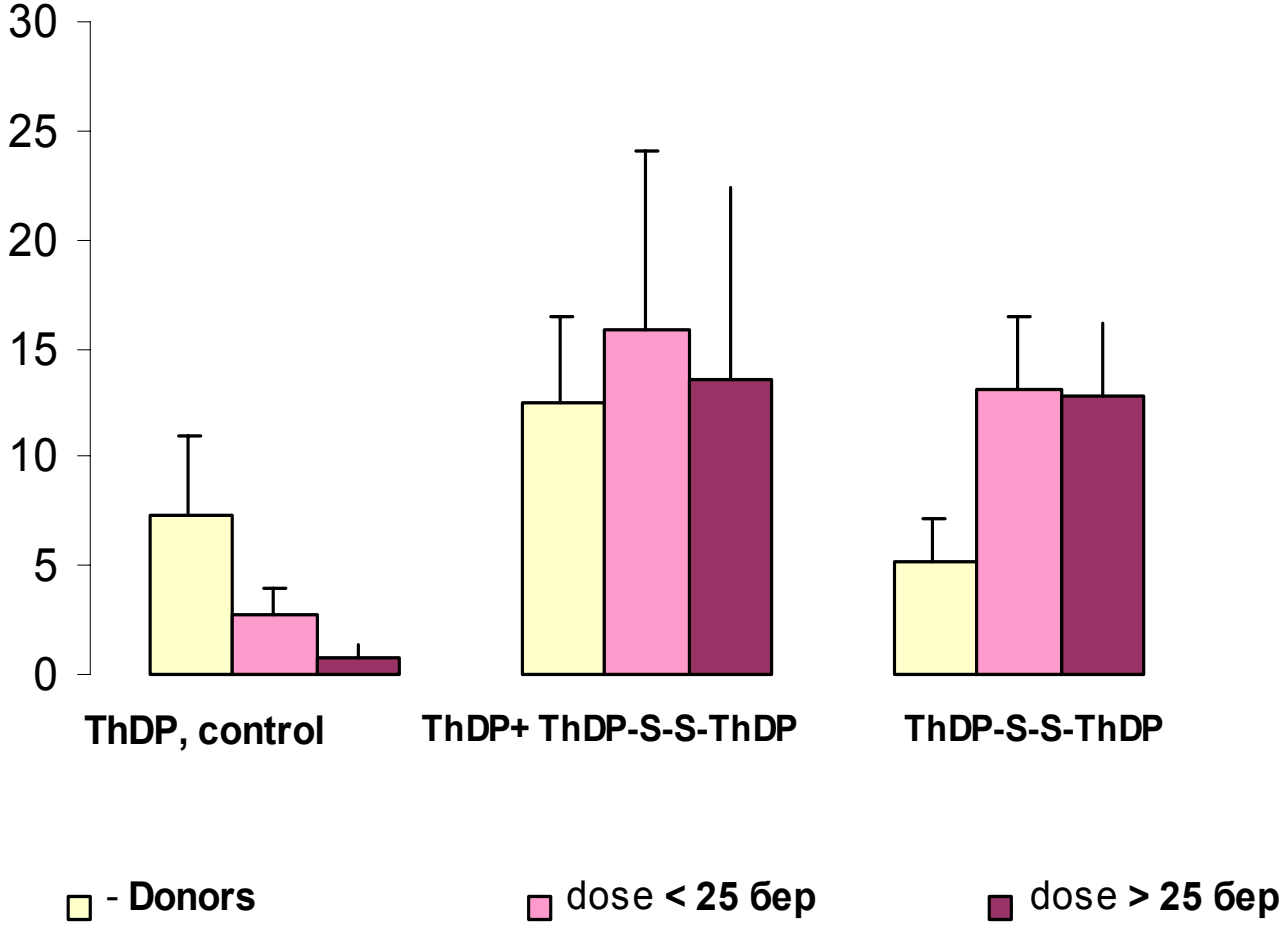
The analysis has shown, that the ThDP contents correlates **with a degree of the nervous system injury.**

In this case **the total contents** (restored and oxidized forms) of coenzyme **remained constant** in blood of all groups of the investigated people, and decrease of the determined ThDP contents was conditioned by irreversible transition it into disulfide and absence in the people organism the conditions for its restoration.

The further researches have confirmed
negative influence of a radiation on contents of ThDP and its disulfide in blood of irradiated persons.

The data received by us testify that in the blood of people which have received a dose less 25 REM, inactive disulfide form of ThDP constitutes about 83 % of total contents of ThDP, and at the doses exceeding 25 REM - up to 94,5 %.

Defined value of ThDP and ThDP-S-S-ThDP (мкг%) in the blood of people, 1990



Conclusions from the investigation:

ThDPS-SThDP contents in the blood of the irradiated persons can be used as a diagnosticum test on the health effect arising and (may be) radiation doses received.