

DISTRIBUTION OF ^{75}Se -SELENIUM METHIONINE IN ATHEROSCLEROTIC RABBITS TREATED WITH PROTEIN HYDROLYSATE

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Many authors' and our own investigations establish some disturbances of protein metabolism in experimental atherosclerosis. M. G. Kritzman et al. ascertained by means of methionine — ^{35}S an increase of protein synthesis at early stages and its considerable reduction at terminal ones in rabbits with experimental atherosclerosis. V. F. Saitzev, et al. note also the reduced binding of labelled methionine to aortic collagen components. Our previous investigations (3) demonstrated that the accumulation of ^{75}Se methionine in organs of rabbits under cholesterol feeding for 45 days and of guinea pigs fed an atherogenic diet for 150 days is considerably less expressed in comparison with that of the controls. Parallely to cholesterol feeding, the parenterally applied PH influences favourably upon these animals. This effect is much better displayed in cholesterol-fed rabbits for a shorter time (45 days) as compared with that in guinea pigs (fed for 150 days).

In the present work we had for an object to investigate the distribution of ^{75}Se methionine in internal organs of rabbits which were fed with cholesterol for a long period of time and treated with PH for 90 days.

Material and methods

The experiment covered 49 male rabbits, Chinchil breed, with body weight between 2000—2700 g divided into 4 groups. The animals of the Ist and IInd group were given 0,2 g/kg cholesterol diluted in sunflower-seed oil and added to laboratory food, whereas those of the IIIrd and IVth group were given only laboratory food for 90 days. At the same time, the animals of the IInd and IIIrd group were injected s. c. with 5 ml/kg PH Hydroprot, whereas those of the Ist and IVth group were given same dose saline solution.

The distribution of labelled methionine in internal organs was determined on the day of animals' killing. The labelled methionine was injected i. v. 2 hours before decapitation. We measured the activity of whole organs or their parts (of larger one) respectively, by means of count device type NK-107-C and calculated the percentage of impulses in gram/tissue related to the totally introduced quantity of activity.

Results and discussion

Fig. 1 shows the results concerning methionine distribution. The animals of the first group given both cholesterol and saline solution demonstrate considerably less expressed accumulation of methionine in any organs than the con-

trol ones. A great difference is established in liver, intestine, spleen, pancreas, kidneys, adrenal glands, thymus, and heart.

The animals of the IInd group which were fed with cholesterol and treated with PH have better expressed accumulation of methionine in the studied organs. In comparison with those of the Ist group we established the most significant accumulation in heart, aorta, intestine, thymus, and pancreas. On the other hand, methionine accumulation in most organs of animals of the IInd group remains less expressed as compared with that of the controls. The data about the liver, intestine, pancreas, and adrenal glands are reliably lower.

As regards the animals of the IIIrd group (normally fed and injected with PH) it is ascertained that methionine accumulation in any organs is considerably less expressed as compared with that of the controls (injected with saline solution). Most probably this is due to previous saturation of the organs with the amino acid methionine coming of PH.

If we compare these results with the data of our previous investigations (3) about rabbits fed a cholesterol diet for a shorter time (45 days only) we can see that the changes of the animals fed for 90 days are more considerably expressed. The parallel treatment with PH (IInd group) for 45 days leads to significant improvement of methionine accumulation. In most organs the values equalize those of the controls. They are even higher in heart, aorta, lungs, and spleen (3). We establish an analogous influence on the accumulation of ⁷⁵-Se methionine in a lower degree (fig. 1) in rabbits which are studied on the 90th day. This accumulation is more expressed in the animals of the Ist group without reaching the control levels.

The results obtained allow us to assume that considerably weaker assimilation of methionine occurs in experimental atherosclerosis which supports the data about serious disturbances of protein metabolism. With increasing the term of cholesterol feeding these changes go deep. The PH application, parallelly to cholesterol feeding, improves the accumulation of labelled methionine in organs of atherosclerotic animals. Based on these data we accept that the introduction of PH amino acids reduces the degree of disturbances of protein metabolism. This influence is more expressed at early stages of the disease.

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РАСПРЕДЕЛЕНИЕ ^{75}S -СЕЛЕНОМЕТИОНИНА В ОРГАНАХ КРОЛИКОВ С АТЕРОСКЛЕРОЗОМ ПРИ ВВЕДЕНИИ БЕЛКОВОГО ГИДРОЛИЗАТА

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Р Е З Ю М Е

В развитии атеросклеротического процесса наряду с нарушениями липидного обмена устанавливаются существенные изменения и в обмене протеинов. Радионуклидным методом установлено, что у кроликов, получивших холестерол в количестве 0,2 г/кг, понижается скопление ^{75}S -селенометионина во внутренних органах. В наибольшей степени он уменьшается в печени, в щитовидной железе, в поджелудочной железе, в тонком кишечнике, в надпочечной железе, в сердце. Подкожное введение белкового гидролизата в количестве 5 мл/кг улучшает не только холестероловое питание, но также существенно повышает накопление метионина в исследуемых органах. Введение в организм intactных животных только белкового гидролизата приводит к понижению накопления меченого метионина.

Авторы предполагают, что посредством введения аминокислот белкового гидролизата понижается степень нарушения белкового обмена у животных с экспериментальным атеросклерозом.