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EFFECT OF HYPOKINESIA ON INVERTASE ACTIVITY OF THE MUCOSA OF THE SMALL INTESTINE

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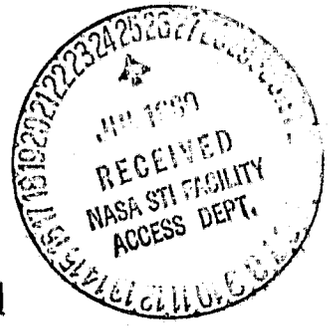
Translation of "Vliyanii gipokinezii na invertaznuyu aktivnost' slizistoy tonkoy kishki," Uzbekskiy Biologicheskiy Zhurnal, No. 1, 1978, pp 61-62.



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16. Abstract

84 mongrel white male rats weighing 170-180 g were divided into 2 equal groups, the experimental group of 42 being maintained in single cages under 30 days of hypokinetic conditions and the control animals under ordinary laboratory conditions. It appears that rates of invertase formation and its inclusion in the composition of the cellular membrane, if judged by the enzyme activity studied in sections of the small intestine, are subject to phase changes in the course of prolonged hypokinesia.

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EFFECT OF HYPOKINESIA ON INVERTASE ACTIVITY OF THE MUCOSA OF THE SMALL INTESTINE

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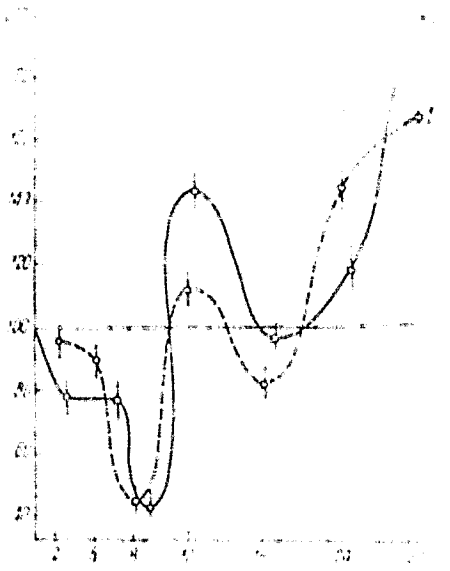
On the model of one of the enteral enzymes /61
that participate in the concluding stages of carbohydrate hydrolysis (invertase KF 3.21.26) an attempt was made to study the effect of prolonged hypokinesia on the enzyme activity of the middle portion of the small intestine.



Invertase activity of inverted (1) and homogenized (2) sections of the middle portion of the small intestine in prolonged hypokinesia. X axis --day sacrificed; Y axis -- enzyme activity in percent of control taken as 100.

The experiment was conducted with 84 mongrel white male rats weighing 170-180 g maintained on standard rations and water ad libitum. The rats were divided into 2 groups, experimental and control, containing 42 animals each. Each animal was placed alone in a little cage constructed by us which severely restricted its movements. Hypokinesia lasted 30 days. The control animals were kept in ordinary laboratory cages.

Invertase activity of the small intestine was determined by photocolorimetry [1] expressed in terms of 1 min. formation of glucose in micromoles as calculated for one gram of dry tissue weight (Figure).

Observations showed that restriction of the motor activity of the rats substantially changed the invertase activity both in the intact sections that characterized the enzyme activity of the intestinal surface and in homogenized sections reflecting the general enzyme supply. Thus during the first periods of the experiment (2-8 days) invertase activity dropped sharply (to 52-55%). Beginning with day 12 of the experiment the level of the intact sections went back to that of the control. But in

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* Numbers in the margin indicate pagination in the foreign text.

the homogenized sections it increased by 43%. By day 18 invertase activity was practically the same as that of the control and toward the end (days 24-30) it was increasing sharply both in the intact and homogenized preparations (by 43.65 and 19.10% respectively).

Consequently the rates of invertase formation and its inclusion in the composi-/62
tion of the cellular membrane during the course of prolonged hypokinesia undergo certain phase alterations, if we may judge by the enzyme activity of homogenized and inverted sections of the small intestine.

We know [2-5] that a long depleting muscular overload or severe hypokinesia is accompanied by all three phases of chronic stress according to G. Selye at the level of morphofunctional changes in the adrenal glands and activity of the sympathetic-adrenal system. A comparison of our results with the data of the authors indicated allows us to assume that changes in invertase activity in our experiments are traceable to the hypothalamus-hypophysis-adrenal system due to a nonspecific adaptive syndrome.

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