

CYTOCHEMICAL INVESTIGATIONS OF MANGANESE IN BLOOD CELLS IN DIABETES MELLITUS (Preliminary communication)

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Manganese in the form of microelement participates in carbohydrate metabolism. There are data about the regulating role of manganese in this metabolism in the literature available (5). Shukla and Chandra (1982) prove experimentally that chronic manganese treatment causes changes of the activity of numerous enzymes participating in the glycolytic chain and peptose-phosphate cycle. These considerations suggested us to look for an eventual presence of manganese by a cytochemical way in blood cells from diabetes mellitus patients.

Material and Methods

Blood smears from 63 diabetes mellitus patients were studied. 21 patients were of type 1 and 42 ones -- of type 2. Patients' age varied between 22 and 74 years. Of the patients of type 2, 14 were on insulin therapy, 23 were perorally treated, and only 5 patients were on special dietotherapy only.

Cytochemical investigation was carried out after the method of Halacheva and Dokov (1981) based on the specific effect on manganese ions of sodium persulfate. A 0.5 per cent water solution of sodium persulfate was used in our study.

Blood smears were preliminarily fixed for 10 min in 70% ethanol and then put for 20 min in a reagent. Then they were washed in distilled water and laid down to dry at room temperature. Light microscopic observations were made at magnification of 4 x 10.

Results and Discussion

When one studies manganese-treated animals one distinguishes several degrees of poisoning (2). The slighter expressed degree of intoxication is manifested by manganese accumulation in thrombocyte chromomer and hyalomer. When manganese quantity increases in the organism it can be proved in leukocytes, too, where it can be found out on cellular membrane structures. In cases of more severe manganese lesion one can establish this agent in the form of membrane thickenings of erythrocytes and of granules of different size.

We observed in workers with occupational exposure to this microelement in dependence on length of service and constitutional peculiarities the same alterations like in experimental animals (3). In healthy subjects manganese can not be proved by using our method.

The establishing of large amounts of manganese in blood cells from diabetes mellitus patients indicates the disbalance of this element. It is possible that these disturbances are related to activity changes of some enzymes participating in carbohydrate metabolism or to other reasons. The investigation of these problems will be the aim of our forthcoming observations.

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ЦИТОХИМИЧЕСКИЕ ИССЛЕДОВАНИЯ МАРГАНЦА В КРОВЯНЫХ КЛЕТКАХ ПРИ САХАРНОМ ДИАБЕТЕ

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РЕЗЮМЕ

Марганец как микроэлемент участвует в метаболизме углеводов. В связи с этим авторами сделана попытка отыскать его наличие в кровяных клетках больных сахарным диабетом. Исследование основывалось на специфическом воздействии персульфата натрия на ионы марганца. У здоровых лиц исследование этой методикой не показало наличие марганца. У всех больных сахарным диабетом однако, независимо от их возраста, пола, типа заболевания, тяжести и давности болезни, устанавливаются изменения, дающие положительную реакцию во всех форменных элементах периферической крови. В большинстве случаев эти данные связаны со значительной и тяжелой степенью поражения марганцем у людей, имеющих профессиональный контакт с ним.

Авторами обсуждается связь марганца с сахарным диабетом.