

## **ENZYMATIC TECHNIQUE AS AN ESSENTIAL PART OF IMMUNOLOGICAL MONITORING FOR REJECTION CRISIS OF HUMAN KIDNEY GRAFTS**

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One very perspective direction for studying the immune status of patients with kidney allotransplantations is the investigation of the fermentative systems of lymphocytes. According to R. P. Nartsissov (1978) and G. M. Lvit-zina and Y. M. Zaretskaya (1980) the study of metabolic status of blood cells allows the determination of most early features of immunological changes in the organism. In our previous work (Kr. Metodiev, 1981) we pointed out the necessity of investigation of mitochondrial enzymes of lymphocytes (succinate dehydrogenase — SDH and alpha-glycerophosphate dehydrogenase alpha-GPDH) for the prognosis and diagnosis of rejection crisis of kidney human grafts, as well as the differentiation of additional complications, results of the immunosuppressive therapy, etc. More important is the role of alpha-GPDH and the prevailing opinion of the authors is that its activity has certainly bigger significance for the prediction of rejection failures. Presuming all that we had for an object of the present study the investigation of both enzymes in the early periods after kidney allotransplantations, thus suggesting the importance of this method for the determination of the immune status of patients with kidney grafts.

### **Materials and methods**

The activity of the mitochondrial dehydrogenases (SDH and alpha-GPDH) was studied after the quantitative method of R. P. Nartsissov (1969) on the base of the average number of ferment-substrate granules in one lymphocyte out of 50 cells examined. The study covers 34 patients with human kidney allotransplantations investigated until and in the early weeks after operation. In this postoperative period they were treated by the usual dose immunosuppressive preparations (imuran and prednisolon).

### **Results and discussion**

For the period after transplantation we studied a total number of 74 crises for the examined 34 patients. Each rejection crisis was characterized clinically by bigger sizes of the graft, its induration, lower diuresis, increased level of serum creatinin and urea, febrile reactions. As for the mitochondrial ferments, as a rule their activity was increased in the period just before crisis, especially that of alpha-GPDH. The average period of activation of alpha-GPDH before rejection crisis was 3.23 days; after this period the clinical signs of rejection were established. Therefore, the diagnostic significance of this enzyme was undoubtful.

The level of alpha-GPDH and SDH is lower in patients with renal insufficiency than that of the healthy people. Alpha-GPDH was averagely 4.07 in our patients until operation (background) and SDH — 10.03. After transplantation the level of both ferments was unconsiderably changed approximately in the same statistical ranges:  $\pm 1.87$  for alpha-GPDH and  $\pm 3.21$  for SDH, when the status of the patients was not influenced by rejection, infections, additional complications, etc. As for the rejection crises, 3.23 days before each of them the level of the mitochondrial enzymes was statistically increased — up to 12.68 for alpha-GPDH and up to 14.11 for SDH. The latter had no considerable importance for the prediction in comparison with alpha-GPDH. The applied immunosuppressive therapy had its definite influence upon the ferment activity. In the periods after operation, free of any serious complications and rejection crises, the level of both enzymes, especially that of alpha-GPDH, was considerably decreased as a result of the intensive immunosuppressive therapy. This was most obvious in the first 1—2 weeks after transplantation when the level of alpha-GPDH from its background 4.07 decreased to 0.95 and that of SDH from 10.03 — to 4.21. Another week later the level of the enzymes was slightly increased, but never reached the background values. When the amount of alpha-GPDH and SDH was increased considerably above the initial background it was clear that their activity was influenced by certain complications, most of all rejection crises.

Our data, together with those of other authors, show the undoubtful specificity of the activated mitochondrial enzymes, specially alpha-GPDH, concerning the prediction and prognosis of any rejection crisis. Nearly 89% of all cases of increased level of this enzyme were contributed to rejection crises, which 3.23 days later were established clinically too. Therefore, the coefficient of correlation between rejection crises of allografts and the activation of alpha-GPDH, according to our study was 0.802.

The increased activity of alpha-GPDH has certain correlation to any rejection crisis in the postoperative periods and its determination, together with the rest methods included in the immunological monitoring of transplantation status (RBT, MLC, NK and CML) has a considerable role, based on the quickness, easiness and clearness of the performance.

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**ЭНЗИМАТИЧЕСКАЯ АКТИВНОСТЬ КАК ОСНОВНАЯ ЧАСТЬ  
ИММУНОЛОГИЧЕСКОГО МОНИТОРИРОВАНИЯ ПРИ ИССЛЕДОВАНИИ  
КРИЗОВ ОТТОРЖЕНИЯ ПЕРЕСАЖЕННОЙ ЧЕЛОВЕЧЕСКОЙ ПОЧКИ**

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**Р Е З Ю М Е**

Изучена активность двух митохондриальных ферментов — сукцинатдегидрогеназы (СДГ) и альфа-глицерофосфатдегидрогеназы (альфа-ГФДГ) у больных с трансплантированной почкой. Динамика активности этих ферментов является ценным критерием при диагностировании кризов отторжения. Метод ферментативной активности является частью иммунологического мониторинга при исследовании трансплантационного иммунитета.