Reaktion aus. Die mit der PAS-Reaktion positiv reagierende Substanz im Reizleitungssystem ist das Glykogen. Jedoch unterscheidet sich das Glykogen des Reizleitungssystems histochemisch durch relative Wasserunlöslichkeit vom der Arbeitsmuskulatur.

Literatur

- 1) His, W.: Arb. med. Klin. Lpz. S. 14, 1883. 2) Keith, A. & M.W. Flack: J. Anat. Physiol. 41, 172, 1907. 3) Purkinje, J.E.: Arch. anat. 41, 342, 1845. 4) Schiebler, T.H.: Z. Zellforsch. 39, 152, 1953. 5) Schiebler, T.H.: Z. Zellforsch. 43, 243, 1955. 6) Tawara, S.: Das Reizleitungssystem des Säugetierherzens. Jena, 1906. 7) Trott, J.R., S.L. Gorenstein, & M.D. Peikoff: J. Histochem. & Cytochem. 10, 245, 1962.

On the Histochemical Changes of Glutamic-Oxalacetic Transaminase in Heart, Liver and Kidney

Kikuaki OGATA, Go AKAGI, Tadao KITAMURO, Fukuhei FUKUDA
and Akiko KAGEYAMA

(Department of 2nd Pathology, School of Medicine, Tokushima University)

It was well known that the increase of glutamic-oxalacetic transaminase (GOT) in the serum of myocard infarction, hepatitis and liver cirrhosis, was due to a leakage of this enzyme into blood from the injured organs. All tissues used in the present studies were obtained from the human autopsies of 50 cases involved various diseases.

Slices of fresh tissue with 3 mm thickness obtained from each organ were previously fixed for about 12-36 hours in the buffered formalin containing 0.3M sucrose. Then, the frozen sections of 15 μ thickness were prepared, GOT was stained with the developing color (reddish brown) based on the coupling reaction of the produced oxalacetic acid and the diazonium salt (6-benzamide-4-methoxy-m-toluidine diazonium chloride-Zn : BMTD), a method devised in our laboratory. The incubation medium was as follows :

0.2 M Tris-HCl buffer (pH 7.4)	6.0 ml
0.2 M Aspartic acid	0.7 ml
0.1 M α -Ketoglutaric acid	0.7 ml
BMTD	5 mg
EDTA	3 mg

The incubation was carried out for 2 hours at 37°C. After washing and rinsed in 0.1 M CuSO₄ for 10 minutes, the sections were dehydrated with alcohol and cleared in xylene. The stained section was mounted with balsam and submitted to microscopic investigations. All materials were fixed within 10

hours, because it was preliminarily confirmed that GOT of tissue was stable within 12 hours after the death.

Heart :

GOT reaction in the normal heart was distributed uniformly in the heart muscle fibers. In the case of myocardial hypertrophy, the activity was observed in each muscle fiber in the same manner as that of the healthy fiber. It showed apparently a decreased activity in the GOT in the atrophic heart muscle fiber. The same phenomenon was observed in myocardium presented fatty infiltration or fatty degeneration. The decrease of GOT was also found in the tissues of myocardium with bleeding in idiopathic thrombopenic purpura. In the necrotic portion of myocardium, it showed decreased GOT reaction in accordance with the degree of its necrosis. It was generally observed that the activity of GOT in cases of regressive changes of myocardium was apparently lowered.

Liver :

In the normal human liver tissue, in the hepatic cells of the whole acini was the GOT reaction uniformly recognized. In cases of chronic congestive liver and in the liver cells atrophied by the effect of leukemic cell infiltration compared with normal hepatic cells showed decrease of the GOT activity. In the degenerated liver cells containing tiny fatty droplets, the GOT reaction was well preserved, but in the cytoplasm of the hepatic cells showing intense fatty degeneration with large fatty droplets gave no reaction of GOT. In cases that showed remarkable necrosis of liver parenchyma, i.g., in cases of hepatitis, the reaction of GOT was generally decreased, in particular destroyed hepatic cells, or distorted liver cell cords where the morphology of liver cell was recognized the reaction was also remarkably lowered. In instances of intrahepatic cholestasis, the liver cell surrounding bile thrombus gave almost normal reaction. Liver cells containing bile pigment in their cytoplasm showed decreased GOT activity.

Tissue of liver cirrhosis gave very interesting findings, namely the majority of the regenerating nodules in general showed uniform reaction but the regenerating nodules encircled by connective tissue gave lowered reaction of GOT in their central portion compared with the remaining hepatic cells. In the group of hepatic cells formed by the surrounding increased connective tissue with exception of atrophic cells, the hepatic cells maintained the same reaction, the pseudobile ducts presented remarkably decreased reaction. Cells of the primary liver carcinoma gave an extreme weak GOT reaction compared with the remaining hepatic cells. Pancreatic-, gastric- and lung cancer producing metastasis in the liver tissue gave a weak reaction compared with the liver cancer. Myeloid leukemic cells infiltrated in the liver showed no reaction of GOT. Hepatic cells faced to the carcinomatous infiltration, only the distorted liver cell cords gave a decreased activity being normal the GOT activity in the liver cells compressed by tumor tissue.

Kidney :

In the normal kidney, GOT was detected strongly in the epithelium of

proxymal convoluted tubules, weakly in the Henle's loop or distal renal tubuli, and very scantily in the glomeruli or blood vessels.

In the granular kidney resulted by chronic nephritis, the GOT activity was completely negative in the epithelium of renal tubuli and in the sclerotic glomeruli. In cases of bilirubin nephrosis with jaundice, it was shown a remarkable decrease of the activity in the renal tubuli in comparison with those of the distal convoluted tubuli. Also, in the case of kidney infiltrated with leukemic cells and involved with renal abscess, GOT activity in the injured renal tubuli was found decreased. In the tissue with Wilm's tumor, the GOT activity of the mesenchymal cells gave almost negative reaction, but the epithelial element showed slight activity. As already mentioned, the histochemical reaction of GOT in kidney tissue was also lowered or disappeared in accordance with its regressive changes.

It may be advanced the fact based on the present observations that the changes of enzyme-histochemical reaction of the organs already presented have a correlative effect with the degree of GOT activity in the serum, in particular in instances of injured liver.

Histochemical Studies on the Human Liver

Shigetoshi OHKAWA, Norihiko IWAI, Hiroshi SUGIMOTO, Masahiko OHBAYASHI,
Keisuke HIKIMA, Yuzo KANEMATSU, Yoshiaki OKUDA
and Akima MIYOSHI

*The First Division, Department of Internal Medicine, Faculty of Medicine Kyoto University
(Director: Prof. Gyoichi Wakisaka)*

We had reported the histochemical studies on the experimentally damaged animal liver (rat and rabbits)¹⁾. The present study dealt with the histochemical study on the surgically removed human liver during cholecystectomy.

Materials and Methods

The small blocks of the surgically removed liver during cholecystectomy were divided into two parts; a half light microscopy (stained with heamatoxlin and eosin and by the PAS) and the other half, promptly frozen by dry-ice, and was cut in 15 microns in thickness in cryostat at -15°C , was used for histochemical study. As a control, the human liver, removed at gastorectomy was investigated histochemically.

The enzymes demonstrated histochemically were as follows.

1. succinic dehydrogenase (SDH): Nachlas et al. (1957)²⁾.