However, the data given in this paper are evidence of a possible fall in linoleyl-CoA-desaturase activity in the rat liver during long-term ethanol consumption as a result of diversion of the stream of electrons for ethanol oxidation in the microsomes.

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EFFECT OF HEMODYNAMIC DISTURBANCES ON THE RAT LIVER TRANSEPITHELIAL POTENTIAL IN VIVO

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KEY WORDS: liver; hemodynamics; transepithelial potential.

Most pathological states of the liver are accompanied as a rule by disturbances of the blood flow through the organ, and these in turn may specifically aggravate the pathological process [1]. An important factor in the development of experimental and clinical hepatology is the establishment of simple, reliable methods of continuous monitoring of the state of the liver function in vivo in various hemodynamic disturbances.

The trabecular structure of the hepatic lobule provides a series of barriers between the sinusoidal space and the biliary capillary. Under these circumstances the leading role in the maintenance of the barrier function is played by membranes and intercellular junctions of hepatocytes bounding the biliary capillary [2]. By analogy with other barrier tissues, forming continuous epithelial layers bearing a transepithelial potential (TEP; the skin, the intestinal wall, the wall of the gallbladder, and so on) [4], the presence of a similar potential can also be postulated on the boundary between the intestinal space and the internal lumen of the hepatic biliary capillary.

Since there is no information on this question in the accessible literature, the investigation described below was undertaken with the aim of developing a method of recording TEP and studying its response to various changes in the hepatic blood flow.

EXPERIMENTAL METHOD

Experiments were carried out on male Wistar rats weighing 150-200 g. To record TEP laparotomy was performed, the common bile duct was dissected, and a thin polyethylene cannula, connected through an agar bridge to an Ag–AgCl electrode, was introduced into it. The drainage

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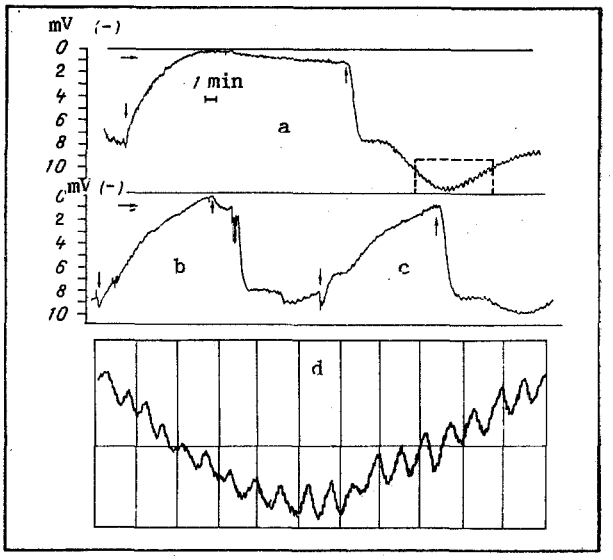

Fig. 1. Diagram of TEP recorded during various disturbances of the hepatic blood flow. Abscissa, time (min); ordinate, TEP (in mV). Short vertical lines indicate times of applying and removing ligatures. a) Dynamics of TEP during compression of common hepatic artery; b) dynamics of TEP during compression of artery and portal vein (total ischemia); c) dynamics of TEP during compression of portal vein; d) enlarged region of diagram with periodic fluctuations of TEP (indicated by broken line in Fig. 1a).

of bile was undisturbed by this procedure, for the cannula allowed the outflow of bile. The comparison electrode, connected through an agar bridge, was inserted into the femoral vein, which had previously been isolated. TEP was recorded by means of an I-115 M high-ohmic millivoltmeter and KSP-4 automatic writer.

EXPERIMENTAL RESULTS

At the time of connection of the electrodes the mean value of TEP was 5 ± 2 mV. It then rose, and in the course of 15-20 min it reached 11 ± 3 mV, after which it remained constant and did not change during 4 h of continuous observation.

Diagrams of individual measurement of TEP during ligation of various portal vessels of the liver (portal vein, common hepatic artery) are shown in Fig. 1. As the diagrams show, compression of the artery, the portal vein, and of both together was accompanied by a similar kind of response of rapid fall of TEP virtually to 0 in the course of 7-10 min. After removal of the ligatures and restoration of the blood flow, TEP rose; the rise was complex in character and consisted of three phases: 1) rapid recovery of TEP in the course of 1-1.5 min to its initial value, at which it remained for 3-4 min; 2) a further increase in the value of TEP to 1.5-2 times its initial value in the course of 5-6 min; 3) a subsequent fall of TEP to its original level in the course of 5-6 min.

Compression of one of the branches of the portal vein supplying portal blood to the left and right lobes of the liver was accompanied by an increase in the absolute value of TEP. In addition, against the background of slow changes in TEP in the 2nd and 3rd phases distinct regular oscillations of TEP appeared with a period of about 30 sec (Fig. 1). The range of the oscillations gradually increased to reach a maximum at the end of the second phase (up to 10% of the initial value of TEP), and remained at that level throughout the experiment. Oscillations of TEP appeared in all cases of exposure to ischemia a few minutes after the termination of ischemia on restoration of the blood flow. The period of the oscillations was independent of the type of ischemia and was always the same (30 ± 2 sec).

The writers showed previously [3, 5] that the membrane potential of the hepatocytes undergoes changes similar to those of TEP, in response to different versions of disturbance of the hepatic blood flow. For instance, during ischemia of the portal vein or hepatic artery, and also during total ischemia of the liver, a rapid fall of the membrane potential of the hepatocytes was observed in the course of 2-3 min, irrespective of the type of ischemia.

It is well known that TEP, for example, of the intestinal epithelium is the difference between membrane potentials of the basolateral and apical surfaces of the epitheliocytes, and that it averages 4-8 mV [6]. It is possible that the TEP recorded in the liver is also the difference of membrane potentials of hepatocytes facing the biliary and sinusoidal capillaries. The fall of TEP of the liver during ischemia and its rapid recovery on resumption of the blood flow evidently reflect depolarization of the hepatocyte membranes in response to ischemia.

An advantage of the use of TEP to assess the state of the liver function is that it can be recorded continuously.

Thus as a result of these investigations it was shown that a TEP exists in the liver between the sinusoidal and biliary capillaries, with a mean value of 10 mV, and highly sensitive to changes in the hepatic blood flow; it also correlates in the character of its responses to changes in blood flow with the responses of the membrane potential of the hepatocytes.

The method of continuous recording of TEP may be promising as a means of assessing the functional state of the liver and its blood flow in vivo.

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LYSOSOMAL ENZYME ACTIVITY IN THE GASTRIC MUCOSA OF RATS WITH EXPERIMENTAL GASTRIC ULCER

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KEY WORDS: ulcer formation; lysosomal enzymes; gastric mucosa.

The formation of experimental gastric ulcers is linked with disturbances of the stability of lysosomal membranes. It has been shown [8] that during stress-induced ulcer formation their stability is reduced. The ability of prostaglandin E_1 to prevent ulcer development may be due to its stabilizing effect on lysosomal membranes [9]. Disturbances of the integrity of lysosomal membranes have been found as a result of exposure of the gastric mucosa (GM) to a combination of bile and hydrochloric acid, which was accompanied by the development of damage to GM [15]. Increased acid phosphatase (AP) activity in GM was observed in [2] during the development of experimental ulcer. There is much evidence to show that ulcerogenic factors acting on GM have a labilizing effect on lysosomal membranes [6, 14]. Information on labilization of lysosomal membranes and activation of lysosomal enzymes in the presence of injury to GM provided a basis for formulation of the general hypothesis that lysosomes can participate in the development of gastric ulcer [8, 9, 14, 15]. Some workers, however, deny the pathogenetic role of lysosomes in the development of gastric ulcer and, in particular, of ulcer due to histamine [11].

The aim of this investigation was to study the resistance of lysosomal membranes to mechanical injury during isolation of lysosomes from GM, and the intravital release of lysosomal enzymes from mucosal cells into the lumen of the stomach during the formation of an

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