After 24 h of incubation we determined the total cell protein with LOWRY[11] reagent and the glycogen content with anthron reagent[12]. For the determination of glycogen, the cells were heated with 30% KOH for 30 min and precipitated with ethanol and Na_2SO_4 solution as coprecipitant[13]. Insulin enhanced the glycogen content per 100 µg total cell protein (Figure). The difference between control and the culture treated with insulin is significant ($p < 1\%$).

Studies carried out on the beating rat heart cells in primary culture indicated that the cells isolated with fractionated trypsination are suitable for the investigation of the effect of insulin in the muscle cells.

Zusammenfassung. An pulsierenden Rattenherzzellen in der Primärkultur wurde die Insulinwirkung auf die Glykolyse und den Glykogengehalt untersucht.

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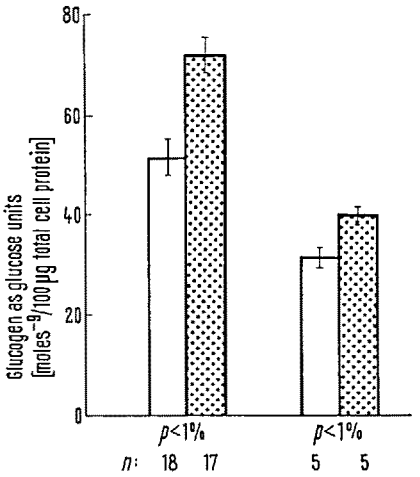

Glycogen content of beating rat heart cells 3 days in culture. Open bars, control; dotted bars, insulin 10 mU/ml medium. $\bar{x} \pm s_{\bar{x}}$.

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The Influence of Fibrinogen Degradation Products on the Electrobiological Activity of the Rat Heart

From earlier publications we know that the pharmacological properties of fibrinogen degradation products (FDP), that is, the potentiation of the smooth muscle contraction caused by the amines or polypeptides, result from the FDP action upon the cell membrane[1-4]. It was found in experiments on the isolated rat uterus that FDP in small doses causes an increase in the amplitude and the frequency of the action potentials, and in higher doses lowers the resting potentials, and at the same time the amplitude and the frequency of the action potentials decrease until they finally disappear altogether[5-7]. In this paper we will present the influence of FDP on the electrobiological phenomena of the rat heart.

Methods. In our experiments in vitro the right auricle of the isolated heart of a Wistar rat was used. 2 methods of preparation of the specimens for the electrobiological investigation were employed.

1. The right auricle was placed in oxygenated Tyrode's solution at 37 °C immediately after decapitation of the animal and excision of the heart and 10–15 min after we began the electrobiological measurements. In these specimens, each time the microelectrode was introduced into the heart cell it was possible to register the resting potential and the action potentials, the amplitude and frequency of which were regular.

2. The auricle was incubated for about 2 h in oxygenated Tyrode's solution at 20 °C. In such a preparation, an introduction of the microelectrode, only resting potentials were registered in the majority of the cases.

The electrobiological investigations were carried out in a 25 ml water bath at 37 °C. Glass (Pyrex) microelectrodes of about 0.5 µm in diameter were used. These were filled with 3 *M* KCl solution. A silver, zero electrode, was placed near the tissue investigated. The registering microelectrode, which was connected by a silver wire to an electrometric lamp via a D.C. amplifier, fed the electrical potentials into the oscilloscope (OK7-2S).

Partially purified products of the proteolytic degradation of fibrinogen (Kekwick) digested by plasmin were used in the experiments[2,6]. The concentration of FDP was expressed in µg of tyrosine calculated per 1 ml of Tyrode's solution in the water bath.

Results. Fibrinogen degradation products in a concentration of 2.5 µg tyrosine acting on the muscle of the right auricle, which shows regular spontaneous electrobiological activity, cause a transient increase in the frequency of the action potentials (Figure 1a). When

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only resting potentials are registered, FDP in the same concentration provokes a rhythmical electrobiological activity of the tissue investigated (Figure 1 b). The increase in the frequency of the action potentials induced by FDP is preceded by a short latent period. This effect of FDP lasts for about 2–5 min. In the course of our experiments, we have found that the increase in the number of the action potentials per unit of time, caused by FDP, depends on the initial electrobiological frequency 'f_i' (Figure 2). From the diagram it can be seen that FDP provokes the appearance of the action potentials in the tissue of the right auricle which previously showed only the resting potential. The frequency of these action potentials are the highest which we have encountered in the course of our experiments. The influence of FDP diminishes together with the increase of the spontaneous frequency of the action potentials.

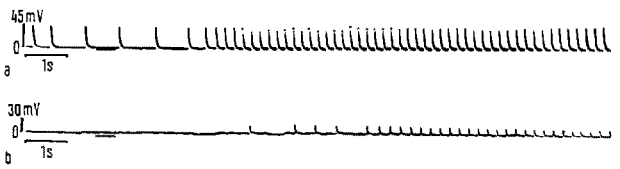

Fig. 1. a) Influence of FDP in concentration of 2.5 µg tyrosine on the frequency of the action potentials in the right auricle of the heart of rat, showing spontaneous activity. b) Appearance of rhythmical electrobiological activity influenced by FDP in the same concentration as in a).

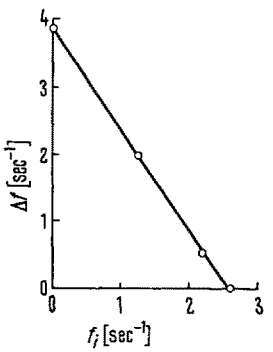

Fig. 2. The relation of the frequency of action potential increase under the influence of a constant dose (2.5 µg eq. tyr.) of FDP with initial frequency of the action potentials (f_i). The abscissa: difference (Δf) between the initial frequency (f_i) and the maximal frequency caused by FDP. The ordinate: initial frequency (f_i) i.e. the number of the action potentials in 1 sec.

Discussion. In our experiments we have observed the action potentials characteristic of the right auricular muscle[8] and the results presented indicate that FDP accelerates the appearance of the action potentials in the tissue which is electrobiologically active, and that FDP facilitates a spread of the activation wave in the right auricle, a manifestation of which is the appearance of electrobiological activity in tissue which had up till then exhibited only resting potentials.

The fact that the action of FDP depends on the initial electrobiological frequency and that under its influence action potentials appear in the tissue which possessed only the resting potential indicates that the essential action of FDP consists in its effect on the properties of the cell membrane and thus on the metabolic processes and excitability of the heart muscle cells. This view is supported by the results of previous papers particularly those showing that FDP influences the behaviour of electrobiological phenomena in the rat uterus cell[5–7].

The products formed during fibrinogen digestion by plasmin are always present in the plasma and their level constantly rises in pathological states in which there is an activation of the plasmin proteolysis[6]. The properties of FDP observed to date[1–4, 6, 9] and the results presented here indicate that FDP is an agent which, besides its role in the processes of haemostasis, acts not only on the local circulation, but also by influencing the electrobiological phenomena in the heart, may have, to some extent, an effect on the general circulation.

Résumé. Nous avons constaté que les produits de dégradation de fibrinogène (FDP) dûs à l'action de la plasmine exercent une influence sur les phénomènes électrobiologiques de l'oreillette droite isolée du cœur du rat.

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Metabolism of Different Histone Fractions in Ehrlich Ascites Cells after Environmental Change

Many investigators studied content, composition and metabolism of histones in various types of cells in an effort to understand the mechanism by which histones could specifically block the DNA template. While the analytical work has shown a remarkable similarity in types of histones isolated from different types of cells or organisms[1], the relationship between the rates of synthesis of individual histone fractions and between the metabolisms of histones and of DNA was found different from cell type to cell type[2]. To determine whether these relationships are characteristic for different types of cells, or are an expression of growth and metabolic conditions of the cells at the time of the experiment, the synthesis of individual histone fractions in Ehrlich ascites cells cultivated in vivo and in vitro was measured.

In in vitro experiments Ehrlich ascites cells were collected seven days after i.p. inoculation of about 4×10^6 cells into BDF1 strain of mice, washed free of erythrocytes with Dulbecco buffer, suspended in Earle's balanced salt solution to 2×10^6 cells per ml and swirled at 37 °C. Suspensions of cells were labeled at various intervals by addition of 1.0 µCi of amino acid ^{14}C (reconstituted protein hydrolysate, Schwarz Bioresearch Inc.; Schwarz Mixture) and 1.0 µCi of thymidine-methyl-^3H, Schwarz Bioresearch Inc., specific activity 7.0 Ci/mmole) per 2×10^8 cells 30 min prior to the time of harvest. In in vivo