found by these investigators either in the whole brain or in its two divisions, accompanying intensive and prolonged EFS [7, 8, 10, 11]. Meanwhile, 24 h after EFS, which we used to induce PAL, we found significant changes in the brain NA level, which were opposite in direction in animals of different age groups. The substantial fall in the basal NA level in both parts of the brain studied after very weak and short-acting stress in rats aged 1 month can be regarded as evidence that these animals were more sensitive to stress than rats aged 2 months, in which the NA level not only did not fall, but actually rose in the hypothalamus–brain stem division.

These results indicate differences in reactivity of the brain catecholaminergic systems to injury in rats of different ages.

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MECHANISM OF PARTICIPATION OF BONE MARROW CELLS IN COAGULATION

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KEY WORDS: bone marrow; fibronectin; culture; factor VIII antigen.

The role of the cellular factors of coagulation in the manifestation of the functional properties of the hemostasis system is regarded as exceptionally important [1, 3, 4]. Ability of the blood to coagulate is known to be determined by the functional state of the plasma membranes of the blood, blood vessel, and tissue cells. The problem of relations between the cellular component of the hemostasis system and the plasma component has been discussed in detail in the literature, but only a few publications have dealt with the participation of bone marrow cells in coagulation processes [7-9].

The aim of this investigation was to study the coagulatory and lytic properties of bone marrow in rats and changes in the concentration of fibronectin and factor VIII antigen in the culture medium of mouse bone marrow cells after 1 to 8 weeks in culture.

EXPERIMENTAL METHOD

Experiments were carried out on 30 male Wistar rats weighing 180-200 g. Under ether anesthesia the bone marrow was removed from the femur and tibia, suspended in cold buffered physiological saline, and then washed 3 times at 2000g for 10 min. Blood was taken from the animals' jugular vein and treated under similar conditions. The blood and bone marrow cells were counted, a cell suspension with a concentration of $(6\text{-}8)\cdot10^{12}$ cells/liter was prepared, and this was used in the experiments in a dilution of 1:10. Some blood and bone marrow cells were destroyed to determine fibrinolytic activity. The cells were destroyed by means of ultrasound in an MSE disintegrator (England) for 12 sec, followed by centrifugation at 8000g for 10 min. Protein was determined in the supernatant. The coagulation properties of the

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TABLE 1. Coagulatory and Lytic Properties of Bone Marrow and Peripheral Blood Cells (M ± m)

Test object	Thromboelastogram			Fibrinolytic activity (area of lysis), % of control
	angle α	*R*, sec	*K*, sec	
Cells				
peripheral blood	12,8±0,7	21,3±0,6	42,1±0,9	100±9,0
bone marrow	21,7±1,1	13,3±0,7	23,2±0,9	173±8,0

Legend. n = 30.

washed whole bone marrow and peripheral blood cells were tested by the thromboelastographic method after incubation in the animals' plasma for 10 min [5]. The fibrinolytic activity of the destroyed bone marrow and blood cells was determined on standard fibrin plates. Concentrations of factor VIII antigen and of fibronectin were determined by "Laurell" electrophoresis, using commercial antisera from "Behringwerke" (West Germany).

Apparatus from "Chemistry" (Hungary) was used. The culture medium was obtained from long-term cultures of mouse bone marrow cells [6].

EXPERIMENTAL RESULTS

Comparative investigation of the coagulatory and lytic properties of the bone marrow and peripheral blood cells revealed significant differences (Table 1).

Functional activity of the bone marrow cells was higher than that of the peripheral blood cells, as was shown by the more intensive release into the plasma of substances accelerating blood coagulation. The change in the principal parameters of the thromboelastogram in the presence of bone marrow cells pointed to activation of coagulation processes. A corresponding increase was observed in the angle α, with shortening of the parameters R and K on average by 33-50%.

High fibrinolytic activity also was found in the lyzed bone marrow cells. Values of the parameters of the lytic properties of the lyzed cells were significantly (by 30-60%) higher than the corresponding values for peripheral blood.

Consequently, compared with peripheral blood cells, bone marrow cells exhibit properties of hypercoagulation, and they also possess a higher level of components with fibrinolytic activity.

Considering the ability of bone marrow cells to synthesize certain coagulation factors, it was interesting to study changes in the concentration of factor VIII antigen in the culture medium of mouse bone marrow cells from 1 to 8 weeks in culture.

Changes in the concentration of factor VIII antigen depending on the period of culture of the cells were as follows: from the 1st through the 5th week the concentration decreased, but from the 7th week its level rose to 130% compared with the control.

At these times of bone marrow culture the fibronectin concentration in the culture medium was studied. Throughout the period of culture its concentration fell. From the 1st through the 5th week correlation was observed between the change in concentration of factor VIII antigen and the fibronectin concentration, but after the 6th week, while the level of factor VIII antigen rose, the fibronectin concentration fell to 15% of the normal value.

The results of these experiments are evidence that the coagulatory and lytic properties of bone marrow are much stronger than those of peripheral blood. Participation in coagulation processes is determined by the functional state of the cells. Growth and maturation of the blood cells are known to be accompanied by active metabolism, which determines the increased ability of the cells to exhibit their functional properties. Consequently, these processes are characteristic of bone marrow and they also determine the enhanced coagulatory and lytic properties of its cells.

The results of this investigation are evidence that maturation and differentiation of bone marrow cells are connected with synthesis and isolation of factor VIII antigen. These processes somehow or other lower the level of fibronectin, which plays an extremely important role in hemostasis.

Bone marrow, as regards its functional manifestations, is thus not only the central organ of hematopoiesis, but it is also a central organ of the functional system regulating the state of aggregation of blood [2].

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ROLE OF INTESTINAL HORMONES IN DEVELOPMENT OF PANCREATIC B CELL REACTIVITY OF RAT FETUSES TO GLUCOSE

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KEY WORDS: rat fetuses; insulin; intestinal hormones.

Because of its marked ability to respond directly to changes in the blood glucose level, for a long time the pancreas was considered to be self-regulating. However, data obtained on adult animals in recent years indicate that the action of glucose on B cells is modulated by the brain–islet cell system, the entero-insular axis, and paracrine influences in the islets [1, 7, 9].

In previous experiments in vitro and in vivo the writer obtained data to show that the hypothalamus and pituitary are involved in the control of development of B-cell reactivity of the fetal pancreas to glucose [11].

In view of data in the literature on the insulinotropic action of intestinal hormones in adults and neonates [4, 5, 8], on the high level of these hormones in the prenatal period of development [10], and the absence of information on relations of these hormones with insulin in the intrauterine period of development, it was decided to study whether intestinal factors are involved in the development of the insulin-releasing capacity of rat fetuses.

EXPERIMENTAL METHOD

Wistar albino rat fetuses were used. Experimental inactivation of the hypothalamus and pituitary was carried out by performing encephalectomy on the fetuses in utero [2] at 17.5 days of development, and reactivity of the fetal pancreas were studied at the age of 21.5 days.

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