In einer modifizierten Form der Ausschleusung, die weniger häufig beobachtet wurde, bildet die Substanz der Randkörper einen dünnen Kanal zwischen Nukleolus und Kernmembran aus. Dieser Kanal, der sich offenbar mit einem feinen Porus gegen das Cytoplasma hin öffnet, dient als «Leitbahn» für den langsamen, aber kontinuierlichen Abstrom von Nukleolarmaterial (Fig. 3).

Mit dem vorliegenden Befund gewinnt die Funktion des Kernes bei der Sekretion der Milchdrüse einen neuen, bisher unberücksichtigt gebliebenen Aspekt. Entsprechende Untersuchungen der Frage nach einem eventuellen Leistungsrhythmus der Nukleolen und einer Beteiligung der Nukleolarsubstanz an der Sekretbereitung sind im Gange.

W. WEBER und K. KRIESTEN

Zoologisches Institut der Universität Köln (Deutschland) 15. September 1960.

Summary

Mammary glands of the white mouse in different stages of lactation were fixed in Carnoy's fluid and the sections stained with Gallocyanin-chromalum für microscopic observation. After dislocation of the nucleolus to the nuclear membrane or the formation of a heterochromatic pathway between nucleolus and nuclear membrane the extrusion of nucleolar substance into the cytoplasm was observed.

The Osmotic Fragility of Thrombocytes of Laboratory Animals

The osmotic fragility test of human red blood cells is well known and variations from the normal occur in different diseases[1]. The osmotic fragility of human blood platelets has been recently investigated[2,3] and variations from the normal have been found in many hemorrhagic disorders[4]. Whereas the osmotic fragility test of erythrocytes is based upon the release of hemoglobin from the cells into different hypotonic NaCl solutions, the osmotic fragility of thrombocytes is measured by the morphological changes which the cells undergo in different hypotonic NaCl solutions, as well as by the release of the enzyme pyrophosphatase into these solutions.

The present communication deals with the study of the osmotic fragility of thrombocytes of different laboratory animals.

Materials and Methods. The preparation of the thrombocyte suspensions from animal's blood and the performance of the osmotic fragility test were carried out according to the method described in studies on the osmotic fragility of human thrombocytes[4].

Blood from human donors was drawn by cubital vein puncture into a siliconized syringe containing the anticoagulant solution[4]. The blood from rabbits, guinea pigs, and rats was obtained by cardiac puncture into siliconized syringes, while blood from the sheep, obtained by puncture of the jugular vein was directly let into siliconized test tubes, containing anticoagulant solution. Blood from mice was obtained by first opening the thorax of anesthesized animals and then by cardiac punctures, into a small syringe containing the anticoagulant solution.

Experimental and Results. The blood of five guinea pigs, 300–500 g each, fifteen rabbits 2–3 kg each, five rats, 120 g each, five mice, about 20 g each and three sheep, 20–30 kg each, was examined. The results are summarized in the Tables I–III. For the sake of comparison the osmo-

Tab. I. Percentage of thrombocytes with a sword-like process in various hypotonic NaCl solutions

	Concentration of NaCl solution						Distilled Water
	0.85%	0.44%	0.34%	0.30%	0.24%	0.1%	
Man	0	5	71	80	50	0	0
Guinea Pig	0	1	12	44	21	0	0
Rat	0	1	2	1	0	0	0
Rabbit	0	0–1	0	0	0	0	0
Mouse	0	0	0	0	0	0	0
Sheep	0	0	0	0	0	0	0

Tab. II. Percentage of thrombocyte ghosts in various hypotonic NaCl solutions

	Concentration of NaCl solution						Distilled Water
	0.85%	0.44%	0.34%	0.30%	0.24%	0.1%	
Man	0.3	4.3	12.4	20	50	100	100
Guinea Pig	1	13	30	49	78	100	100
Rat	1	25	68	81	93	100	100
Rabbit	2	30	70	97	97	100	100
Mouse	5	81	97	100	100	100	100
Sheep	6	99	100	100	100	100	100

Tab. III. Percentage of pyrophosphatase released in various hypotonic NaCl solutions

	Concentration of NaCl solution					
	0.85%	0.44%	0.34%	0.30%	0.24%	0.1%
Man	0	2	8	12	25	100
Guinea Pig	0	5	7	12	23	100
Rat	0	7	31	49	83	100
Rabbit	0	36	79	89	92	100
Mouse	0	37	58	78	92	100
Sheep	0	60	84	87	95	100

Tab. IV. Range of hemolysis of the erythrocytes in hypotonic NaCl solutions

	Beginning of hemolysis at NaCl concentration of	Complete hemolysis at NaCl concentration of
Man	0.44%	0.32%
Guinea Pig	0·46%	0.34%
Rat	0·48%	0.38%
Rabbit	0.54%	0.44%
Mouse	0.54%	0.46%
Sheep	0.6 %	0.48%

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tic fragility of the erythrocytes of the animals was also examined. The values for the osmotic fragility of thrombocytes in man (Tables I–III) are taken from previous studies[4].

Comment. From the first 3 Tables it may be seen that the osmotic fragility of thrombocytes of the different species varies considerably. Table IV, which gives the results of the osmotic fragility of erythrocytes, indicates similar variations.

Comparison of the figures in the different Tables shows that the osmotic fragility of erythrocytes and thrombocytes is very similar in the same species. The most resistant erythrocytes and thrombocytes were found in man, followed by guinea pig, rat, rabbit, and last by mice and sheep. It is of interest to note that, in the case of resistant thrombocytes like those of man and guinea pig, an intermediate form between normal platelets and platelet ghosts was encountered, namely platelets with sword-like process. In man, where the thrombocytes are most resistant osmotically, the percentage of thrombocytes with a sword-like protrusion in a NaCl solution of 0.30% was 80%, and in the guinea pig only 44%.

The thrombocytes with increased fragility obtained from the other animals, however, showed a direct transition from normal thrombocytes to thrombocyte ghosts, and practically no cells with sword-like processes were encountered.

N. Gilboa-Garber, D. Nelken, and J. Gurevitch

Department of Clinical Microbiology, Hebrew University-Hadassah Medical School, Jerusalem (Israel), April 1, 1960.

Zusammenfassung

Die osmotische Resistenz von Thrombozyten fünf verschiedener Tierarten wurde untersucht und mit der osmotischen Resistenz menschlicher Thrombozyten verglichen. Ein Zusammenhang zwischen der osmotischen Resistenz der Thrombozyten und Erythrozyten der gleichen Tierart konnte gezeigt werden.

Influence of Glutathione on Serum Cholesterol in Rabbits[1]

An increase of intravital oxidation processes could be expected to oxidize cholesterol or its precursors and thus decrease the level of cholesterol in the blood and other tissues. An investigation into whether or not oxidized cholesterol is less atherogenic to animals and whether enhancing *in vivo* oxidation processes decrease the level of cholesterol in the blood of humans and animals, may contribute to the elucidation of these problems. Indeed, Altschul *et al.* could show that

(a) feeding of cholesterol oxidized in various ways prior to giving it to rabbits, produces little or no atherosclerosis[2];

(b) increasing O_2 inhalation tends to decrease serum cholesterol in humans[3];

(c) treating rabbits with pure cholesterol for 3 months and exposing them to increased O_2 tension 3 × weekly, markedly inhibits atherogenesis[4];

(d) ultraviolet irradiation of humans decreases their serum cholesterol[5];

(e) repeated ultraviolet irradiation of rabbits given during the experimental period cholesterol, inhibits atherogenesis[6].

These observations led to the testing of large doses of nicotinic acid which is said to enhance oxygenation of blood and to augment DPN and TPN.

Thus it was found that

(f) nicotinic acid in large oral or parenteral doses lowers serum cholesterol in humans and animals[7] and inhibits atherogenesis in rabbits[8]. The clinical application of this procedure is now widely accepted.

On the other hand, injections of DPN, TPN, catalase, and peroxydase have so far shown no influence on serum cholesterol in rabbits.

Continuing the investigation of substances which may stimulate the activity of respiratory enzymes, Altschul found that

(g) injections of cytochrome C and of hematoporphyrin lower serum cholesterol in rabbits[9].

Recently we have examined the influence on serum cholesterol in rabbits of reduced and oxidized glutathione and of its constituents glycine and cysteine (as DL-cysteine hydrochloride) with the following results.

Methods. Adult male and female rabbits were used. Blood was taken from an ear vein in the morning and the substance to be tested was injected or given in capsule form immediately afterwards. 24, and in some cases 48 h later, blood was again taken. The cholesterol was determined by Schönheimer-Sperry's method as modified by MacArthur. Reduced glutathione was injected intramuscularly in doses of 0.05 g in 16 rabbits, in doses of 0.1 g in 22 rabbits; subcutaneously in doses of 0.1 g in 6 rabbits. It was also given in single capsules of 0.1 g to 6 rabbits and in single capsules of 0.05 g to 6 other rabbits. Oxidized glutathione in doses of 0.1 g was injected intramuscularly in 18 rabbits. DL-cysteine hydrochloride and glycine were each injected intramuscularly into 12 rabbits in doses of 0.1 g. Glycine was also given to 16 rabbits subcutaneously in doses of 0.1 g.

Results. Oxidized glutathione had no significant influence on serum cholesterol by intramuscular or oral administration. Neither had intramuscular injections of DL-cysteine or glycine. Subcutaneous injections of 0.1 g glycine were followed by an average increase in serum cholesterol of 11.9%, but the changes were not regular enough to be significant. Reduced glutathione in capsules of 0.1 g had no effect and neither had intramuscular injections of 0.025 g. Quantities of 0.05 g intramuscularly increased the serum cholesterol after 24 h by 6.6%, but the results were not statistically significant. However, doses of 0.1 g of reduced glutathione, injected intramuscularly, increased serum cholesterol after 24 h to a highly significant degree (see Table). In 19 cases the serum cholesterol was also determined 48 h after the injection of 0.05 g and 0.1 g of reduced glutathione. In 8 of these cases the increase of serum cholesterol surpassed the 24 h increase, in 10 cases the cholesterol values were lower than those after 24 h and in one case the value was unchanged.

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