deep changes induced by MTU treatment. The significance of these last findings deserve further attention and study.

Riassunto. Gli autori hanno ottenuto in conigli un siero anti-TSH usando come antigene ormone bovino. Questo siero inibisce il TSH endogeno di ratti nutriti con dieta di Remington e trattati con tiouracile, impedendo cosi la formazione della iperplasia tiroidea. È stato anche osservato che il trattamento con siero anti-TSH mantiene normale il rapporto MIT/DIT cancellando le salienti alterazioni indotte dal trattamento con tiouracile.

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On the Controlling Function of the Kidneys in Fibrinolysis

The lytic action of urine upon impure fibrin clots[1,2] was elucidated when a plasminogen activator, named urokinase (UK) was found in urine[3–5].

It is supposed that UK is a plasma plasminogen activator which, after it has been transferred from the tissues to the blood and carried to the kidneys, is excreted with the urine[6,7].

ASTRUP and STERNDORFF[3] suggested that UK may be a product of the kidney, a suggestion supported by other observations[8]. It can therefore be accepted that the fibrinolysis activator reaches the blood from the kidney tissue as it does from the other tissues.

So far no investigations, apart from the evaluation of the excretion of UK with the urine, have been carried out on the possibility of the secretion of this product by the kidney into the blood. It may be expected that, if UK is secreted by the kidney into the blood, the fibrinolytic activity of the renal venous blood will be higher than that of renal arteries.

In the investigations presented in this communication, the fibrinolytic activity of euglobulins from the renal arterial blood (RAB) or blood euglobulins from other vessels is compared with the fibrinolytic activity of euglobulins from the renal venous blood (RVB).

Methods. The human blood was collected from surgical patients during operations on the kidneys from renal vessels and cubital veins.

In rabbits under ethyl ether anaesthesia, the abdominal cavity was opened and the blood was collected from the renal vessels and other blood vessels.

Renal blood stasis was induced by pressure on the renal vein near to the vena cava.

Urine stasis was induced by pressure on the region of the ureter nearest to the kidney.

Blood was withdrawn into 0.1 *M* potassium oxalate (9/1:v/v). The euglobulins were obtained after diluting the oxalated blood plasma 10 times and precipitating at pH 5.3 by the addition of *N*/6 acetic acid. The precipitate was dissolved in borate buffer (pH 7.6) to half of the original plasma volume.

Clotting was induced after the addition of an equal volume of thrombin[9] (bovine thrombin 4 units/ml, containing 0.0125 *M* $CaCl_2$).

The fibrinolysis time was estimated at a temperature of 37°C from the moment when calcified thrombin was added.

Results. The difference in the fibrinolysis time of RAB and RVB euglobulins in rabbit is presented in Table I.

The fibrinolysis time of the euglobulins from RVB is shorter than that from RAB. Renal blood stasis causes a further decrease of fibrinolysis time (Table II).

Ligation of the ureter itself without pressure on renal veins causes such an increased activation of fibrinolysis

Tab. I. Fibrinolysis of the euglobulin fraction of rabbit's blood.

Number of cases	Euglobulin plasma fraction derived from		Fibrinolysis time in min
15	Arterial blood		198 (98–280)
	Renal venous blood		
15	Before stasis:		103 (18–172)
15		5 min	86 (10–155)
12	After stasis:	10 min	38 (0–60)
12		15 min	18 (0–47)

Tab. II. Fibrinolysis of the euglobulin fraction of rabbit's blood before and after stasis of the urine

Euglobulin fraction; Blood derived from		Fibrinolysis time in min Rabbits I	II	III	IV	V	VI
Femoral vein		164	128	110	273	190	–
Renal artery		182	119	92	280	175	170
Renal vein							
Before stasis of the urine		75	65	66	170	141	120
After stasis of the urine	10 min	45	14	–	120	95	20
	20 min	14	18	–	–	42	22
	30 min	no clot appeared			28	–	32

Tab. III. Fibrinolysis of human euglobulin plasma fraction in min

Cubital veins	Renal arteries	Renal veins
155	130	18
136	—	17
150	142	35
192	—	34
193	187	72

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in the renal blood that the flow of this blood into the general circulation causes a decrease of the fibrinolysis time of the euglobulins in the blood obtained for example from aorta or arteria carotis.

In some cases, after pressure on the renal veins or ligation of the ureters, such noticeable activation of fibrinolysis occurs in the euglobulins of the renal blood that during their preparation a proteolytic break-down of fibrinogen takes place, thus showing a lack of coagulation after the addition of calcified thrombin.

This increased fibrinolytic activity may also be observed in the plasma. The plasma in such cases contains fibrinogen and, after recalcination and coagulation, its fibrinolysis time varies from 2.5 to 6 h. In fibrinolytic inactive plasma, no fibrinolysis was observed in 20 h.

Only the RVB euglobulins obtained without stasis and without pressure on the ureters show fibrinolytic activity that is markedly higher than in the arterial blood euglobulins. Euglobulins, from the rabbit venous blood derived from the femoral vein, the marginal auricular vein, the vena cava below the inflow of blood from the renal veins, from the jugular vein and from the bone-marrow blood, do not show any noteworthy fibrinolytic activity compared with the fibrinolytic activity of RAB euglobulins.

The human kidney is similar in this respect to the rabbit kidney. In 5 surgical patients, blood was collected 5 times from the renal veins and cubital veins and 3 times from the renal arteries (Table III).

The results obtained after estimation of euglobulins fibrinolysis time in patients corresponded to those obtained in the experiments with the rabbit blood.

The fibrinolysis time of RVB euglobulins is always shorter than that of RAB and cubital veins euglobulins in man.

Discussion. From the difference in fibrinolytic activity observed between RVB and RAB it may be supposed that the higher fibrinolytic activity of the former is caused by a reduction in fibrinolysis inhibition. This may be a result of a greater excretion of the inhibitors with the urine[10,11] than of plasminogen activator, which is supposed to be carried to the kidney with the blood stream. However, on ligating the ureters an increased fibrinolytic activity of renal blood is also marked and even more noticeable than during blood stasis and takes place in such conditions that a loss of fibrinolysis inhibitors from the blood is practically impossible.

In such conditions an increase in fibrinolytic activity of renal blood can be explained as being the result of an increased concentration of the plasminogen activator produced locally by the kidney and secreted into the blood.

The results indicate the powerful effect of the fibrinolysis activator produced by the kidney which would appear to be the organ controlling the fibrinolysis of the circulating blood.

The presence of UK in human and animal urine appears to be merely a side effect of the much more important function of the kidney; that is, the production of the plasminogen activator and the secretion of it into the circulating blood.

Zusammenfassung. Die Fibrinolysezeit der Euglobuline aus dem Blut der Nierenvenen ist kürzer als die Fibrinolysezeit der Euglobuline aus dem Blut der Nierenarterien des Menschen und Kaninchens. Es wird hieraus gefolgert, dass die Niere Urokinase produziert und somit ein Organ ist, das die Fibrinolyse des kreisenden Blutes kontrolliert.

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Effect of Thyroxine on Radioiodine Metabolism by the Thyroid Gland of Goldfish, *Carassius auratus* L., in Fresh and Iodine-Enriched Water

In teleostean fish, the thyroid gland is diffused along the ventral aorta. The basic function of the thyroid is to concentrate iodine and to form from this basic element a characteristic iodoprotein. In general, marine forms, which live in salt-water rich in iodine, accumulate less iodine[1-3]. On the contrary, iodine accumulation is high in fresh-water fish[4-6]. It has also been shown that goldfish, *Carassius auratus* L., behaved differently when kept in fresh-water than they do in iodine-enriched water[7]. The presence of abundant iodine in aquarium water caused the goldfish to take up injected radioiodine less effectively and to excrete more of radioiodine into the water than did the fish maintained in fresh-water which contain very little iodine. This parallels the difference in iodine accumulation and retention in the thyroid between marine and fresh-water fish and suggests that the cause of that difference is associated with the larger stores of iodine which are normally present in sea. The present experiments were carried out to determine if the treatment of the fish with thyroxine brought about any difference.

Material and Methods. Two groups of goldfish were maintained in fresh-water and iodine-enriched water (60 p.p.m. KI solution) in well aerated aquaria in a constant temperature room at 20°C for a week. Each fish was then injected with 40 μc of carrier-free I^{131} intraperitoneally. The solution of I^{131} was made in physiological saline so that it would not interfere with the osmotic balance of the fish. The needle was pushed through the hypaxial muscles of the caudal peduncle to the peritoneal cavity so that any leakage of the radioiodine was prevented when the needle was withdrawn.

At regular intervals starting from 1 h, five fishes were taken out, anesthetized in 1:2000 solution of tricaine methane sulfonate (MS 222), radioactivity of I^{131} was determined on a scaler using a thin window Geiger tube (No. D 34, Nuclear-Chicago Corp.) by the technique described by Swift[8], all the readings were corrected for

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