

various antigens, including bacterial ones. It means that in this area the immunodepressive effect of ionizing radiation is depressed and therefore the immune resistance of irradiated animals is increased.

The authors assume that the radioprotective effect induced by immunization of urease is realized probably by the two mechanisms described above. The further possible pathways of the radioprotective effect of the above-mentioned compound are being studied further.

Zusammenfassung. Die Problematik der biologischen Radioprotektion wird diskutiert und die radioprotektiven Einwirkungen von Urease demonstriert.

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The Effect of Angiotensin II on the Platelet Aggregation Induced by Adenosine-diphosphate, Epinephrine and Thrombin

It is generally accepted that blood platelets play a main role in hemostasis, especially in the first step¹. Formation of the hemostatic plug is initiated by the platelet aggregates on the surface of which fibrin threads may be formed². Platelet aggregation *in vitro* can be induced by many substances, e.g. adenosine-di-phosphate (ADP), thrombin, epinephrine and serotonin^{3,4}.

The risk of the incidence of thromboembolic complications in patients with hypertensive cardiovascular disease is higher in comparison to normal persons⁵. Previously we have stated that in hypertension the adhesiveness of platelets is considerably increased⁶. On the other hand it is known that, in hypertension, the level of angiotensin

is often elevated⁷. The purpose of this study was to investigate the effect of angiotensin II on the platelet aggregation induced by thrombin, epinephrine or ADP.

The experiments were carried out on human platelet-rich plasma (PRP). Platelet aggregation was induced by the method of BORN⁸ in the following systems: 3.6 ml of PRP + 0.2 ml of angiotensin II (CIBA, Basel) and 0.2 ml of thrombin (Wytwórnia Surowic i Szczepionek, Lublin, Poland) or 0.2 ml of ADP (Sigma, USA) or 0.2 ml of epinephrine (Polfa, Poland).

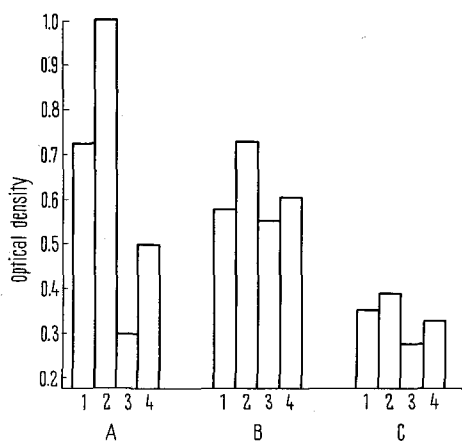
The results are presented in the Figure. It has been found that angiotensin II very significantly increased the aggregating effect of epinephrine (A). This effect was observed to a lesser degree when ADP was used (B) with angiotensin II. Almost no changes were observed in the system thrombin + angiotensin II (C).

Recently we have shown that injection of angiotensin II to dogs increased the number of platelets aggregating twofold⁹. During stress, catecholamines, e.g. epinephrine, may be released into the circulation. On the basis of our results we suggest that release of epinephrine, with simultaneously increased level of angiotensin II, may be at least in part responsible for arterial thrombosis in such cases. The presence of ADP and thrombin together with angiotensin II does not seem to be so important as in the case of epinephrine in patients¹⁰.

Zusammenfassung. Angiotensin erhöht die Plättchen-Aggregation verschiedener aktueller Stoffe.

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The effect of angiotensin II on the platelet aggregation induced by epinephrine, ADP and thrombin.

(A) (1) 3.6 ml of PRP + 0.2 ml of epinephrine 2×10^{-5} mg/ml + 0.2 ml of 0.9% NaCl; (2) 3.6 ml of PRP + 0.2 ml of epinephrine 2×10^{-5} mg/ml + 0.2 ml of angiotensin II $0.005 \mu\text{g/ml}$ ^a; (3) 3.6 ml of PRP + 0.2 ml of epinephrine 2×10^{-7} mg/ml + 0.2 ml of 0.9% NaCl; (4) 3.6 ml of PRP + 0.2 ml of epinephrine 2×10^{-7} mg/ml + 0.2 ml of angiotensin II $0.005 \mu\text{g/ml}$.

(B) (1) 3.6 ml of PRP + 0.2 ml of ADP $0.5 \mu\text{g/ml}$ + 0.2 ml of 0.9% NaCl; (2) 3.6 ml of PRP + 0.2 ml of ADP $0.5 \mu\text{g/ml}$ + 0.2 ml of angiotensin II $0.005 \mu\text{g/ml}$; (3) 3.6 ml of PRP + 0.2 ml of ADP $0.25 \mu\text{g/ml}$ + 0.2 ml of 0.9% NaCl; (4) 3.6 ml of PRP + 0.2 ml of ADP $0.25 \mu\text{g/ml}$ + 0.2 ml of angiotensin II $0.005 \mu\text{g/ml}$.

(C) (1) 3.6 ml of PRP + 0.2 ml of thrombin 30 u/ml + 0.2 ml of 0.9% NaCl; (2) 3.6 ml of PRP + 0.2 ml of thrombin 30 u/ml + 0.2 ml of angiotensin II $0.005 \mu\text{g/ml}$; (3) 3.6 ml of PRP + 0.2 ml of thrombin 10 u/ml + 0.2 ml of 0.9% NaCl; (4) 3.6 ml of PRP + 0.2 ml of thrombin 10 u/ml + 0.2 ml of angiotensin II $0.005 \mu\text{g/ml}$.

^a These concentrations are final concentrations.

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