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POSTER SYMPOSIUM XI

Endothelial Cells and Prostacyclins.

INHIBITION OF PLATELET REACTIVITY BY ENDOTHELIAL CELLS. L.A. Harker, N. Joy, R.T. Wall, L. Quadracci and G. Striker. University of Washington School of Medicine, Seattle, Washington, U.S.A.

The process of endothelial thromboresistance has been studied by measuring platelet reactivity to cultured human endothelial cells (EC), vascular smooth muscle cells (SMC), and fibroblasts (FB). Human ^{14}C -serotonin labeled platelets in a concentration of 300,000 cells/ μl and washed cultured cells (brought into monocellular suspension by EDTA buffer) were reacted in stirred plasma suspensions at 37°C while assessing light transmission, ^{14}C -serotonin release and electron microscopy. SMC from adult arteries and veins induced aggregation and release (A-R) in a dose response fashion with maximal ^{14}C -serotonin release of 62% - 7% by 10^6 SMC/ml, whereas comparable reactivity was induced by 3×10^6 /ml umbilical vein SMC and 5×10^6 FB/ml. Trypsinization at 0.05% solution for 2 minutes destroyed the capacity of SMC and FB to induce A-R.

EC failed to induce aggregation and release in concentrations as high as 10×10^6 cells/ml. Moreover, the addition of EC to suspensions of SMC or FB in ratios as low as 1:5 prevented platelet A-R. The inhibitory effect of EC was not destroyed by trypsinization. Platelet A-R induced by ADP, epinephrine or collagen were similarly impaired by the addition of EC (10^6 cells/ml) while control studies using comparable numbers of SMC and FB produced no change. EC grown in the presence of indomethacin failed to inhibit platelet reactivity. ADP, epinephrine and collagen induced A-R were also significantly reduced by supernatant media from EC cultures. Supernatant media from SMC and FB failed to affect A-R. These results indicate that the lack of platelet reactivity to endothelial cells is mediated through endothelial cell synthesis of a soluble platelet prostaglandin inhibitor, probably prostacyclin.

AN AORTA INTIMA INHIBITOR OF PLATELET AGGREGATION : A. duP. Heyns, C.J. Badenhorst and F.P. Retief. University of the Orange Free State. Bloemfontein. South Africa.

The interaction of platelets and the vessel wall is of importance in the pathogenesis of intravascular thrombosis and atherosclerosis. We have previously described the presence of an inhibitor of platelet aggregation and a low Km ADPase in aorta intima extracts. The inhibitor was further characterized.

Human aorta intimas were homogenized, centrifuged and supernatants used. Platelet aggregation was measured in a aggregometer. ADPase activity was measured by incubating ^{14}C -ADP with intima, separating metabolites by high voltage electrophoresis and quantitated.

Aggregation induced by ADP, collagen, Ristocetin and polylysine was inhibited by the intima extract. The inhibition was still evident in aspirin treated platelets. The inhibitor is present in the supernatant of 100 000g centrifuged extracts. This inhibitor appears not to be ADPase or the recently described prostacyclin (PGX) :- it is stable and not destroyed by incubation at 37°C , blocking of prostaglandin synthesis by pre-incubation of the intima with indomethacin has no effect on inhibitor activity. ADPase is inactivated by KCN whereas the inhibitor is not.

The inhibitor of platelet aggregation and to a lesser extent ADPase, in the intima may be important regulators of platelet-vessel wall interaction.