DEPOSITION OF PLATELETS ON COLLAGEN AS EVALUATED BY ^{51}Cr -LABEL OR MORPHOMETRY: EFFECTS OF ASPIRIN. Th.B. Tschopp, P. Hoffmann-La Roche & Co., Ltd., Basel, Switzerland

Whether aspirin inhibits platelet deposition on thrombogenic surfaces by its effect on adhesion-induced aggregation only or whether it also affects adhesion per se, is still controversial. This study compares platelet deposition determined from the deposited radioactivity using ^{51}Cr -labeled platelets with platelet surface interaction as measured by morphometry. Collagen fibrils of α -chymotrypsin-digested segments of rabbit aorta were exposed to citrated rabbit blood for 10 min in a perfusion chamber at 830 s^{-1} blood shear rate. The number (L) of deposited platelets as calculated from the ^{51}Cr -label amounted to $687 \pm 87 \times 10^3/\text{mm}^2$ (mean $\pm$ SE of 35 control perfusions). The surface area covered with platelets (D) as determined by morphometry amounted to $31 \pm 2\%$ and that covered by platelet thrombi (T) (aggregates higher than $5\text{ }\mu\text{m}$) to $19 \pm 2\%$. The deposited platelet mass (M) as measured by the sum of platelet cross section area multiplied by section thickness amounted to $564 \pm 66\text{ }\mu\text{m}^3/\text{mm}^2$. Linear regression analysis showed platelet mass as determined by L and M to be highly correlated ($R = 0.9509$, $2p < 0.001$). Thus platelet deposition on thrombogenic surfaces may be adequately measured by adding a small proportion ($13 \pm 1\%$) of ^{51}Cr -labeled homologous platelets to citrated blood.

Aspirin ($100\text{ }\mu\text{M}$) significantly inhibited platelet deposition as shown by decreased values of L, M and T but did not decrease the surface area covered with platelets (D) as evaluated morphometrically. Thus the inhibition of platelet deposition on thrombogenic surfaces exerted by aspirin appears to be due to inhibition of a platelet reaction subsequent to adhesion.

INHIBITION OF COLLAGEN-INDUCED PLATELET AGGREGATION BY ANTIBODIES TO DISTINCT TYPES OF COLLAGEN. L.Balleisen, R.Timpl, S.Gay. Medizinische Universitätsklinik Münster; Max Planck-Institut für Biochemie, Martinsried b. München, Germany.

The reaction of platelets with fibrillar collagen was measured by recording aggregation according to Born's method and by retraction of Ancrod-fibrin clots. These reactions could be completely inhibited by coating the fibrils with stoichiometric amounts of purified antibodies to type I, II or III collagens. The inhibition was specific, i.e. antibodies to type I collagen prevented aggregation by type I collagen but not by type II or III collagen. Comparable amounts of antibodies to fibrinogen or to serum albumin had no effect on the reaction. The data indicate that platelet aggregation by type I or II collagen fibrils is not due to contamination with type III collagen. The inhibition reaction may be useful for further studies on molecular parameters of the interaction between platelets and collagen fibers.

COLLAGEN CARBOHYDRATES ARE NOT INVOLVED IN COLLAGEN-INITIATED PLATELET AGGREGATION. Richard K. Gordon and Elizabeth R. Simons. Boston University School of Medicine, Boston, Ma., U.S.A.

There is strong evidence that the quaternary (polymeric) structure of collagen is necessary for platelet aggregation. Although the specific groups required are unknown, the carbohydrate moieties have been implicated. To further elucidate their role we have used NaIO_4 (0.01M , 4°C in the dark for 24 hours) to selectively destroy 75-87% of total carbohydrate. The collagens were characterized by circular dichroism spectra and by polymerization kinetics observed by light scattering. The fibril formation kinetics for control collagen exhibit a linear rate for more than 5 min. while the modified collagen's levels off to a zero rate after 1 min. Further evidence for abnormal polymerization is its inability to form fibrils in 0.25ml PPP plus 0.75ml 0.9% NaCl . However, soluble control collagen initiated normal PRP aggregation as did fibrils of control and periodated collagen preformed in buffer, although the periodated fibrils evoked a slightly attenuated response. In competition experiments, periodated monomeric collagen incubated with platelets (and thus incapable of polymerizing) delayed platelet aggregation by preformed control collagen fibrils. As concentration of modified tropocollagen increased, the lag time before platelet aggregation increased. These results suggest that preformed fibrils must displace monomeric, essentially carbohydrate-free, collagen from the platelet surface before the platelet-collagen aggregation response can occur. Thus neither the carbohydrate moiety nor the quaternary structure is necessary for collagen binding to the platelet surface. The quaternary fibrillar structure is necessary for platelet aggregation while the carbohydrates are important for the formation of such fibrils rather than for platelet aggregation itself.