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Immunochemical Studies on the Fibrin Stabilizing Factors from human Plasma and Platelets

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The last step in normal blood coagulation is the crosslinking or stabilization of fibrin by transpeptidation [5,8,17]. Human plasma as well as platelets contain a precursor of the transpeptidating enzyme called factor XIII or fibrin stabilizing factor which requires thrombin for activation [3,9,12].

So far only the fibrin stabilizing factor from plasma had been isolated and characterized [6,7,11]. We now also have purified the factor from human platelets and compared its properties with those of plasma factor [1].

Fig. 1: Crystallized platelet factor XIII.
Fig. 1 shows crystals of the highly purified factor from platelets. This fibrin stabilizing factor is completely different from plasma factor in its physicochemical properties.

While factor XIII isolated from human plasma has a molecular weight of around 300 000, for platelet factor a sedimentation constant of 7.4 was found; its molecular weight probably lays in between 150 000 and 200 000.

Because of the different sizes the two fibrin stabilizing factors have different mobilities in polyacrylamide gel electrophoresis (Fig. 2). The separation in a gel containing urea shows that there is also no identity as to the subunits.

Under certain conditions a split product of plasma factor XIII which lacks in enzymatic activity can be isolated [2,7,11]. It has a molecular weight of approximately 100 000 and seems to be identical with one of the subunits of the plasma factor. After clotting of blood or plasma this split product is found in serum, [2] too.