Date - 15/05/20

CLOTTING OF BLOOD

Coagulation, also known as clotting, is the process by which blood changes from a liquid to a gel, forming a blood clot. it potentially results in hemostasis, the cessation of blood loss from a damaged vessel, followed by repair.

or Blood clotting or coagulation, is an important process that prevents excessive bleeding when a blood vessel is injured. platelets (a type of blood cell) and proteins in your plasma (the liquid part of blood) work together to stop the bleeding by forming a clot over the injury.

THROMBIN :— also known as coagulation factor -II, Thrombin is a serine protease that plays a physiological role in regulating hemostasis and maintaining blood Coagulation. once converted from prothrombin, Thrombin converts fibrino-gen to fibrin, which, in Combination with platelets from the blood, forms a clot.

FIBRIN ⟶ fibrin thread wind around the platelet plug at the damaged area of the blood vessel, forming an interlocking network of fibres and a framework for the clot. This net of fibres traps and helps hold platelets, blood cells and another molecules tight to the site of injury.

The activation of clotting factors occurs in a sequence manner. The first factor in the

sequence activates the second factor, which activates the third factor and so on. This series of reactions is called the clotting cascade.

Blood clotting is the transformation of liquid blood into a semisolid gel. clots are made from fibres (polymers) of a protein called fibrin (see the diagram below). Fibrin monomers come from an inactive precursor called fibrinogen. The body of the fibrinogen molecule has caps on its ends that mask fibrin-to-fibrin binding sites. If the caps are removed then fibrin monomers polymerize to form fibrin polymers. This process requires thrombin, the enzymes that converts fibrinogen to fibrin. This process also requires calcium, which acts as a kind of glue to hold the fibrin monomers to each other to form the polymeric fibre.

The fibrin fibre form a loose network that is stabilized by clotting factor XIII. The stabilized meshwork of fibrin fibres traps erythrocytes, thus forming a clot that stops the flow of blood.

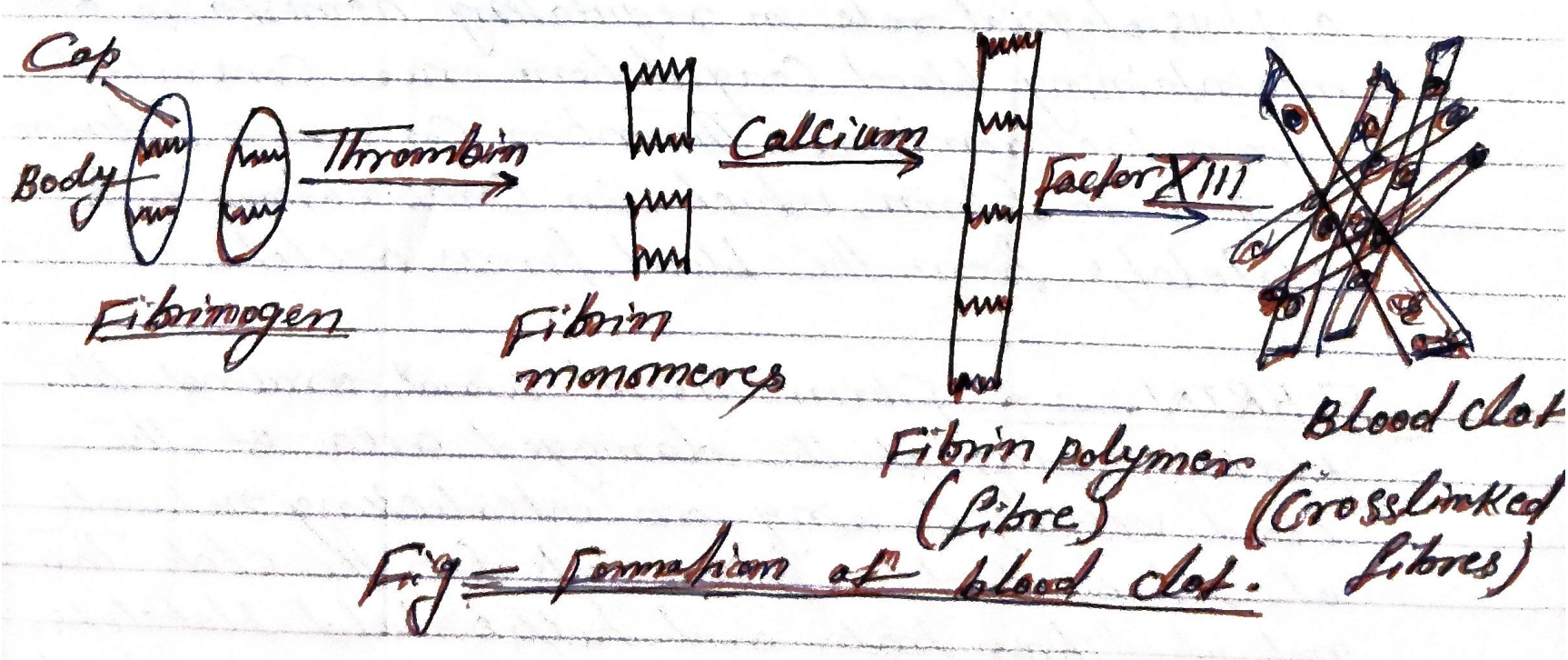
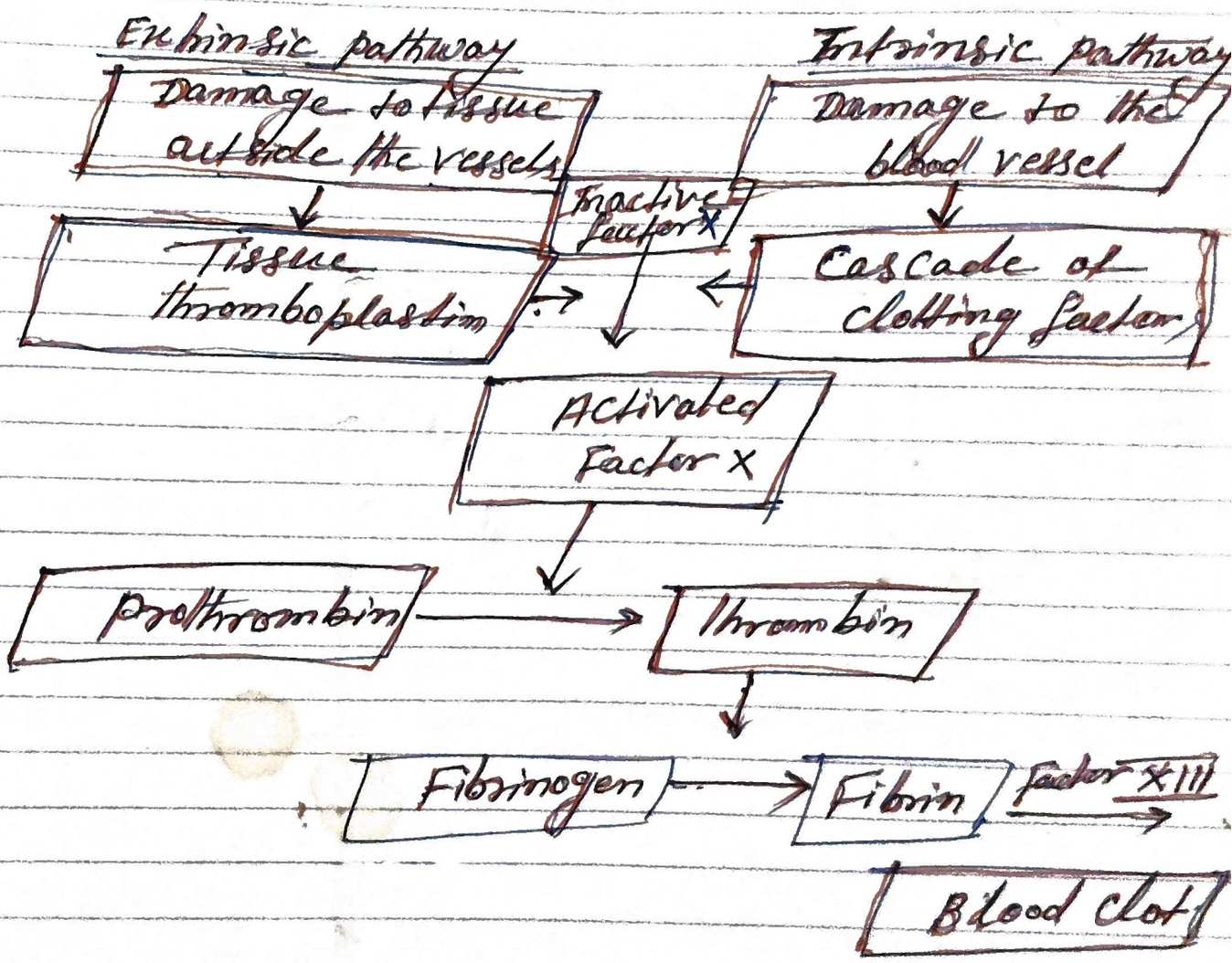


Fig = formation of blood clot.

CONTROL OF THE CLOTTING CASCADE

The diagram above we can see that thrombin is the key to the clotting mechanism if thrombin is present then clotting will procede but if thrombin is absent then clotting will not occur. How then is thrombin controlled? thrombin is derived from an inactive precursor called prothrombin. There are two pathways that lead to the conversion of prothrombin to thrombin.

(I) The intrinsic pathway
(II) The extrinsic pathway.



INTRINSIC PATHWAY → Activated factor X is an enzyme that converts prothrombin to thrombin, Thrombin converts fibrinogen to fibrin monomers, which then polymerize in fibrin fibres. Fibrin fibres form a loose meshwork that is stabilized by crosslinks created by factor XIII.