

PROB ANIL KUMAR Zoology

B.Sc HONS Part-III Paper-V

Topic: Describe the Physiology of blood coagulation.

PROB ANIL KUMAR

Associate Professor Zoology

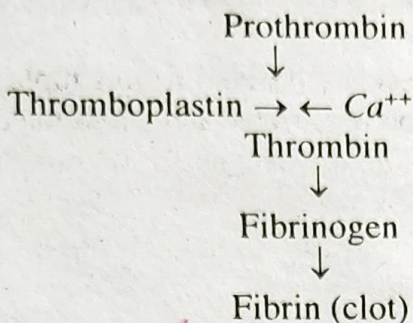
R.R.S College MOKAMA P.P.U

Q. III. Describe the physiology of blood coagulation.

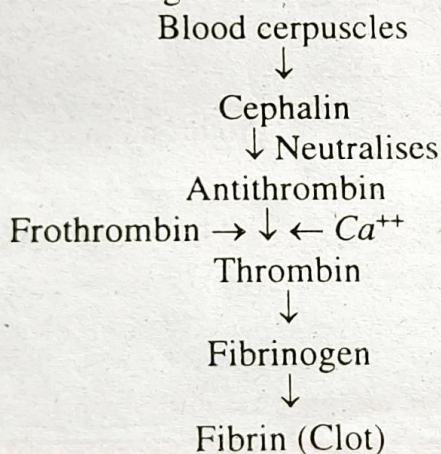
Ans. When the blood is exposed to the atmospheric air, a semi-solid mass is formed. This semi solid mass is called clot. The formation of clot is called blood coagulation. It is of great biological value in the survival of animals. The important mechanisms can be explained by the following theories—

1. Best and Taylor's theory—According to Best and Taylor, four substances, namely prothrombin, calcium thromboplastin and fibrinogen are taking part in coagulation. The plasma of circulating fluid contains small quantities of prothrombin, which is produced by the liver. Thromboplastin is

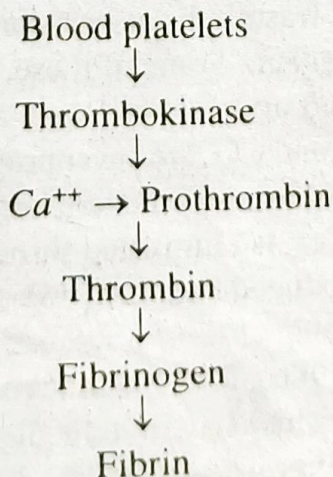
present in the tissues calcium occurs in plasma. Fibrinogen occurs in a dissolved state in the plasma. When blood is shed the injured tissues liberate thromboplastin. In the presence of Ca^{++} ions, prothrombin is converted into active thrombin. Then thrombin acts upon soluble fibrinogen converting it into insoluble fibrin.



2. Howell's theory—According to Howell, Ca^{++} alone are promoting the conversion of prothrombin into thrombin. Because of the presence of antithrombin in the blood the prothrombin is prevented from activation. When there is an injury, The formed elements of the blood at once release a substance known as Cephalin. The Cephalin neutralises the activity of antithrombin and allows Ca^{++} to react with prothrombin. This results in the formations of thrombin which converts fibrinogen to fibrin.



3. Full and Spiro's theory—Full and Spiro consider an enzyme thrombokinase produced by the thrombolytes as essential constituent for the coagulation of blood.



4. Enzyme Cascade Hypothesis— This theory was proposed by Biggs and MacFarlane in 1966. According to this hypothesis 13 factors, namely factors, I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII, and XIII are involved in coagulation. These factors act as enzymes and proenzymes. They bring about a sequence of reactions in which each enzyme activates the next until the clot fibrin is formed.

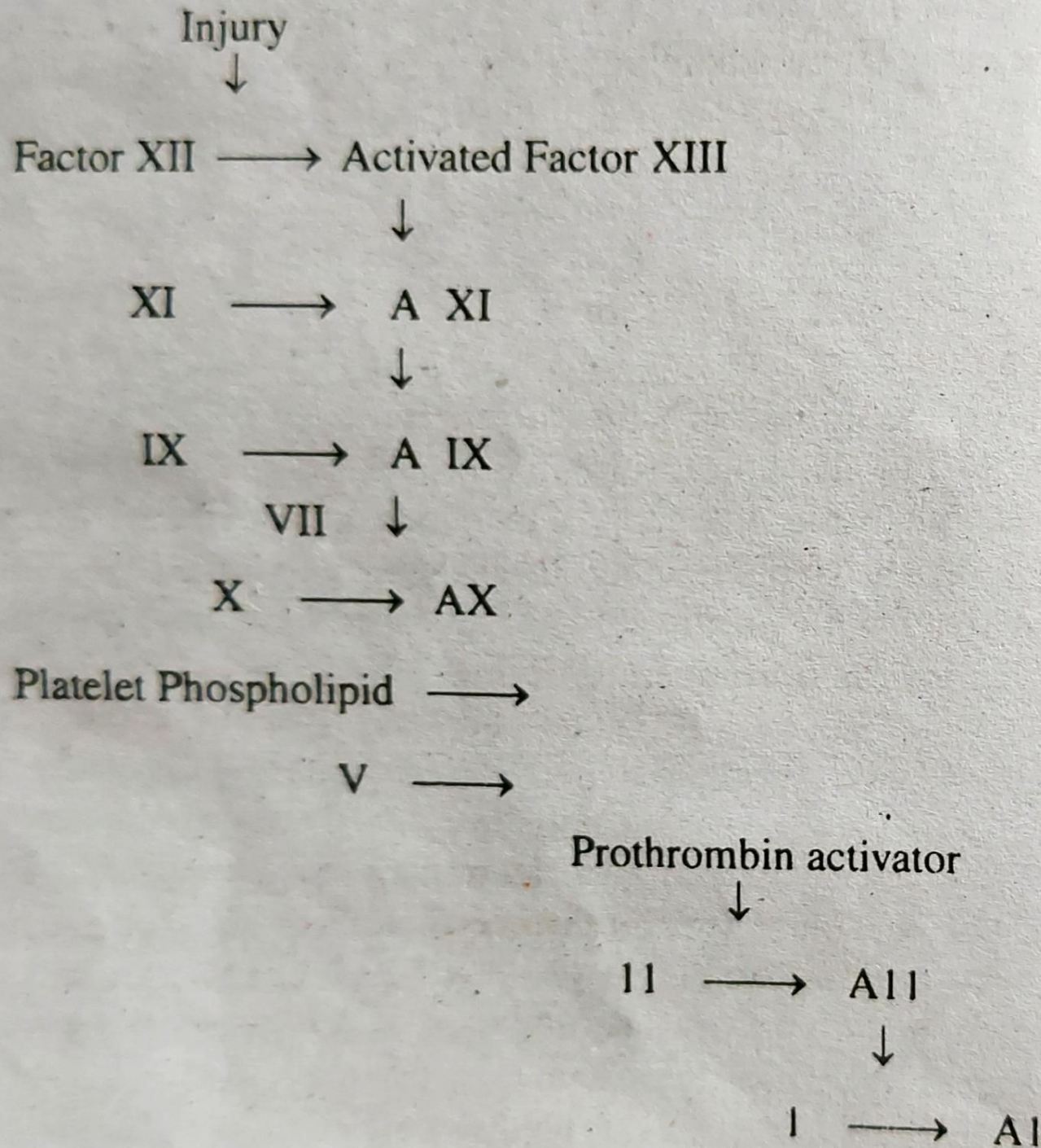


Fig. enzyme cascade hypothesis.