HEMOSTASIS AND COAGULATION OF BLOOD

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- Hemostasis-arrest of bleeding by physiological process.
- Blood –natural property-fluidity and semisolid jelly
- When small injury to blood vessel - series of events occur-leads to arrest the bleeding by formation of clot.

Hemostasis events

- **Immediate vasoconstriction** at the site of injury or vasospasm
- **Formation of a platelet plug or temporary hemostatic plug or primary hemostasis:**

- Begins within a few seconds after injury.
- Injury to blood vessel cause the sub endothelial tissue of the vessel to become exposed.
- Collagen fibers attract platelets.
- Circulating platelets come and adhere to collagen fibers.
- Binding is strengthened by von Willebrand Factor (vWF).
- Process known as **platelet adhesion**

- Adhered platelets can attract more and more circulating platelets to the injury site- **platelet aggregation.**
- After sometime, a clump of platelet is formed- **loose platelet plug**.
- Also, platelet secrete- serotonin, histamine etc.- cause vasoconstriction
- Platelet plug together with vasoconstriction –**primary hemostasis**

Bleeding time

Time between the onset of bleeding and the primary hemostasis.

❑ **Secondary hemostasis**

- loose platelet plug converted to definitive clot by deposition of fibrin.
- Formation of fibrin- **clotting or coagulation**

Coagulation or clotting

Process in which blood looses its fluidity and becomes jelly like mass.

- Coagulation mechanism include cascade of reaction in which some inactive enzymes are activated and activated enzymes, in turn , stimulate other inactive enzymes.

Procoagulants

substances help in clotting

Anticoagulant

substance prevent clotting

Mechanism of coagulation

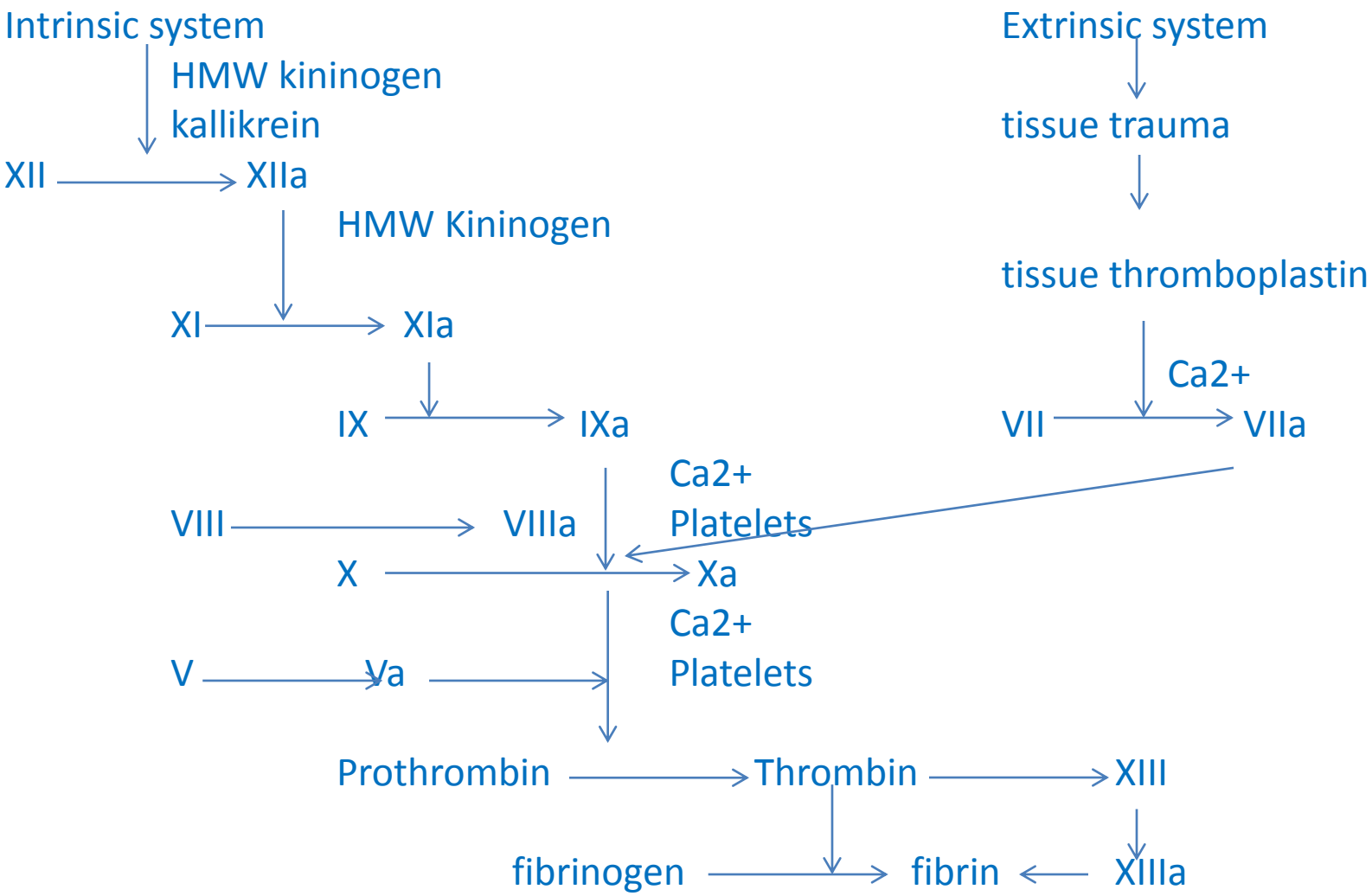
Coagulation is the conversion of the soluble plasma protein fibrinogen into insoluble fibrin threads

Series of reaction occur:

- Thrombin acts upon fibrinogen to form fibrin.
- Thrombin is formed by activation of prothrombin.
- Prothrombin to thrombin activation occurs in the presence of factor Xa
- Factor Xa is produced by 2 major pathways

➢ The intrinsic pathway

➢ The extrinsic pathway



Clotting Mechanism

Intrinsic Pathway

- Occurring both in vivo in vitro
- Triggered by an injury to blood vessel trauma to tissue

Extrinsic pathway

only in in vivo triggered by a

Formation of fibrin(clot)

- Thrombin converts fibrinogen to fibrin: XIIIa stabilizes the clot formed.
- Fibrin threads form a network entrapping RBC , WBC, platelets and plasma to form clot.
- Clot becomes adherent to the injured vessel wall, plugging it permanently.

Clot retraction

- Within few minutes of formation of clot, it starts contracting to about 40%of its original size

THANK YOU