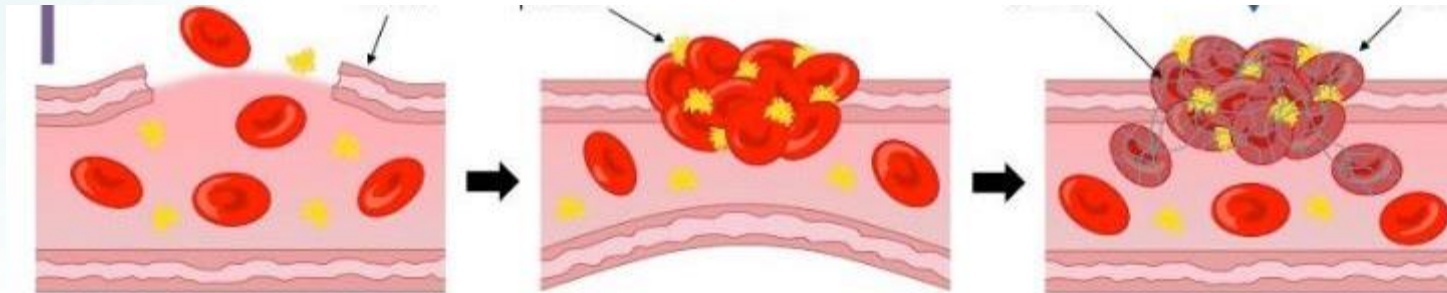


# BCH 471 Experiment (10)

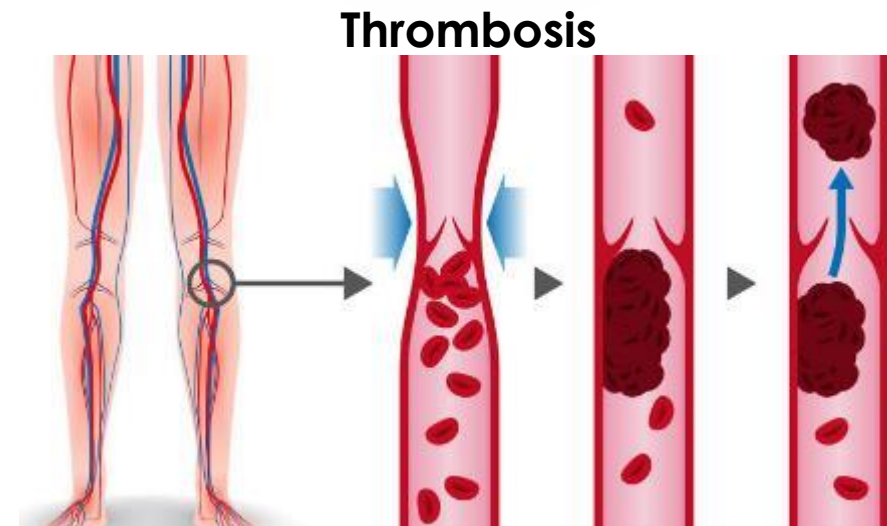
## Coagulation Profile

Clotting time, Bleeding time, and  
Prothrombin time



# Coagulation

- **Coagulation** is a complex process by which blood forms clots.
- It is an important part of **haemostasis** (the cessation of blood loss from a damaged vessel).
- Disorders of coagulation can lead to an increased risk of bleeding (**hemorrhage**) or clotting (**thrombosis**).

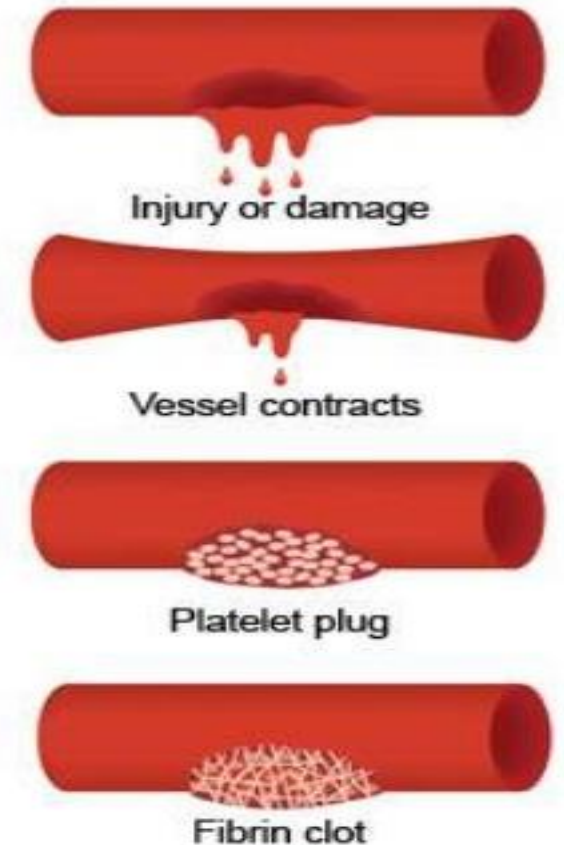


# Hemostasis is maintained in the body via three mechanisms :

-*Vascular spasm* - Damaged blood vessels constrict

-*Platelet plug formation* - Platelets adhere to damaged endothelium to form platelet plug (*primary hemostasis*)

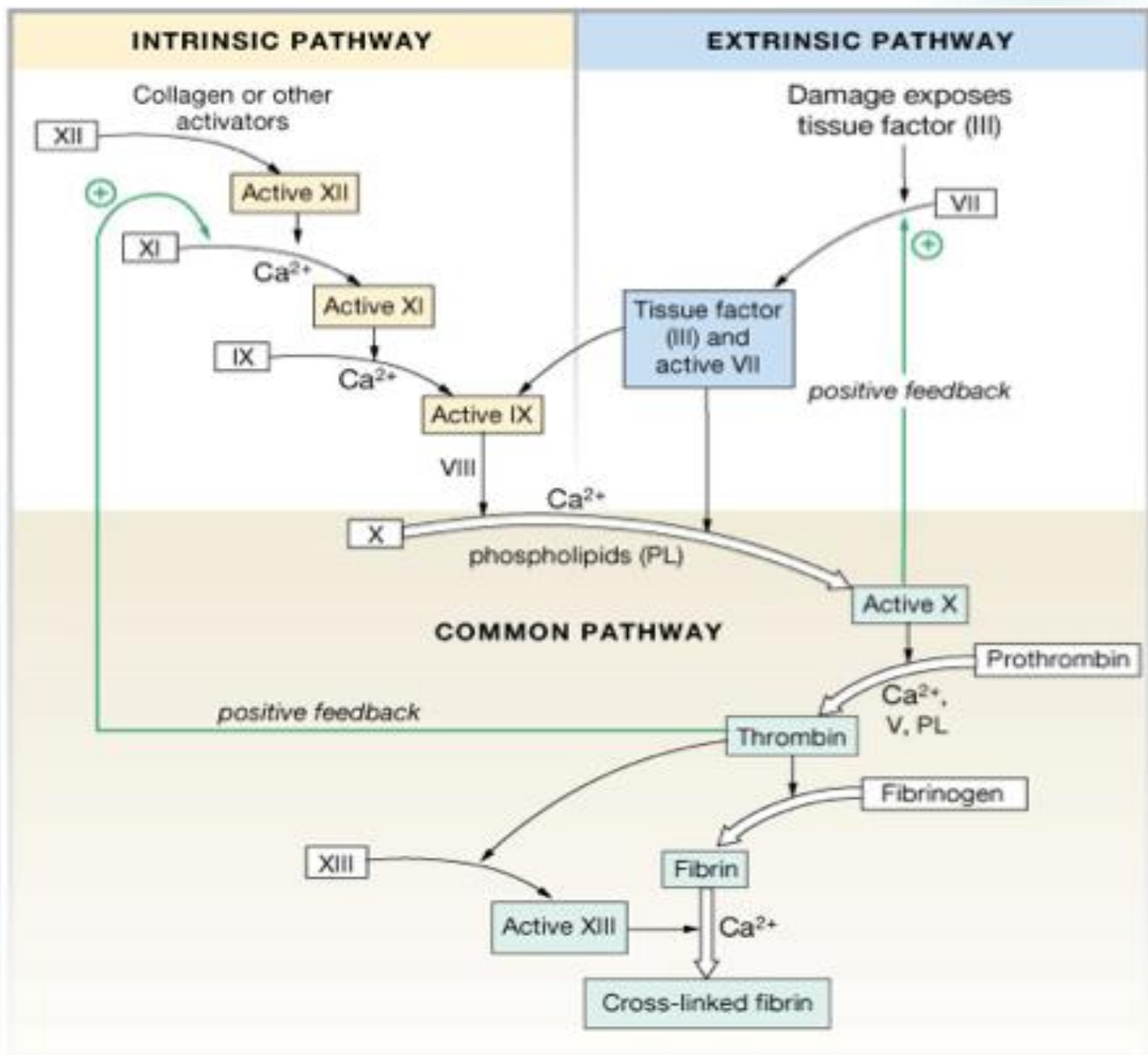
-*Blood Coagulation* - Clots form upon the conversion of fibrinogen to Fibrin (*secondary hemostasis*).



# Clotting Cascade

- A cascade is a mechanism in which enzymes activate other enzymes sequentially usually leading to an amplification of an initial signal.
- **Pathways:**
  - Extrinsic
  - Intrinsic

} Initially independent, then they converge on common pathway leading to the formation of a **fibrin clot**
- Each of these pathways leads to the conversion of **factor X** (inactive) to **factor Xa** (active)



# What triggers extrinsic and intrinsic pathways

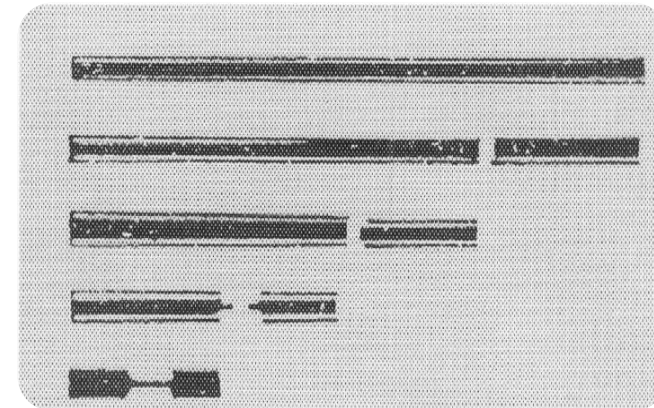
- ▶ **Extrinsic**—Release of biochemicals from broken blood vessels/damaged tissue.
- ▶ **Intrinsic**—No tissue damage, blood contacts damaged endothelial layer of blood vessel walls.

# Clotting time



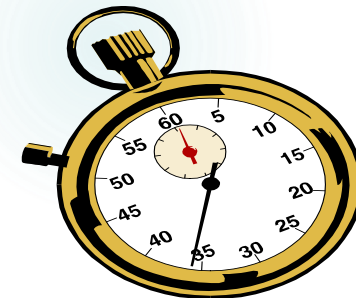
- ▶ Test for intrinsic system
- ▶ Simple test but takes time and rarely done now
- ▶ **Method:**
  - ▶ Venous blood is taken and placed on test tube at 37°C and it observed at time intervals until clotting occurs
  - ▶ Normal blood takes 5-10min to clot
  - ▶ Longer periods → Coagulation defects (e.g. **Hemophilia**)

# Clotting time - capillary method





# BLEEDING TIME



- ▶ Provides assessment of **platelet** count and function.

- ▶ **Method:**

- ▶ It is determined by noting time at which blood coming out a small cut, no longer forms a spot on a piece of filter paper placed in contact with cut surface
- ▶ The normal range from 2-4 min



# PROTHROMBIN TIME (PT)



- Measures effectiveness of the **extrinsic pathway**
- **Method:**
  - An excess of tissue factor and  $\text{Ca}^{2+}$  ions are added to diluted plasma containing citrate (anticoagulant) and then the time taken for the mixture to clot is measured
- **Normal value** → 10-15 secs
- High PT → low levels of thrombin
- Results from **liver disease** due to deficiency of prothrombin, fibrinogen, V, VII and X factors