COGULATION 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**—Damage to tissue outside the blood vessel. This pathway acts to clot blood that has escaped from the vessel.

- **Intrinsic**—Damage to blood vessel wall, triggered by elements that lie within the blood itself.
Clotting time

- Test for **intrinsic system**
- Simple test but takes time and rarely done now

**Method:**
- Venous blood is taken and placed on glass 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 1-9 min
PROTHROMBIN TIME (PT)

- Measures effectiveness of the extrinsic pathway

Method:
- An excess of tissue factor and Ca2+ ions are added to diluted plasma containing citrate (anticoagulant) and then the time taken for the mixture to clot is measured

Normal value $\rightarrow$ 10-15 secs

- High PT $\rightarrow$ low levels of thrombin
- Results from liver disease due to deficiency of prothrombin, fibrinogen, V, VII and X factors