

# Blood Coagulation (Haemostasis)

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## Blood Coagulation

- **Haemostasis:** A physiological process that arrest the bleeding from ruptured blood vessels, through blood coagulation or clotting.
- There are three main Stages:
  - Vasoconstriction
  - Platelets plug formation
  - Coagulation

### 1. Vasoconstriction

- Platelets adhere to the damaged blood vessels and release **Serotonin (5HT)** that constrict the vessels to reduce the blood flow at damaged area. Other chemicals that cause vasoconstriction, e.g. thromboxanes, are released by the damaged vessel itself.

# Blood Coagulation

## 2. Platelets plug formation

- The adherent platelets clump to each other and release other substances, including **adenosine diphosphate (ADP)**, which attract more platelets to the site, are released by the damaged vessel itself (Positive Feedback System)

## 3. Blood Coagulation or Clotting

- Platelets & damaged tissue cells release prothrombin activator, which initiates a cascade of enzymatic reactions through various clotting factors and finally form a clot over the damaged vessels

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# Blood Coagulation

## BLOOD CLOTTING FACTORS

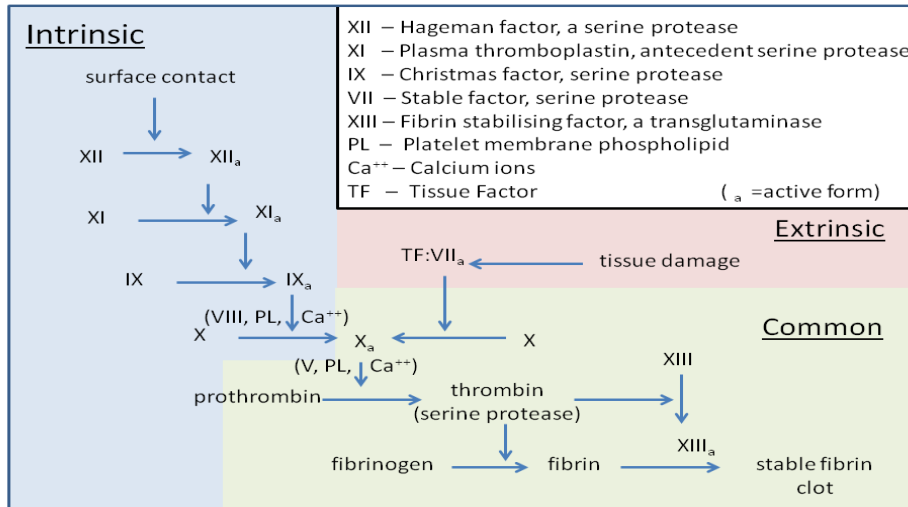
- I Fibrinogen
- II Prothrombin
- III Tissue factor (thromboplastin)
- IV Calcium ( $\text{Ca}^{2+}$ )
- V Labile factor, proaccelerin, Ac-globulin
- VII Stable factor, proconvertin
- VIII Antihæmophilic globulin (AHG), antihæmophilic factor A
- IX Christmas factor, plasma thromboplastin component (PTA), antihæmophilic factor B
- X Stuart Prower factor
- XI Plasma thromboplastin antecedent (PTA), antihæmophilic factor C
- XII Hageman factor
- XIII Fibrin stabilising factor

\*\* (There is no factor VI) Vitamin K is essential for synthesis of factors II, VII, IX and X

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# Blood Coagulation

The three pathways that makeup the classical blood coagulation pathway



# Blood Coagulation

## 4. Fibrinolysis

- Break down of the Blood clot
- Plasminogen, trapped within the clot as it forms, is converted to the enzyme **plasmin**
- Plasmin breaks down fibrin to soluble products that are treated as waste material and removed by phagocytosis.
- As the clot is removed, the healing process restores the integrity of the blood vessel wall

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