

Haemostasis & thrombosis

Parts 1 & 2

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Session Plan

Part 1 –Overview of Haemostasis

- Primary Haemostasis
- Secondary Haemostasis (Coagulation)
- Fibrinolysis

Part 2 –Primary Haemostasis

- Platelets
 - Adhesion
 - Release reaction
 - Thromboxane A2 synthesis
 - Platelet aggregation
- Antiplatelet drugs
- Von Willebrand factor

Part 3 – Coagulation (Secondary Haemostasis)

- Clotting factor synthesis
- Cellular base model of coagulation
 - Initiation
 - Amplification
 - Propagation
- Coagulation inhibitory mechanisms
 - Anticoagulant Pathway
 - Anticoagulant Drugs

Part 4: Fibrinolytic system

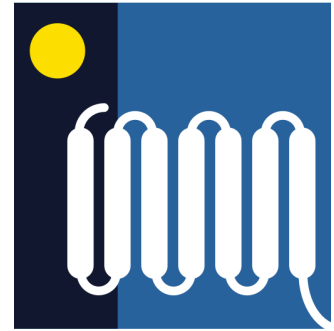
- Fibrinolysis
- Antifibrinolytic drugs

Part 5: Tests of Coagulation

- Prothrombin time (PT)
- Activated Partial Thromboplastin Time (APTT)

Part 6 – Bleeding and Thrombosis: READING

- The Balance Model of Coagulation and its Application



Session Plan

Part 1 –Overview of Haemostasis

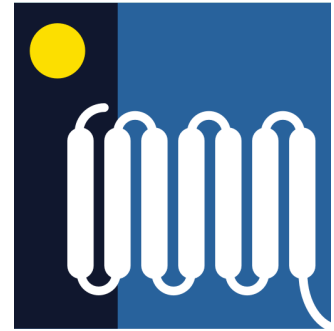
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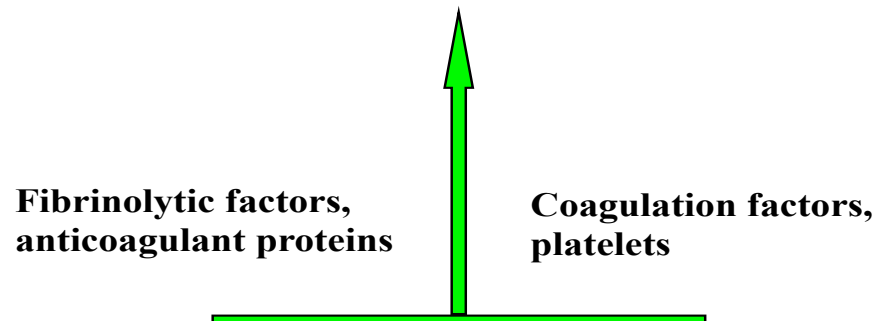
What is Haemostasis?

- Haemostasis describes the 'halting of blood' following trauma to blood vessels

Functions of Haemostasis

1. Prevention of blood loss from intact vessels
2. Arrest of bleeding from injured vessels

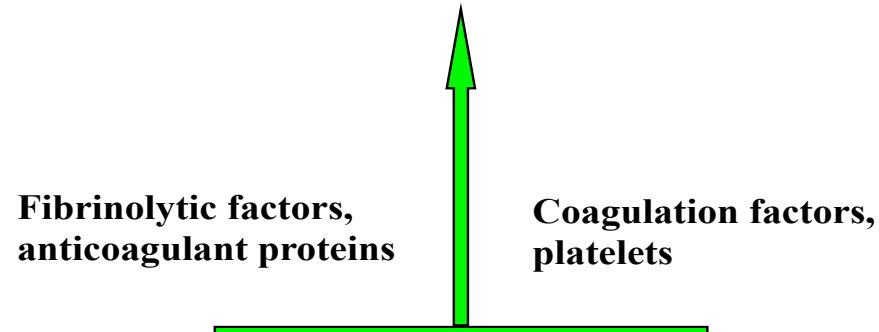
Normal haemostasis: a state of equilibrium



Why is this balance important?

1. Allows the stimulation of blood clotting processes following injury, in which blood changes from its liquid state (**coagulation**)
2. Limits the extent of the response to the area of injury to prevent excessive or generalised blood clotting (**thrombosis**)
3. Start the process that eventually leads to the breakdown of the clot as part of the process of healing (**fibrinolysis**)

Normal haemostasis: a state of equilibrium



Haemostatic Plug Formation: An Overview

Response to injury

Vessel constriction



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Formation of an unstable platelet plug

- platelet adhesion

- platelet aggregation



Haemostatic Plug Formation: An Overview

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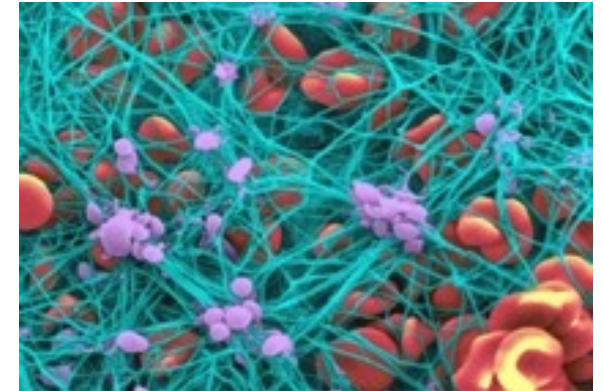
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Stabilisation of the plug with fibrin

- blood coagulation



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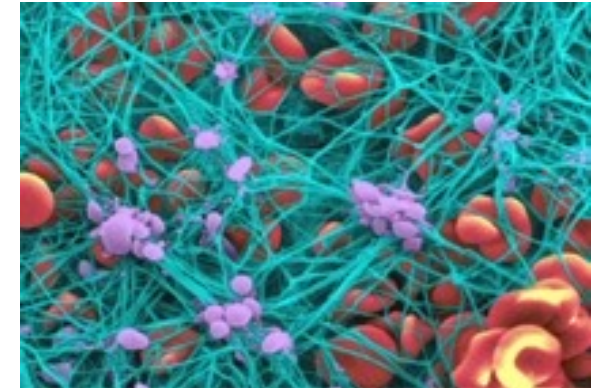
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Dissolution of clot and vessel repair

- fibrinolysis



Mechanisms of Haemostasis

Response to injury to endothelial cell lining

Vessel constriction

Vascular smooth muscle cells contract locally

Limits blood flow to injured vessel



Formation of an unstable platelet plug

platelet adhesion

platelet aggregation

PRIMARY HAEMOSTASIS

Limits blood loss + provides surface for coagulation



Stabilisation of the plug with fibrin

blood coagulation

Stops blood loss

SECONDARY HAEMOSTASIS



Vessel repair and dissolution of clot

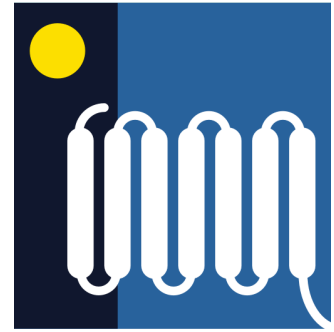
Cell migration/proliferation & fibrinolysis

Restores vessel integrity

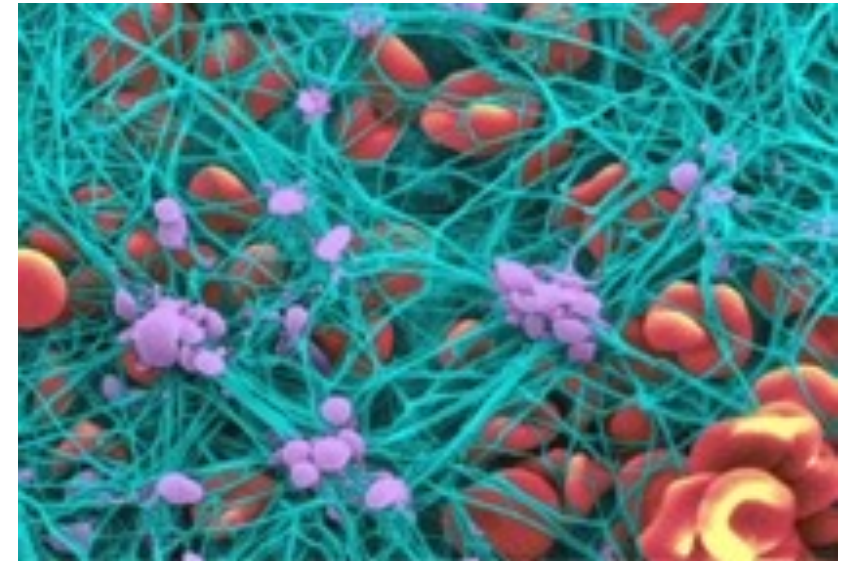
FIBRINOLYSIS



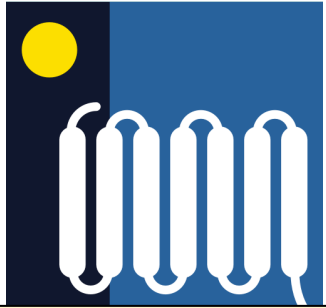
Why do we need to understand haemostatic mechanisms?



- Diagnose and treat bleeding disorders
- Control bleeding in individuals who do not have an underlying bleeding disorder
- Identify risk factors for thrombosis
- Treat thrombotic disorders
- Monitor the drugs that are used to treat bleeding and thrombotic disorders



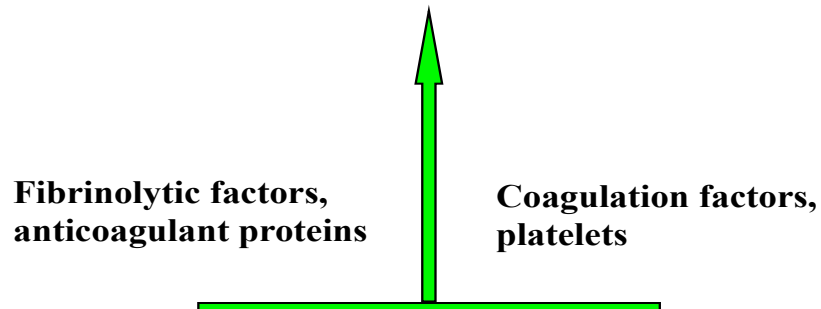
Primary Haemostasis



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Normal haemostasis: a state of equilibrium



Vessel constriction

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Stabilisation of the plug with fibrin

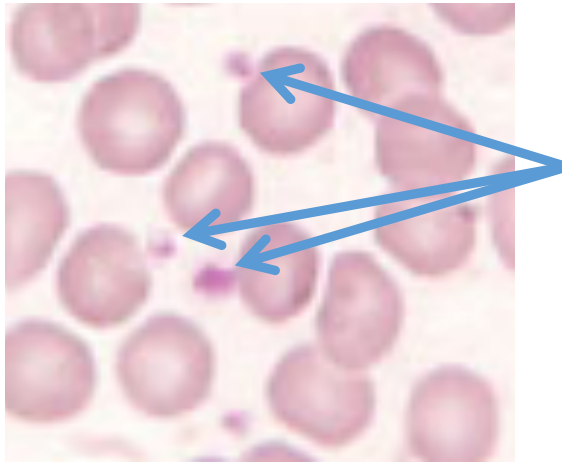
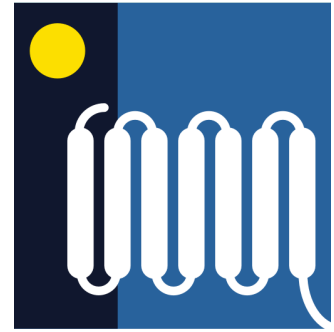
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Dissolution of clot and vessel repair

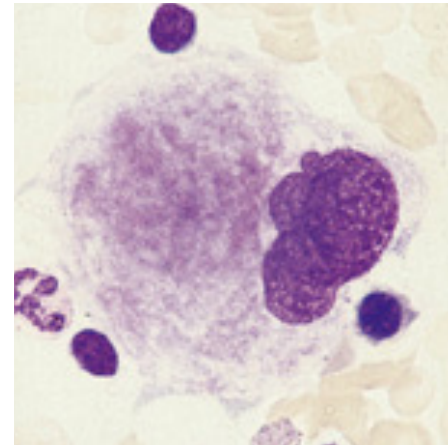
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Platelets



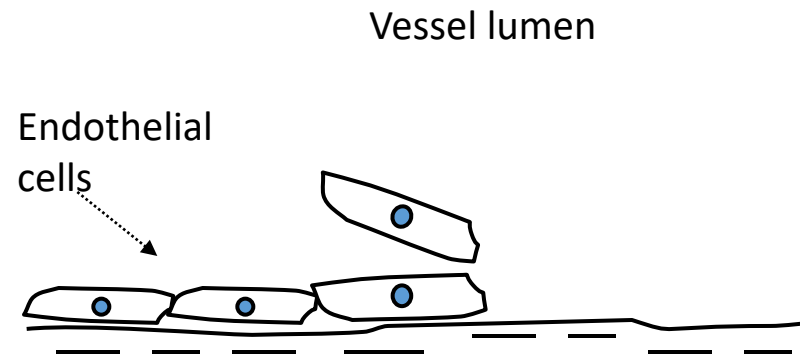
Platelets in circulating blood



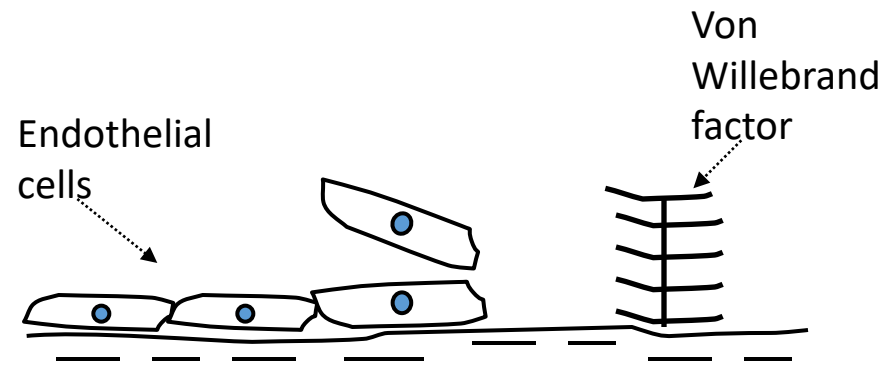
Megakaryocyte in the bone marrow



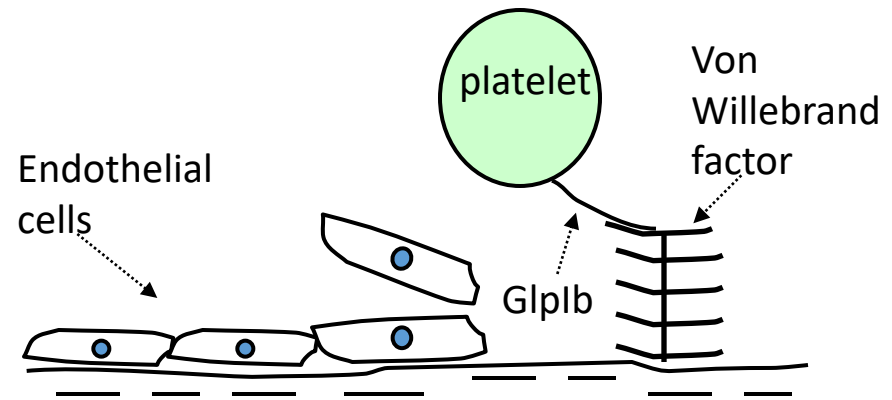
Platelet adhesion



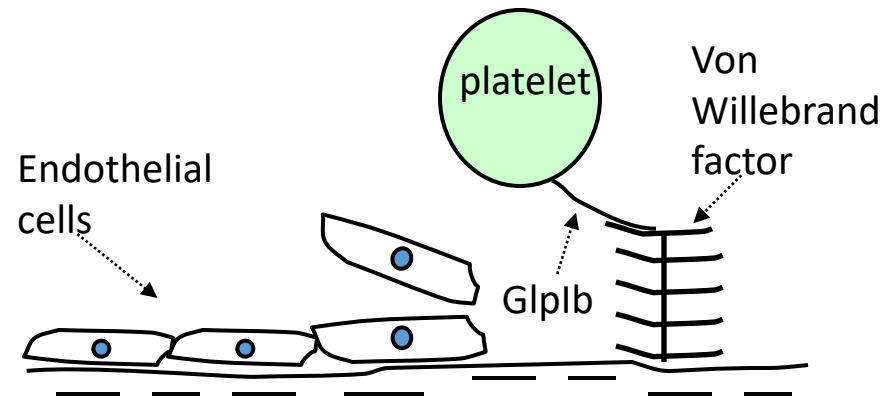
Platelet adhesion



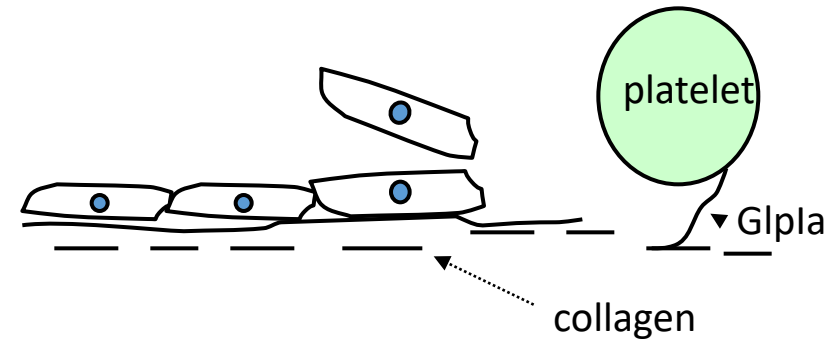
Platelet adhesion



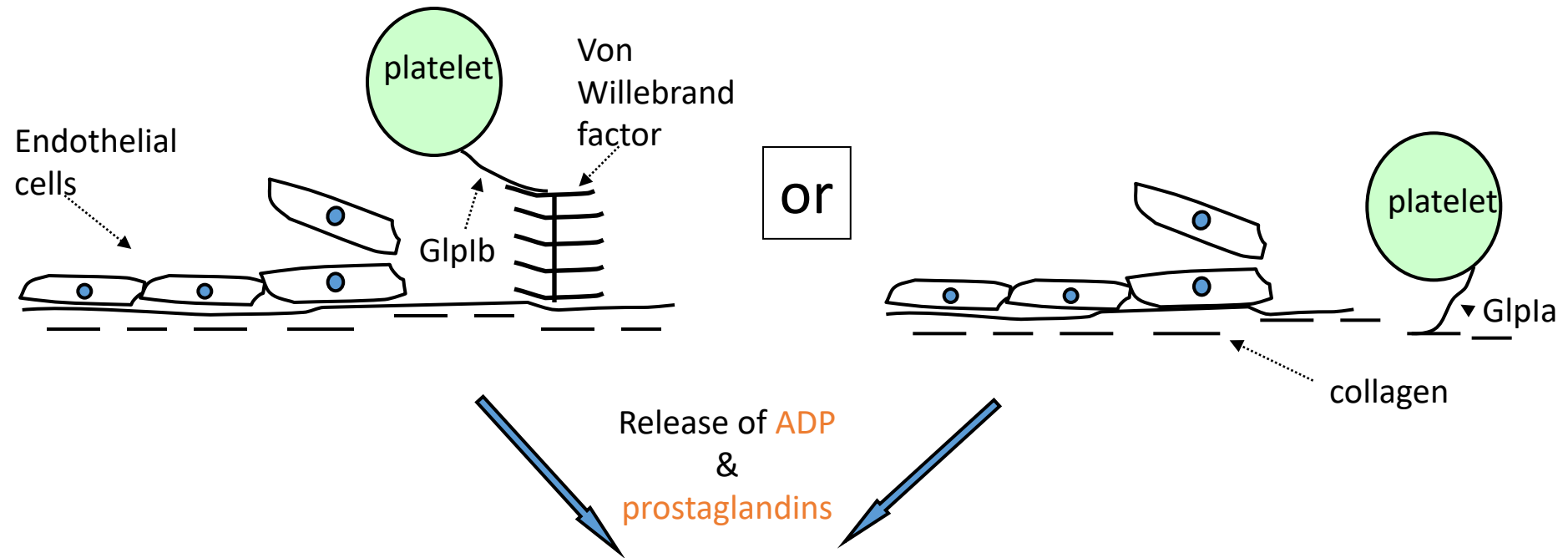
Platelet adhesion



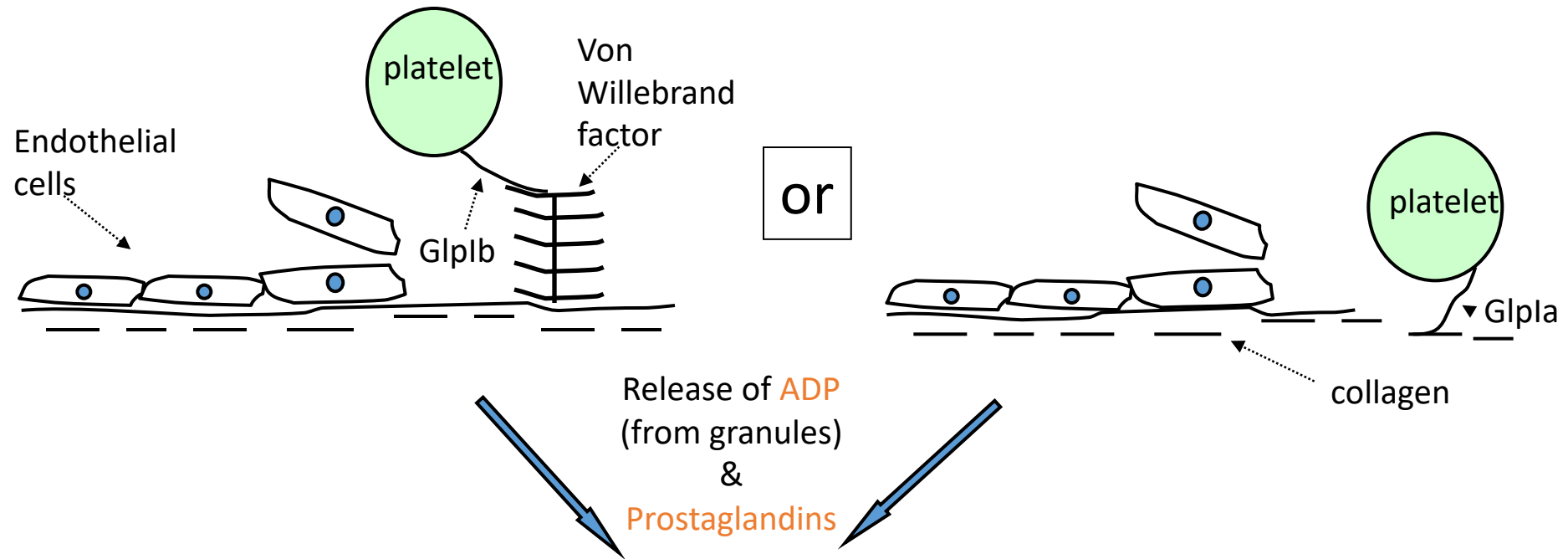
or



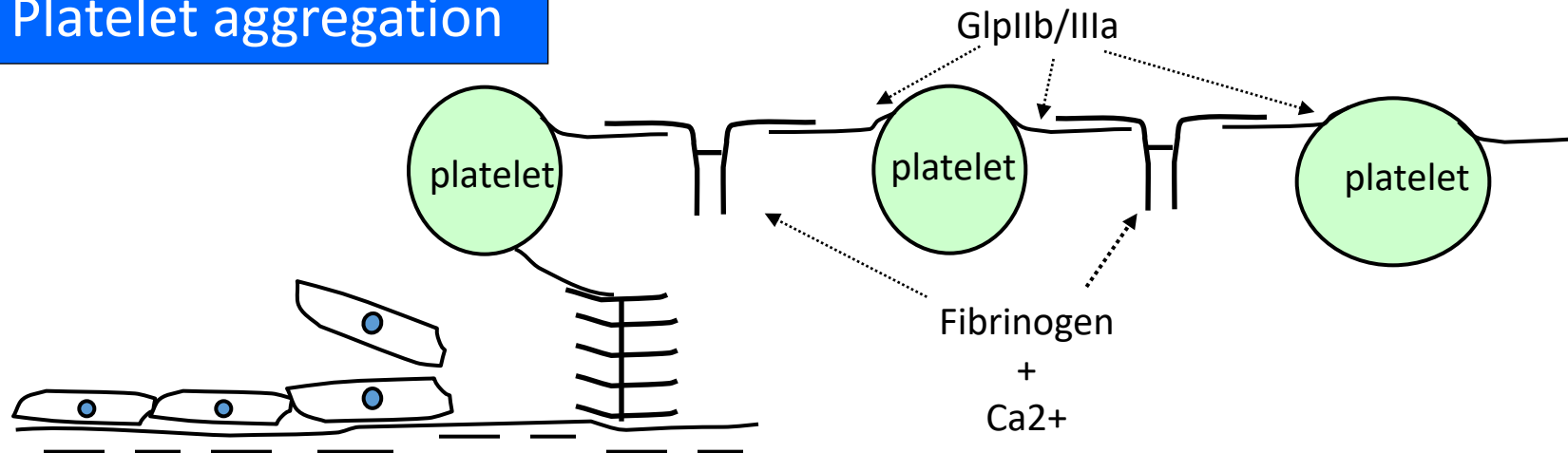
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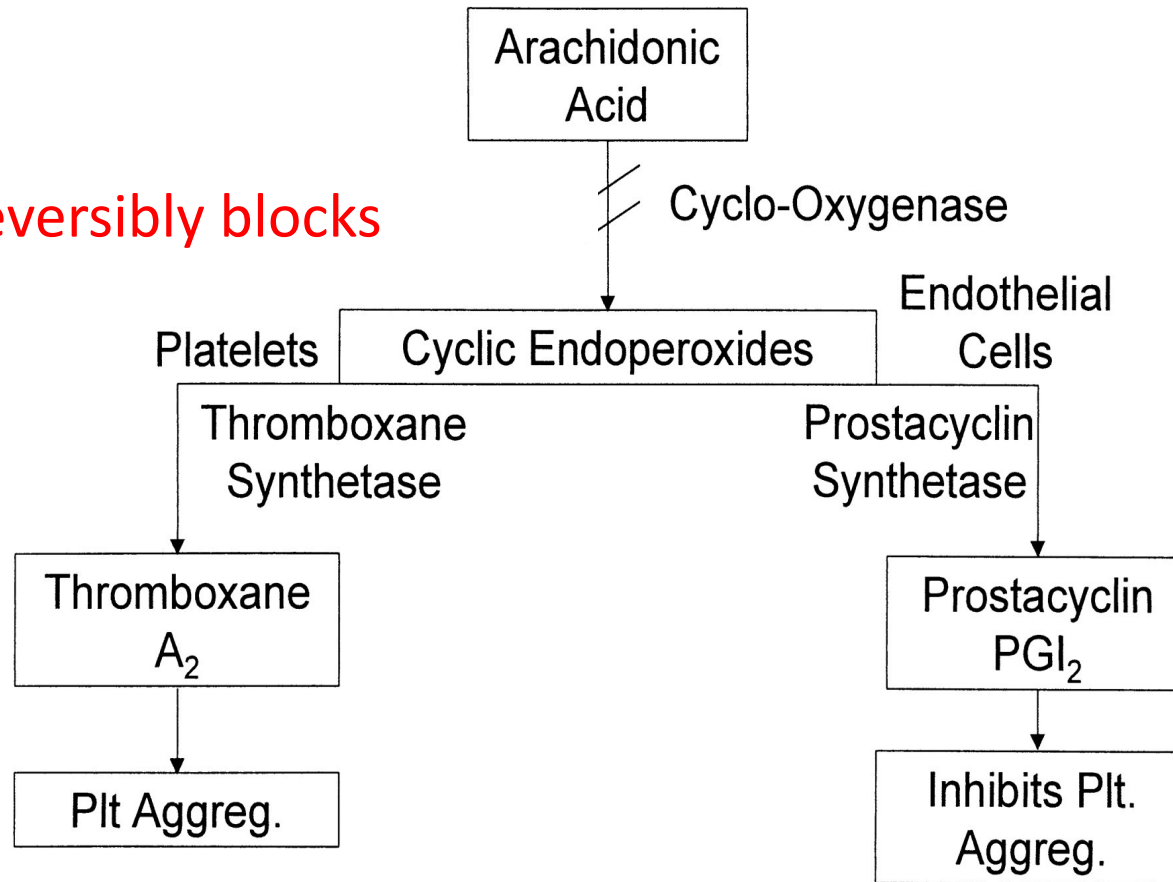
Platelet aggregation



The prostaglandin Thromboxane A₂ is produced by platelets from Arachidonic acid

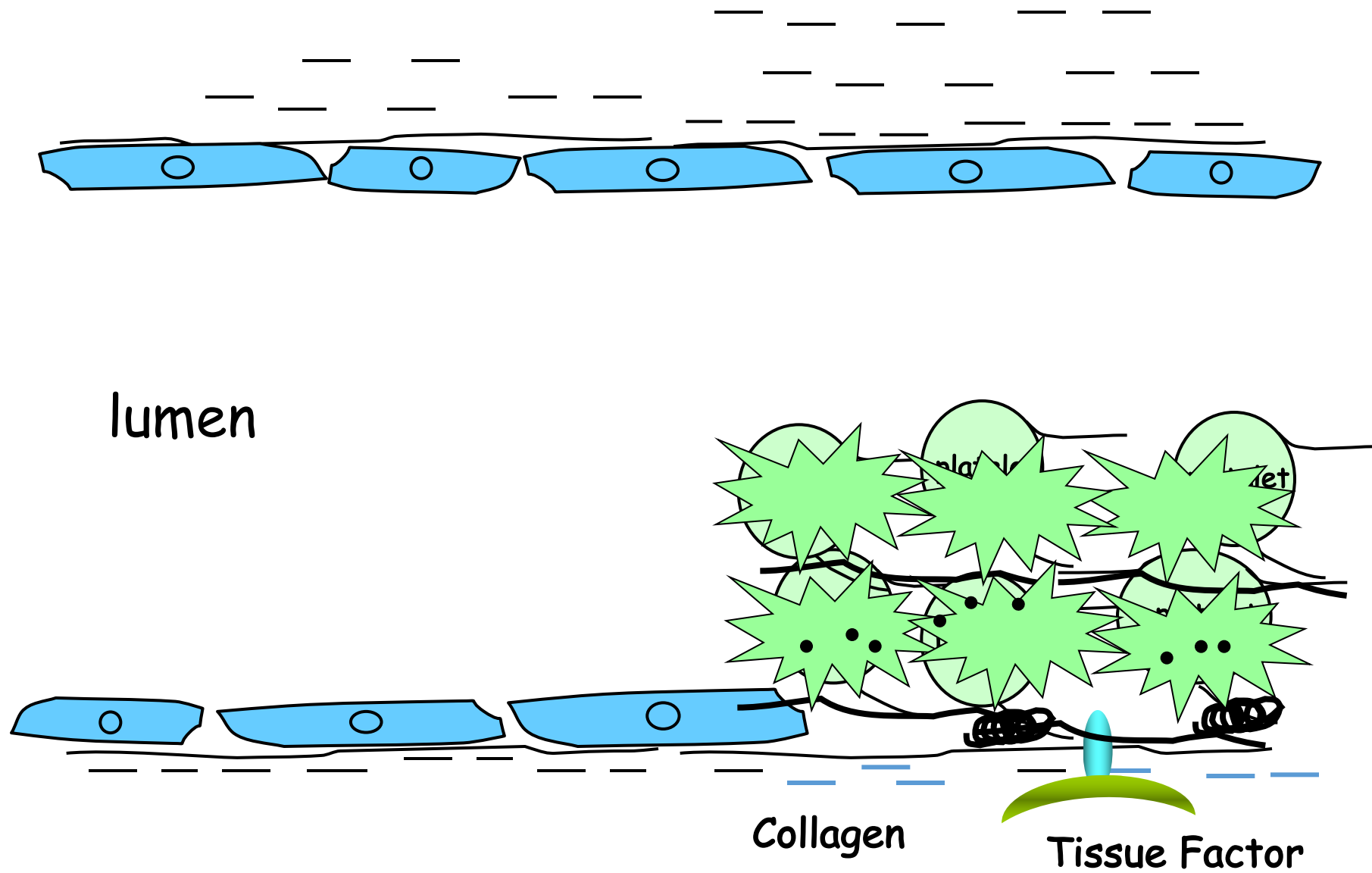
Aspirin and Clopidogrel are
Antiplatelet drugs

Aspirin irreversibly blocks
COX



Clopidogrel irreversibly blocks the ADP receptor P2Y₁₂ on platelets





Primary Haemostasis: platelet plug

