

BLOOD VESSEL

CONNECTIVE TISSUE: Fibroblasts

Smooth Muscle Cells

These cells secrete COLLAGEN - a negatively charged substance; platelet agonist

BASEMENT MEMBRANE: Collagen-rich (from CT)

Serves as support of endothelial lining

ENDOTHELIAL LINING: Secretes **Heparan Sulfate**

- an natural anticoagulant to keep blood flowing without turbulence in intact subendothelium

*- heparan sulfate is inactivated by **B-thromboglobulin and Platelet Factor 4** for hemostasis to proceed*

*- **Zeta potential** is also responsible for keeping platelets from touching the subendothelium*

Zeta Potential: Platelets: Phospholipids (phosphatidylethanolamine)

Endothelial Lining: Collagen (from CT)

*- A platelet is a negatively charged cell (from phospholipids) that can be activated by negatively-charged substances called **PLATELET AGONISTS***

PLATELET FUNCTIONS

1. ADHESION:

Adhered Platelets: single-layer of platelets

Collagen-stimulated adhesion

Platelet > GP Ib/IX > vWF > Collagen

(Platelets have a GP Ib/IX binding site on their membrane that von Willebrand Factor attaches to, to form a bridge between platelets and collagen — found on the subendothelium)

2. SECRETION:

Adhered platelets secrete **DENSE GRANULES**

ADP (from dense granules) recruit & activate surrounding inert platelets

(Adhered platelets are REactivated by **thromboxane A2** to secrete granules thru OCS)

3. AGGREGATION:

ADP-stimulated Platelets expose **GP IIb/IIIa**

Fibrinogen attaches to GP IIb/IIIa

Primary Platelet Plug is formed (loose clot)

(Fibrinogen bridges the GP IIb/IIIa binding sites of each platelet to create **long spiny projections** that indicate activation, and lead to aggregation)

*- Platelet functions **always** have to be enumerated in order*

*- The 3 functions comprise the events of **PRIMARY HEMOSTASIS**, meaning its output is a **primary platelet plug***



PLATELET AGONISTS

**ARACHI-
DONIC ACID** - *strongest platelet agonist*

without this, secretion cannot happen = no ADP-stimulated platelets, and no primary platelet plug formation

**THROMB-
OXANE A2** - *stimulates secretion*

it reactivates the adhered platelets to secrete granules

**ADENOSINE
DIPHOS-
PHATE** - *stimulates aggregation*

from dense granules; causes the aggregation of platelets to form a primary platelet plug = ADP-stimulated Platelets

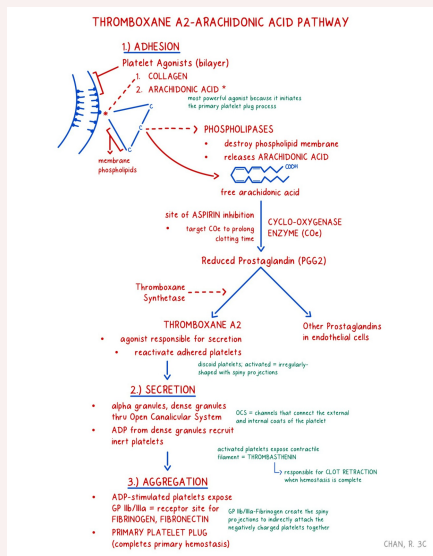
**THROMBIN
(agonist &
Factor IIa)** - *most important protease enzyme*

COLLAGEN - *electronegativity in connective tissue*

**source of negative charge in connective tissue -> epithelial lining*

EPINEPHERINE

THROMBOXANE A2 AND ARACHIDONIC ACID PATHWAY



This pathway shows what happens upon injury to blood vessel

