**Ministry of Higher Education And Scientific Research Al-Mustaqbal University College**

**Department of Medical laboratory techniques**

# Platelets

**Lec 17 3ed stage hematology**

Platelets

* Platelets, or thrombocytes, are small, irregularly shaped
* Nucleus: a nuclear cells
* Diameter 2-4µm
* Site production: bone marrow, in bone marrow, by budding off from

megakaryocytes.

* Each megakaryoblast produce about 5000-10000 platelets
* Control production: Thrombopoietin hormone which produced from

the liver and kidney (often abbreviated as TPO).

* Platelets count are 150000-450000/cum
* Old platelets are destroyed by the spleen and by Kupffer cells in the liver
* Normal life span 7-10 days.

# Platelets structure

1-on the membrane

The platelet membrane is important to the whole process of clot f

**Membrane structure**

contain the following substances

**1-phosphlipds**

which are important for coagulation factors function (also called Platelets Factor 3)

**2-receptors**

1. Glycoprotein Ib, Which binds

von Willebrand factor (vWF),

1. Glycoprotein GPIIb/IIIa Which binds fibrinogen

#### Major receptors found on the surface of resting platelets

* vonWillebrand factor (VWF) The receptor for vWF is GPIb.
* ADP - Thrombin - Epinephrine - thromboxane A2 – Collagen

-Fibrinogen The receptors for fibrongen are GPIIb/IIIa

**They are essential for platelet aggregation**

* Prevents the adherence of platelets to normal endothelium.

-Accelerates the adherence of platelets to collagen and damaged endothelium in ruptured blood vessels

-Forms a receptor for ADP and thromboxan2 ,Thrombin ,von

Willebrand factor , Fibrinogen etc.

### 2-Platelet structure - Inside the platelets

Contain 2 unique types of granules

* 1. **The alpha granules** contain proteins such as fibrinogen , a heparin

antagonist , von willbrand factor vWf, factor V

* 1. **The dense granules** the dense granules Contain chemicals such as
		1. Adenosine diphosphate - ADP b) Adenosine triphosphate - ATP c)

Serotonin

d) Magnesium e) Calcium

# 2-Platelet structure

**Hormones** a)Adrenaline , b) Serotonin c) Histamine ( vascular and local tissue reactions d) Catecholamines ( epinephrine , norepinephrine) The contents of both the alpha and dense granules are released during the PLATELETS ACTIVATION Platelets activation leads to production of thromboxane A2, encourages platelet aggregation

**Dense Tubular System (DTS)** Important structure present in the

cytoplasm of the platelets. The DTS is the site of prostaglandin and thromboxane (TxA2) synthesis and sequestration of calcium. open canalicular system is an open canalicular system linking the interior of the platelet to the exterior (plasma)

#### Platelet structure

**Thromboxane (TxA2) function**

Potentiate platelet adhesion and aggregation

**Prostacyclin (PGI2) function**

from endothelial cells, inhibits platelet aggregation

**Platelets membrane phospholipid function**

forming an ideal site for important coagulation reactions to take place

**Summary the platelets function in hemostasis are**

1. Stimulated by injury
2. Forming the unstable platelets plug
3. Maintain the vascular integrity
4. Provide a surface for coagulation reaction
5. Have a role in inflammatory response (activating the fifth component of complement