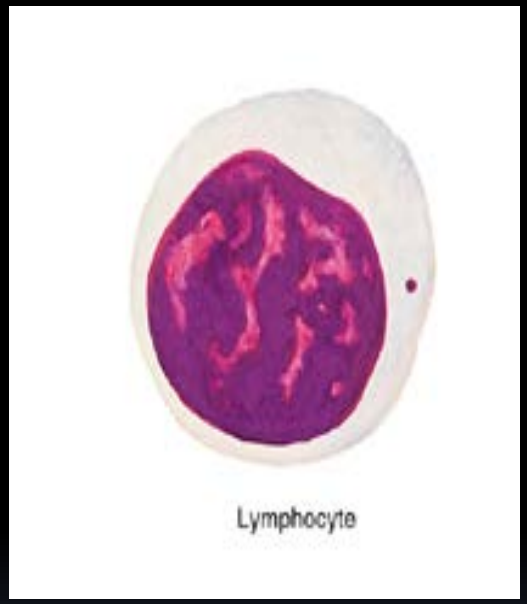
BIOLOGY

Lymphocytes:

- Are groups of spherical cells with similar morphological characters,
- they have an ovoid nucleus,
- the cytoplasm of the cell is scanty and can be seen as a thin rim around the nucleus.
- Lymphocytes make up 20-30% of WBCs.



- there are two main types of lymphocytes:

1. T- lymphocytes
2. B- lymphocytes

- those lymphocytes are responsible for immune surveillance to detect any foreign particle in the tissues.

- Activation of B lymphocytes after an immune response to a foreign particle leads to their differentiation into plasma cells.

- Plasma cells are large cells with eccentric rounded nucleus, and they are responsible for active synthesis of immunoglobulins. In health plasma cells are not found in the blood but they are seen in small population in lymphoid organs.

Monocytes:

- Are spherical cells with oval or kidney shaped nucleus which is often placed eccentrically.
- Their cytoplasm is basophilic.
- Monocytes can live in the blood for 8 hours, after which they move in to the connective tissue, where they may remain for a few months or longer.
- Blood monocytes are the precursor cells of tissue macrophages and other cells of the mononucleal phagocytic system such as kupffer cells in the liver and pulmonary and alveolar macrophages.
- They constitute 3-8% of the blood leukocytes.

White blood cells concentrations [descending order]

"Never Let Monkeys Eat Bananas"

N: Neutrophils

[60-70%]

L: Lymphocyte

[20-30%]

M: Monocytes

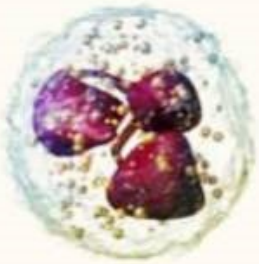
[3-8%]

E: Eosinophils

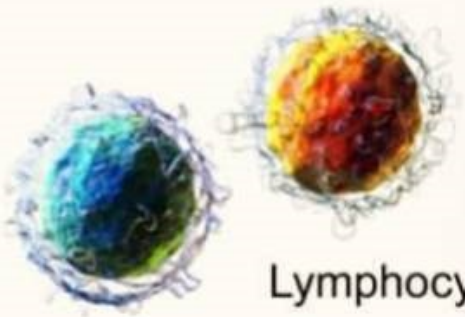
[2-4%]

B: Basophils

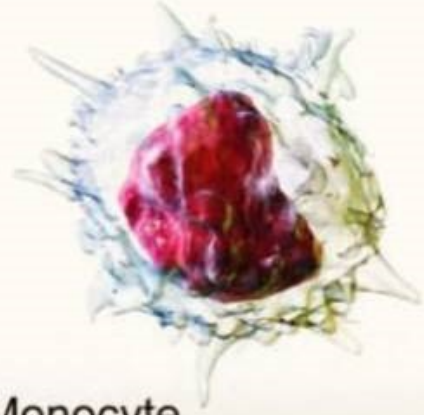
[< 1%]



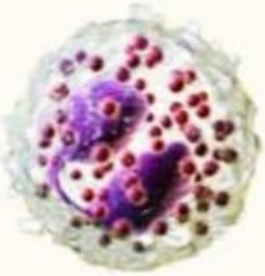
Neutrophil



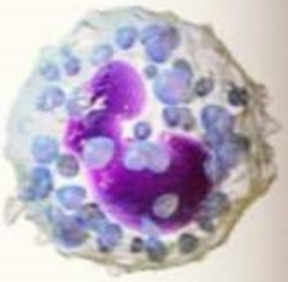
Lymphocytes



Monocyte



Eosinophil

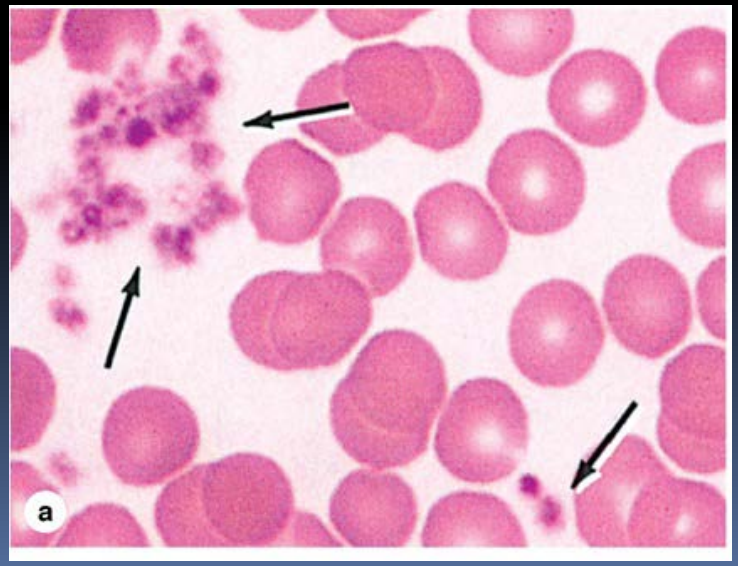


Basophil

- **Clinical notes:**
- • An increase of circulating neutrophils in bacterial infections (neutrophilia)
- • An increase of circulating eosinophils in parasitic infestations and some allergies (eosinophilia)
- • An increase in circulating lymphocytes in certain viral infections (lymphocytosis)

Platelets (thrombocytes):

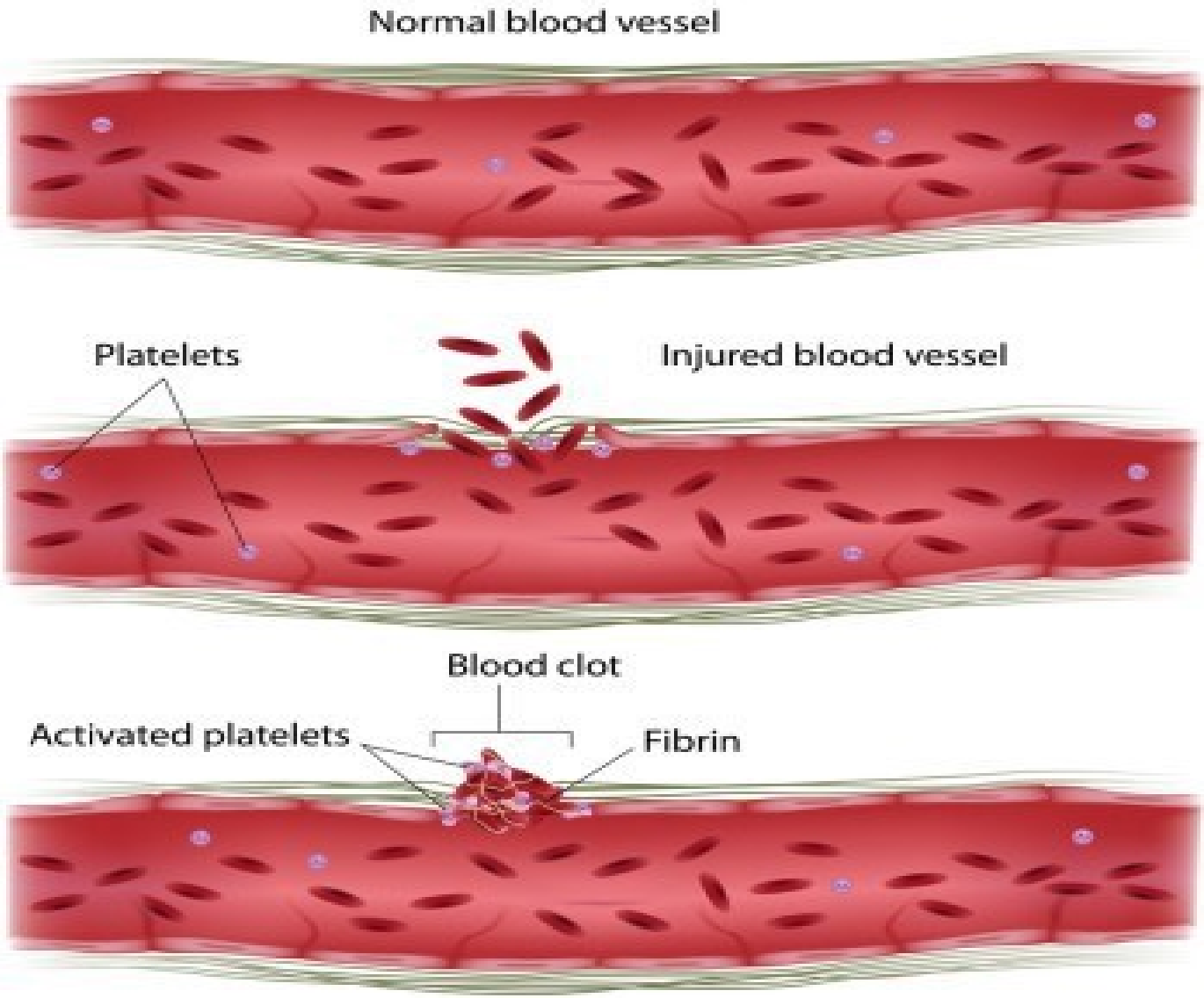
- Are non-nucleated, small, disk like cells formed from fragmentation of a gient cell in the bone marrow called megakariocytes. Platelets will promote blood clotting & help in repairing gaps in the wall of blood vessels. They have a life span of only 10 days.
- (150-400 $\times 10^3/mm^3$)

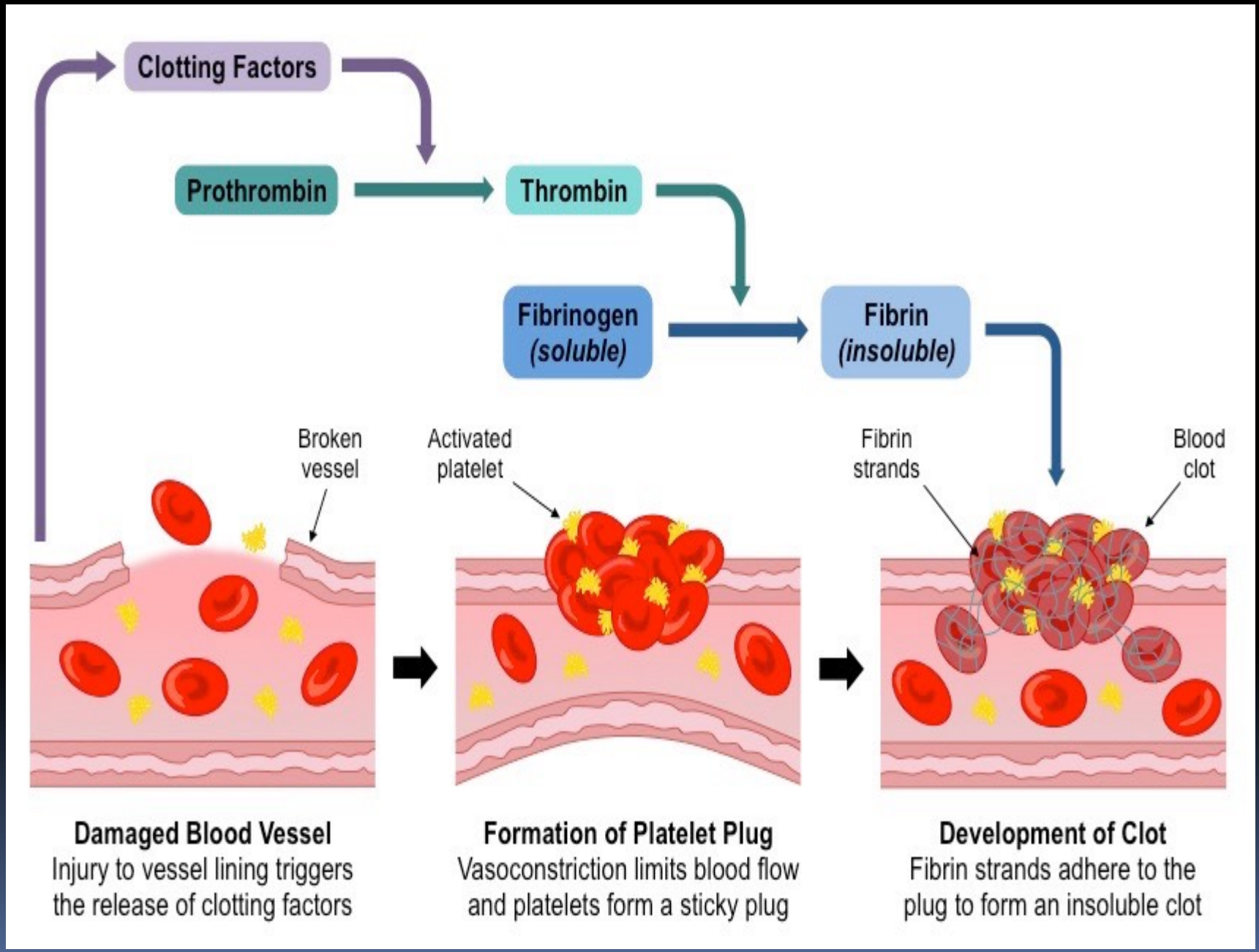


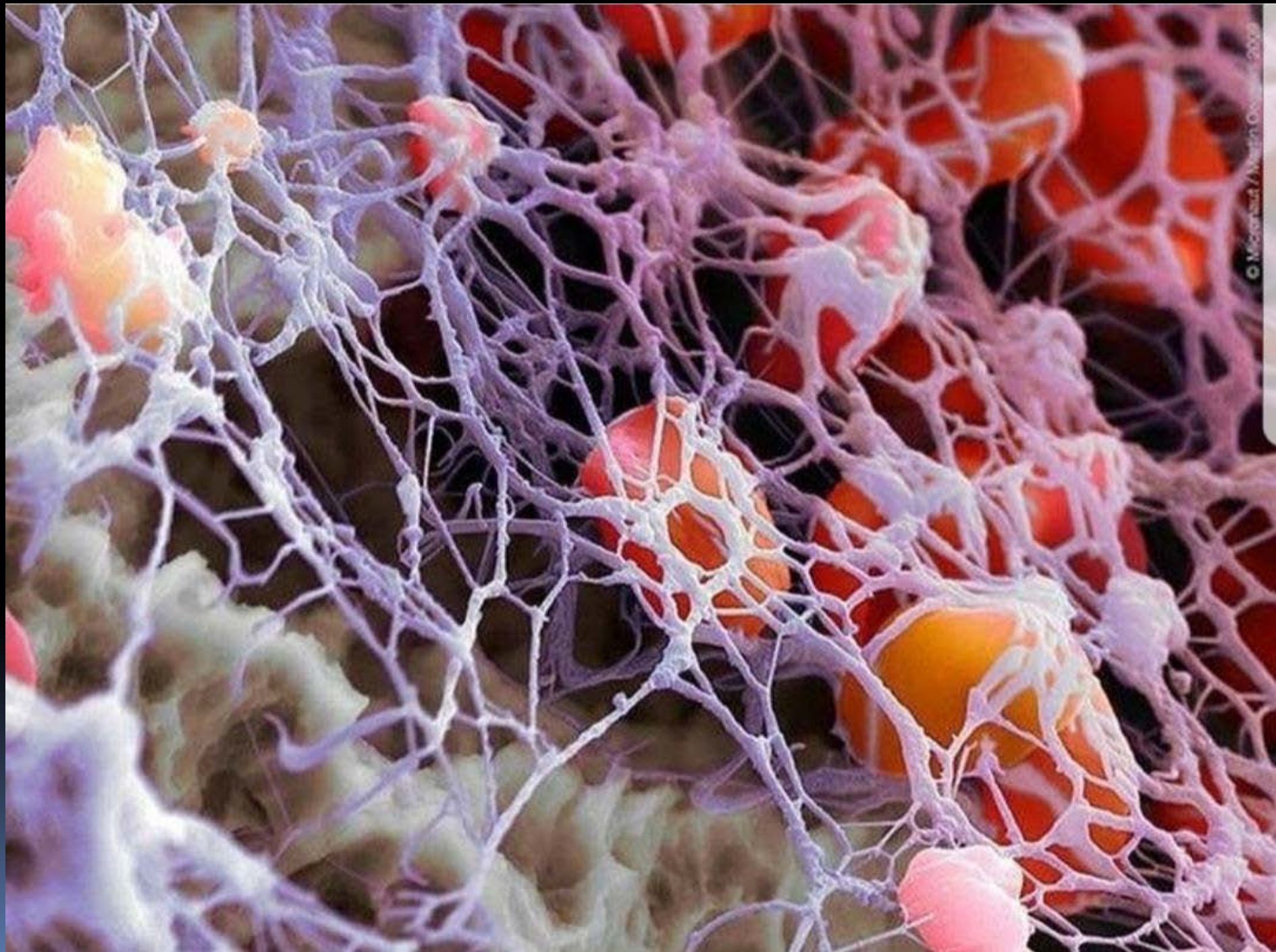
Disorders related to platlates:

- Thrombocytopenia:
- Due to:
- Leukemia
- Drug induced

Blood Clotting:

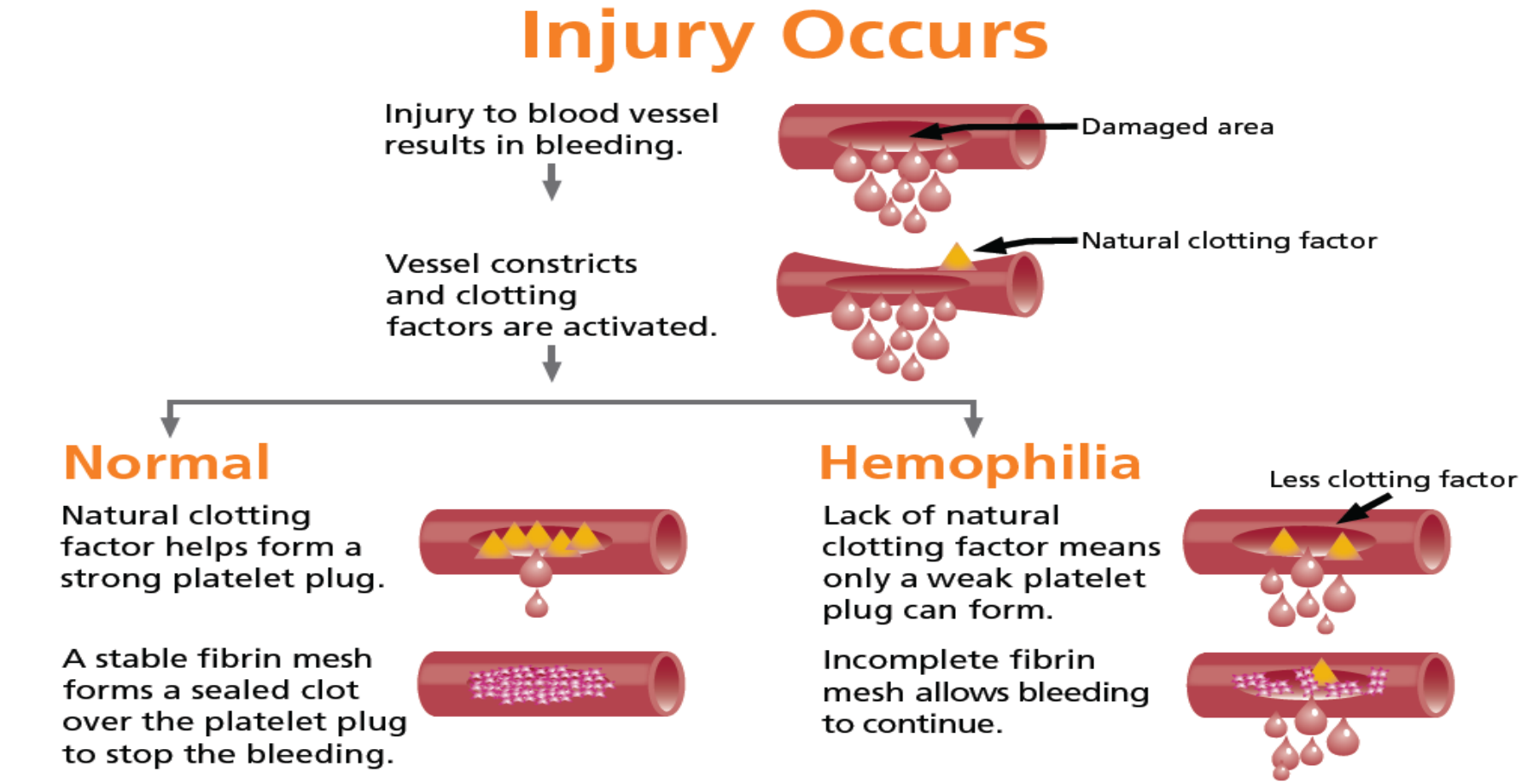



Clotting Factors
Prothrombin
Thrombin
Fibrinogen (soluble)
Fibrin (insoluble)
Broken vessel
Activated platelet
Fibrin strands
Blood clot
Damaged Blood Vessel
Injury to vessel lining triggers the release of clotting factors
Formation of Platelet Plug
Vasoconstriction limits blood flow and platelets form a sticky plug
Development of Clot
Fibrin strands adhere to the plug to form an insoluble clot



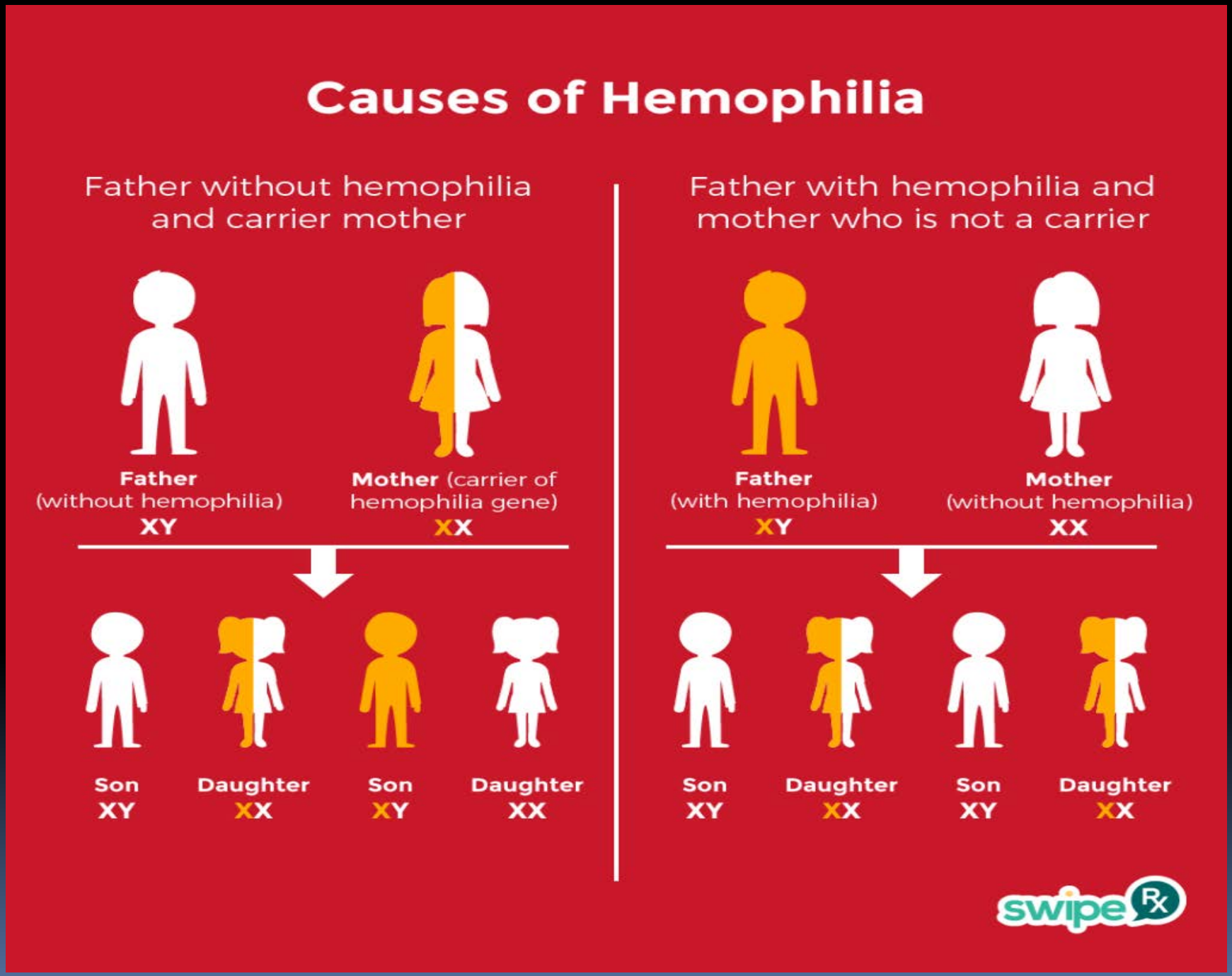
Disorders Related to Blood Clotting

- **Hemophilia** A and B



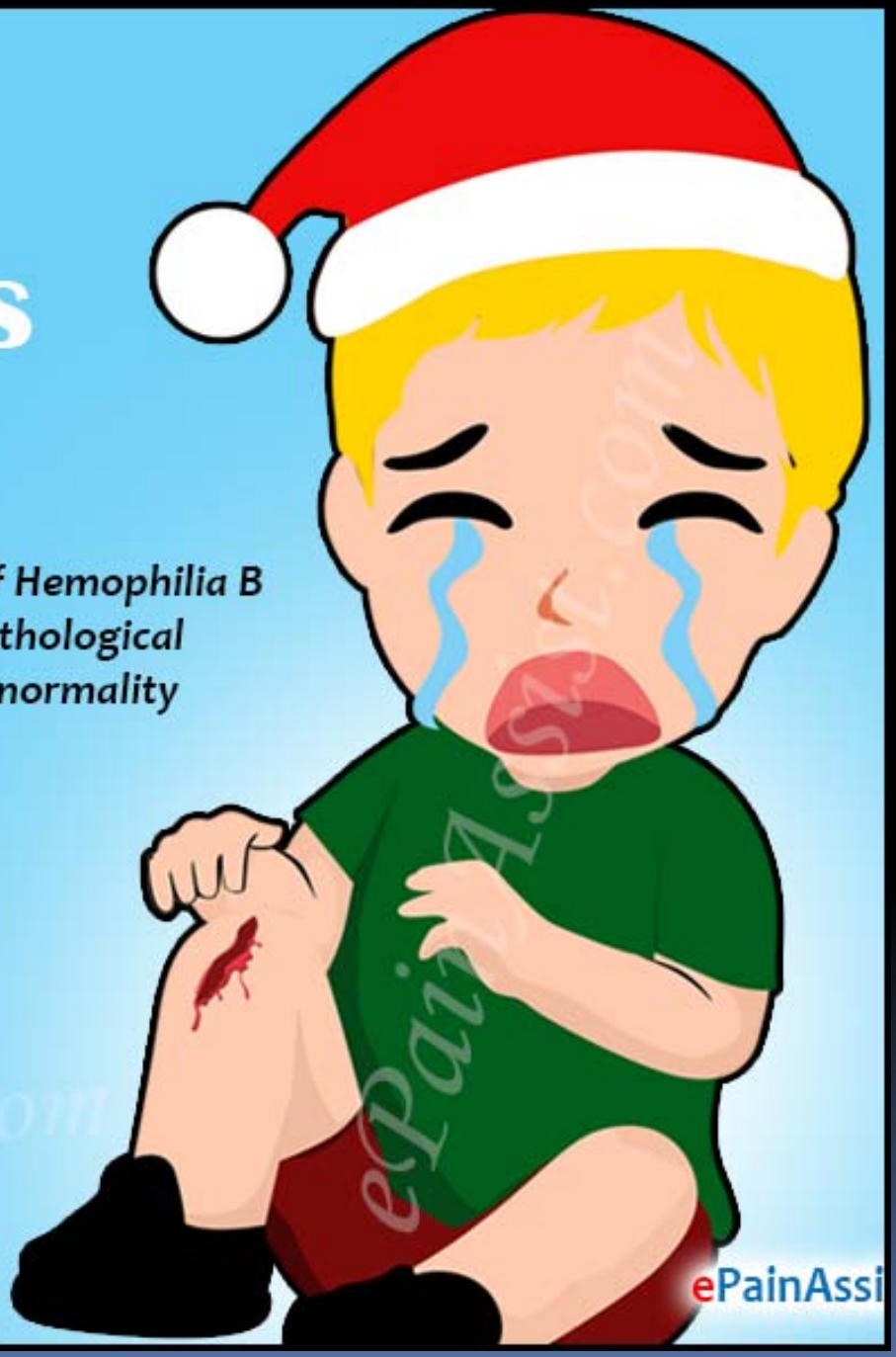
Adapted from: Human Disease: Blood Clot Disease (Hemophilia). Jan 26, 2015. Accessed at: http://humansanatomy.org/2015/01/26/blood-clot-disease-hemophilia/ on 02.26.2015.

Causes of Hemophilia



What Is Christmas Disease?

It is also known by the name of Hemophilia B is an extremely rare genetic pathological disorder characterized with abnormality in blood clotting.



Thank you