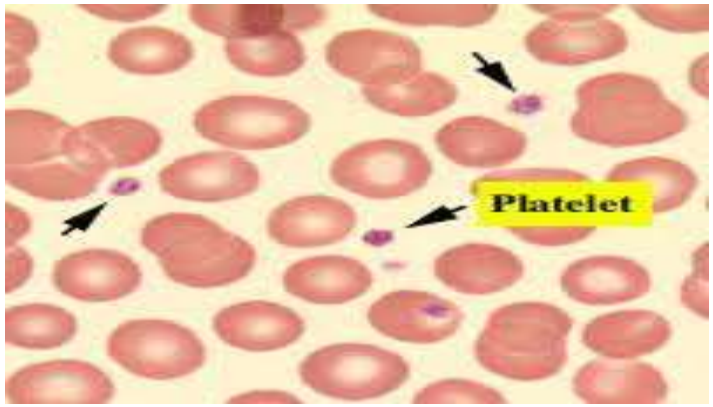
Blood platelets or thrombocytes

1.in mammals the platelets are small round granulated bodies about 2-4 micron in diameter and has no nucleus.

In bird about 4-8micron in diameter and oval in shape and has nucleus.

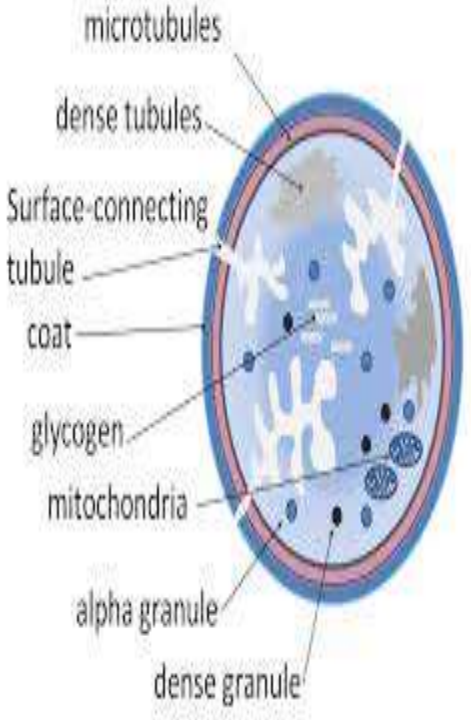
2.life span about 2-10 days.



3.origen from bone marrow(megakaryocytes) under the control of thrombopoietic stimulating factor(TSF).

4.number about 150000-400000cell/ml.

5.cytoplasm contain two type of granules:
1.denese granules which secret ATP, Ca and serotonin .
2.alfa granules which contain protein and coagulating factors to form blood clot and stop bleeding.



Blood coagulation:

it is formation of clot to stop bleeding and this process called Hemostasis.

Hemostasis: formation of clot in the wall of damaged blood vessels by two stages:

1.temporary clot.

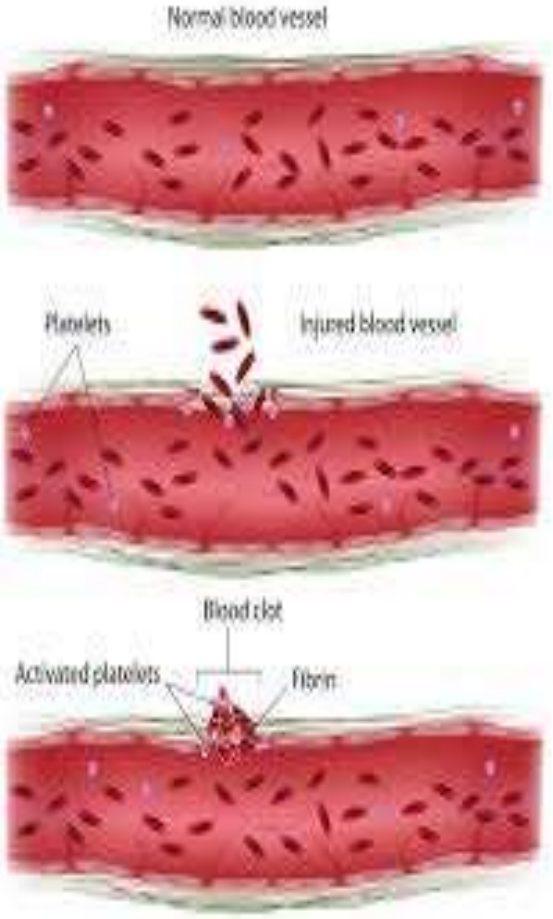
2.perminant clot.

Temporary clot:

1.when blood vessel is damage the endothelial is sloughing and the under layer of collagen is exposed.

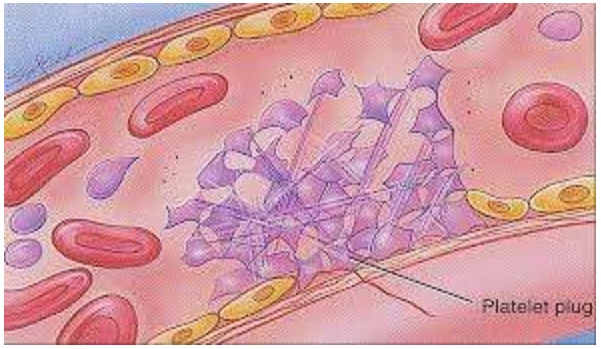
2.collagen attract platelets which adhere to it and liberate serotonin which caused vasoconstriction of blood vessels by aiding Ca .

ATP cause liberation of some agent from other platelets.

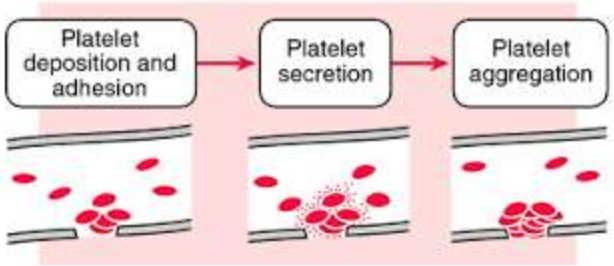


3.ADP which caused adhesion of platelets over each other to form a loss temporary clot.

4.release of archidonic acid from phospholipid in platelets membrane this will formed thromboxan A2 which will cause further aggregation of platelets and libration agents.



5.the plasma protein thrombin also caused aggregation of platelets.
6.at the same time of thromboxan A2 synthesis there is prostaglandin synthesis which prevent aggregation of platelets in adjacent blood vessels.



Perminant clot:

Is the change of loss clot into tight clot, it take several steps that start by activate the hagmen factor which convert of inactivate factor to active factor and this began to activate chain of reaction and in the end it convert *fibrinogen to fibrin.*

Intrinsic factor:

Hagmen factor → active hagmen factor

Christmas factor → active Christmas factor

Antihemophilic factor → active antihemophilic factor

Sturat factor → active stuart factor

Proaccelerin → active proaccelerin

Prothrombin → thrombin

Fibrinogen → fibrin

Plasma :

it is the fluid part of the blood,90%water,7-8%proteins 1-3 %electrolytes , composed about 5%of body weight.

Plasma protein are : albumin, globulin,fibrinogen,mucoprotein,glycoprotein and lipoprotein.

Functions:

1.nutritional: supply nitrogen, amino acids and protein to the cell.

2.physical function: to maintain osmotic pressure.

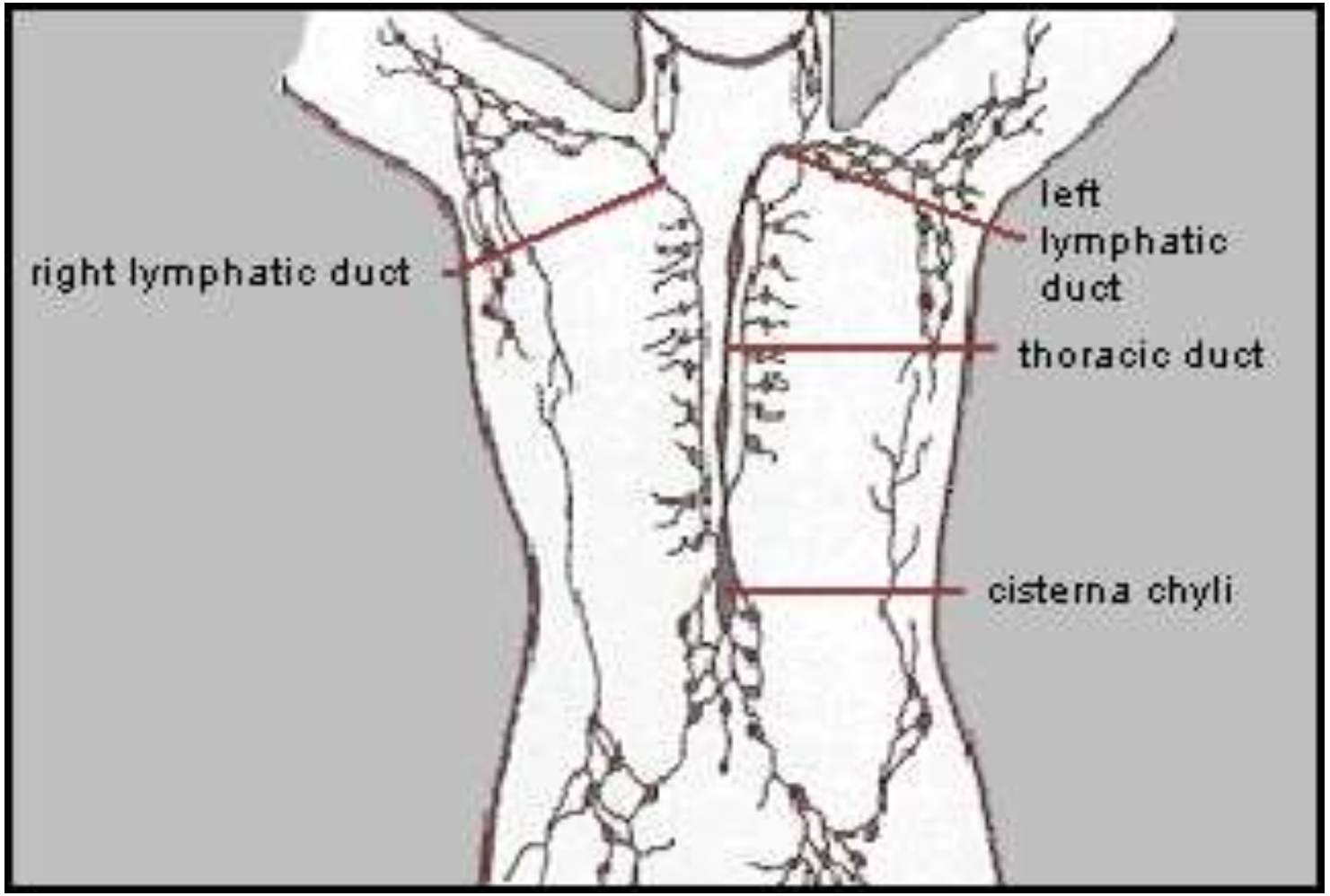
3.Chemical function: to maintain H ion concentration Ph

4.transport function: transport some water insoluble compound like fatty acids and hormones.

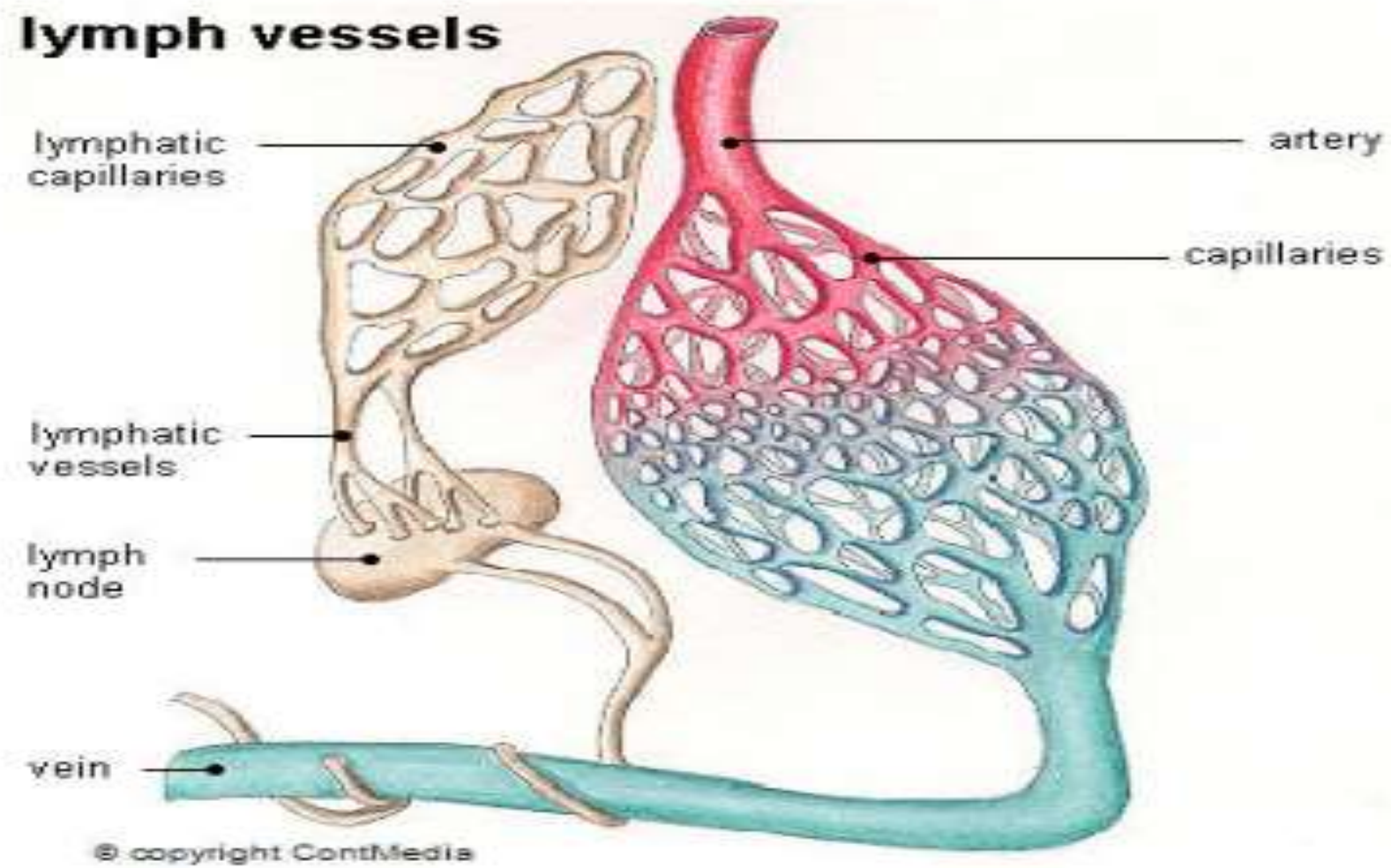
5.diffence mechanism: that the globulin act as immunity system(Ab).
6.clotting function: fibrinogen act as coagulator agent.
7. plasma is a watery media for all chemical reaction.

Lymph:

It is accumulated fluid between cells and blood capillaries produced by filtration of blood during blood passages in blood capillaries it enter lymphatic vessels and then drainage into venous blood via thoracic duct and right lymphatic duct.


right lymphatic duct
left lymphatic duct
thoracic duct
cisterna chyli

lymphatic tissue



Lymph composed from all plasma constituents except that its protein content is less. lymph protein 0.8% plasma protein8%.

Lymphatic vessels: began from tissue as ending blind lymph capillaries, the other end are open together to form large lymphatic vessel which drainage into thoracic duct and right lymphatic duct which empty into venous blood.

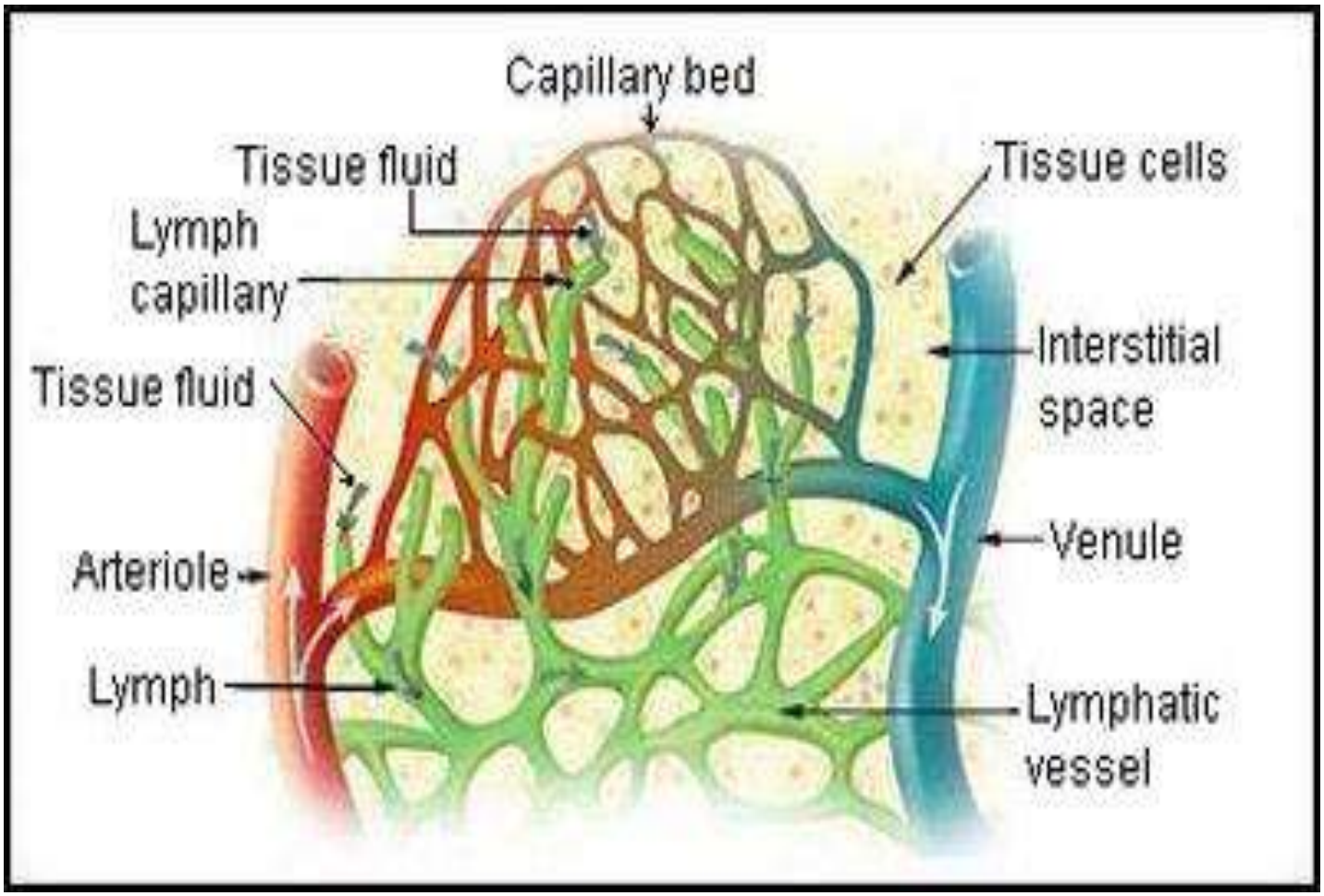
Lymph flow: inside lymphatic vessels is sluggish and in one direction this occurred by :

1.the presence of valves inside the lymphatic vessels.

2.the difference in pressure at the 2 ends of lymphatic vessels.

3.the contraction of smooth muscle at the lymphatic vessel wall.

4.the pressure of skeletal muscle out side the lymphatic vessels.


Capillary bed
Tissue fluid
Tissue cells
Lymph capillary
Interstitial space
Tissue fluid
Venule
Arteriole
Lymph
Lymphatic vessel

Function of lymph:

1.regulate osmotic pressure which returning water to blood circulation(oncotic pressure).

2.mentain hydrostatic pressure which filtrate fluid to tissues.

3.transport protein from liver to blood circulation.

4.transport lipid and water insoluble compounds from intestine to blood.
5.it help blood coagulation because it contain coagulating factors.
6.it has defense mechanism because it contain lymphocyte and antibodies.

Odema: it abnormal condition caused by accumulation of large amount of fluid between cell.(which filtrate from capillaries).

Causes:

1.increase amount of protein out side capillaries which cause increase of fluid filtration from blood capillaries.

2.obstuction of lymphatic vessels.
3.hypoprotonemia: decrease protein in blood.
4.increase capillary hydrostatic pressure.
5.failure of blood returning to the heart.

*accumulation of fluid(odema) inside abdominal cavity called ascites.

* in brain called hydrocephlais.

*in lung called pulmonary odema.

*in heart called hydropericardium.