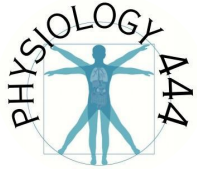


Editing file

Color index:

- Main Text
- IMPORTANT
- Girls' slides only
- Boys' slides only
- Extra Info
- Drs Notes

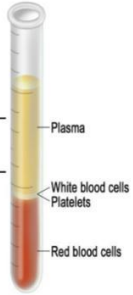
Haemostasis 2

Hemostatic Mechanisms:

- Vessel wall
- Platelet
- **Blood coagulation**
- Fibrinolytic system

Clotting Factors

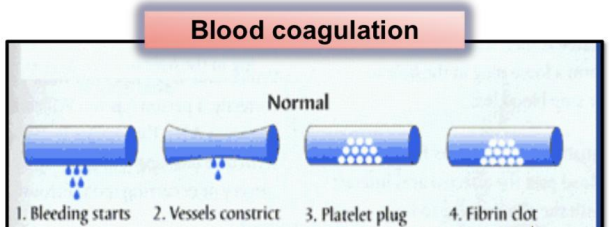
Factors	Names
I	Fibrinogen
II	Prothrombin
III	Thromboplastin
IV	Calcium
V	Labile factor
VII	Stable factor
VIII	Antihemophilic factor A
IX	Antihemophilic factor B
X	Stuart-Power factor
XI	Plasma thromboplastin antecedent (PTA)
XII	Hagman factor
XIII	Fibrin stablizing factors

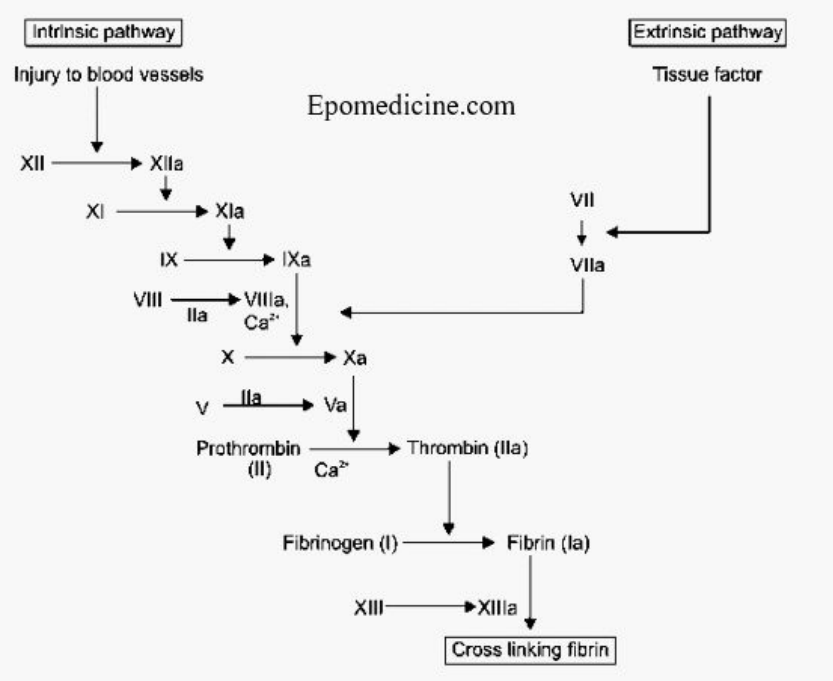


Circulate in plasma in inactive sate

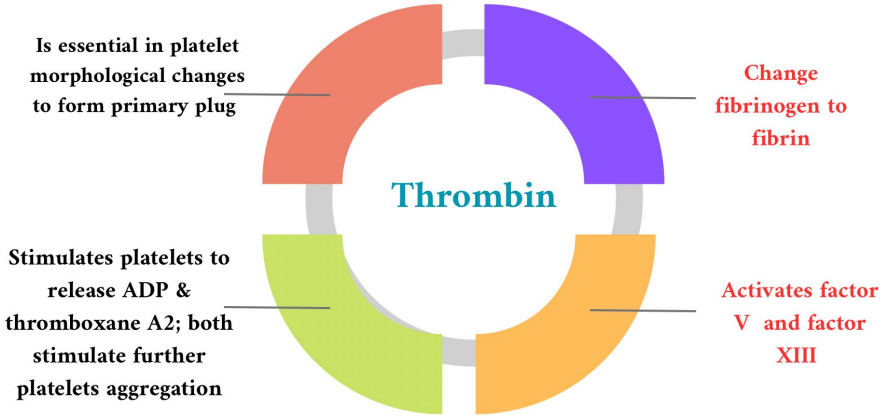
Role in Calcium ions in clotting:

No Ca++ means no clotting.
Blood samples are prevented from clotting by adding:
Citrate ions -> Deionization of Ca++
Oxalate ions -> ppt the Ca++





Intrinsic pathway	Extrinsic pathway
Initiated by injury to the blood vessels	Initiated by trauma to the tissue
Both activated by factor x	



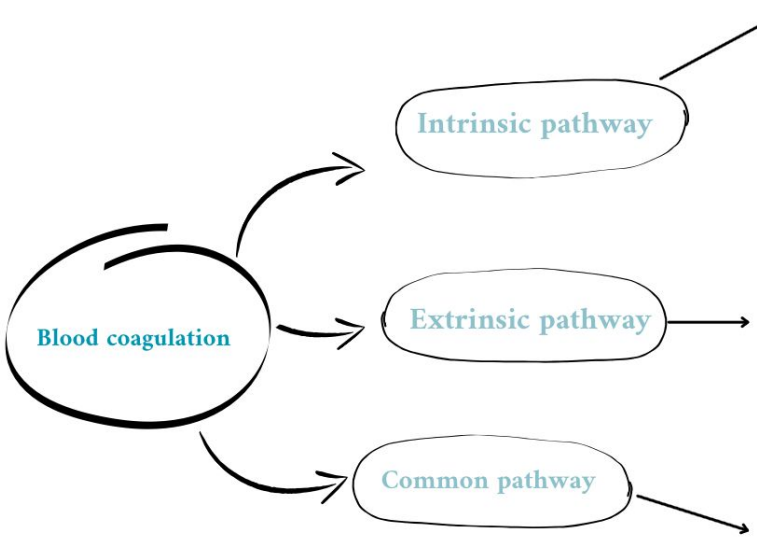
Blood coagulation

A series of biochemical reactions leading to the formation of a blood clot

This reaction leads to the activation of thrombin enzyme from inactive form prothrombin

Thrombin will change fibrinogen (plasma protein) to fibrin (insoluble protien)

Prothrombin (inactive thrombin) is activated by a long intrinsic or short extrinsic pathway



- The trigger is the activation of factor XII by contact with foreign surfac, injured, blood vessel and glass.
- Activated factor (XIIa) -> activate XI.
- XI -> activate IX.
- IXa + VIII + platelet phospholipid + ca -> activate X .
- All clotting factor present in the blood.

- Triggered by material released from damaged tissue (tissue thromboplastin).
- tissue thrpmoplastin + VII + Ca -> activate X.
- triggered by tissue factor.

- Xa + V + PF3 +Ca (prothrombin activator) it is a proteolytic enzyme activate prothrombin-> thrombin.
- Thrombin act on fibrinogen-> insoluble thread like fibrin.
- Factor XIII + Ca -> strong fibrin (strong clot).

In male slide only

	Extrinsic pathway	Intrinsic pathway
Duration	Rapid	Slow
-	Weaker than the intrinsic pathway	More extensive. Forms more fibrin threads
Start by	Factor III (Thromboplastin or tissue factor)	Factor XII (contact factor)
Occurs	Only invivo	Both invivo and invitro
Tested by	Prothrombin time (PT)	Activated partial thromboplastin time (APTT)

Regulation of coagulation:

Antithrombin(Heparin)	●Inhibit thrombin and other enzymes
Protein C	● Degrade activated factor V and VIII
Protein S	● Cofactor for protein C
Tissue factor pathway inhibitor(TFPI)	● Inhibit the extrinsic system by inhibiting factor VIIa
Smooth vascular endothelium	Thus there is no activation of factor XII or platelets
The fibrinolytic system	

Fibrinolytic System:

Definition:
it is the breakdown of fibrin by naturally occurring enzyme plasmin therefore prevent intravascular blocking.

- Plasmin is present in the blood in inactive form (plasminogen).

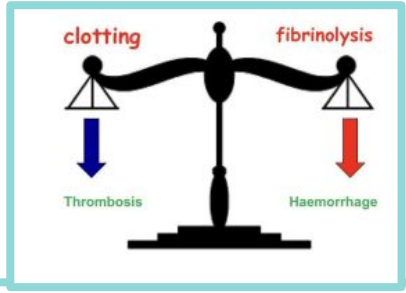
- Plasmin is activated by tissue plasminogen activators (t-PA) in blood.

- Plasmin digest intra & extra vascular deposit of Fibrin → fibrin degradation products (FDP)

. - Unwanted effect of plasmin is the digestion of clotting factors.

Plasmin is controlled by: -
. Antiplasmin from the liver.
- . Plasminogen Activator Inhibitor (PAI).

Uses of Plasmin: - Tissue Plasminogen Activator (t-PA) used to activate plasminogen to dissolve coronary clots.
There is balance between clotting and fibrinolysis: - Excess clotting → blocking of Blood Vessel
Excess fibrinolysis → tendency for bleeding



Hemostatic function tests :

	Test for	Prolonged in
Bleeding time	Platelets function	Thrombocytopenia Thrombocytoasthenia
Coagulation (clotting time)	Coagulation cascade	All disorders of coagulation (Hemophilia – Vitamin K deficiency -
Prothrombin time (PT)	Extrinsic pathway	Abnormalities of the extrinsic pathway (Vitamin K deficiency)
Activated partial prothrombin time (APTT)	Intrinsic pathway	Abnormalities of the intrinsic pathway (Hemophilia)

Bleeding disorders:

Vitamin K deficiency	Platelet defect	Coagulation factors defect	Liver disease
Prothrombin, FVII, FIX, & FX require vitamin K for their synthesis	deficiency in number or defect in function. (thrombocytopenia	Deficiency in coagulation factors (e.g. hemophilia).	almost all coagulation factors are synthesized in the liver.(E.g.hepatitis).

X-linked disease (genetic disorder)
Affects males, females are only carriers. -
Increase bleeding tendency.
- It has (3) types

Hemophilia

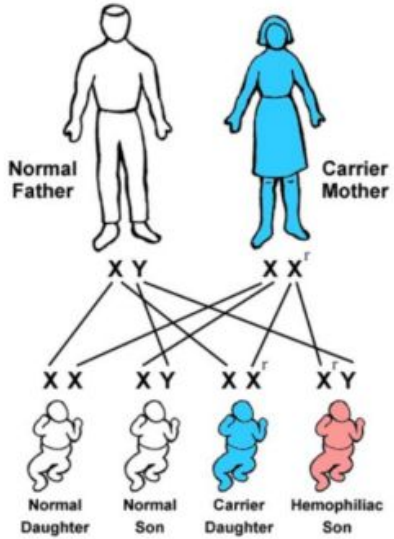
(A): Classic hemophilia, 85%cases, due to VII deficiency

(B): 15% cases, due to IX deficiency

© due to absence of factor XI
● Clinical features: Easy bruising, massive bleeding after trauma or operation, hemorrhages in joints

Male slides only

Inheritance of hemophilia :



THROMBOCYTOPENIA

PLT count upto 50,000 ul ❖ Less than 10,000 → Fatal

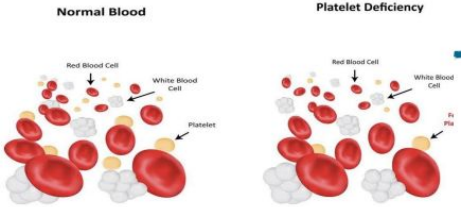
❖ Etiology:

A) Decreased production

1. Aplastic anemia 2. Leukemia 3. Drugs 4. Infections (HIV, Measles)

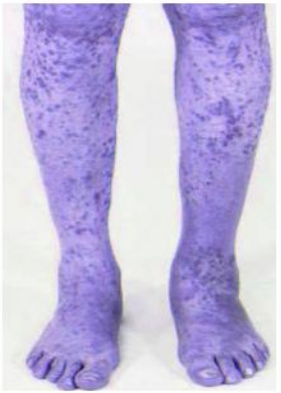
B) Increased destruction

1. ITP. 2. Drugs. 3. Infections



❖ Clinical Features:

1. Easy bruisability
2. Epistaxis
3. Gum bleeding
4. Hemorrhage after minor trauma.
5. Petechiae/Ecchymosis.



❖ Diagnosis:

1. Platelets decrease. 2. Blood trauma increase

Clinical note: The VWF* has a dual role in hemostasis:

First: it promotes platelet adhesion to thrombogenic surfaces as well as platelet -to- platelet cohesion during thrombus formation.

second: it is the carrier for FVIII in plasma. FVII acts as a cofactor to accelerate the activation of factor X by activated factor IX in the coagulation

Anticoagulants :

Heparin:

- Liver, lungs, masts cells and basophils.

- Direct antithrombin.
- Prevent the conversion of prothrombin to thrombin.

- Injection only.
- 6-8 Hours. Warfarin

- Almost all coagulation factors are synthesis In the liver .

- Suppresses the synthesis of prothrombin, FVII, FIX and FX (Vitamin K dependent factors).

- Orally.
- 48 Hours

:

MCQs

1- Thrombin activates factors:			
A- I , V , IX , XI	B- I , X , XI , XIII	C- III , IX , VII	D- I , V , VIII ,XIII

2- Both intrinsic pathways activate clotting factor number:			
A- X	B-XII	C- VII	D- A & C

3- ….. Wil change fibrinogen to fibrin:			
A- Thrombin	B- Serotonin	C- Calcium	D- TXA2

1-D
2-A
3-A

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