

## Normal Hemostasis

### Sequence of response

1. Vasoconstriction
2. Formation of platelet plug (Primary hemostasis)
3. Blood clot formation (Secondary)
4. Clot stabilization and resorption

## Primary hemostasis

### 1. Platelet adhesion and shape change

- Stick to rough surface thru vWF

### 2. Shape change of platelet

- Spiky
- Alter surface glycoproteins for fibrinogen affinity
- Translocate -vely charged phospholipids to surface
- Provide site for coagulation factor complex assembly

### 3. Platelet release reaction

- TXA2, ADP, Serotonin
- Recruit platelets

### 4. Platelet aggregation

- Form platelet plug
- TXA2, ADP, Thrombin, Fibrinogen

## Hemorrhage

Petechia < Purpura < Ecchymosis

### Hemorrhagic disorders

- Defects in coagulation factors, platelets or vessel walls
1. Defects of primary hemostasis (Platelets/ vWF)
  2. Defects of secondary hemostasis (Coagulation factors)
  3. Vascular fragility

## Embolism

- Detached intravascular solid, liquid or gaseous mass that is carried by blood away from its origin
- Composed of thrombi
- Cause infarction (99%)

## Secondary Hemostasis (Blood clot formation)

### Clotting factors

- |                    |                                 |
|--------------------|---------------------------------|
| 1. Plasma Proteins | - By negatively charged surface |
| 2. Tissue factor   | - Initiate XII                  |
| 3. Calcium         |                                 |

### Common stages of Clotting

- |                                       |                    |
|---------------------------------------|--------------------|
| 1. Factor X -> Xa                     | - By tissue factor |
| 2. Prothrombin (II) -> Thrombin (IIa) | - Initiate VII     |
| 3. Fibrinogen (I) -> Fibrin (Ia)      |                    |
- Fibrin trap neutrophil & RBC

### Lab test for clot formation

Prothrombin time: Extrinsic      Partial thromboplastin time:  
Intrinsic

**Retraction:** Platelet adhering to fibrin contract, squeeze out serum

## Clot Stabilization and resorption

- Fibrinolysis: Plasminogen -> Plasmin (Clot buster)
- Or by plasminogen activators (t-PA)

## Thrombin

1. Convert fibrinogen to cross-linked fibrin
2. Platelet activation
3. Pro-inflammatory
4. Anticoagulant

## Thrombosis

### 1. Endothelial injury

- Thrombosis in heart/ arterial circulation

### 2. Stasis/ turbulent blood flow

- Disrupt laminar flow & bring platelet to endothelium

### 3. Hypercoagulability of blood

- aka Thrombophilia

### Fate of thrombus

1. Propagation
2. Embolization
3. Dissolution
4. Organization & Recanalization

