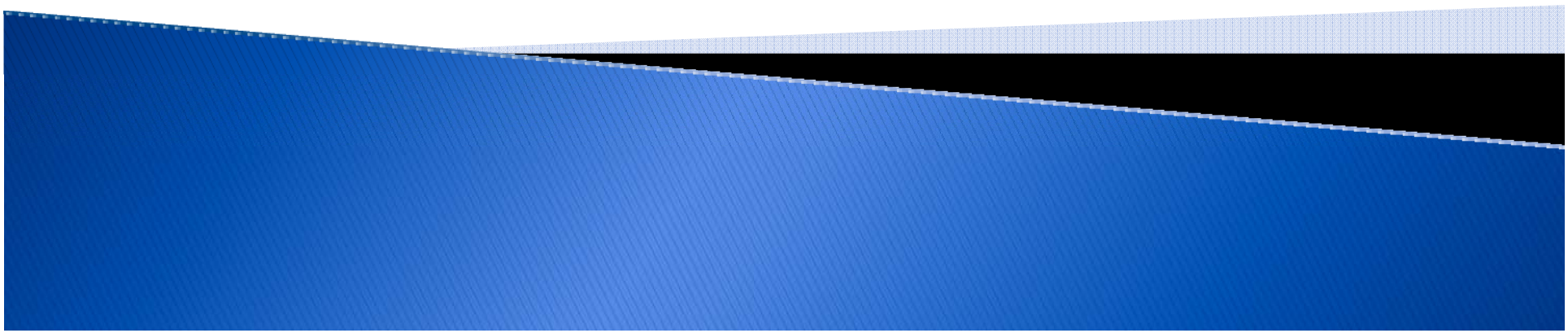
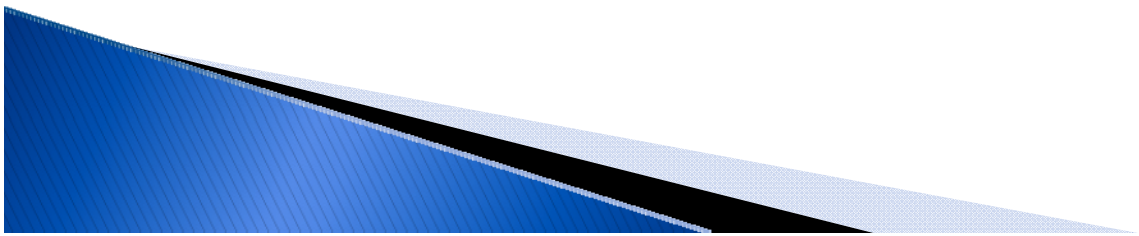
Bleeders

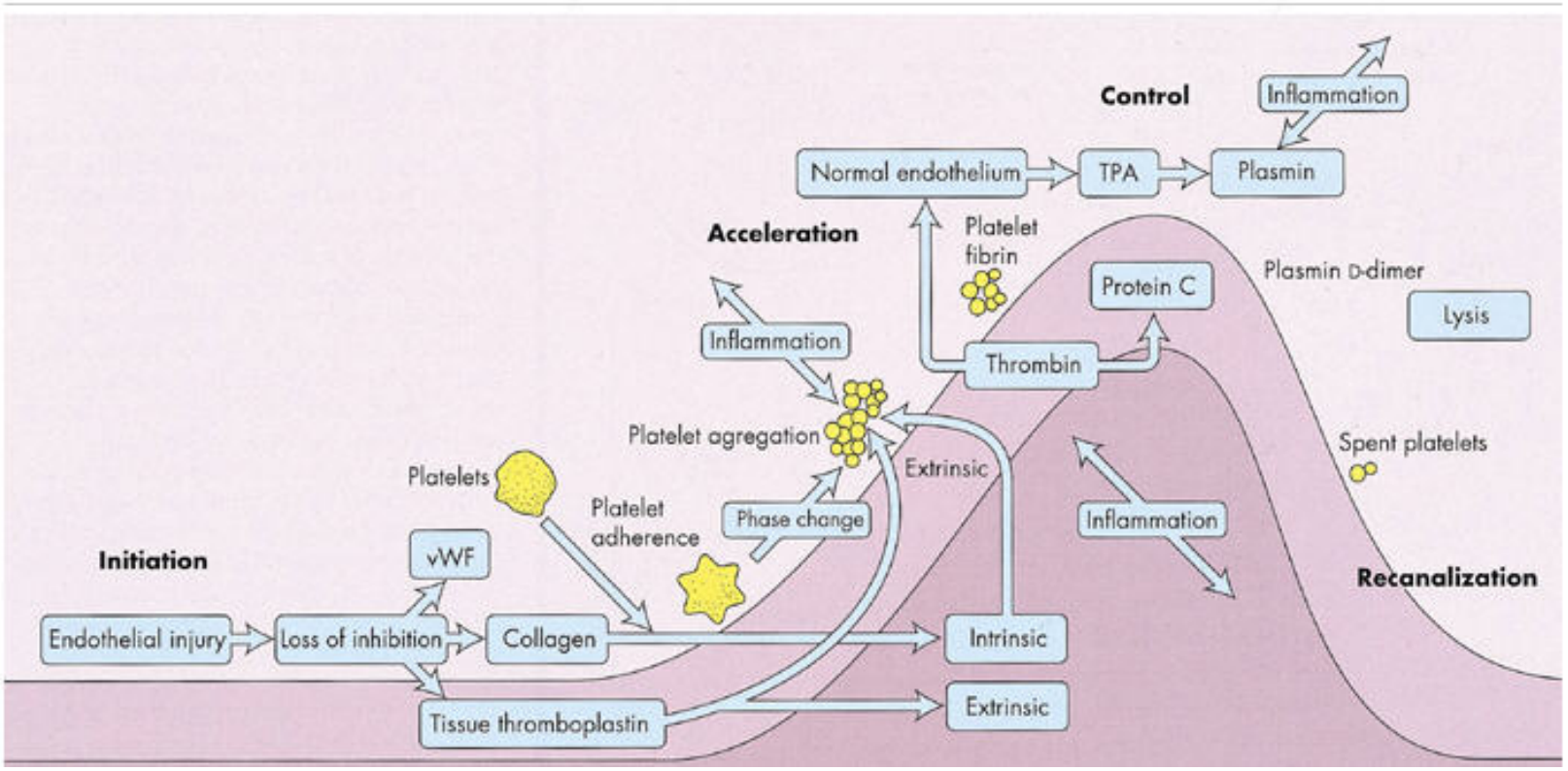


Objectives

- Identify the basic components of the coagulation process
- Describe findings associated with unusual bleeding
- List causes of abnormal bleeding
- Describe important aspects of pre-hospital care in the management of patients with abnormal bleeding.

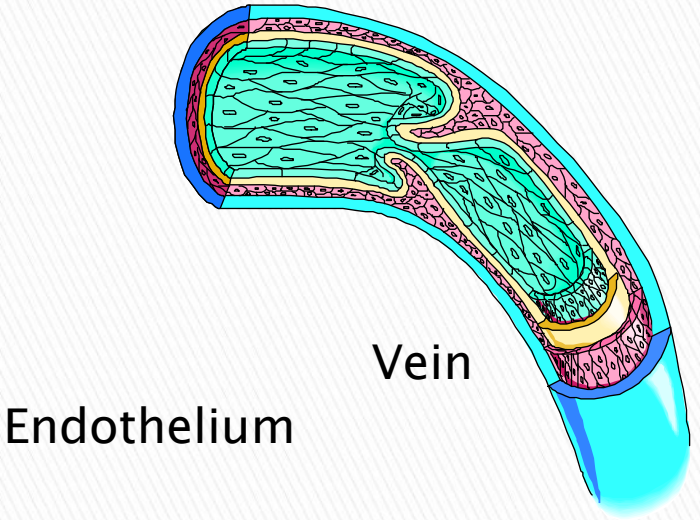


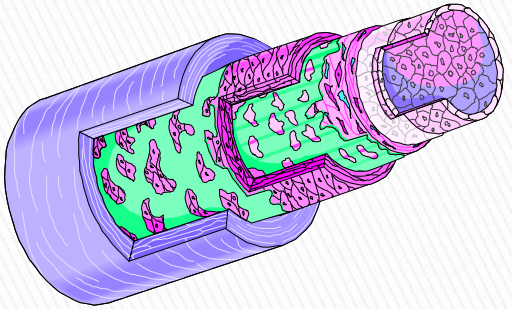
Clots: making them and breaking them



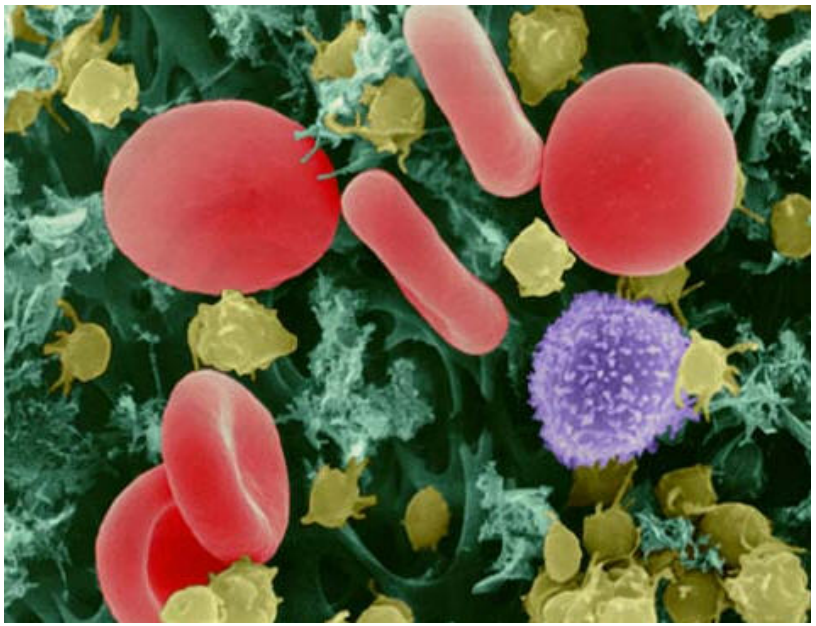
Endothelium

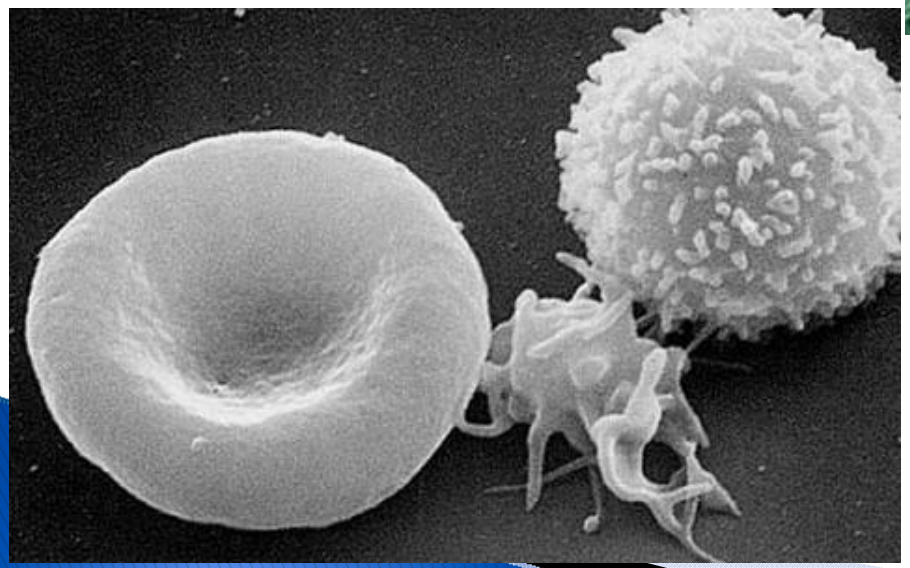
- Lines vessels
- Prevents coagulation
- Produces active substances

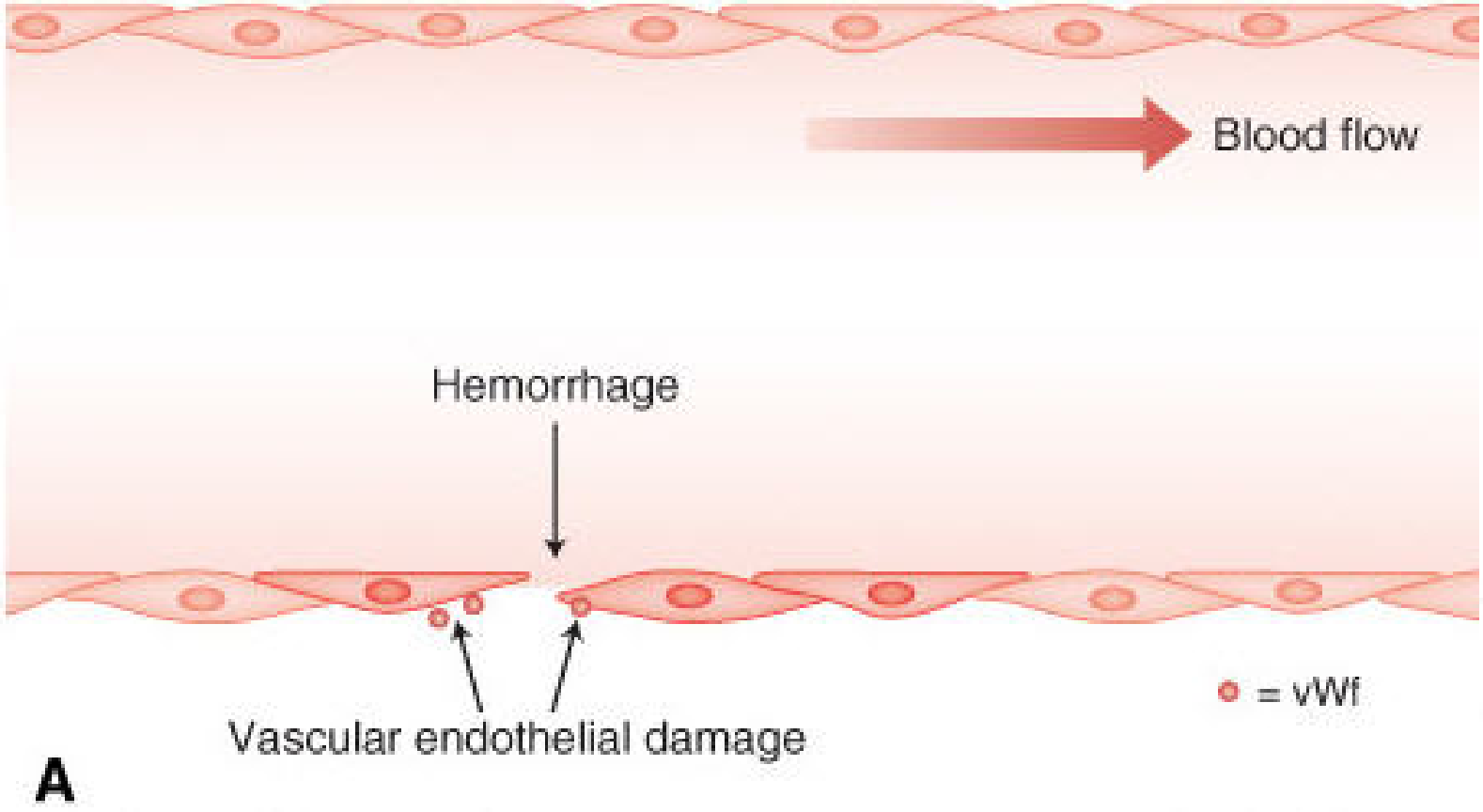


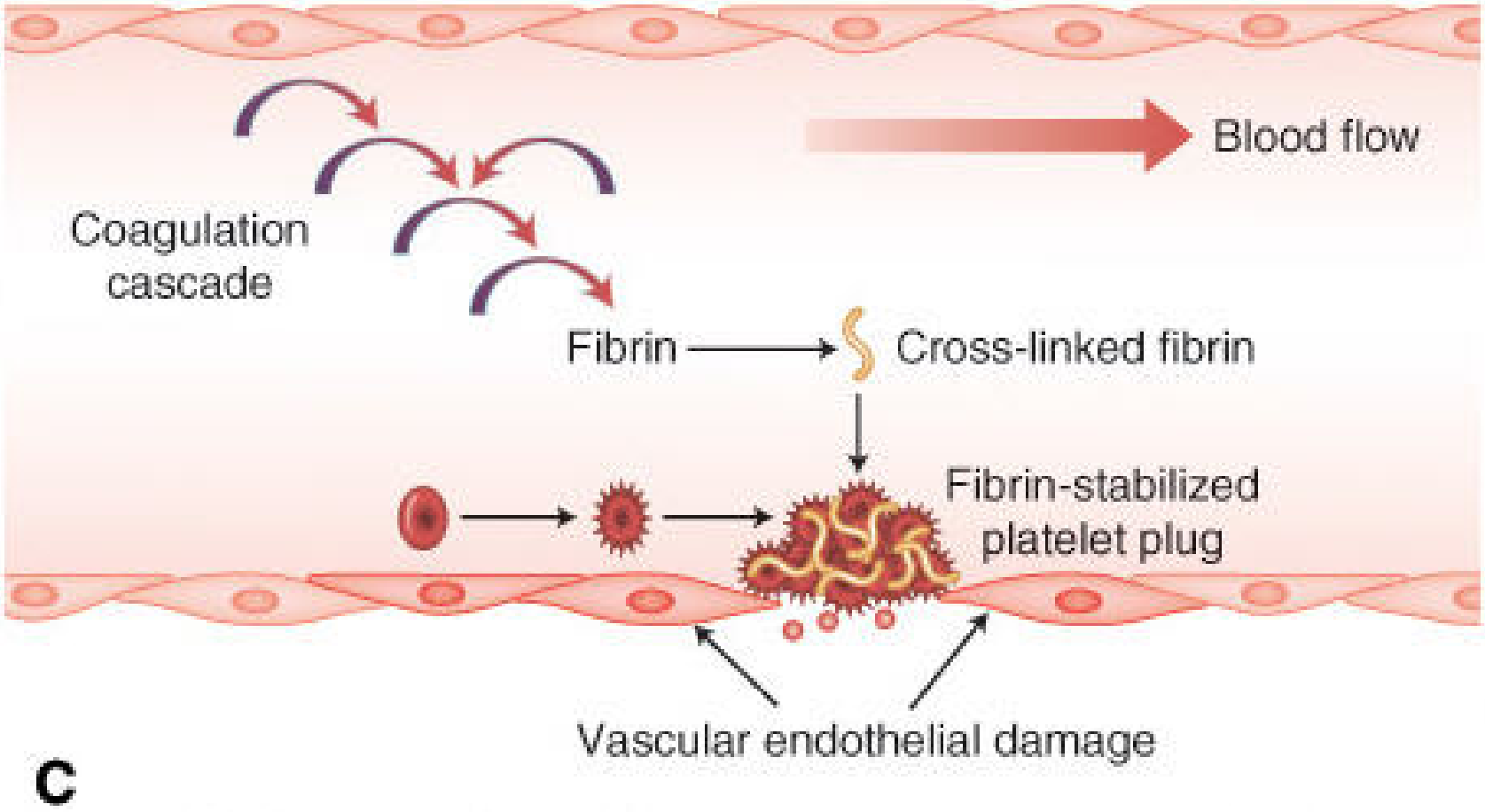


Blood Cells

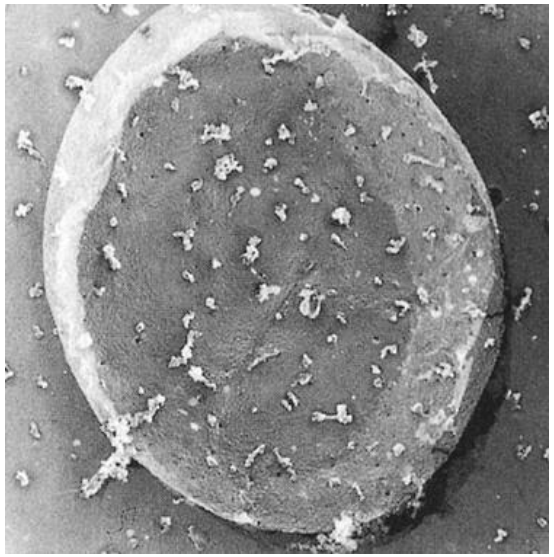


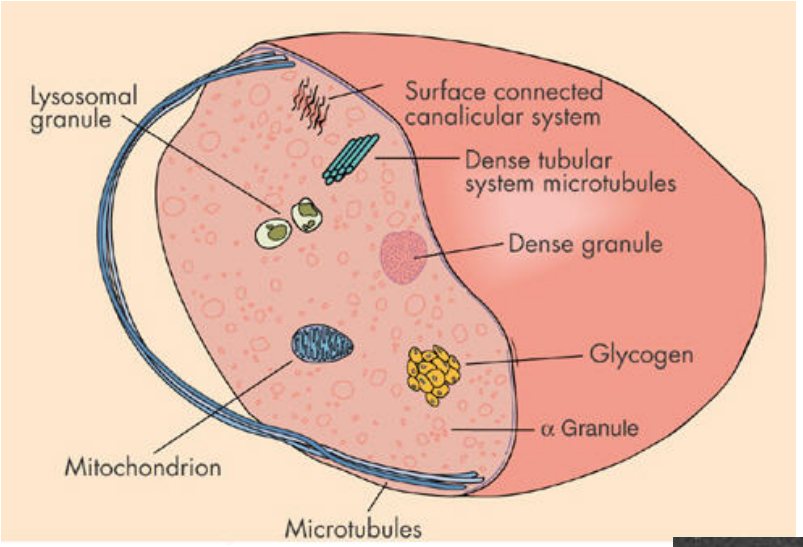


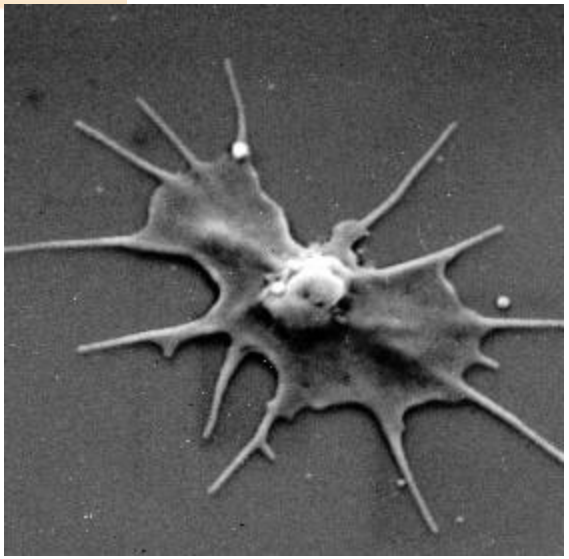

Blood flow
Hemorrhage
= vWf
Vascular endothelial damage
A

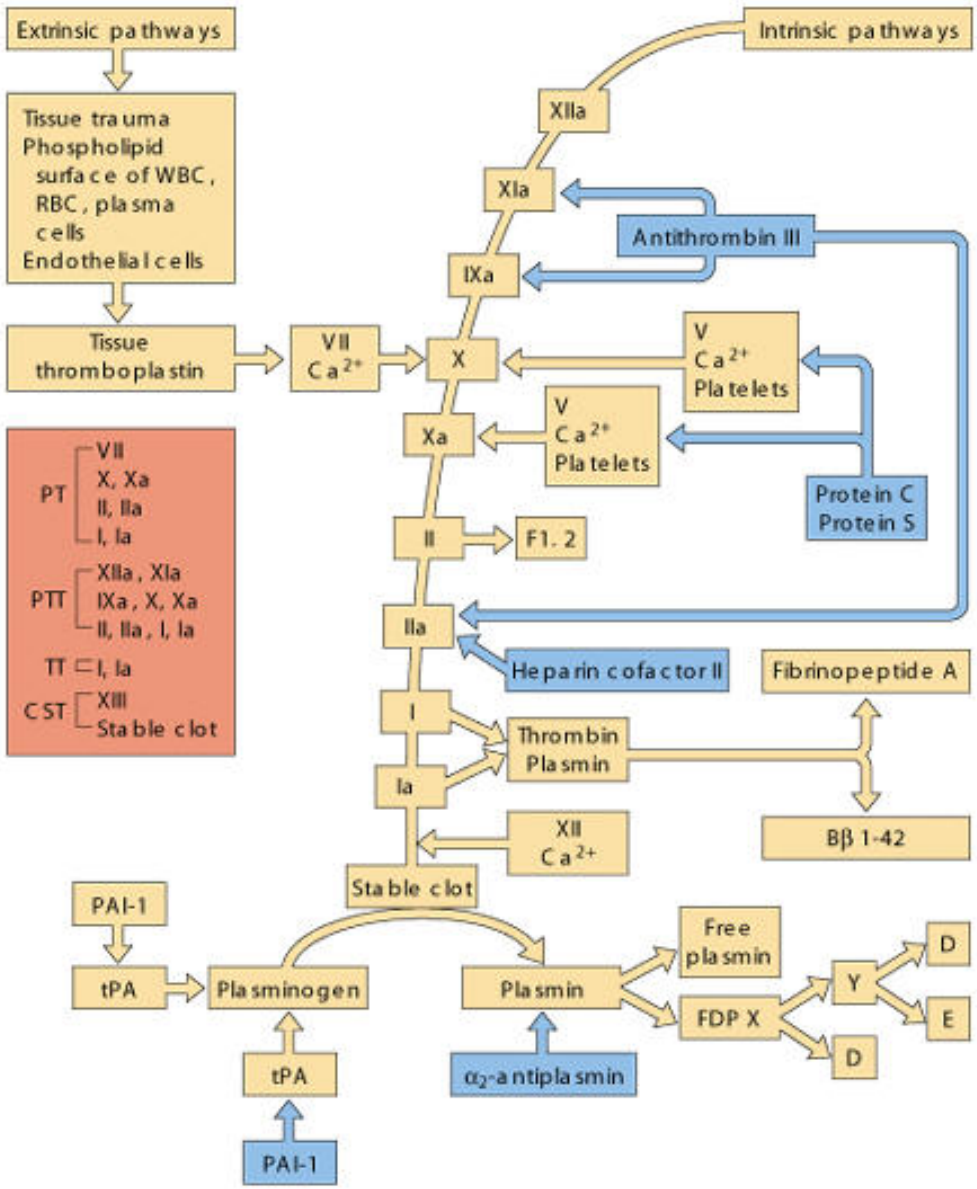

Blood flow
Coagulation cascade
Fibrin
Cross-linked fibrin
Fibrin-stabilized platelet plug
Vascular endothelial damage

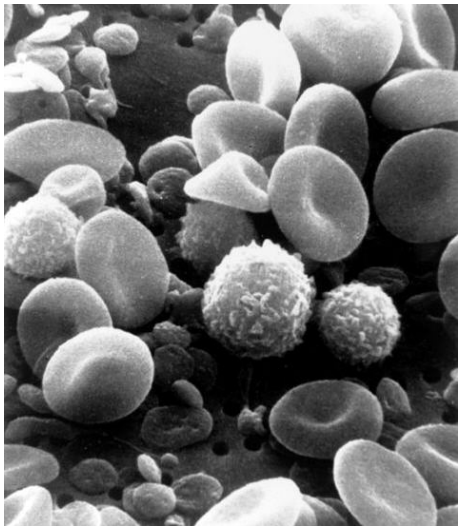
c

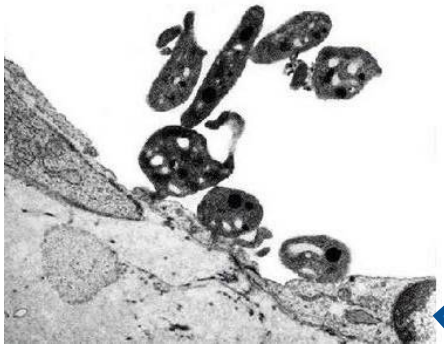


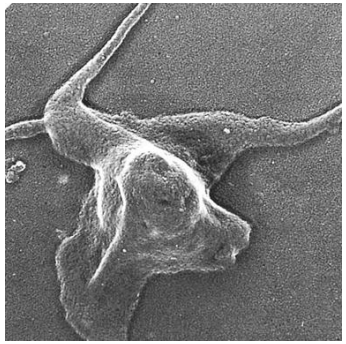

Lysosomal granule
Surface connected canalicular system
Dense tubular system microtubules
Dense granule
Glycogen
α Granule
Mitochondrion
Microtubules

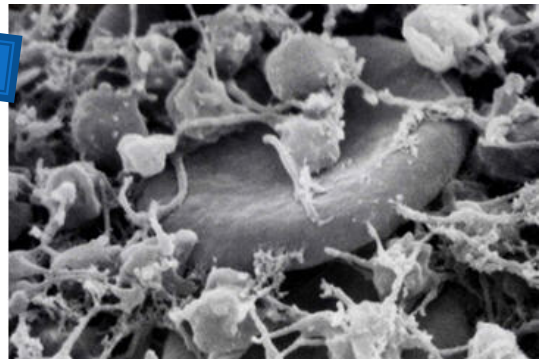


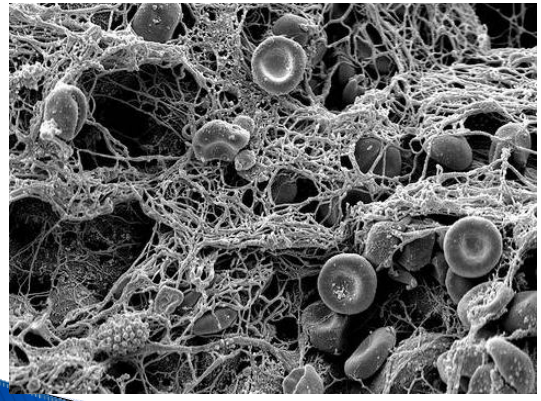

Extrinsic pathways
Intrinsic pathways
Tissue trauma
Phospholipid surface of WBC, RBC, plasma cells
Endothelial cells
Tissue thromboplastin
VII Ca2+
XIIa
XIa
IXa
X
Xa
II
F1. 2
IIa
I
Ia
Antithrombin III
V Ca2+ Platelets
V Ca2+ Platelets
Protein C Protein S
Heparin cofactor II
Fibrinopeptide A
Thrombin Plasmin
Bβ 1-42
XII Ca2+
Stable clot
PT
VII
X, Xa
II, IIa
I, Ia
PTT
XIIa, XIa
IXa, X, Xa
II, IIa, I, Ia
TT
I, Ia
CST
XIII
Stable clot
PAI-1
tPA
Plasminogen
tPA
PAI-1
Plasmin
α2-antiplasmin
Free plasmin
FDP X
Y
D
E
D









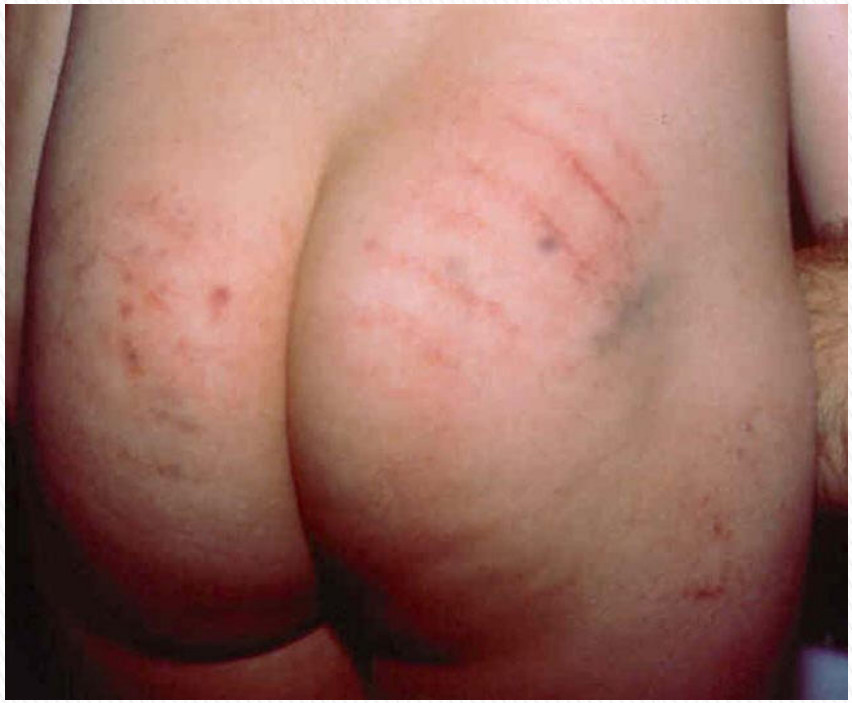


Signs of bleeding

- Blood!?
- Bruising or ecchymosis
- Petechiae
  - Pinpoint red dots- usually related to low platelets

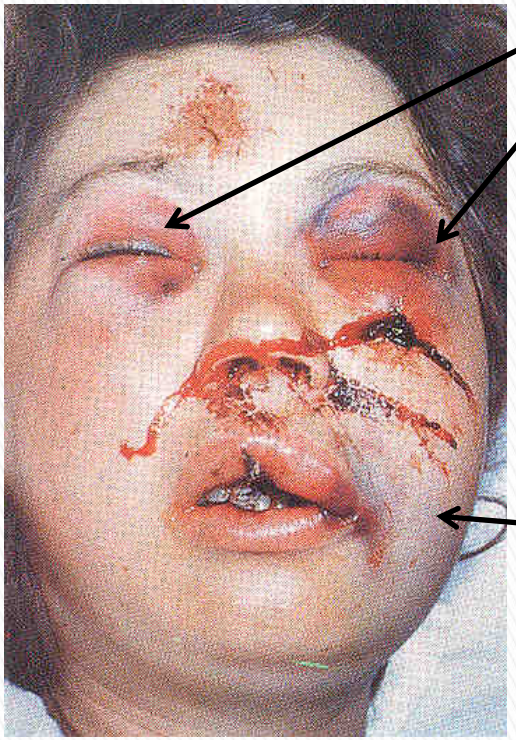
Bruising and ecchymosis

- Color varies generally with age
  - You can only tell relative not precise age
  - Sequence: Red-Blue-Brown-Green/yellow



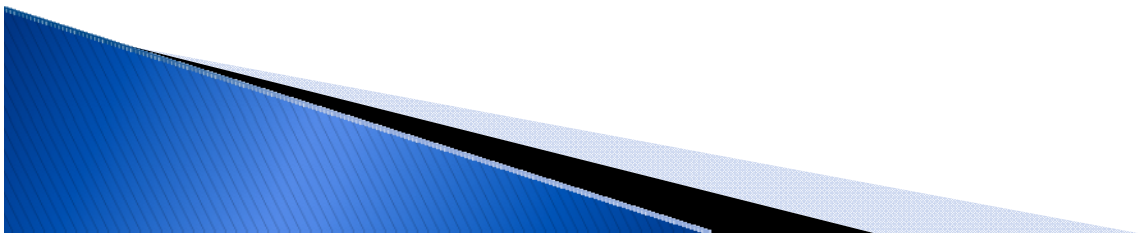
Bruising and ecchymosis

- Bruising: discoloration resulting from traumatic impact
- Ecchymosis: discoloration from migration of blood through tissues



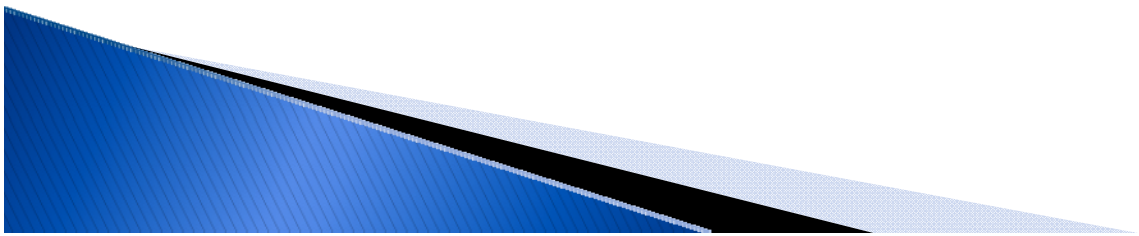
Other bleeding problems

- Nosebleed (epistaxis)
- Bleeding into joints (hemarthrosis)
- Bleeding into muscle
- Intracerebral bleed
- Excessive menses



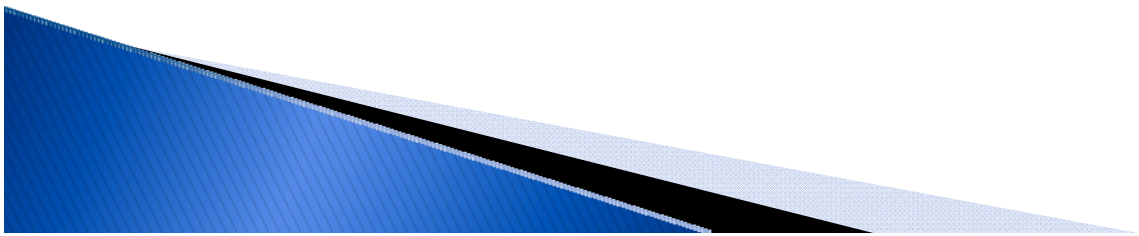
History

- Medications
  - Coumadin
  - Heparin
  - Aspirin
  - Plavix
- Known bleeding condition
- History of heavy bleeding
  - Dental work
  - Menstrual period
  - Minor surgery



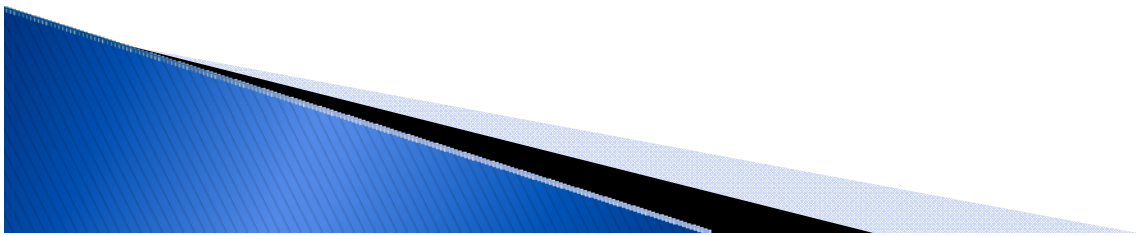
Who Bleeds?

- Congenital
  - Hemophilias
  - VonWillebrands Disease
- Acquired
  - Infection
    - ITP
  - Liver or Kidney Disease
  - Toxic exposure
  - Iatrogenic
    - Medication
    - Hypothermia
    - Dilution



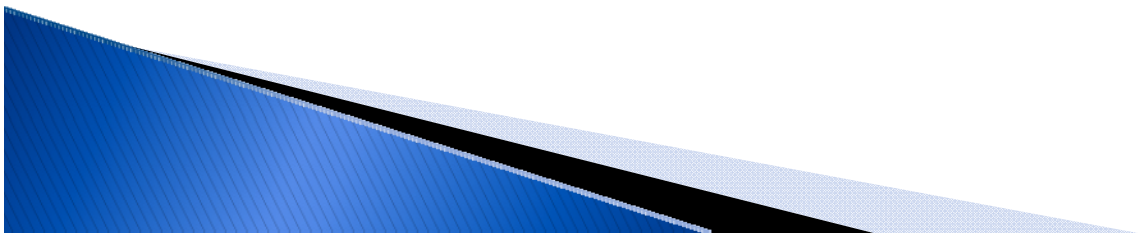
Von Willebrand's Disease

- Most common inherited defect
- Decreased or abnormal Von Willebrands Factor (required to attach platelets to endothelium and to activate)
- Usually (90-98% of time mild to moderate)
- Often appears as increased blood loss during menstruation or at time of miscarraige
- Autosomal gene- woman can have condition
- Long term effects rare



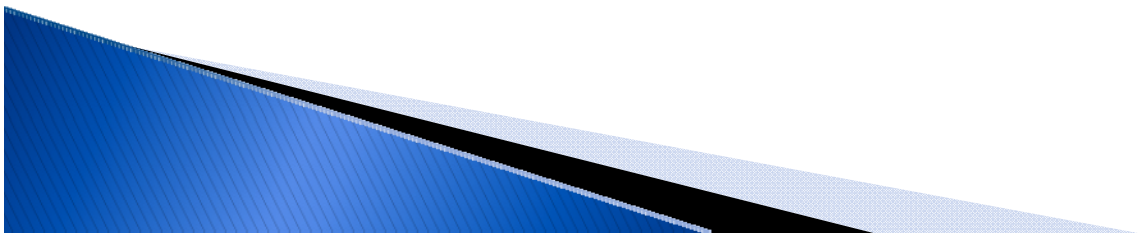
Von Willebrand's Disease- Treatment

- Usually none required unless dental procedure or surgical procedure
- Birth control pills for young women
- Vasopressin for high risk periods
- On rare occasions factor VIII or IX required
- In field usual protocols



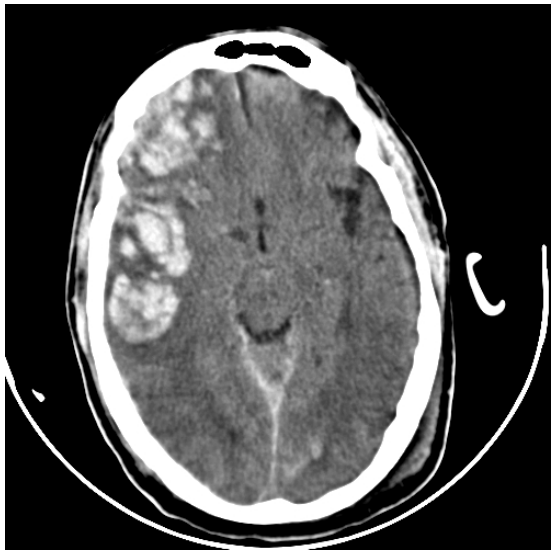
Hemophilias

- Two major types
  - A (Factor VII)
  - B (Factor IX) –"Christmas disease"
- Sex linked recessive
  - Woman may be carriers
  - Almost all patients are males
- Level of severity depends upon amount of factor produced by patient

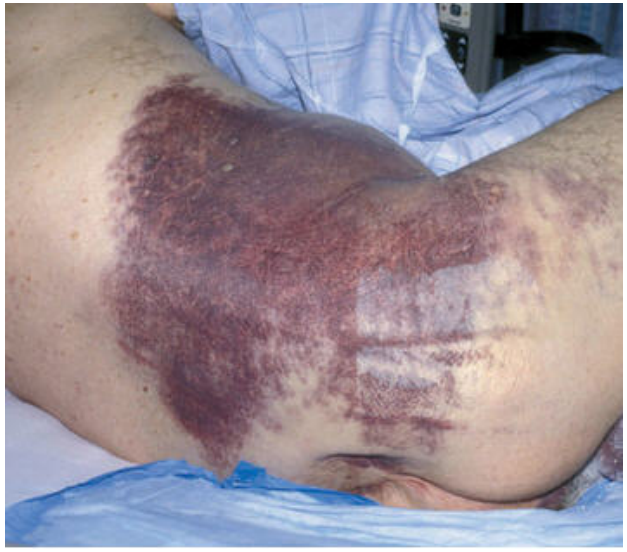


Hemophilias

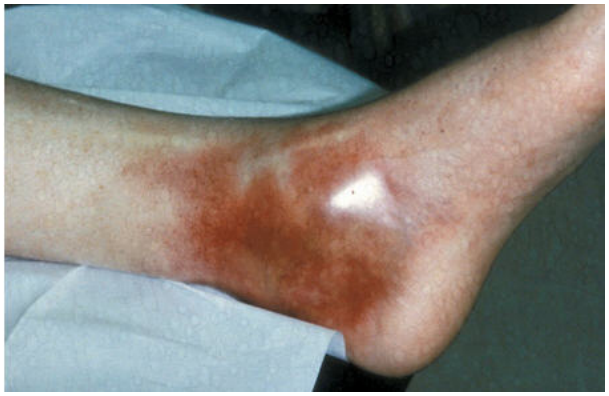
- Significant long term affects



Intracranial Hemmorage



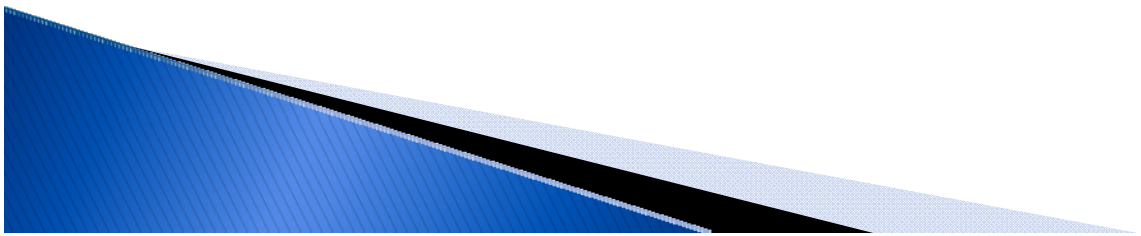
Retroperitoneal Hematoma



Ankle Hemarthrosis

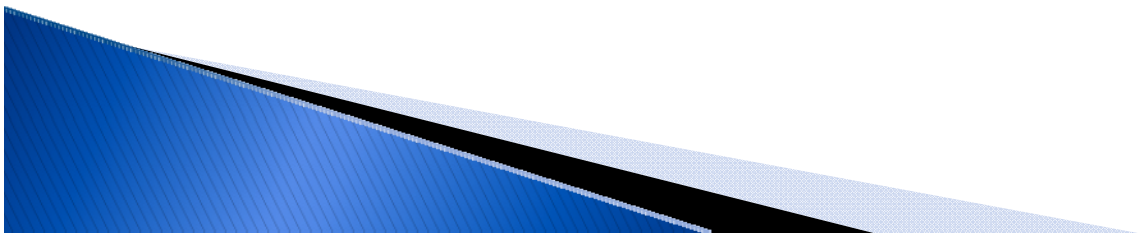
Treatment

- Prevention of contact trauma
- IV infusion of factor VIII or IX
  - In hospital
  - At home by family
  - By Patient
- Case management by HTC
- Topical agents
- Physical therapy and conditioning



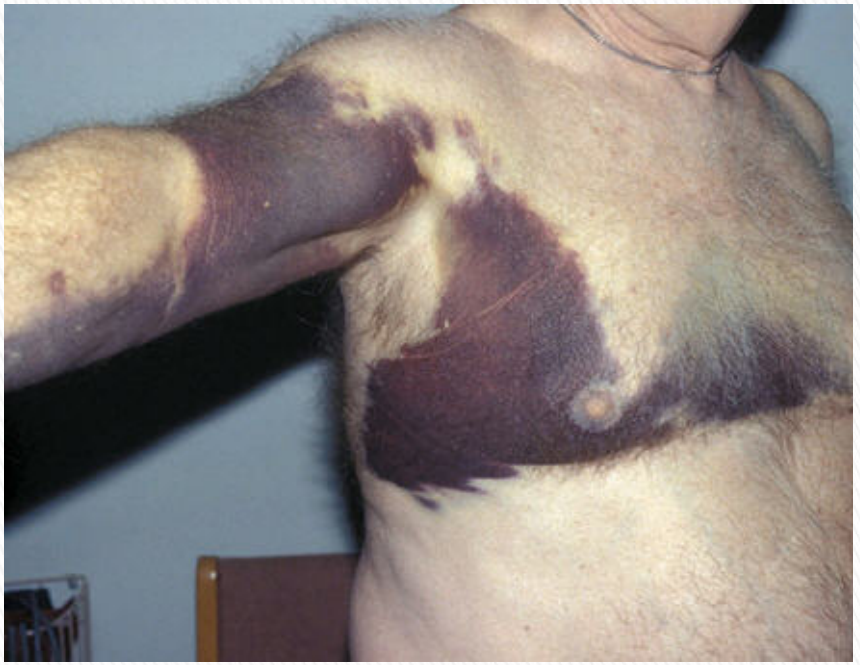
Hemophilias

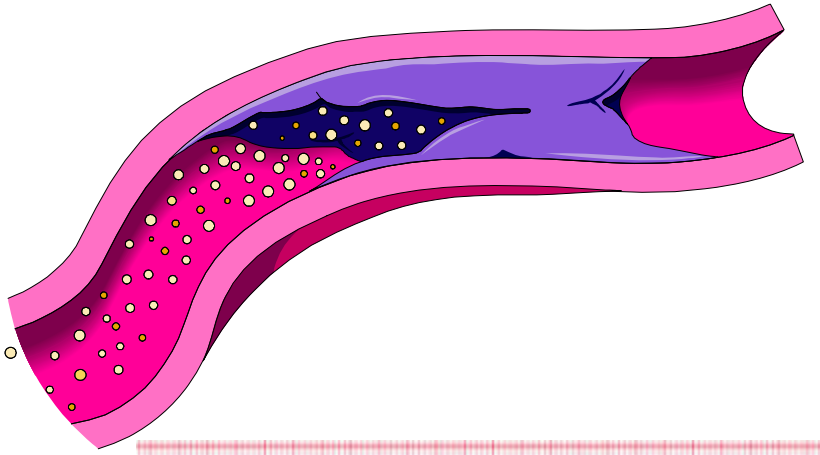
- Name and phone number of HTC
- Infusion?
  - Who?
  - Last infused?
  - When?
- Where is factor
  - Take to facility with you

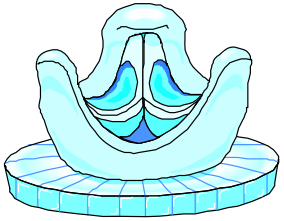


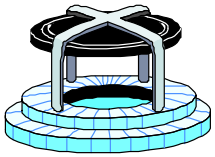
Medication related

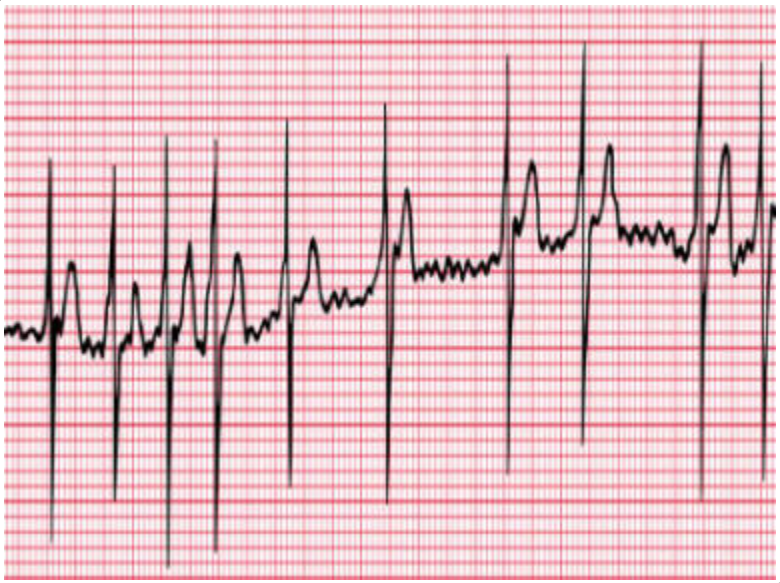
- Coumadin
  - Correct dose varies with medications and diet
  - Reverse with Vitamin K
  - Rapid reversal with coumadin
- Platelet inhibitors
- Heparin

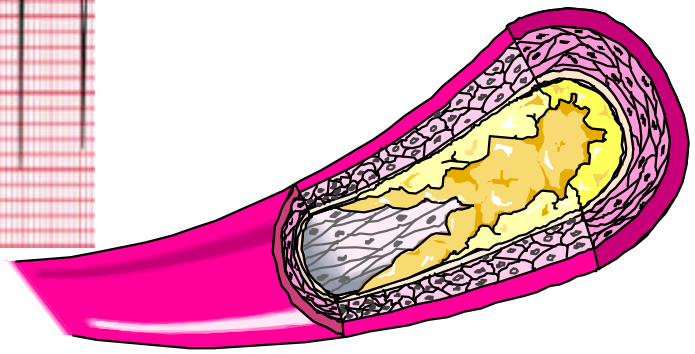






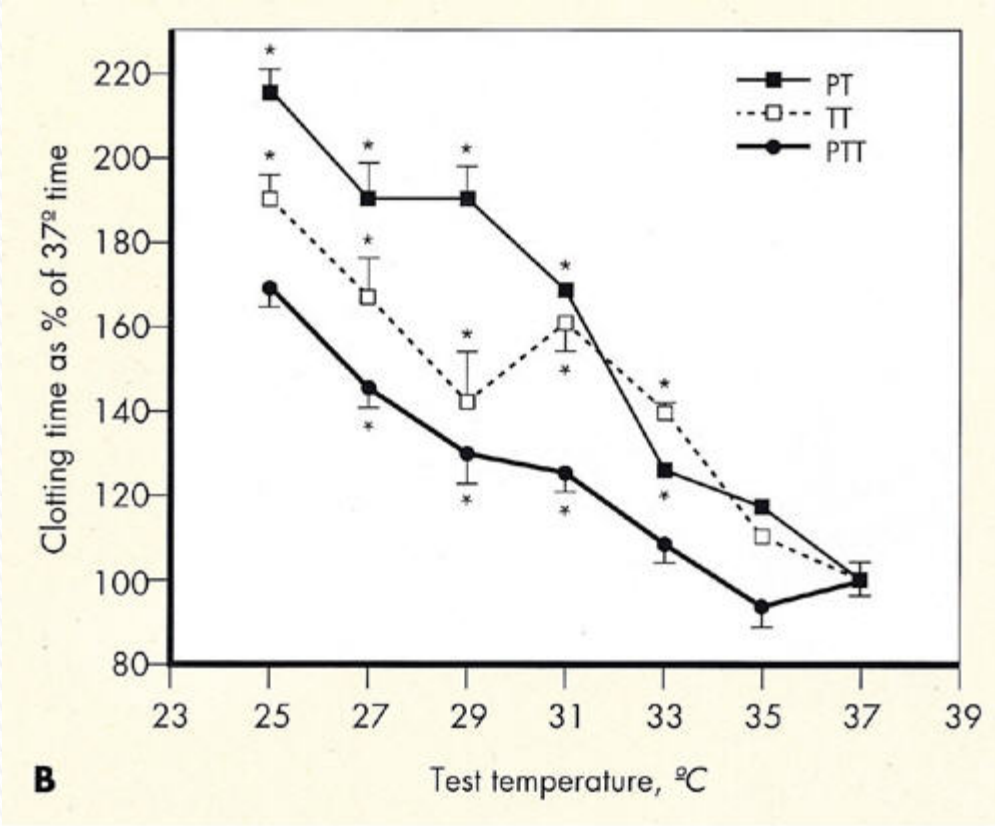






Cold

- Accidental hypothermia
- Therapeutic



Decreased Availability

- Decreased manufacture of clotting factors
  - Liver disease–vitamin K dependent
- Decreased manufacture of platelets
  - Hypersplenism – often occurs in alcoholic cirrhosis
- Destruction of platelets
  - ITP
- Poorly functioning platelets
  - Increased BUN in kidney disease