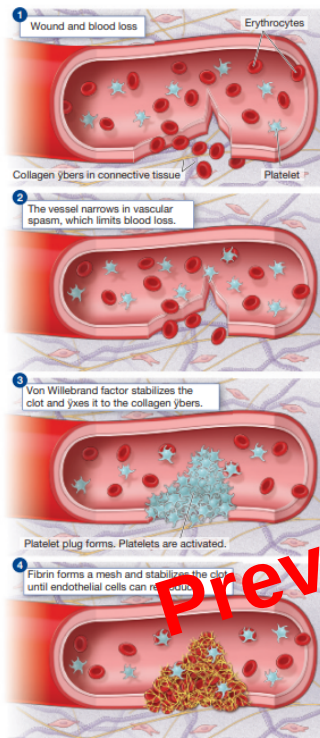


Hemostasis

The Process of Hemostasis

Figure 18.11 Clot Formation

Step 1: The formation of a blood clot is essential when a wound occurs that impacts a blood vessel. Step 2: The immediate reaction is vascular spasm, a narrowing of the vessel. Step 3: Soon a platelet plug forms. Step 4: Fibrin, a fibrous protein formed from fibrinogen, stabilizes the clot as coagulation occurs.



- Process by which the body plugs a ruptured blood vessel to minimize blood loss

- Platelets play a significant role
- Effective for smaller vessels, not larger ones
 - Prevents loss of blood
 - Allows for vessel to be repaired

Steps of Hemostasis

1. Vascular spasm

- Smooth muscle in walls of blood vessels

contracts

Limits blood flow to area and blood loss

2. Formation of platelet plug

3. Coagulation (blood clotting)- Failure of these steps

leads to hemorrhaging

1. Vascular Spasm

- Smooth muscle in the walls of the damaged vessel contracts
 - Triggered by chemicals released from endothelium
- Continues for approximately 30 minutes
- Decreases blood flow and blood loss from damaged area
- Allows other steps of hemostasis to occur

2. Formation of Platelet Plug

- Platelets adhere to exposed collagen fibers in vessel wall
 - Release ADP, serotonin, and prostaglandins
 - > Recruits more platelets and maintains vasoconstriction
- Activated platelets attract more platelets to damaged area, leading to more activated platelets
 - This is a positive feedback loop
- Forms platelet plug
 - Von Willebrand factor helps stabilize plug and bind it to collagen

Fibrin and Coagulation

- Coagulation involves a cascade of events that allows repair of vessel

- Basis for blood types
- Can also cause transfusion reactions when incompatible blood types are mixed

Erythrocyte Antigens

- Blood types are determined based on the antigens present on the surface of RBCs
- Only three antigens commonly used:
 - Antigen A
 - Antigen B
 - Antigen D (Rh factor)
 - Negative or positive blood type

Antibodies

- Proteins that are made by the immune system
- Designed to bind to foreign antigens the body doesn't recognize
 - Forms antigen-antibody complexes
- Antigen-antibody complexes can initiate transfusion reactions
- Cells agglutinate in response
 - "Stick together"

Transfusion Reactions

- Occurs when incompatible blood types are mixed
- Cells clump together
- Hemolysis of red blood cells can overload kidneys
 - Can lead to kidney failure

ABO Blood Groups

- Based on presence or absence of A antigen and B antigen
 - > Type A—A antigen only
 - > Type B—B antigen only
 - > Type AB—A and B antigens
 - > Type O—neither antigen
- Antibodies produced against antigen(s) not present on a person's red blood cells

Red Blood Cell Type	Type A	Type B	Type AB	Type O
Antibodies in Plasma	Anti-B	Anti-A	None	Anti-A and Anti-B
Antigen in Plasma	Green circle	Red triangle	Green circle, Red triangle	