Hemostasis—Blood Halt

- Blood Clotting Requires
  - Platelets made in the bone marrow (Aspirin inhibits platelets from sticking together)
  - Clotting factors and fibrinogen made in the liver (in hemophilia, Clotting Factor VII is missing)
  - Vitamin K from stores in the liver (coumadin inhibits Vitamin K)
  - adequate blood calcium

1. **Vascular Spasms**: local vasoconstriction occurs immediately to reduce blood loss
2. **Platelet Plug Formation**:
   - Capillary damage activates platelets, causing the platelets to stick to each other (agglutination) and temporarily "plug" the damaged area.
     - Aspirin is a COX-inhibitor. COX is an enzyme necessary for platelet aggregation, so aspirin inhibits platelet aggregation.
   - Platelets are also responsible for clotting factors to work properly.
   - Thrombocytopenia is a lack of platelets.
3. **Coagulation (requires 30 different chemicals!)—**clot forms within ~5 minutes
   - Plasma clotting factors circulate until stimulated to initiate clotting through one of two pathways. The final result is always the same: formation of long strands of **fibrin** that act as a net to catch RBCs and stop blood loss.
     - **Intrinsic**: slower process, usually occurs due to venous stasis
     - **Extrinsic**: faster process, thanks to activation of tissue factor; usually more severe injury.
     - **Common Pathway**: After the intrinsic or extrinsic pathway, the last few steps are always the same:
       - **Factor X** activates **prothrombin activator**
       - **Prothrombin activator** converts **prothrombin to thrombin**
       - **Thrombin** converts **fibrinogen** to **fibrin**
4. **Lysis of clot**: Due to anticoagulants such as heparin. Fibrinolysis is the process by which plasmin degrades a clot. Excessive fibrinolysis can lead to bleeding diseases. TPA is sometimes used to bust clots during a stroke.

- Blood clotting can occur inappropriately when people are sendentary for too long.
- Blood that is not flowing well is more likely to form clots.
- Clots formed from venous stasis usually occur in the lower legs.
- These clots can break free, pass through the heart, and then get clogged in the pulmonary circulation.
  - Deep Vein Thrombosis may lead to a Pulmonary Embolism (PE).