Hemostasis

What is it?
- stoppage of bleeding
- fast, localized and carefully controlled
- 4 components
  1. platelets
  2. clotting factors
  3. fibrin
  4. other cells - RBC & WBC
- 3 steps
  1. vascular spasm
  2. platelet plug formation
  3. coagulation

1. MATA: Hemostasis involves
   A. platelet plug formation
   B. coagulation
   C. vascular spasm
   D. arterial dilation

Vascular Spasm
- direct injury, chemical release, and pain receptor reflexes trigger smooth muscles in blood vessels to constrict
- helps limit blood loss
- lasts 20-30 minutes allowing time for a platelet plug to form

2. Platelet plug formation operates under positive feedback. When platelets stick together they release nitric oxide and PGI₂, which cause more platelets to stick together and release their chemicals.
   True
   False

Platelet Plug Formation
- in damaged tissue, platelets aggregate (stick together) to form a plug that seals off the broken blood vessel
- in undamaged tissue, platelets are prevented from sticking together by nitric oxide and prostacyclin (PGI₂, a chemical messenger)
- as platelets stick together, they swell and release ADP, serotonin, and thromboxane A₂ which cause more platelets to aggregate and release their chemicals, a positive feedback cycle
Hemostasis

3. The first step in hemostasis is
   A. platelet plug formation
   B. coagulation
   C. vascular spasm
   D. arterial dilation

4. What ultimately needs to happen for complete coagulation to occur?
   A. fibrinogen must turn into fibrin
   B. prothrombin must create thrombin
   C. prothrombin activator must be produced
   D. both intrinsic and extrinsic pathways must work together

Coagulation

- formation of a blood clot
- complex process that requires 13 clotting factors (CF I-XIII)
- procoagulants - promote clotting (CFs)
- anticoagulants - inhibit/prevent clotting
- to coagulate clotting factors turn fibrinogen (dissolved in plasma) into fibrin (long, hair-like strands)
- requires Ca\(^{2+}\) and prothrombin activator

Coagulation Phases

- Phase 1 - Two pathways to prothrombin activator
  - intrinsic - requires CFs within blood
  - extrinsic - requires tissue factor (TF) found outside blood
- Phase 2 - Common pathway to thrombin
  - in the presence of Ca\(^{2+}\), prothrombin activator turns prothrombin into thrombin (enzyme)
- Phase 3 - Common pathway to fibrin mesh
  - thrombin catalyzes reactions that cut fibrinogen into fibrin
  - fibrin glue platelets and forms a web around the platelets (this is called a clot)
- fibrinolysis - breaks up clots after blood vessel has healed
  - plasmin - “clot-busting” enzyme stored in plasma as plasminogen (inactive)

Hemostasis

5. MATA: Coagulation requires
   A. CFs I-XIII
   B. fibrin
   C. Ca\(^{2+}\)
   D. prothrombin activator