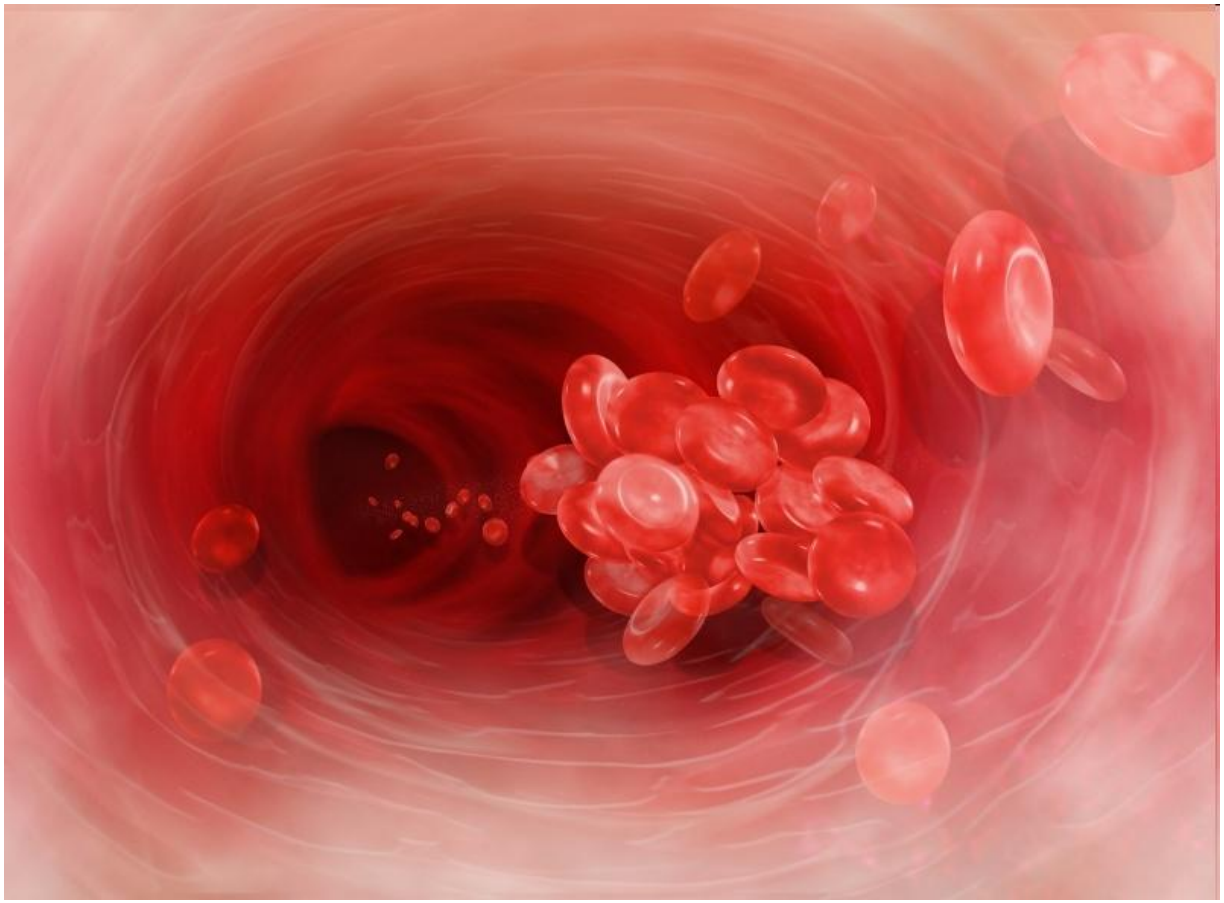
Blood Clotting Notes



I . Hemostasis

1. Hemostasis- the stoppage of bleeding; 3 step process

A. Blood vessel spasm

1. cutting or breaking of blood vessels simulates smooth muscle contraction (vasospasm)
2. may last only a few minutes; effect can last up to 30 minutes
3. serotonin- a hormone that can further contract smooth muscle

B. Platelet plug formation

1. platelets in plasm adhere to broken vessel and to each other
2. will help with small breaks only (see fig. 10.6 pg.337)

C. Blood coagulation

1. Coagulation- most effective hemostatic mechanism (forms blood clot)
2. coagulation depends on clotting factors that promote and/or inhibit clotting
3. sequence has many steps beginning when platelets encounter a broken vessel (a cut)

a. damaged tissue releases thromboplastin which produces prothrombin activator (ca+2 ions must be present)

b. prothrombin- alpha globulin that turns to thrombin in the presence of ca+2 ions

PROTHROMBIN → THROMBIN

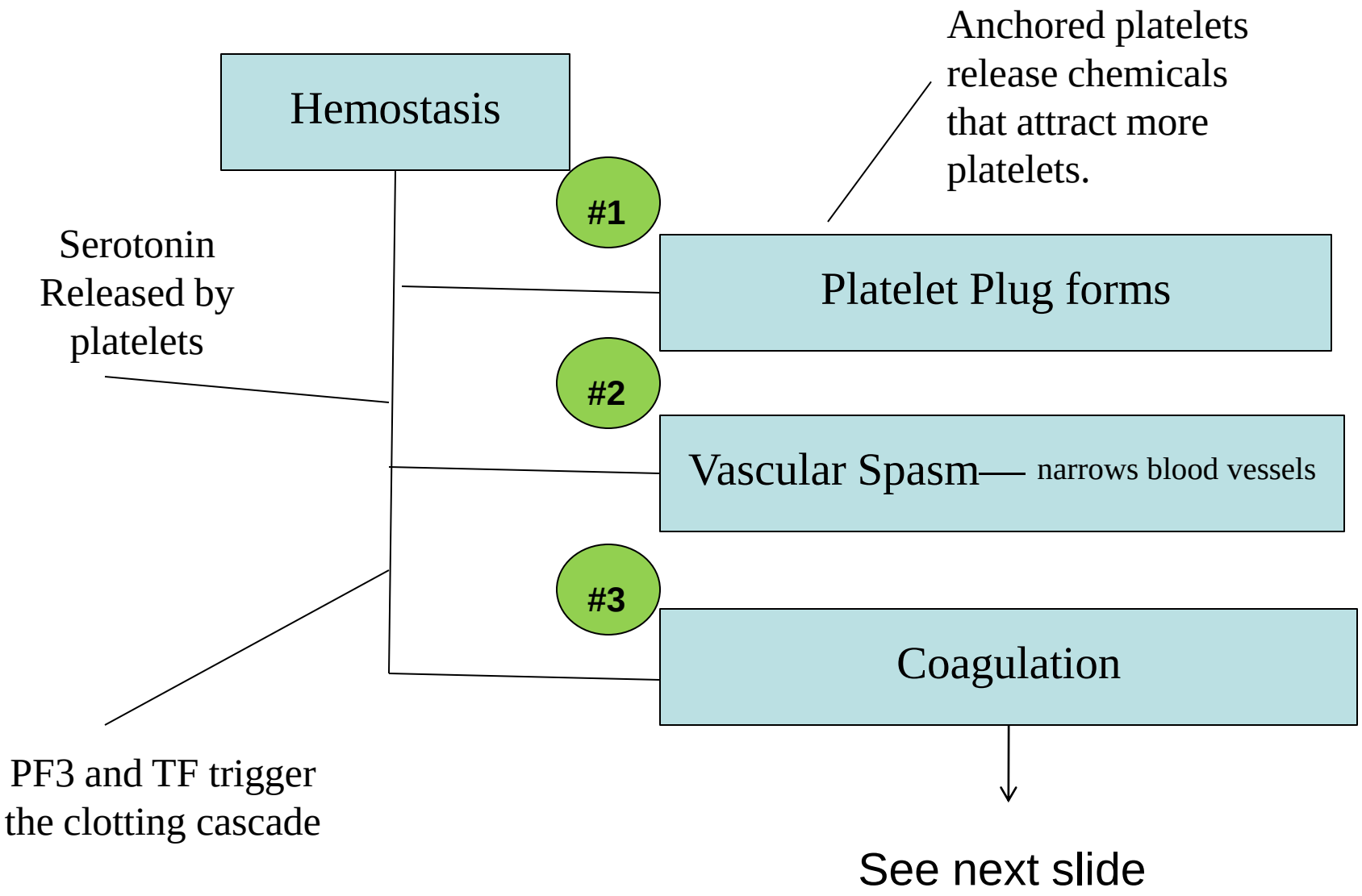
c. formation of fibrin; thrombin catalyzes fibrinogen into thread-like fragments

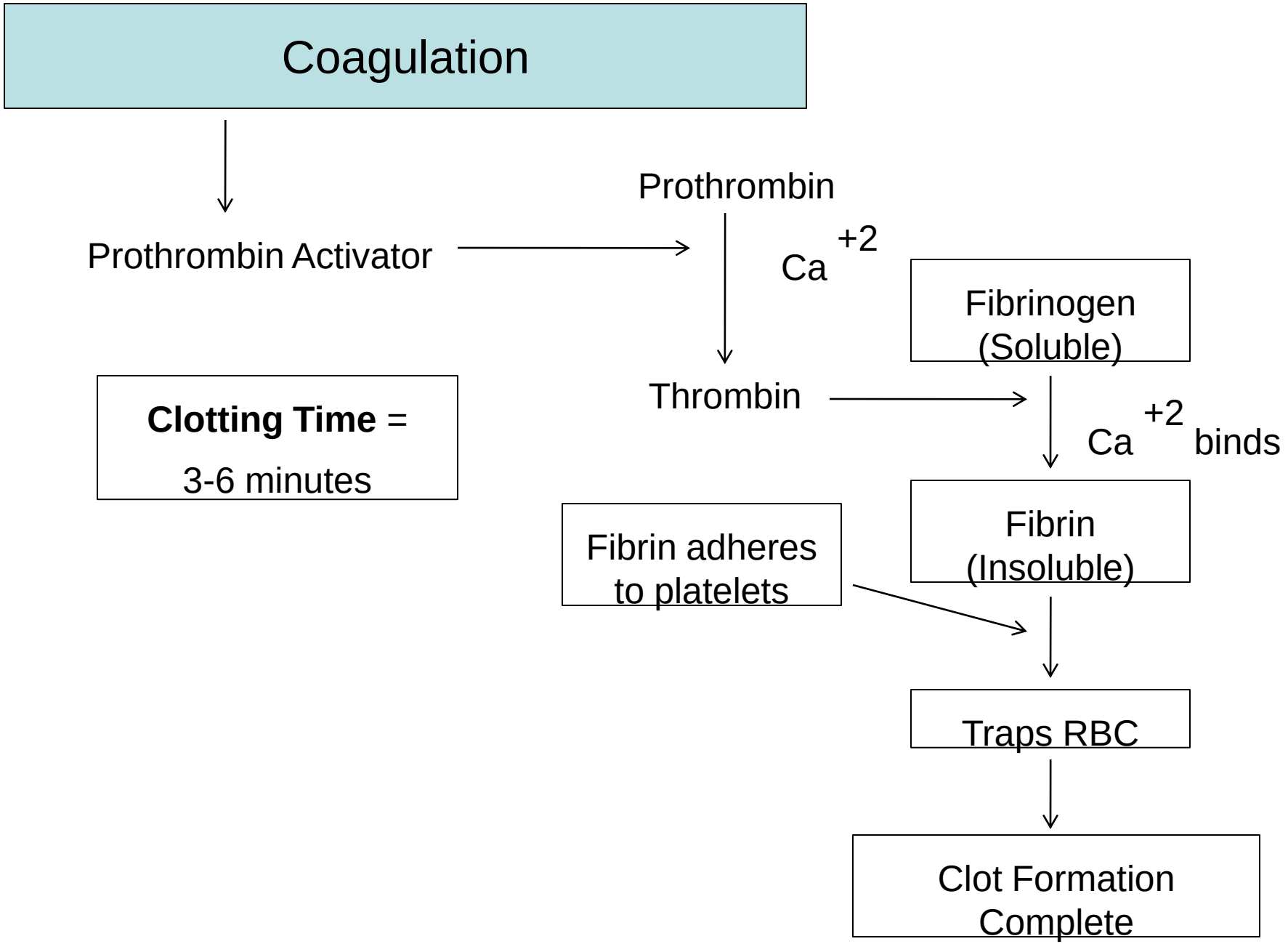
FIBRINOGEN → FIBRIN

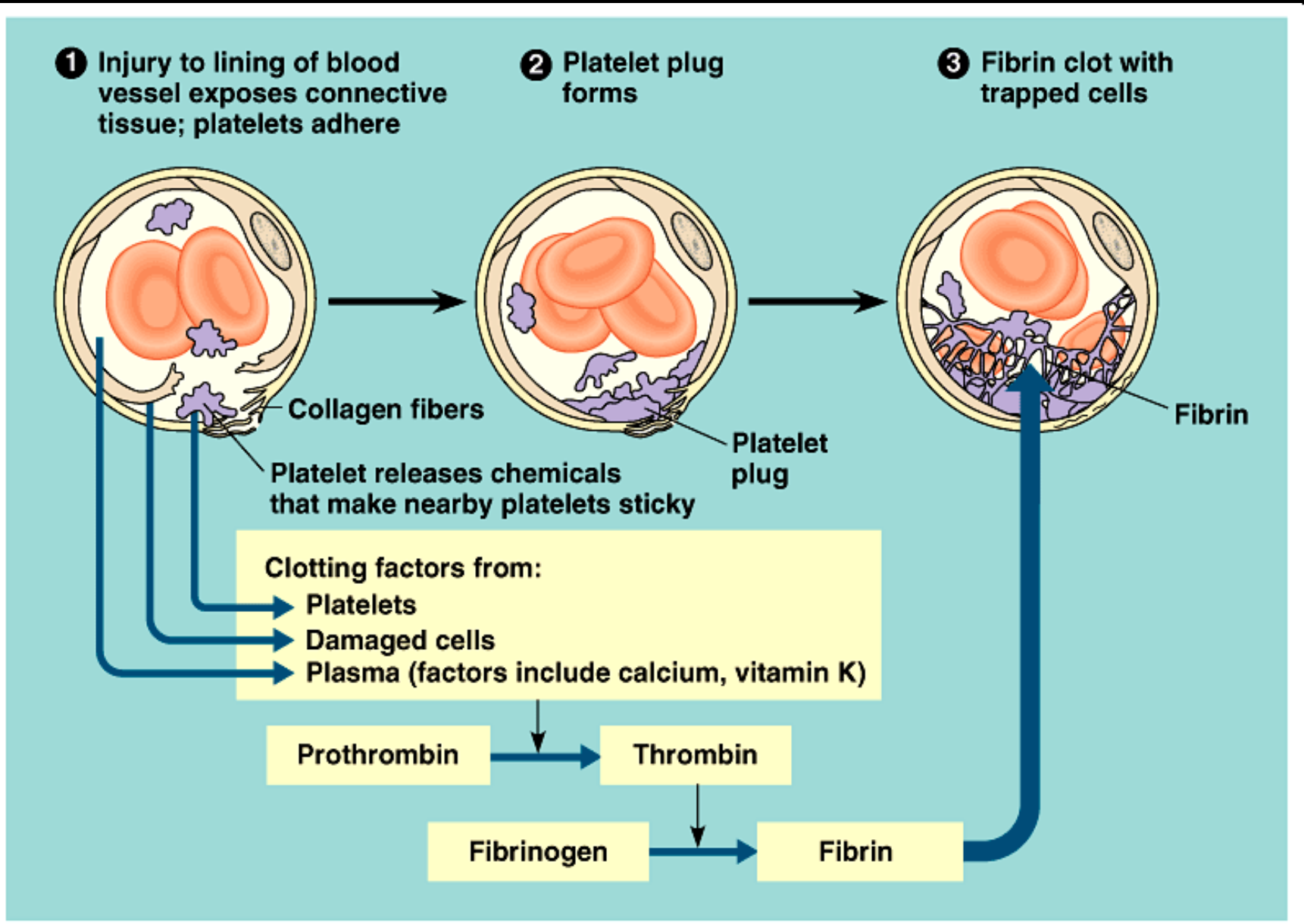
d. fibrin threads stick to exposed surfaces of damaged blood vessels; entraps RBC's and Platelets (blood clot)

e. prothrombin activator in blood is directly proportional to the amount of tissue damage; tissue damage continues to stimulate production

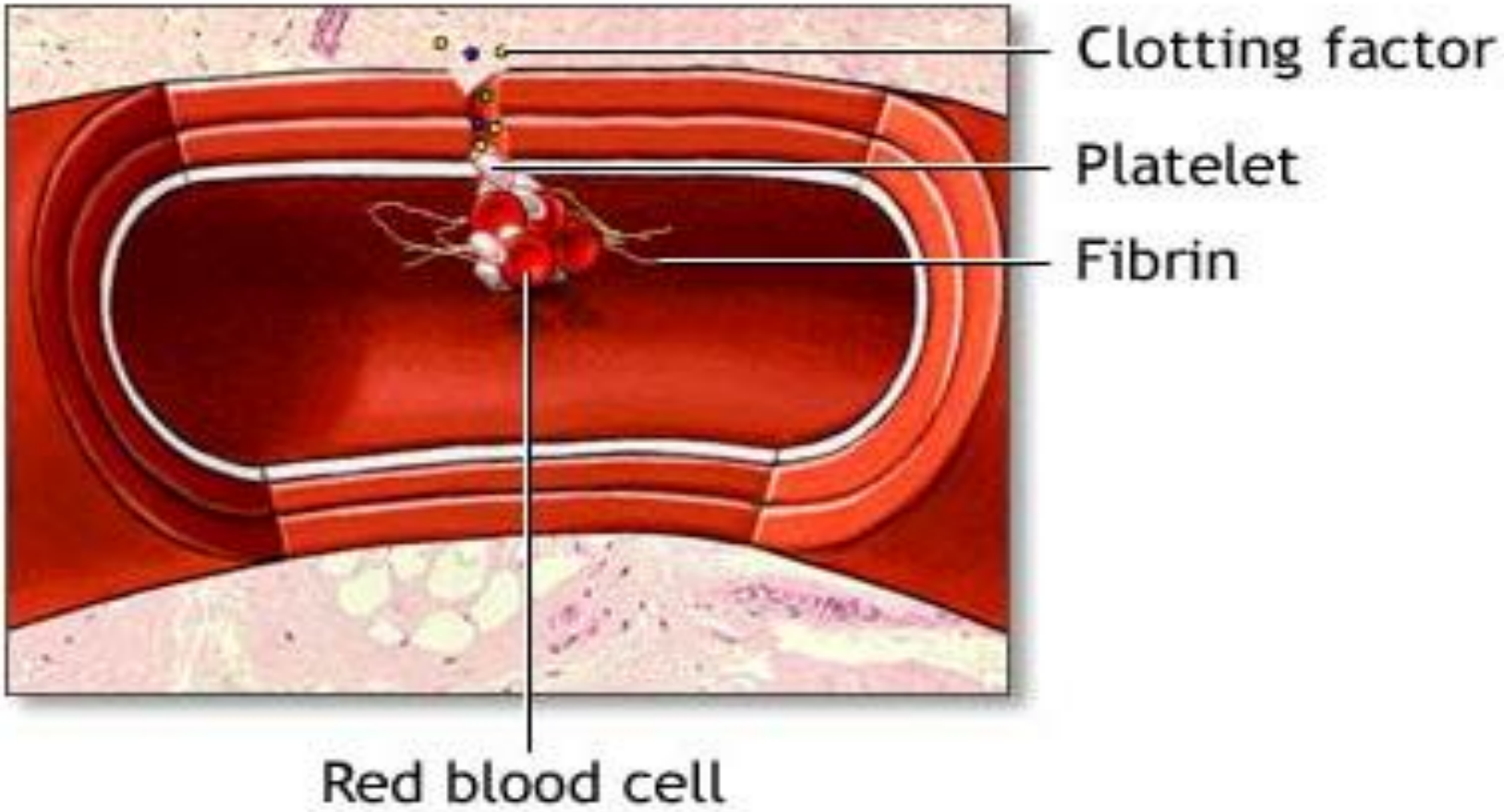
f. clotting ceases where blood is moving quickly (prevents clots in blood stream)


Hemostasis
#1
Anchored platelets release chemicals that attract more platelets.
Platelet Plug forms
Serotonin Released by platelets
#2
Vascular Spasm— narrows blood vessels
#3
Coagulation
PF3 and TF trigger the clotting cascade
See next slide


Coagulation
Prothrombin Activator
Prothrombin
Ca +2
Thrombin
Fibrinogen (Soluble)
Ca +2 binds
Fibrin (Insoluble)
Fibrin adheres to platelets
Traps RBC
Clot Formation Complete
Clotting Time =
3-6 minutes



Blood clot formation



Phlebitis : inflammation of the wall of a vein

(1) Injured tissue + Platelets ⟶ Thromboplastin is formed
(from blood plasma)

(2) Prothrombin (Soluble protein in plasma) $\xrightarrow[Ca^{++}]{\text{Thromboplastin}}$ Thrombin (An active enzyme)

(3) Fibrinogen (Soluble protein from plasma) $\xrightarrow{\text{Thrombin}}$ Fibrin (Insoluble protein which forms a mesh of fibres)

(4) Fibrin (A thick mass of fibres) + Red blood corpules ⟶ Blood clot (RBCs entangled in fibrin)