



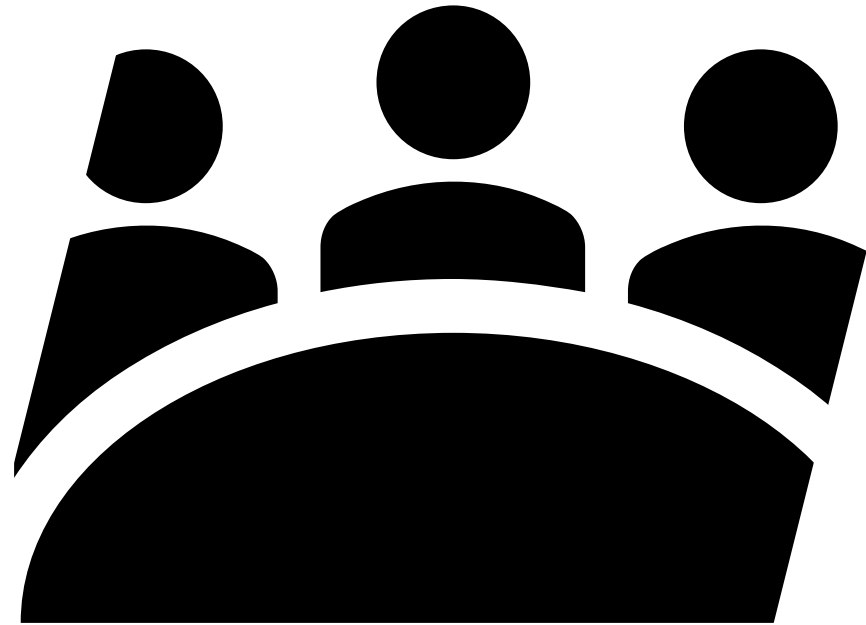
WHEN IS BLEEDING TOO MUCH? UNDERSTANDING COAGULATION & HOW TO HELP

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UL Hemophilia Treatment Center

DISCLOSURES

SANOFI

PFIZER





AGENDA

Primary & Secondary Hemostasis

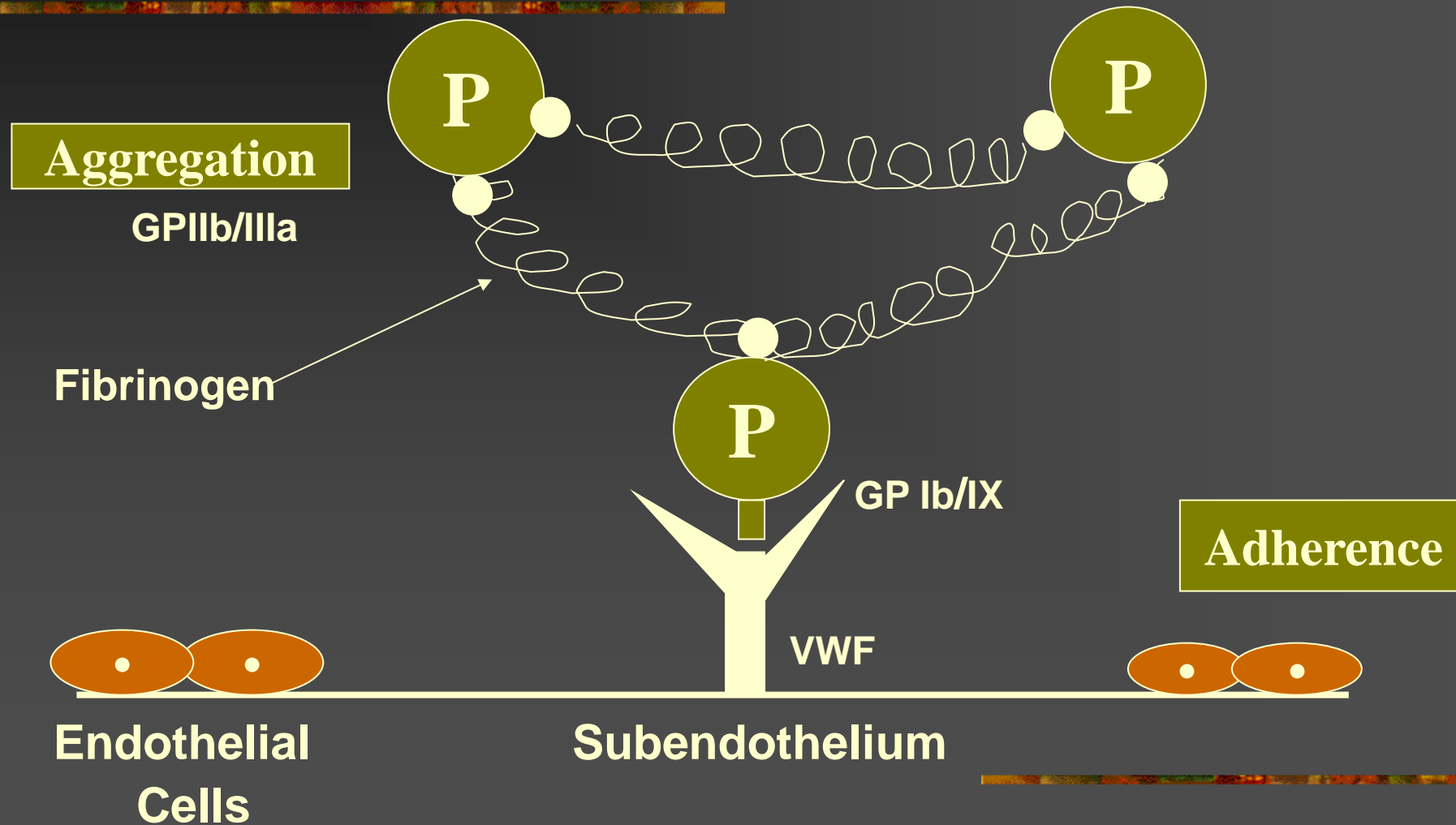
Coagulation Cascade

Normal vs Abnormal bleeding

Final Tips & Takeaways



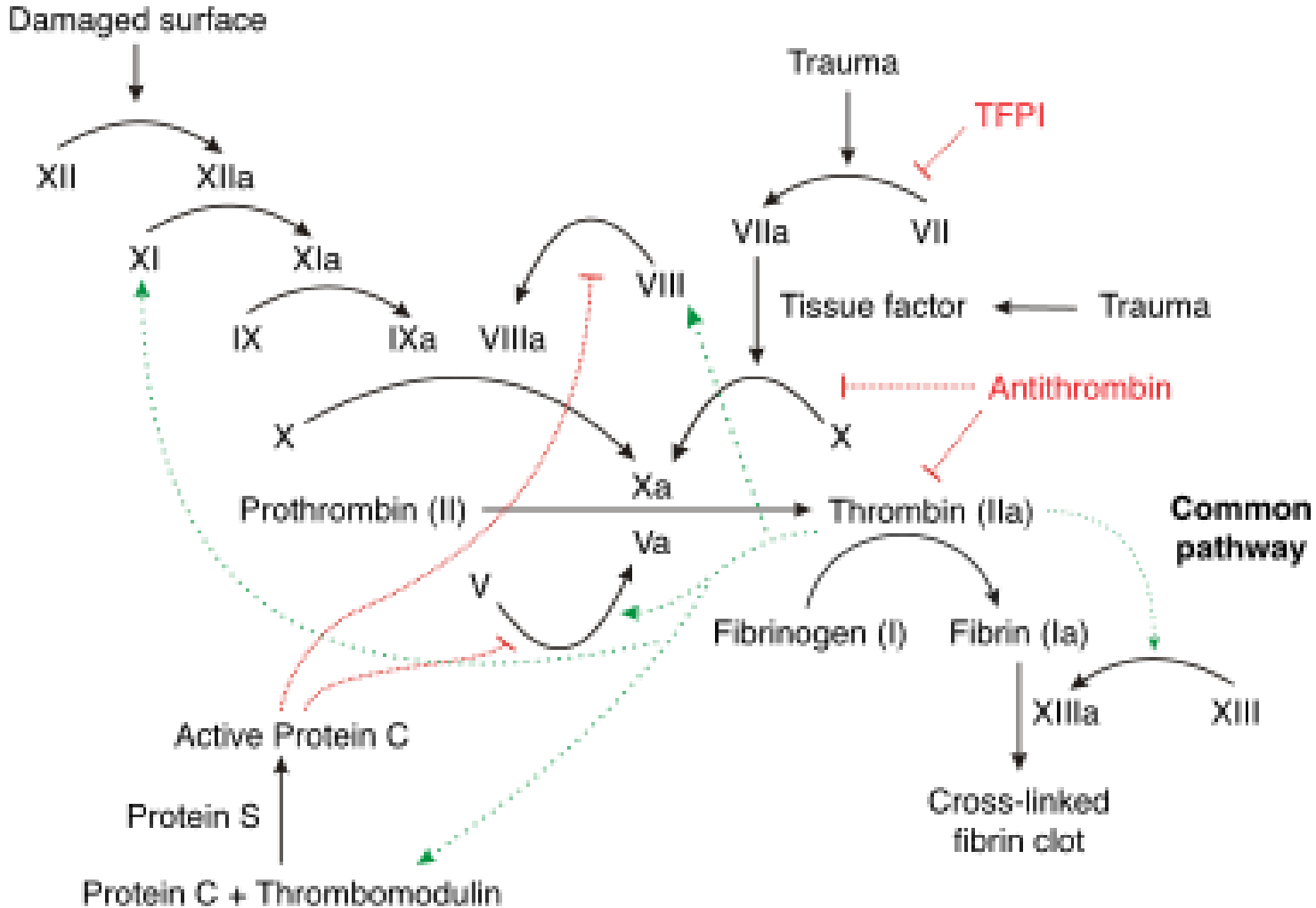
Primary Hemostasis: Role of Platelets



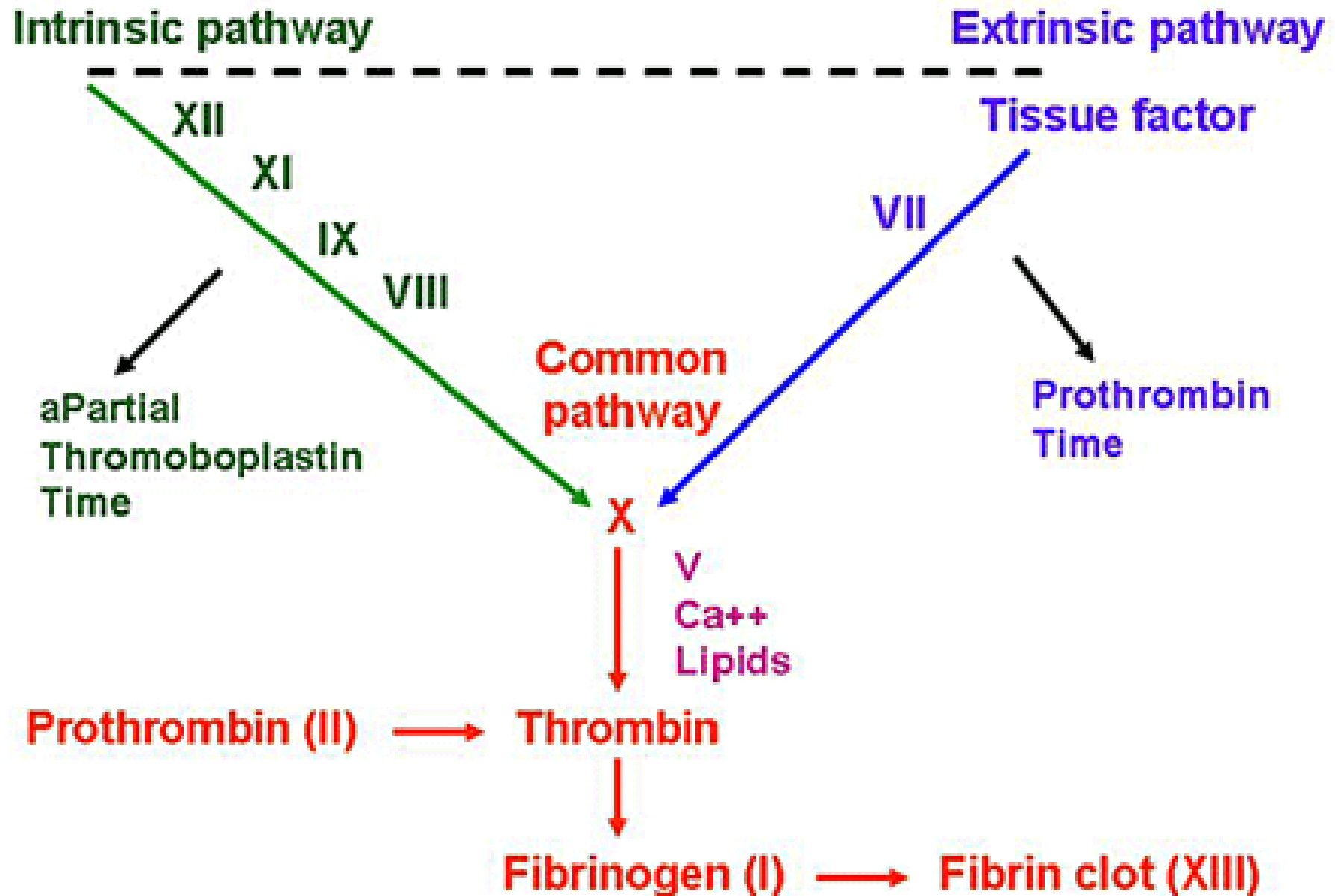
COAGULATION CASCADE

**Contact activation
(intrinsic) pathway**

**Tissue factor
(extrinsic) pathway**



Coagulation Cascade



Intrinsic (In the House)

The PTT Pathway

Extrinsic (Exterior to House)

The PT Pathway

*Rather than thinking about the intrinsic and the extrinsic pathways,
think about the PTT and the PT pathways*



The PTT Pathway

Twelve

Eleven

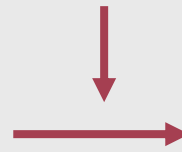
Nine

Eight

Ten



Prothrombin (II)



Thrombin

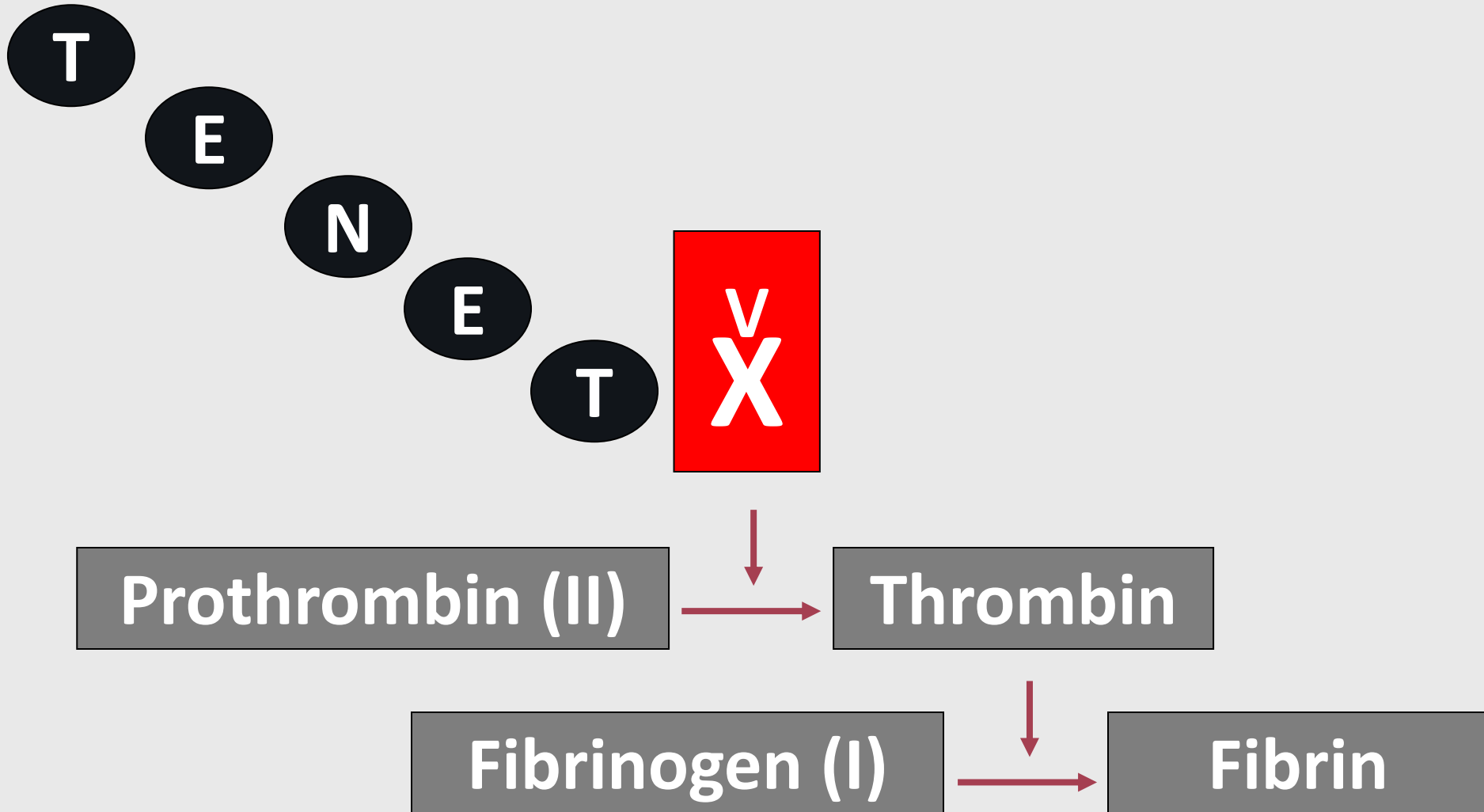
Fibrinogen (I)



Fibrin

The PTT Pathway

The PTT factors are TENETs and live "In" the house. . .





PT has one less letter than PTT, and PT values are shorter than PTT values, because the pathway is shorter.

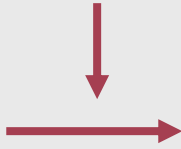
The PT Pathway

7



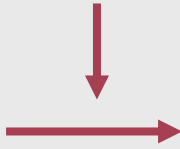
The PT pathway allows lucky factor 7 to play outside the house

Prothrombin (II)



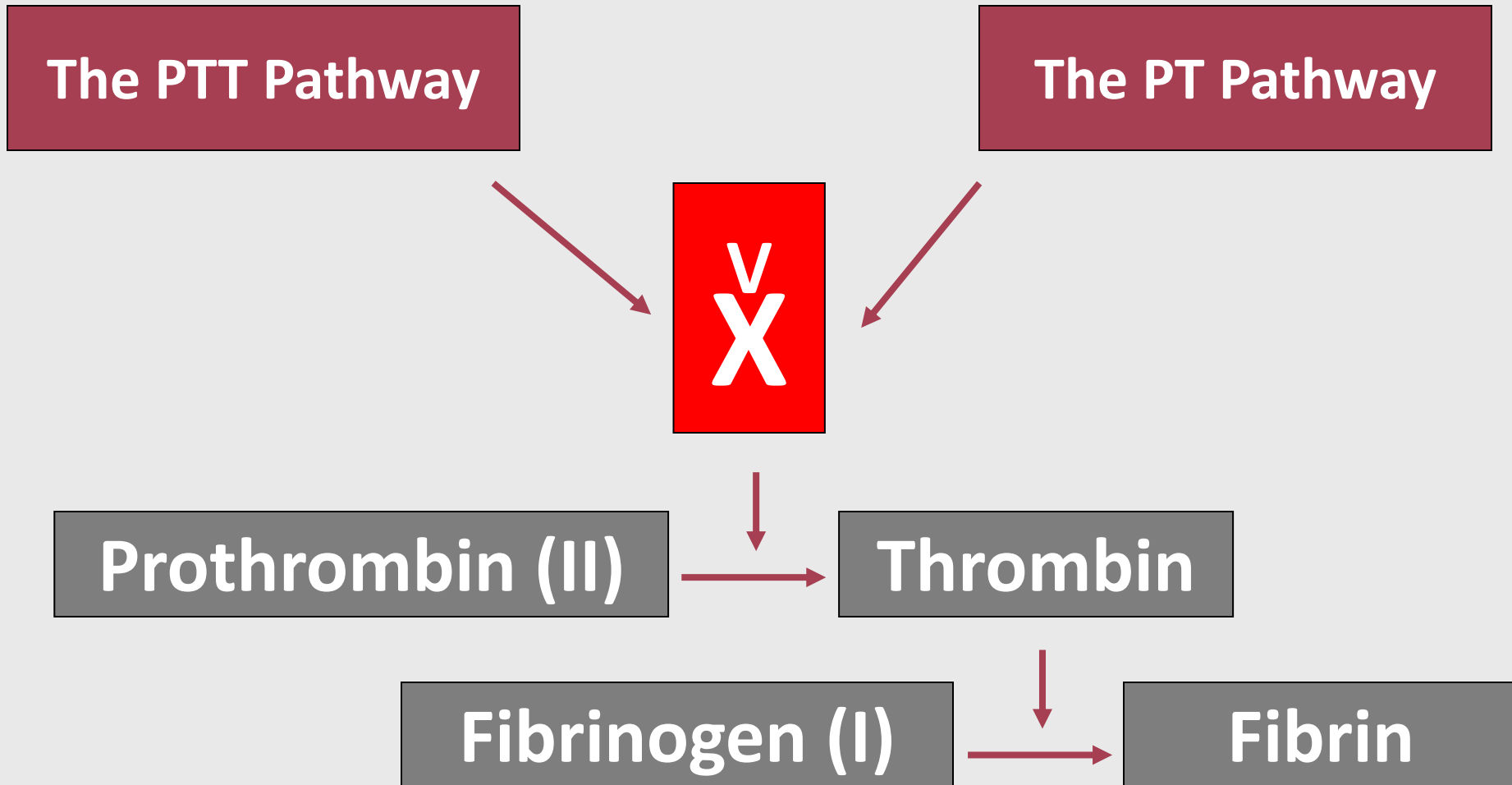
Thrombin

Fibrinogen (I)



Fibrin

THIS IS THE COMMON PATHWAY



THE COMMON PATHWAY = SMALL BILLS



V + X



II = prothrombin

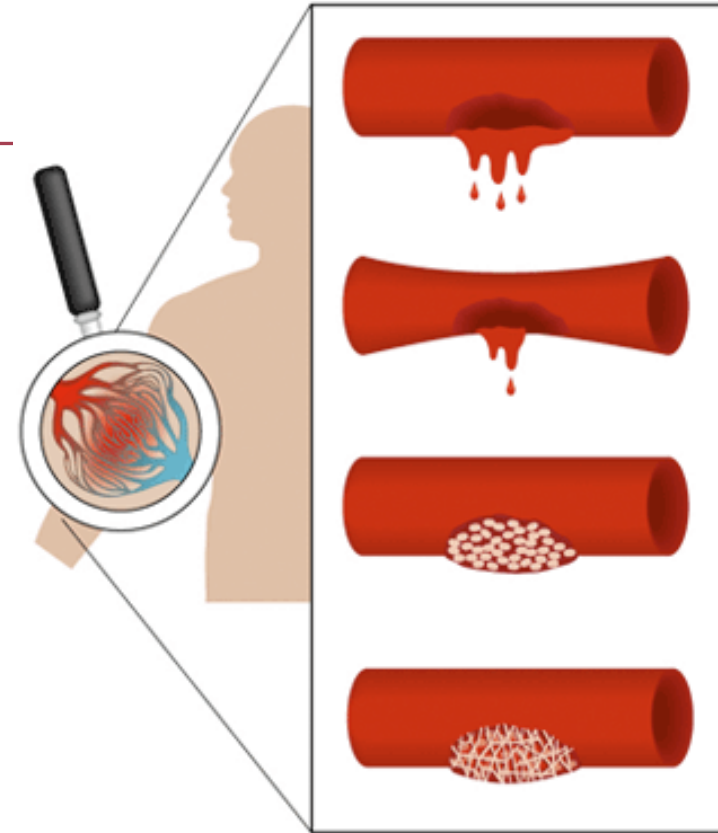


I = fibrinogen

You can remember the factors in the common pathway by remembering the bills in your wallet smaller than a \$20.
Don't forget the \$2 bill!

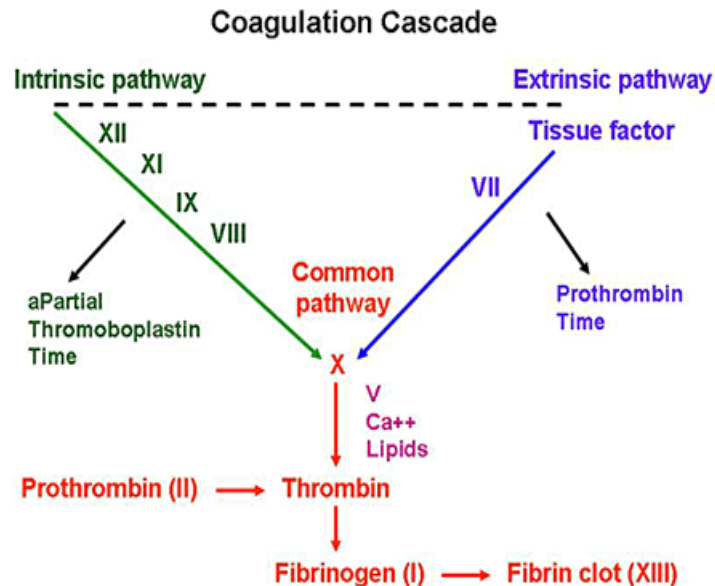
BLEEDING AND HEMOSTASIS

- Vasoconstriction
- Platelet plug formation
- Coagulation factors
- Clot stabilization
- Fibrinolysis



CASES

- Tongue laceration following a fall, with persistent bleeding.
- Initial coagulation studies showed
 - Platelet count 270 (150-450)
 - PT 13.9 sec (11-14)
 - aPTT 52.2 sec (22-32)



- Third episode of epistaxis in a week lasting about 30 minutes each time.
- Initial coagulation studies showed
 - Platelet count 300 (150-450)
 - PT 18 sec (11-14)
 - aPTT 31.4 sec (22-32)
- Menorrhagia since menarche not controlled with OCPs.
- Initial coagulation studies showed
 - Platelet count 540 (150-450)
 - PT 12 sec (11-14)
 - aPTT 32 sec (22-32)

BLEEDING WHERE?



- Bruising (significant)
- Cephalohematoma
- Intracranial hemorrhage
- Circumcision bleeding
- Prolonged mouth bleeding/dental extractions
- Epitaxis
- Menorrhagia
- Joint/muscle bleeding
- Prolonged bleeding with trauma/surgery

WHEN IS IT TOO MUCH?

Bruising greater than quarter size

Menstrual bleeding soaking a pad or tampon in 2 hours or less

Epitaxis lasting longer than 20 mins and/or frequently repeated

Dental extraction bleeding longer than 2-3 hours

Recurrent iron deficiency anemia

CONSEQUENCES OF RECURRENT BLEEDING

- Life threatening bleeding
 - Intracranial hemorrhage
 - Neck – airway
 - Abdomen – significant blood loss
- Compartment Syndrome
- Anemia
- Death
- Target joints
 - Synovitis
 - Osteochondral degeneration
 - Arthropathy
- Acute and chronic pain
- Missed school and work
- Poor quality of life

IS THIS PERSON A BLEEDER?



First Question: Family History of Bleeding?

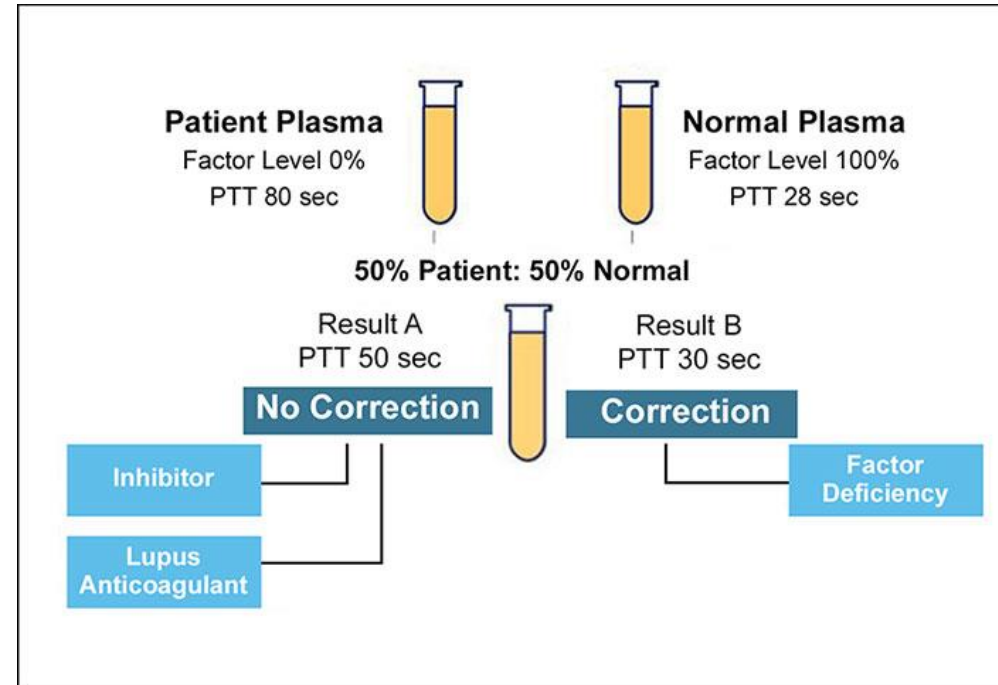
LAB TESTING

-
- PT/PTT
 - CBC
 - CMP
 - PFA
 - Fe studies



LAB TESTING

- Specific factor assays
 - Factor VIII, IX
- Check von Willebrand antigen/activity
- Mixing Studies
 - Correction = factor deficiency



CASES

Hispanic male; 2 y.o.

Unknown family history of bleeding

Fell on concrete and has flesh wound that keeps oozing blood for past two days

PT: 20 (11-14)

PTT: 32 (22-32)

Platelets: 210

CBC: WNL

What Next?

- Factor VII
- Factor X
- Factor V

CASES

Adolescent girl; 13 y.o.

Mother with HMB

Menarche at 12 y.o.; periods increasingly worse over last 6 months.

PT: 12.6 (11-14)

PTT: 22 (22-32)

Platelets: 280

Hgb 9.8

Fe Saturation 8%

Ferritin 20

What Next?

- PFA
- Factor IX
- Von Willebrand Panel
 - Factor VIII
 - vW antigen
 - vW activity

CASES

Male, 57 y.o.

No known family history of bleeding

Patient played sports in high school

Presents to your office today with large area of dark bruising to right arm from fall sustained yesterday.

PT: 13 (11-14)

PTT: 108 (22-32)

Platelets: 210

Hgb: 10.4

What Next?

- Factor VIII
- Factor IX
- vW Panel
- Mixing Study
- Inhibitor Assay



FINAL TIPS & TAKEAWAYS

- Practice your basic coagulation cascade knowledge. It will be helpful in a variety of patient cases.
- When abnormal bruising or bleeding is identified, do baseline testing (PT/PTT, platelets, PFA, coagulation factors as appropriate).
- Give the patient's story of bleeding as much weight as the lab values received.
- Call or Refer to the ULP Hemophilia Treatment Center – We will help you!

502.210.4301



THANK YOU

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