



Sample Cover Slide

Bleeding and Cancer Care

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SCHOOL OF
MEDICINE

Conflicts

- Advisory Board
 - 2023 Pfizer
- Royalties
 - UpToDate



Factors contributing to Bleeding



Patient

- Sources of bleeding, ie PUD, aneurysms
- Factors worsening bleeding, ie VWD, ETOH, NSAIDs, prior TCP



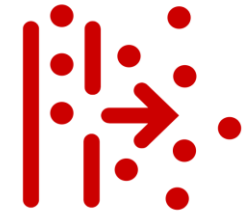
Tumor

- Certain tumors are more prone to bleed,
- Acute leukemias lead to TCP
- GI/GU tumors bleed more with DOACs



Therapy

- Chemo, XRT, immunotherapy
- Anticoagulation for thrombosis

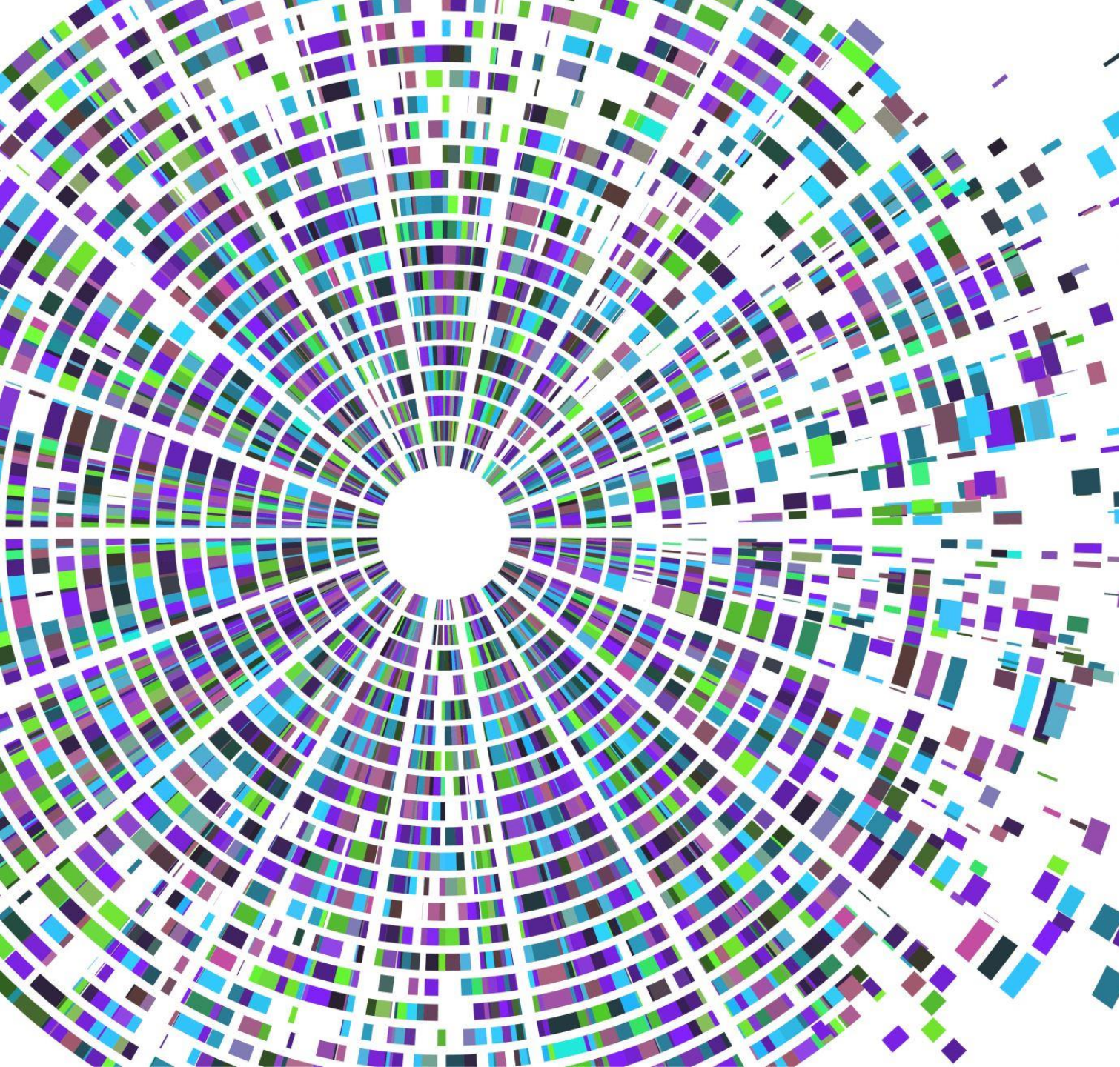


Environment

- Socioeconomic factors
- Home
- Insurance

Assessing Bleeding

- History is the most important feature
 - ISTH BAT Score
 - Epistaxis
 - Gum bleeding
 - Bleeding with tooth extraction
 - Bleeding with minor wounds
 - Bruising
 - Menorrhagia
 - Pay attention to surgical details
 - Family history
 - Medications and supplements
 - Timing of bleeding—early or delayed
- Postpartum hemorrhage
Surgical Bleeding
GI Bleeding
GU bleeding
CNS bleeding
other bleeding



Testing Hemostasis

Steps in Hemostasis

Vessel Spasm

Platelet adhesion and aggregation

Primary Hemostasis

Formation of an insoluble fibrin clot

Secondary Hemostasis

Clot dissolution

Fibrinolysis

Tests of Hemostasis

	Screening tests	Secondary tests
Primary Hemostasis	Bleeding time, PFA-100	VWF assays, platelet aggregation
Secondary Hemostasis	PT/PTT	Factor assays
Fibrinolysis	?TEG, Euglobulin lysis time	alpha2-plasmin, PAI-1

Obligatory confusing coagulation figure

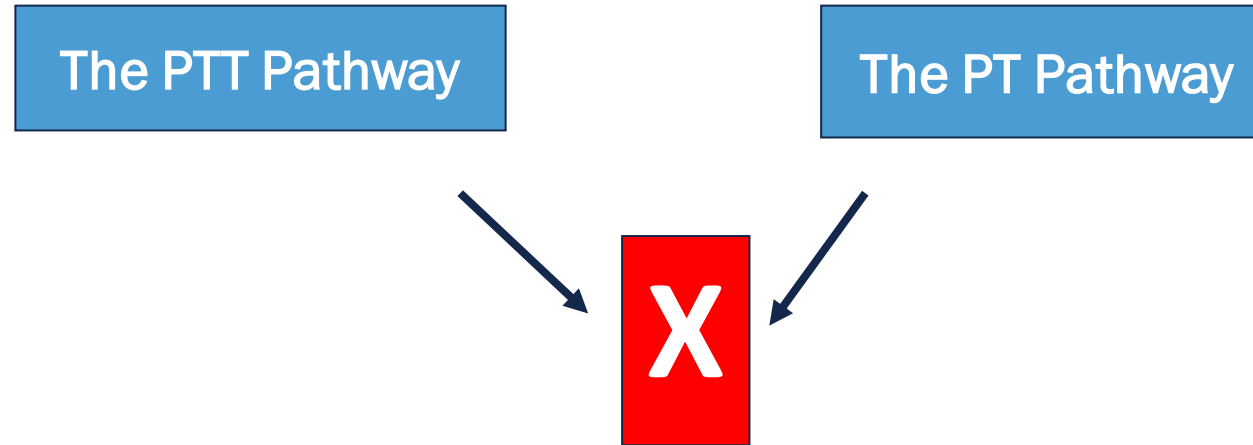


Coagulation Made Easy

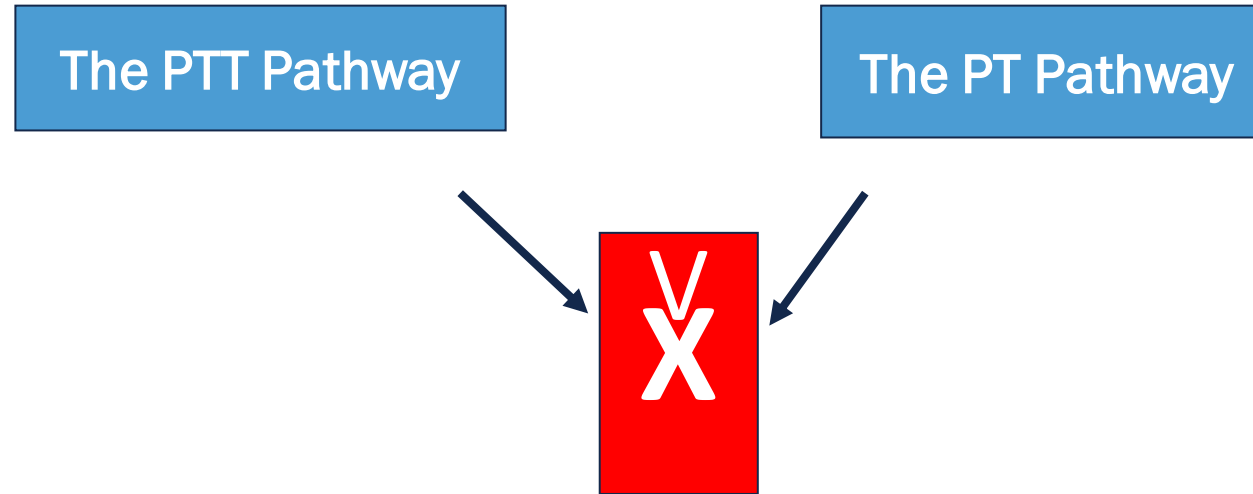
The PTT Pathway

The PT Pathway

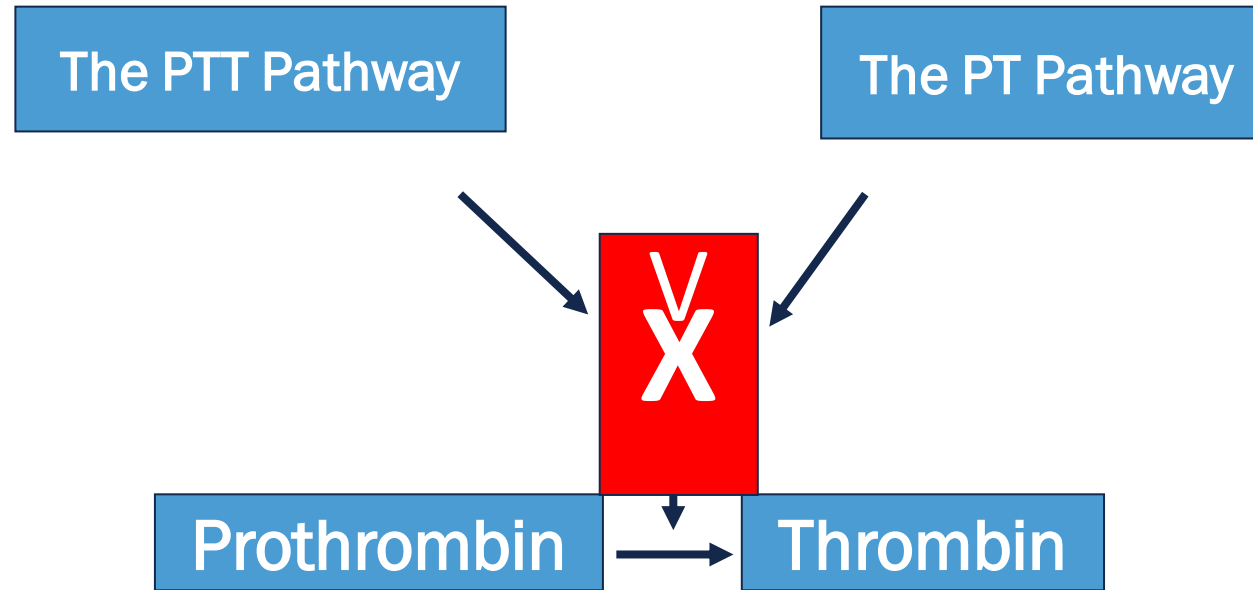
Coagulation Made Easy



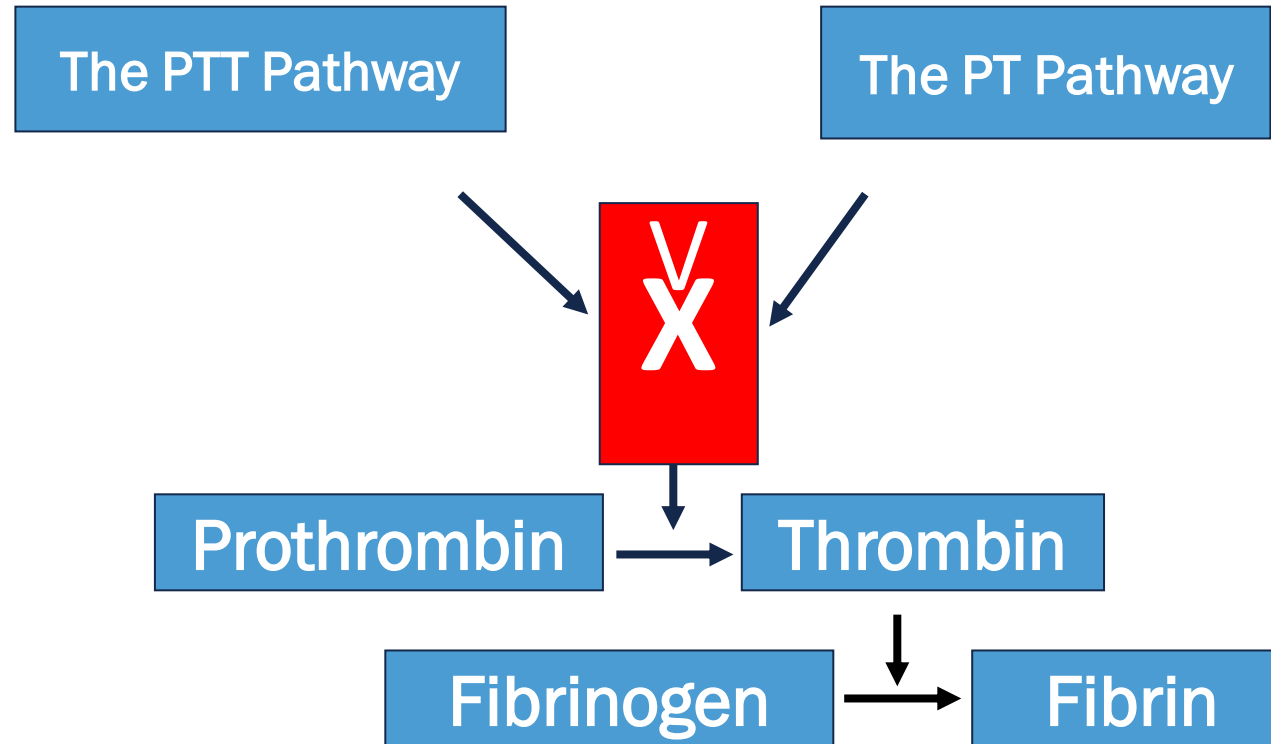
Coagulation Made Easy



Coagulation Made Easy



Coagulation Made Easy



The Common Pathway Factors



Factor X



Factor V

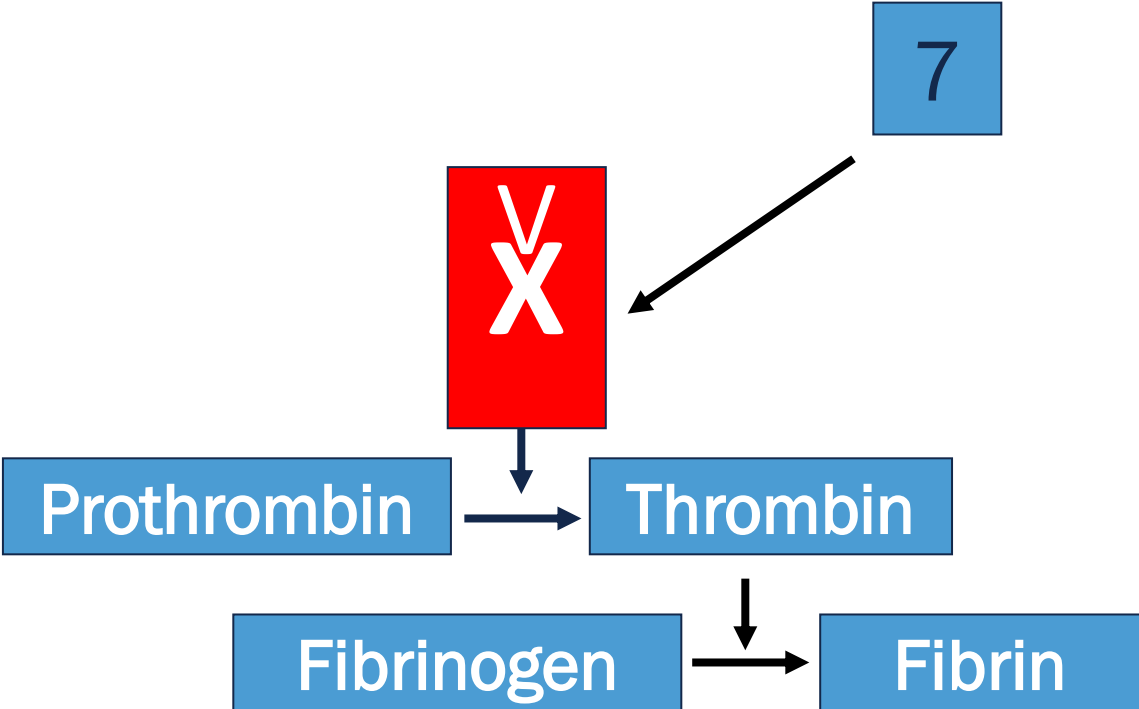


Factor II
(Prothrombin)

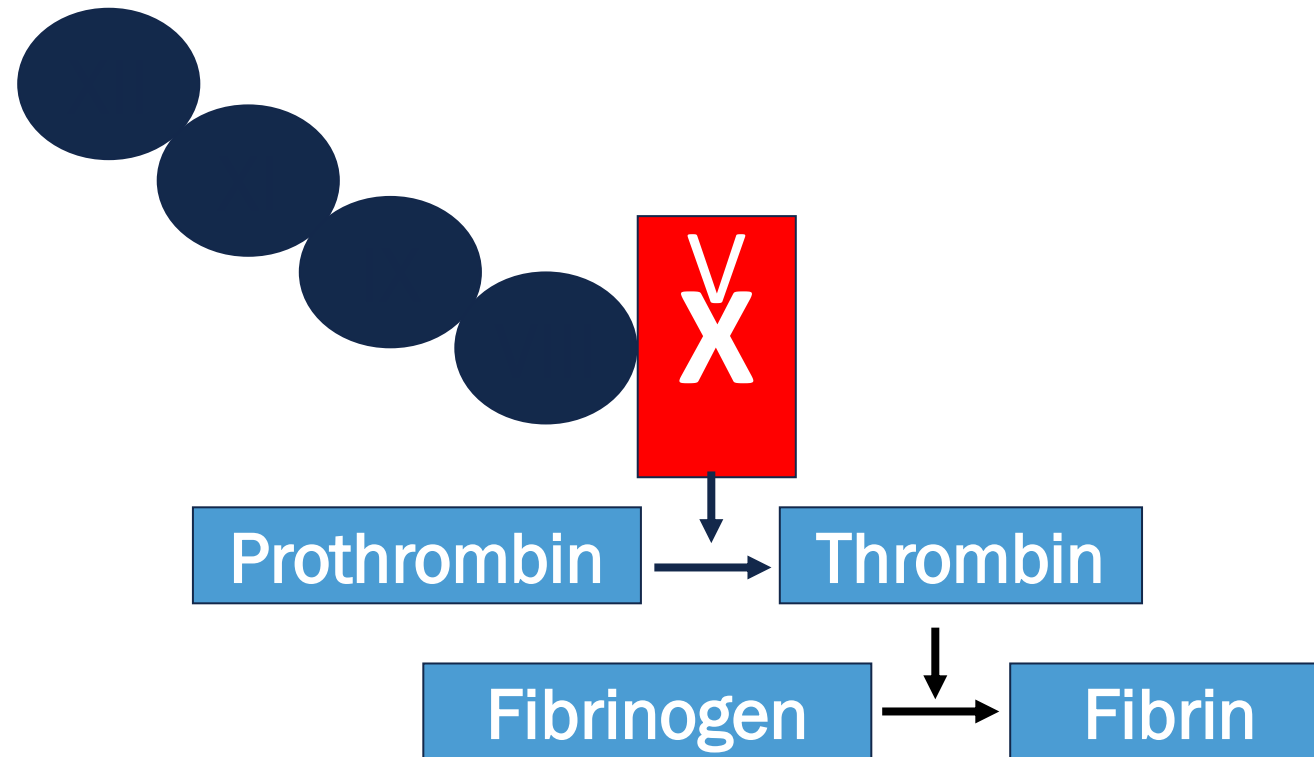


Factor I (Fibrinogen)

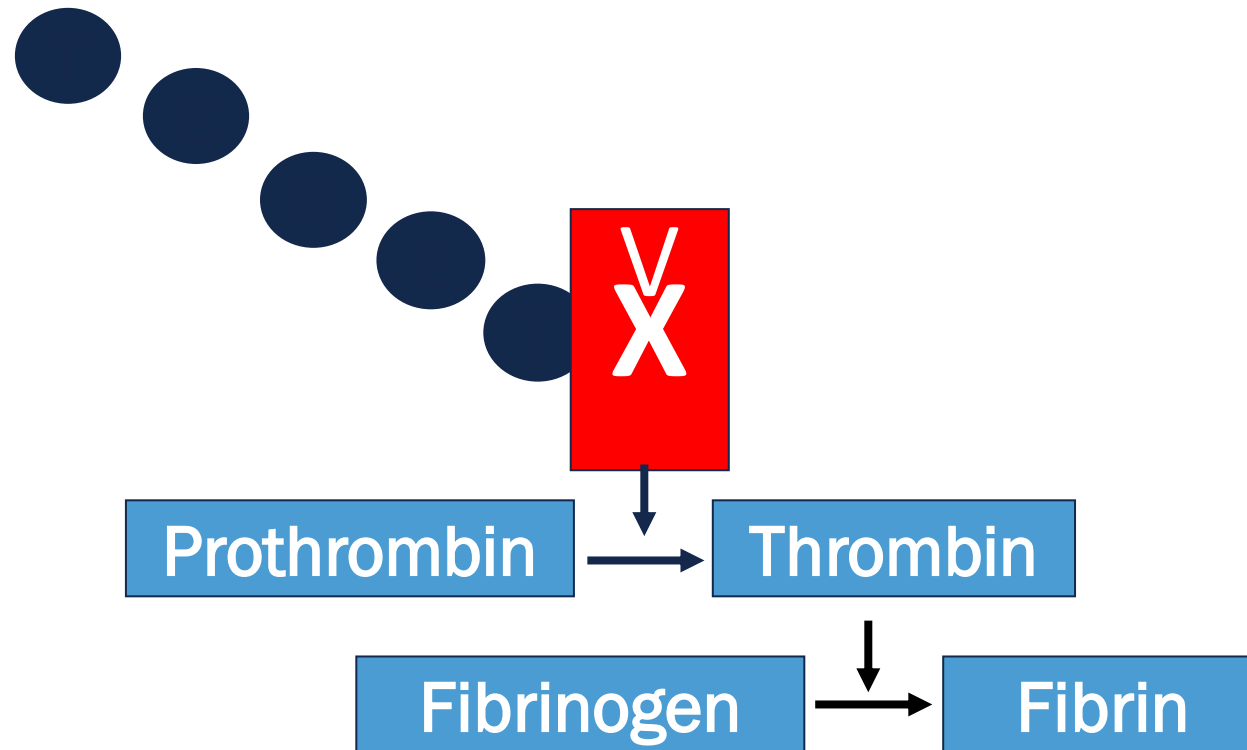
Coagulation Made Easy—the PT



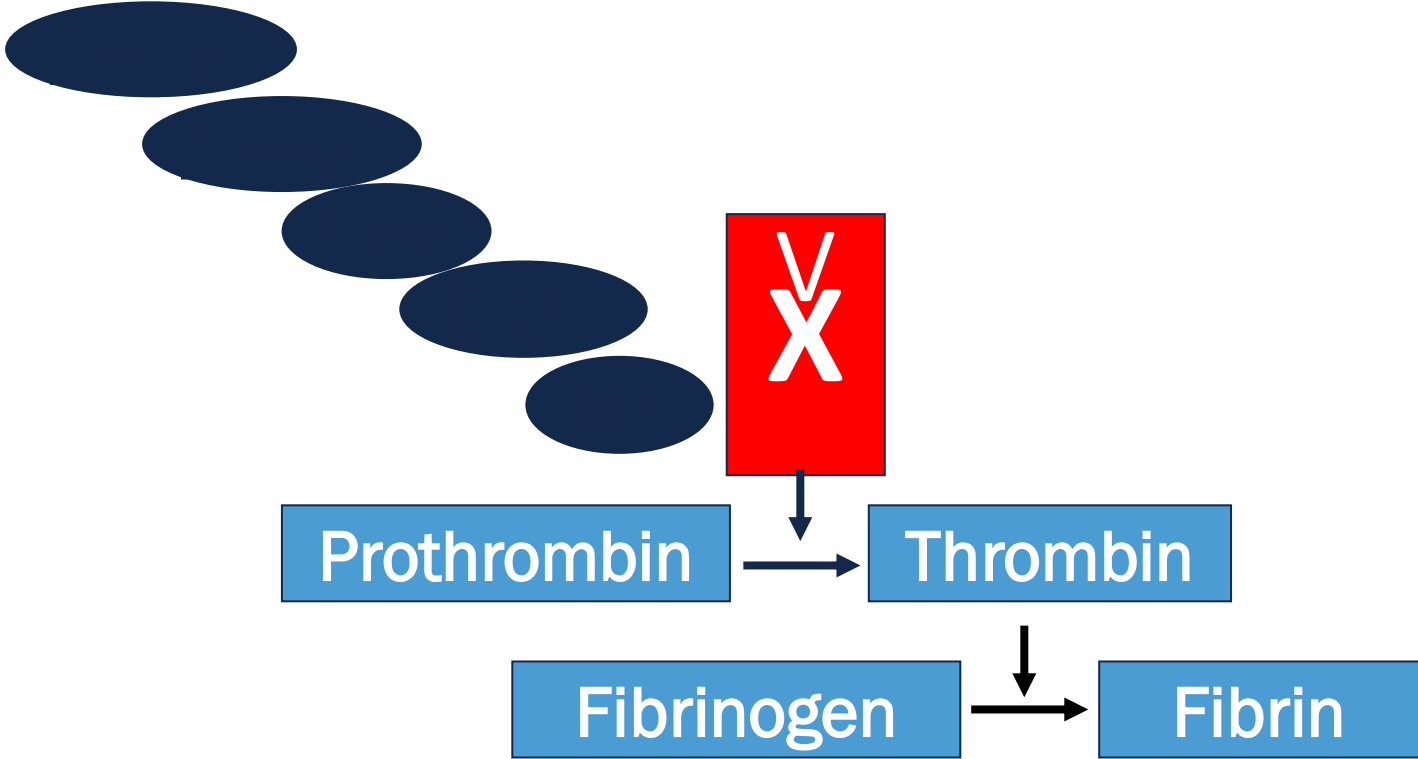
Coagulation Made Easy—the aPTT



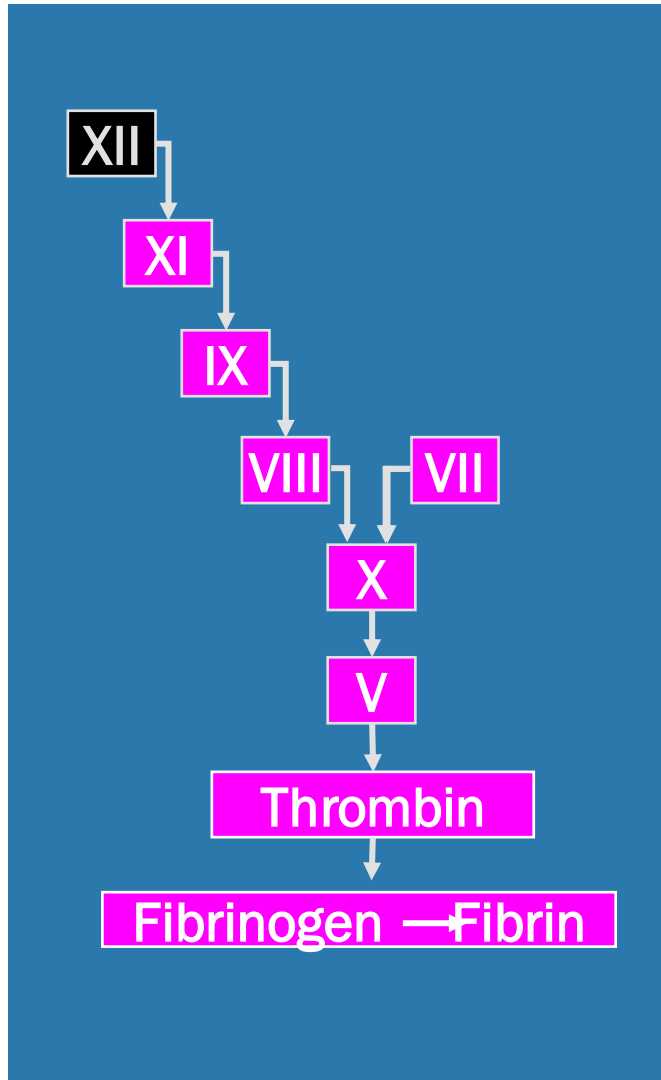
Coagulation Made Easy—the aPTT



Coagulation Made Easy—the aPTT



What Matters Clinically



- Deficiencies of factor XI, IX, VIII, VII, X, V, prothrombin and fibrinogen are clinically significant in terms of bleeding.
- Inhibitors of these factors are clinically significant in terms of bleeding.
- Deficiency of Factor XII, and the presence of the lupus anticoagulant are not.

Secondary vs Primary Hemostasis

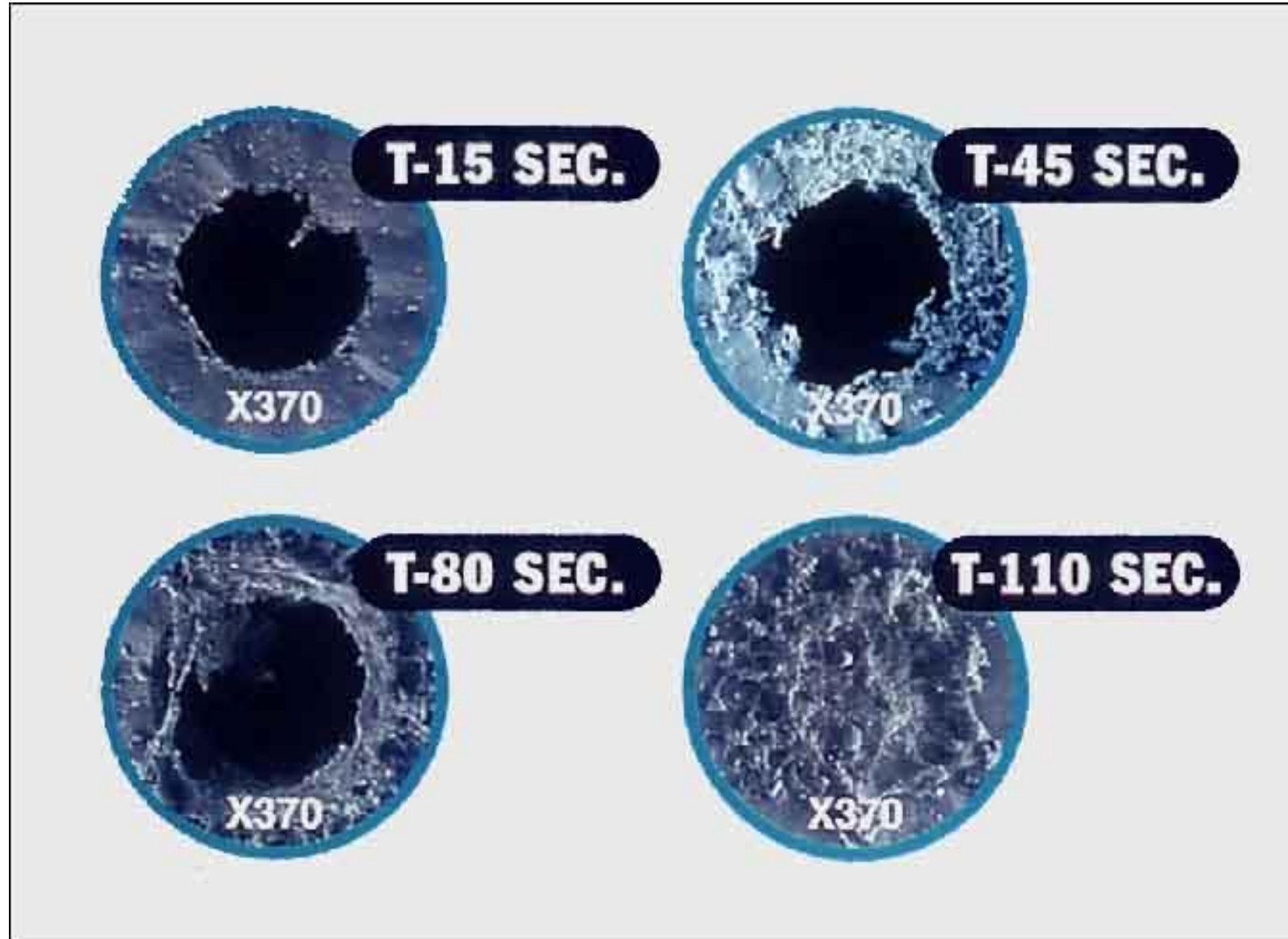
- It is important to realize that the PT and the PTT test ONLY defects in SECONDARY hemostasis.
- To test defects in primary hemostasis, we need a different assay
 - The bleeding time
 - The PFA-100

The platelet function screen (PFA-100®)

- An in vitro method to test primary hemostasis
- Exposes blood under flow to membranes coated with either collagen+epinephrine or collagen+ADP.
- Designed to replace the bleeding time



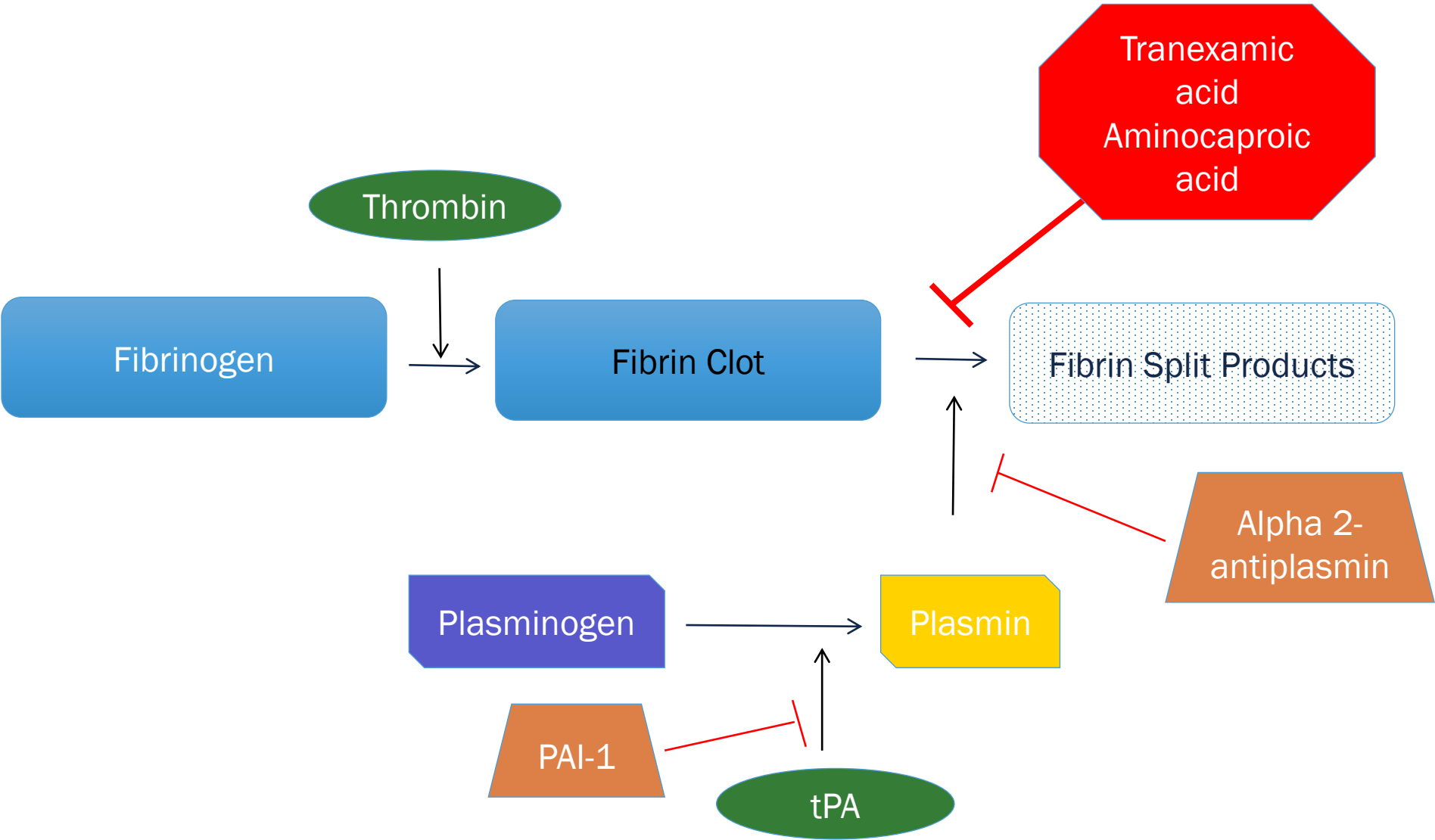
The platelet function assay



More Specific Laboratory Testing

- Von Willebrand's panel
 - Factor VIII activity
 - VWF antigen
 - VWF activity
 - VWF multimers (if indicated)
- Platelet aggregation testing
 - Tests ability of platelets to aggregate in response to a variety of agonists.
 - Done by specialized coagulation laboratory
 - Poorly standardized

Fibrinolysis



Tests of fibrinolysis

- Euglobulin lysis time
 - Great idea
 - Bad test
- TEG (thromboelastogram)/ROTEM
 - Not widely available
 - Not standardized, poorly reproducible

Treating Bleeding

- Do we reverse anticoagulation?
 - Warfarin—Kcentra[®] (4 factor PCC) is superior to FFP
 - Don't forget to use Vitamin K
 - Pradaxa—Idarucizumab (Praxbind[®])
 - Rivaroxaban (Xarelto[®]) Apixaban (Eliquis[®])—Andexanet (Andexxa[®]) for CNS bleeding (not surgery), and Kcentra otherwise

Treating Bleeding

- Ancillary treatment
 - Embolization of bleeding source
 - Antifibrinolytics
 - Treat platelet dysfunction with DDAVP (0.3 mcg/kg)—watch sodium
 - If patient cannot tolerate DDAVP, can use cryoprecipitate for platelet dysfunction
 - Can also use RBCs to treat mucosal bleeding due to refractory thrombocytopenia of the Hct is <30% or Hgb is <10g/dL, then RBCs may help tamponade bleeding

Tradeoffs

- All therapy for bleeding will inevitably increase the risk of thrombosis
- There is no free lunch

*Thank
you!*