

Coagulation Made Easy

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Coagulation Made Easy

The PTT Pathway

The PT Pathway

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

Coagulation Made Easy

The PTT Pathway

The PT Pathway



The PT and the PTT pathway meet at Factor X, because “X” marks the spot.

Coagulation Made Easy

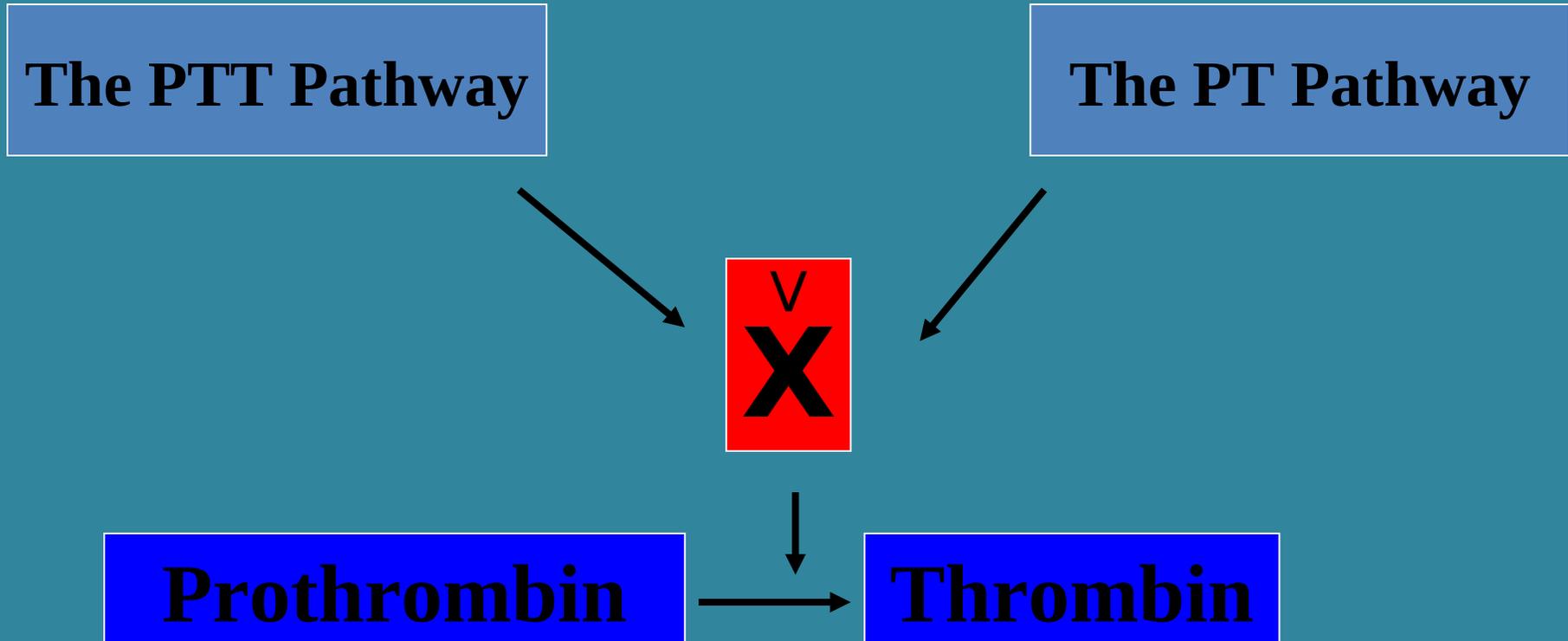
The PTT Pathway

The PT Pathway



Factor V is a cofactor for Factor X, and you can remember this because V fits into the notch of the X.

Coagulation Made Easy



Factor Xa converts prothrombin (Factor II) into thrombin, the most important enzyme on the planet.

Coagulation Made Easy

The PTT Pathway

The PT Pathway



Thrombin, among other things, converts the soluble molecule fibrinogen into a solid fibrin clot.

Prothrombin

Thrombin

Fibrinogen

Fibrin

The Common Pathway = Small Bills



V + X



II = prothrombin



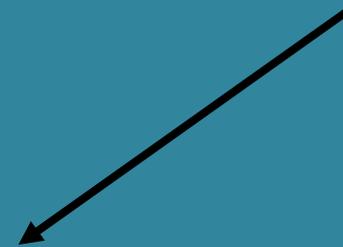
I = fibrinogen

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!*

Coagulation Made Easy: The PT

The PT Pathway

PT has one less letter than PTT, and PT values are shorter than PTT values, because the pathway is shorter. It means that the PT pathway is also shorter. This means that there's fewer steps to remember, and this is lucky, so the lucky PT pathway uses lucky Factor 7 to activate Factor X.



Prothrombin



Thrombin

Fibrinogen

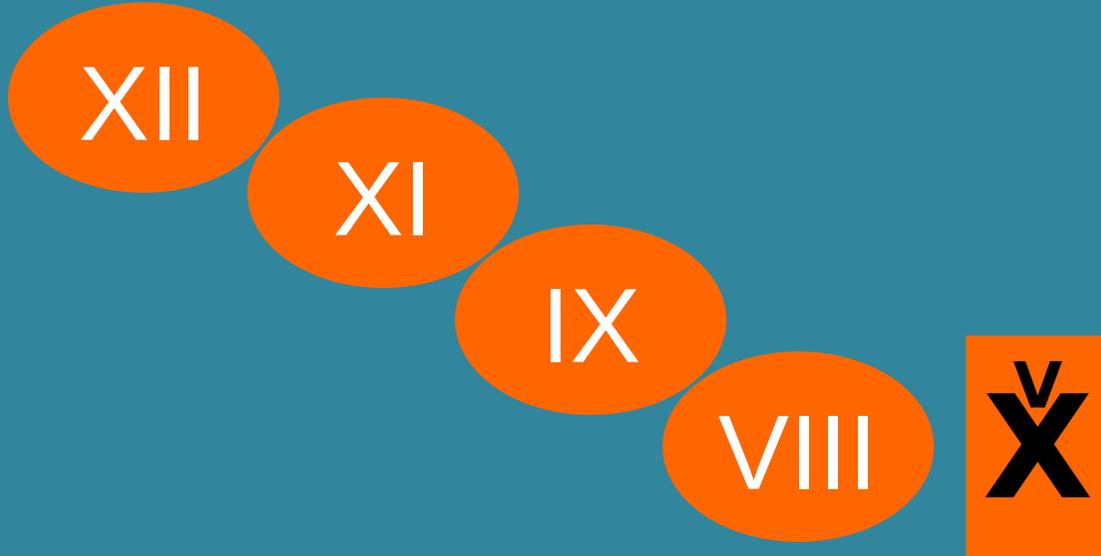


Fibrin



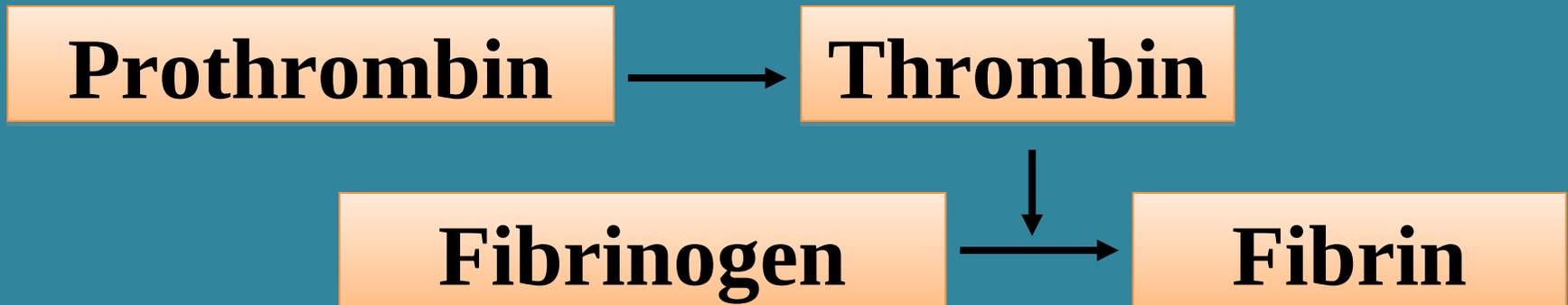
Coagulation Made Easy: The aPTT

The PTT Pathway



The PTT pathway has all those hideous roman numerals. . .

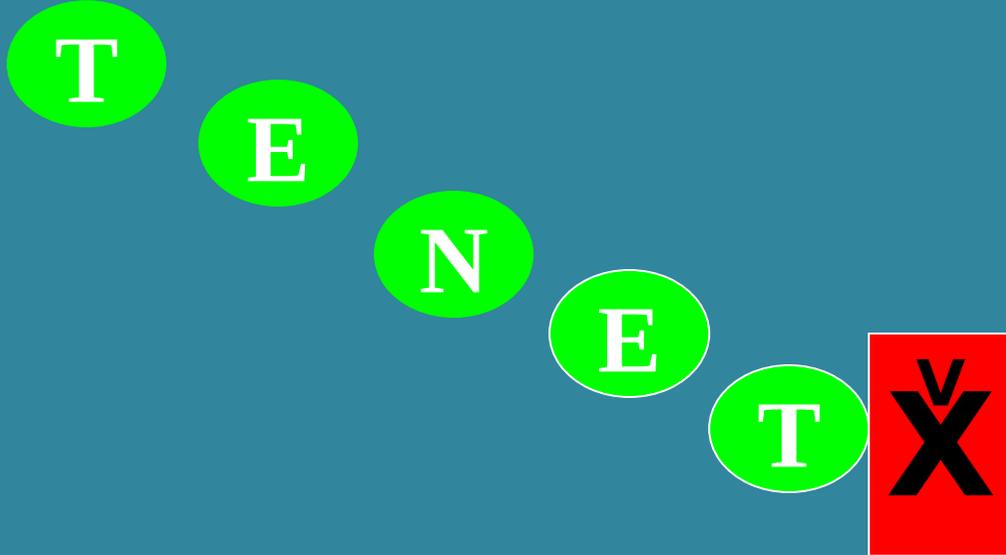
How are we going to remember them? Hmmmmm. . .



Coagulation Made Easy:

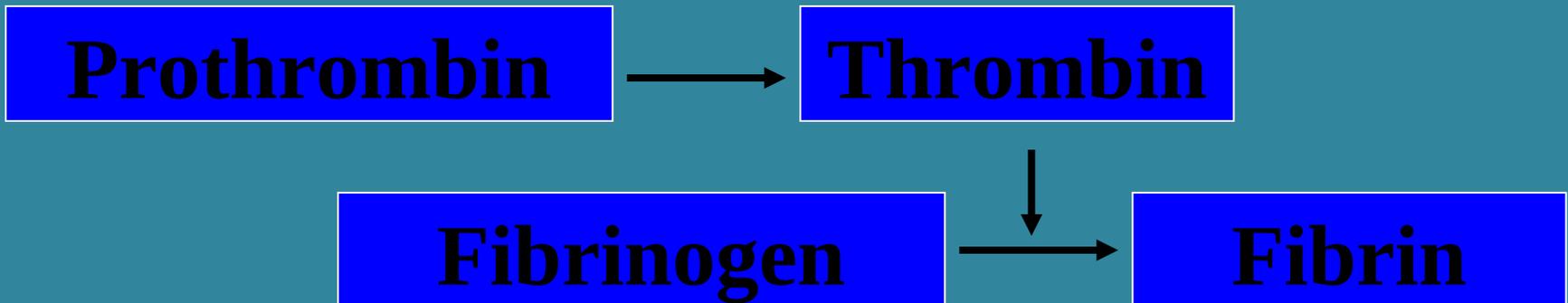
The aPTT

The PTT Pathway



Well, just remember that the PTT is a basic TENET of hematology.

TENET stands for. . .



Coagulation Made Easy: The aPTT

The PTT Pathway

Twelve

Eleven

Nine

Eight

Ten



Prothrombin



Thrombin

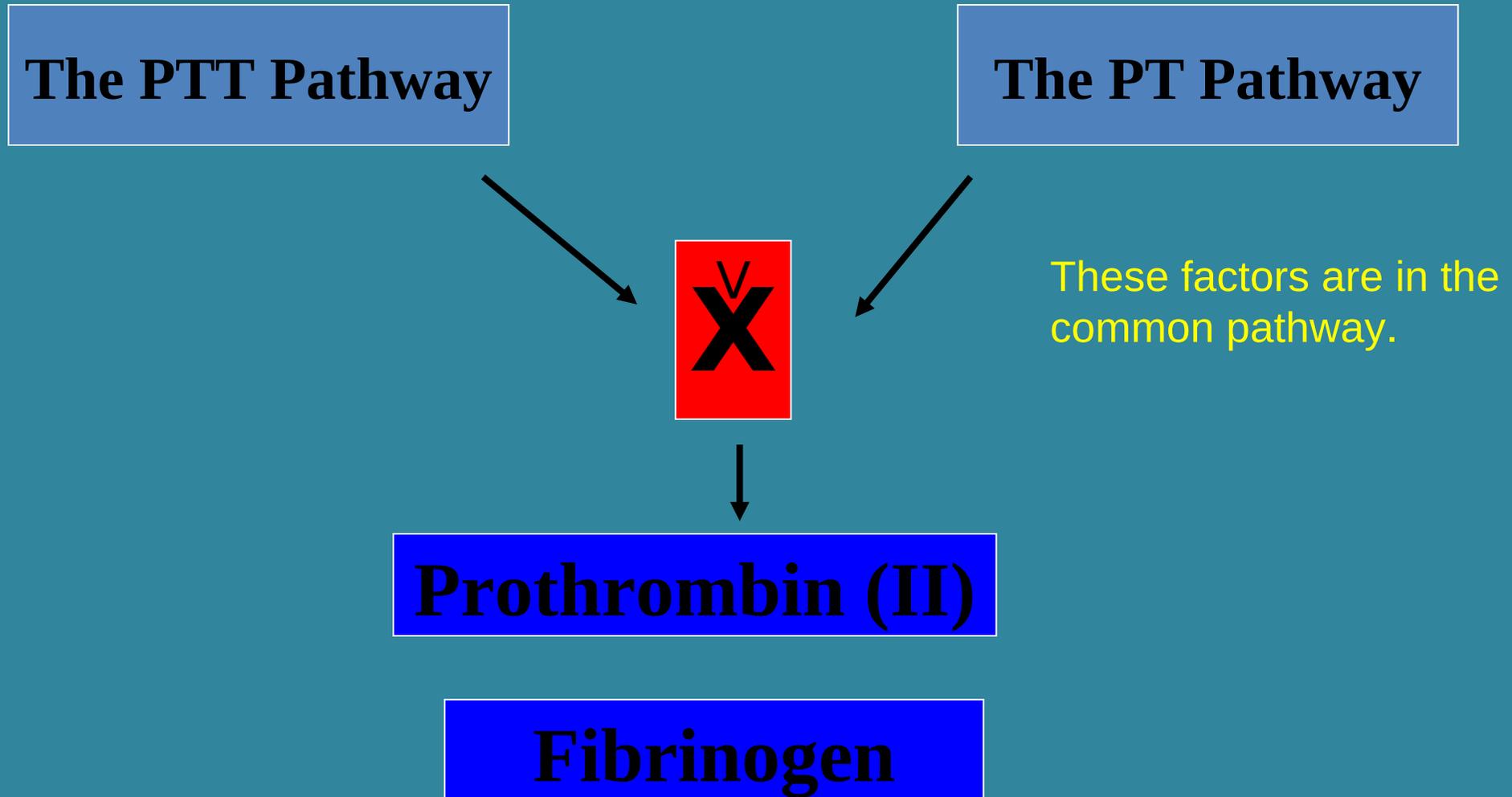


Fibrinogen



Fibrin

Coagulation Made Easy: PT and PTT Both Prolonged



Coagulation Made Easy: Only PT Prolonged

7

Deficiency of Factor VII will prolong the PT but not the PTT.

Coagulation Made Easy: Only PTT Prolonged

Twelve

Eleven

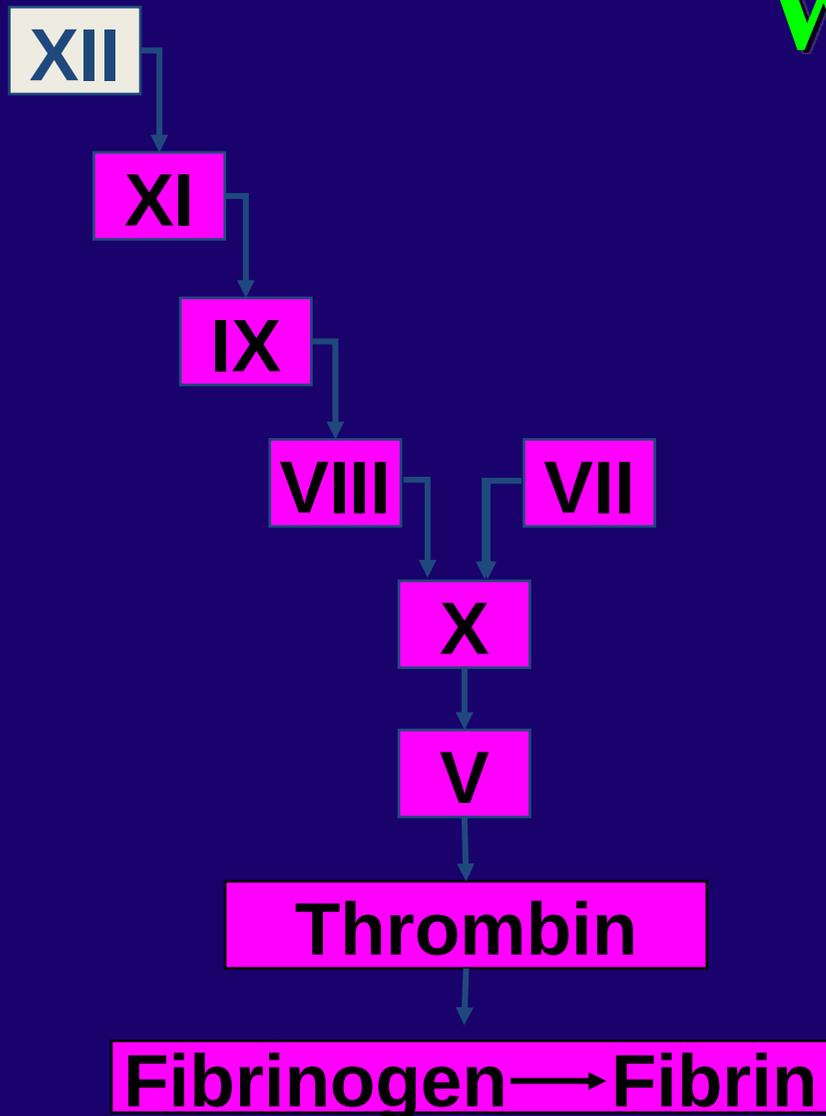
Nine

Eight

~~Ten~~

Deficiencies of Factors 12, 11, 9, and 8 will prolong the PTT and not the PT. Remember that Factor 10 is in the common pathway, and affects BOTH the PT and the PTT.

What Matters Clinically



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

Coagulation Made Easy: The Mixing Study

- Useful to differentiate etiologies of prolonged clotting in a coagulation assay.
- Patient's plasma is mixed 50/50 with normal plasma. Coagulation assay is repeated.
- If “substantial” correction is noted after mix, suspect **clotting factor deficiency**, because you replaced deficient factors in the patient plasma with normal factors from the normal plasma.
- If no or not full correction is seen, suspect an **inhibitor**, because you added the inhibitor (think of this as an anticoagulant) in the patient plasma which inhibits clotting in the normal plasma.