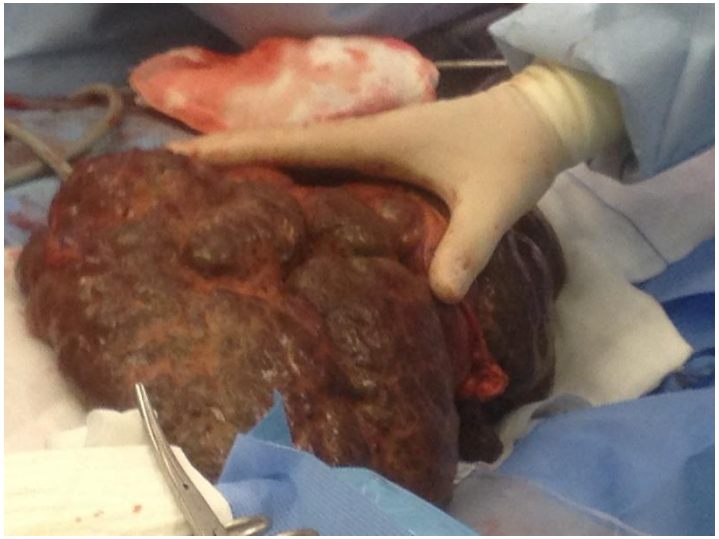

Układ hemostazy – zasada działania

lek. Barbara Nicińska

Funkcje

- zapobiega ucieczce krwi poza organizm
- utrzymanie ciągłości ścian naczyń krwionośnych
- utrzymanie krwi w stanie płynnym

Nature. 1964 May 2;202:498-9.

AN ENZYME CASCADE IN THE BLOOD CLOTTING MECHANISM, AND ITS FUNCTION AS A BIOCHEMICAL AMPLIFIER.

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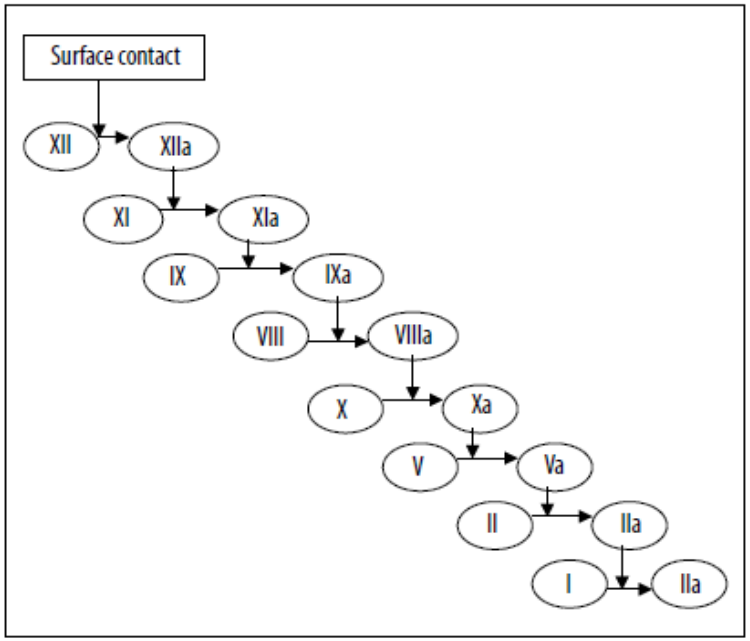
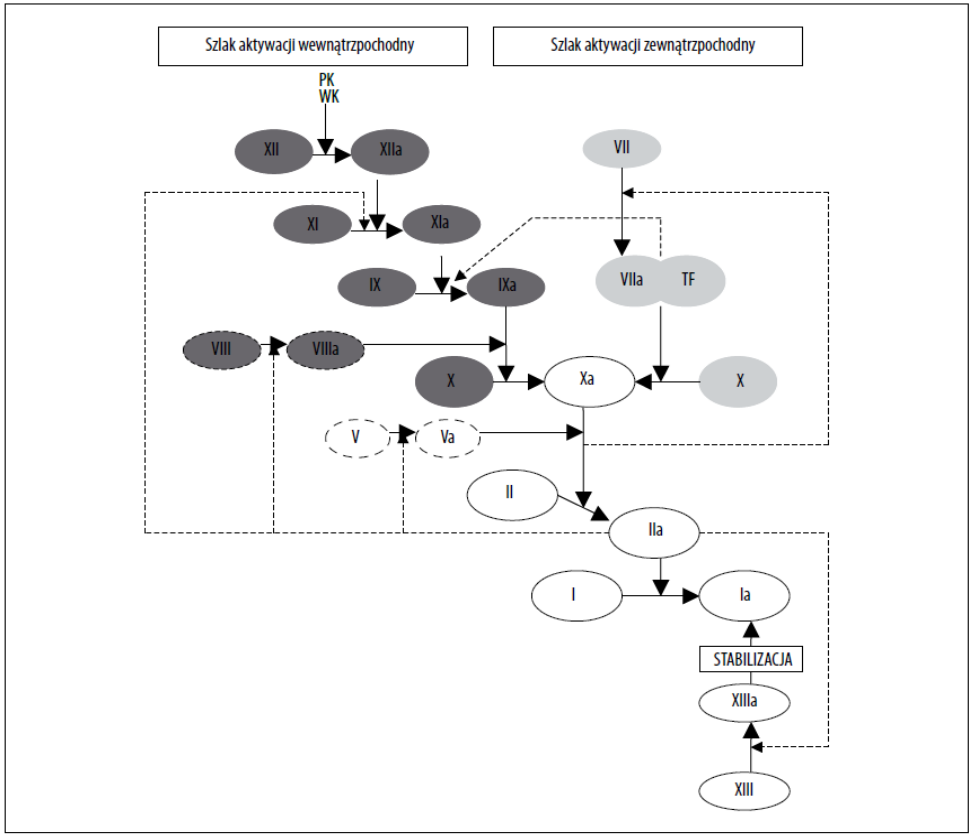
Science. 1964 Sep 18;145(3638):1310-2.

WATERFALL SEQUENCE FOR INTRINSIC BLOOD CLOTTING.

DAVIE EW, RATNOFF OD.

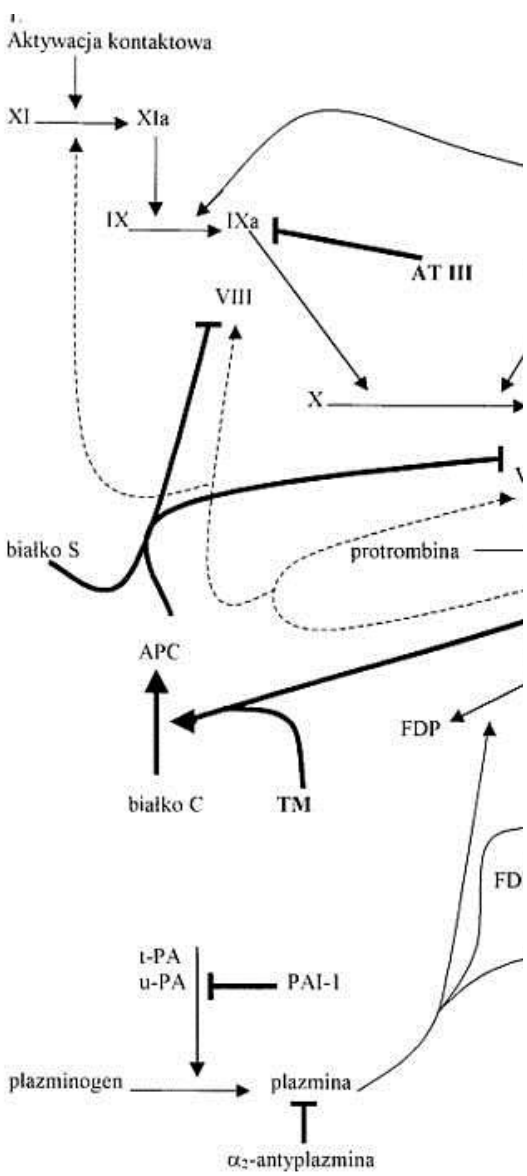


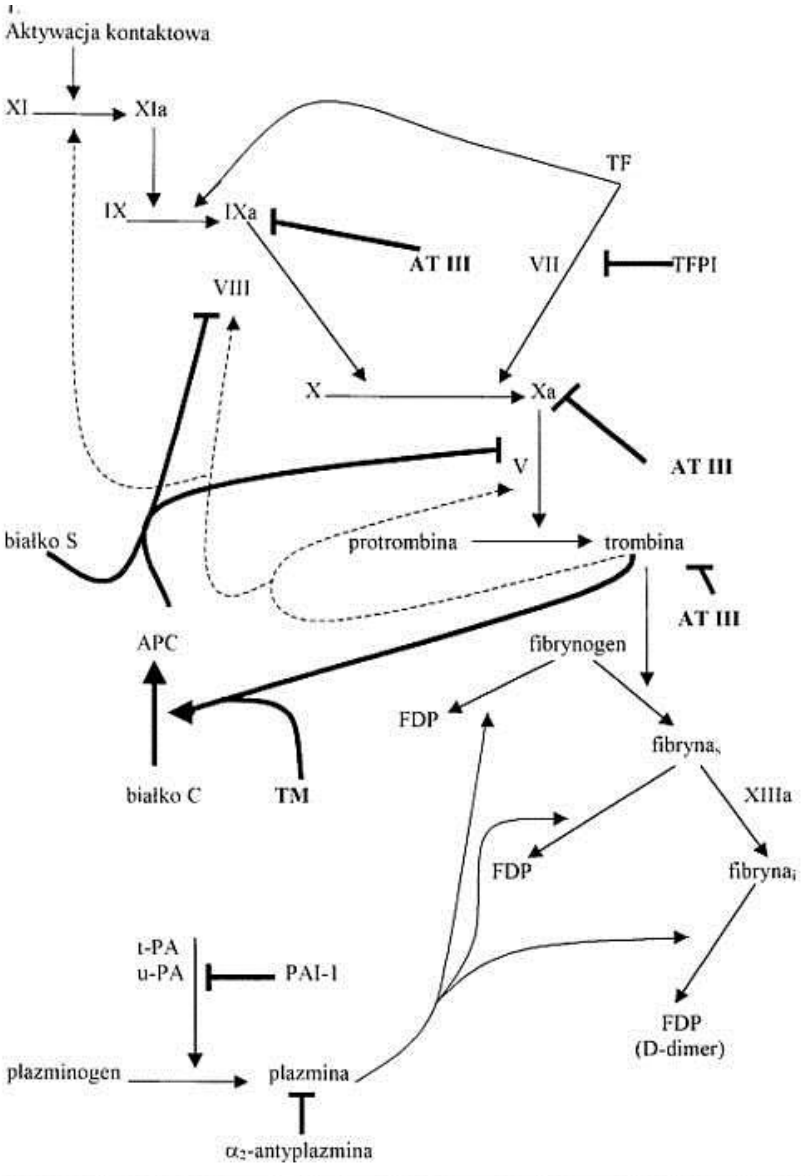
Rycina 1. Schemat kaskady krzepnięcia zaproponowany przez R.G. Macfarlane.

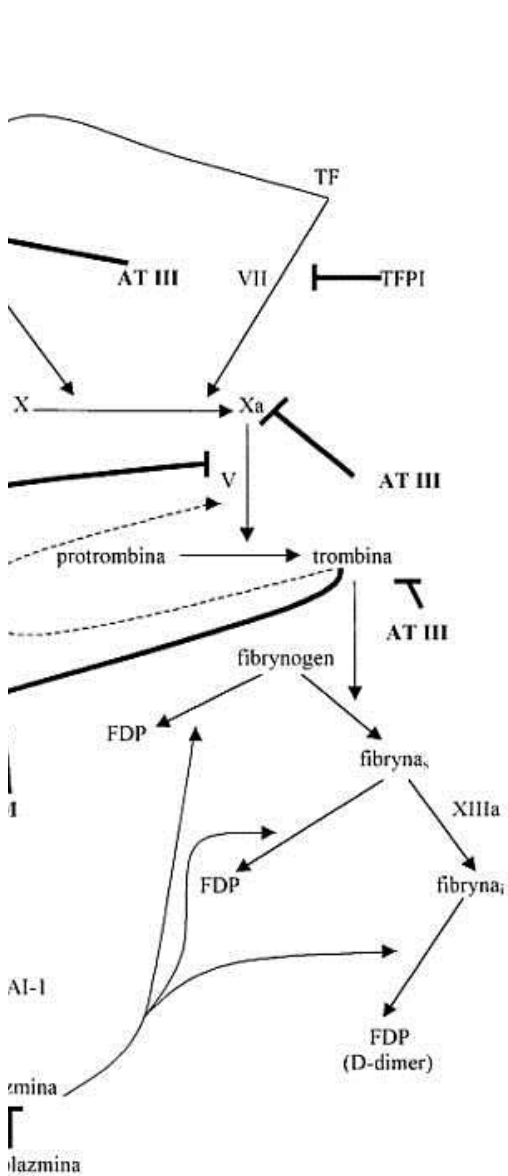


Rycina 2. Schemat Y kaskady krzepnięcia.

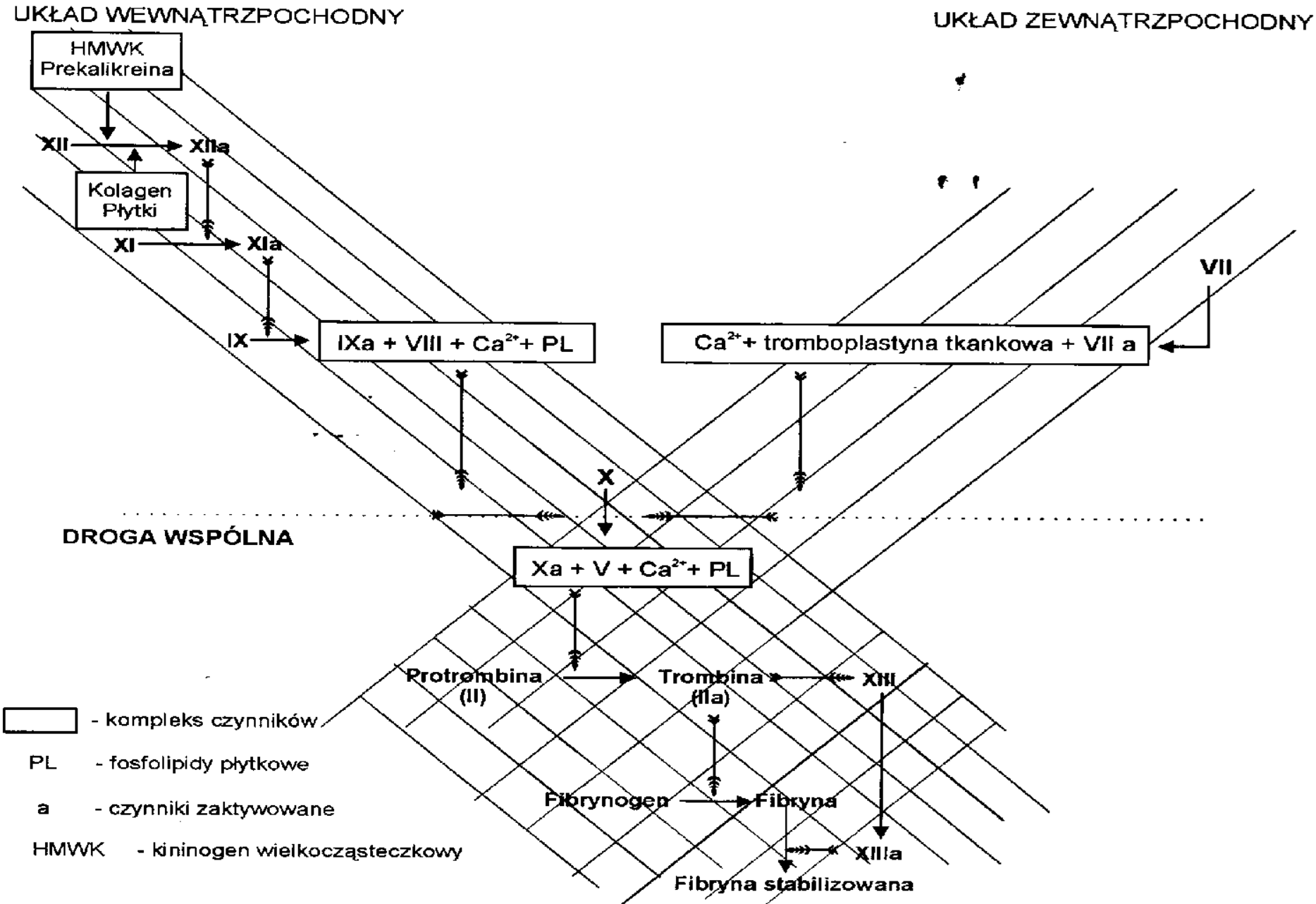
UKŁAD HEMOSTAZY







SCHEMAT KASKADY KRZEPNIĘCIA



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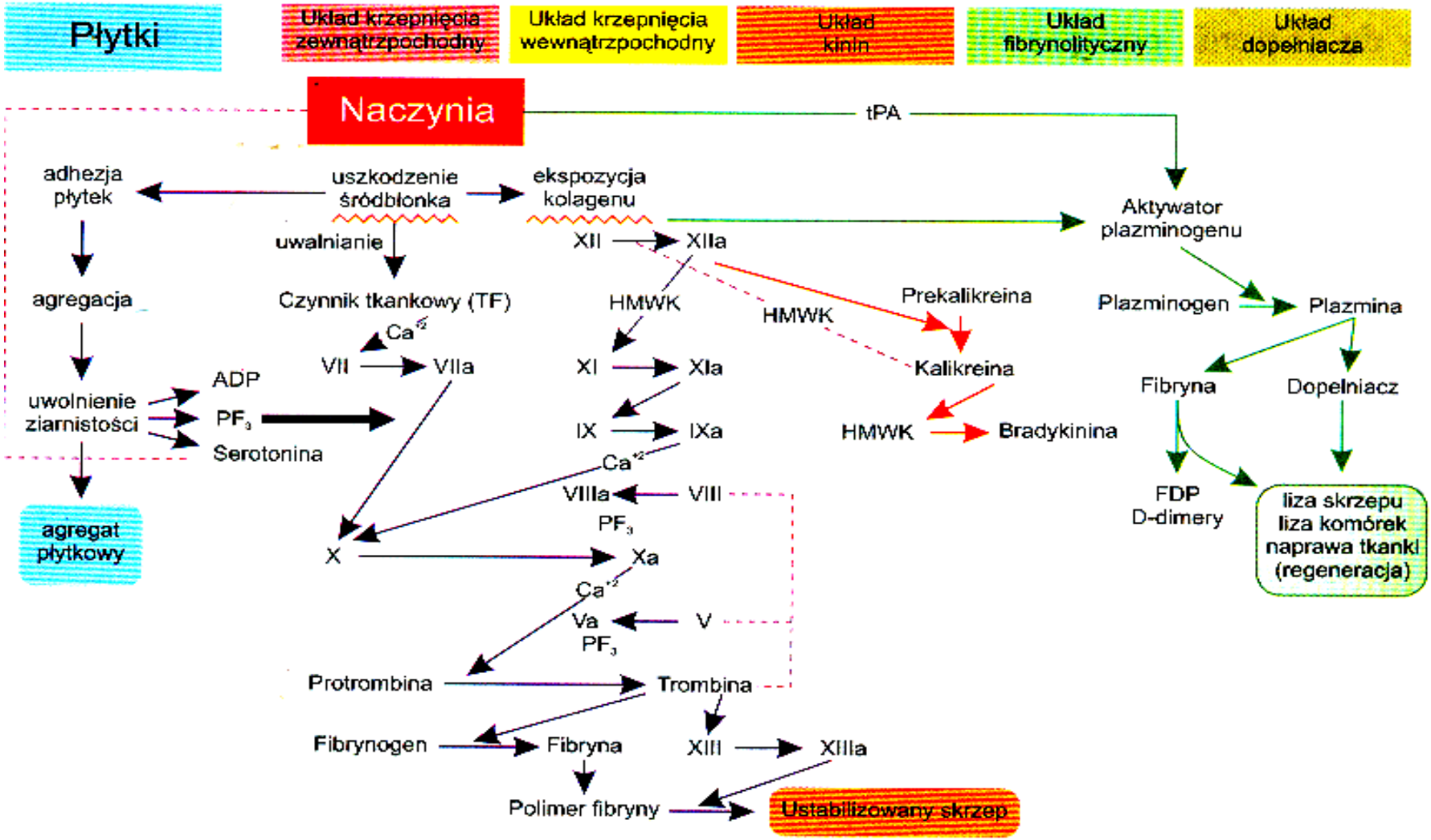


KOMÓRKOWY

MODEL UKŁADU KRZEPNIĘCIA

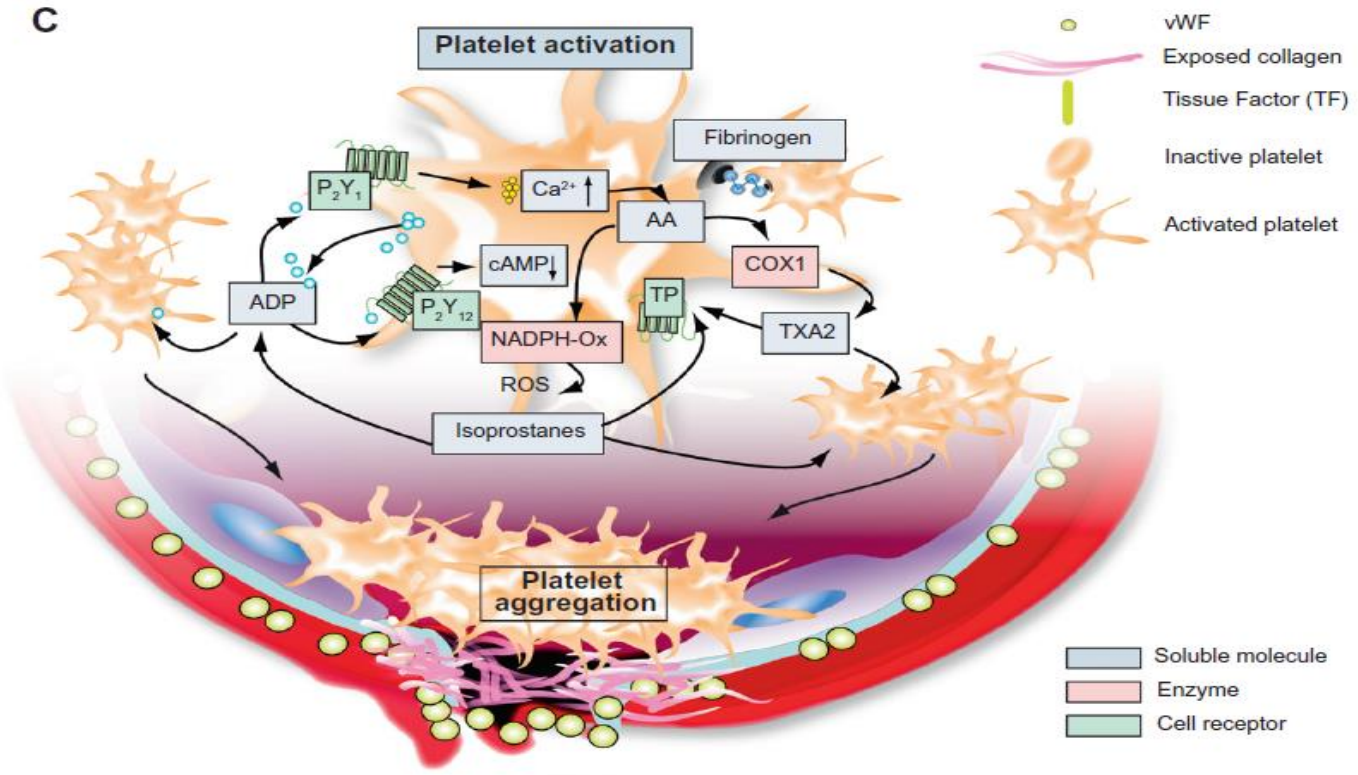


Fig. 1. Primary haemostasis: physiology. Platelets, anucleated cells derived from megakaryocytes, at the side of vessel wall injury, adhere to exposed collagen or vWf. Adhesion and activation is initiated by two distinct pathways acting in parallel or separately: (A) exposure of sub-endothelial collagen initiates platelet activation via Gp VI binding to the collagen and Gp Ib-V-IX exposure of collagen triggers the adhesion and activation of platelets; (B) TF initiates the generation of thrombin. (C) After adhesion to endothelium, in the activation phase, thrombin derived by coagulation cascade and platelets-derived mediators, such as ADP, TXA_2 and isoprostanes, activate several pathways resulting in glycoprotein IIb/IIIa activation and in turn platelet aggregation. AA, arachidonic acid; ADP, adenosine diphosphate; COX1, cyclo-oxygenase 1; GP, glycoprotein; NADPH-Ox, NADPH oxidase; TF, tissue factor; TP, thromboxane receptor; TXA_2, thromboxane A_2; vWf, Von Willebrand factor.

KOMÓRKOWY

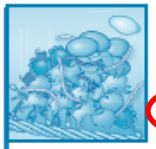
MODEL UKŁADU KRZEPNIĘCIA

Physiol Rev 93: 327–358, 2013
doi:10.1152/physrev.00016.2011

NEW FUNDAMENTALS IN HEMOSTASIS

Henri H. Versteeg, Johan W. M. Heemskerk, Marcel Levi, and Pieter H. Reitsma

Einthoven Laboratory for Experimental Vascular Medicine, Leiden University Medical Center, Leiden, The Netherlands; Department of Biochemistry, Cardiovascular Research Institute Maastricht, Maastricht University, Maastricht, The Netherlands; and Department of Medicine, Academic Medical Center, Amsterdam, The Netherlands



Versteeg HH, Heemskerk JWM, Levi M, Reitsma PH. New Fundamentals in Hemostasis. *Physiol Rev* 93: 327–358, 2013; doi:10.1152/physrev.00016.2011.—Hemostasis encompasses the tightly regulated processes of blood clotting, platelet activation, and vascular repair. After wounding, the hemostatic system engages a plethora of vascular and extravascular receptors that act in concert with blood components to seal off the damage inflicted to the vasculature and the surrounding tissue. The first important component that contributes to hemostasis is the coagulation system, while the second important component starts with platelet activation, which not only contributes to the hemostatic plug, but also accelerates the coagulation system. Eventually, coagulation and platelet activation are switched off by blood-borne inhibitors and proteolytic feedback loops. This review summarizes new concepts of activation of proteases that regulate coagulation and anticoagulation, to give rise to transient thrombin generation and fibrin clot formation. It further speculates on the (patho)physiological roles of intra- and extravascular receptors that operate in response to these proteases. Furthermore, this review provides a new framework for understanding how signaling and adhesive interactions between endothelial cells, leukocytes, and platelets can regulate thrombus formation and modulate the coagulation process. Now that the key molecular players of coagulation and platelet activation have become clear, and their complex interactions with the vessel wall have been mapped out, we can also better speculate on the causes of thrombosis-related angiopathies.

KOMÓRKOWY

MODEL UKŁADU KRZEPNIĘCIA

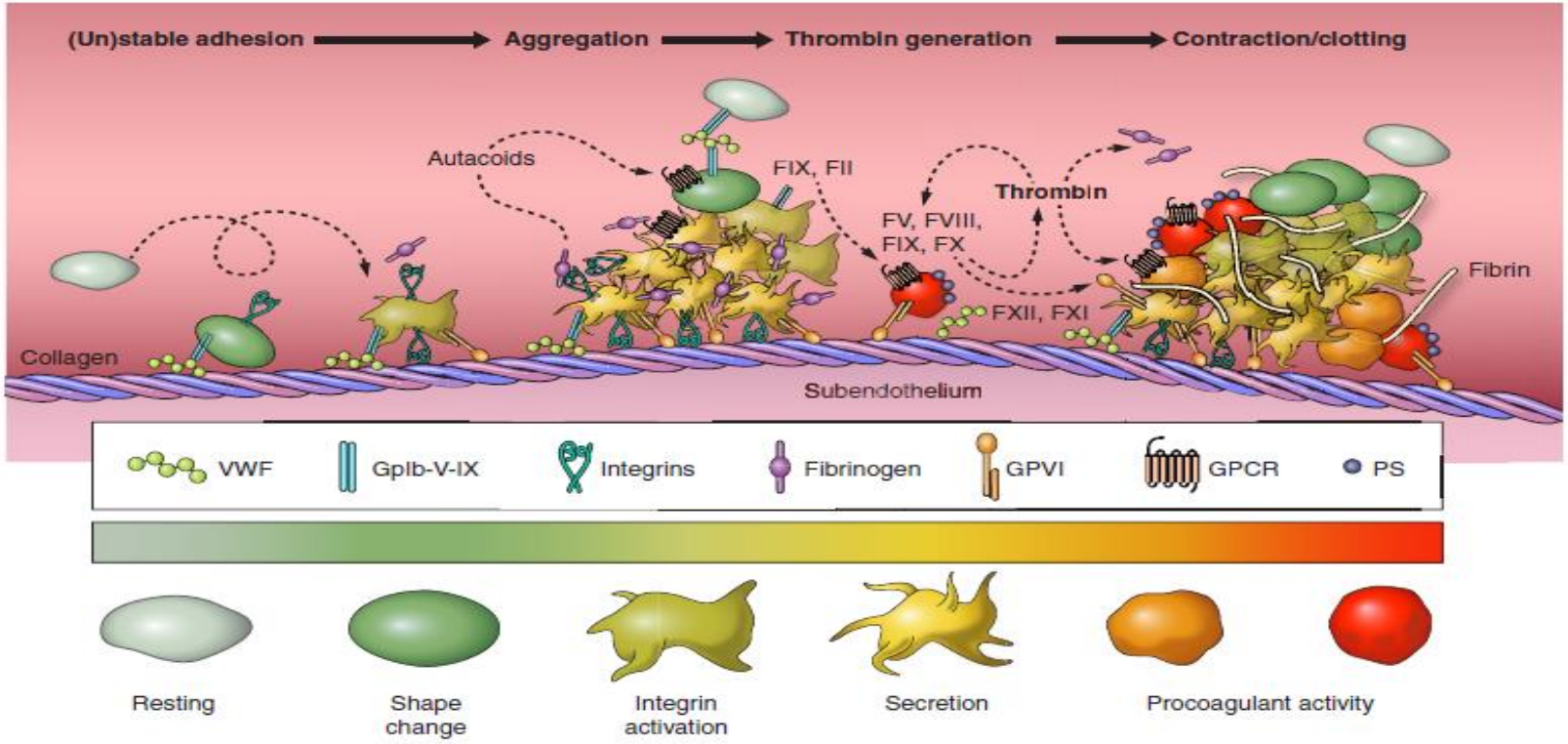


FIGURE 4. Stages of platelet activation and thrombus formation. Platelets adhere to a von Willebrand factor (VWF)/collagen matrix, get activated, secrete granular contents, aggregate via integrins, produce thrombin after developing a procoagulant surface, and form a contracted thrombus with fibrin. Heat map with color codes from green (low Ca^{2+} signal) to red (high Ca^{2+} signal). Interactions of platelets with coagulation factor are indicated, as described. Note that procoagulant platelets provide a phosphatidylserine (PS)-exposing surface for the tenase complex (activated FVIII and FIX) and the prothrombinase complex (activated FV and FX). Formed thrombin provides positive-feedback reactions to activate platelets via GPCR, to activate coagulation factors, and to convert fibrinogen into fibrin.

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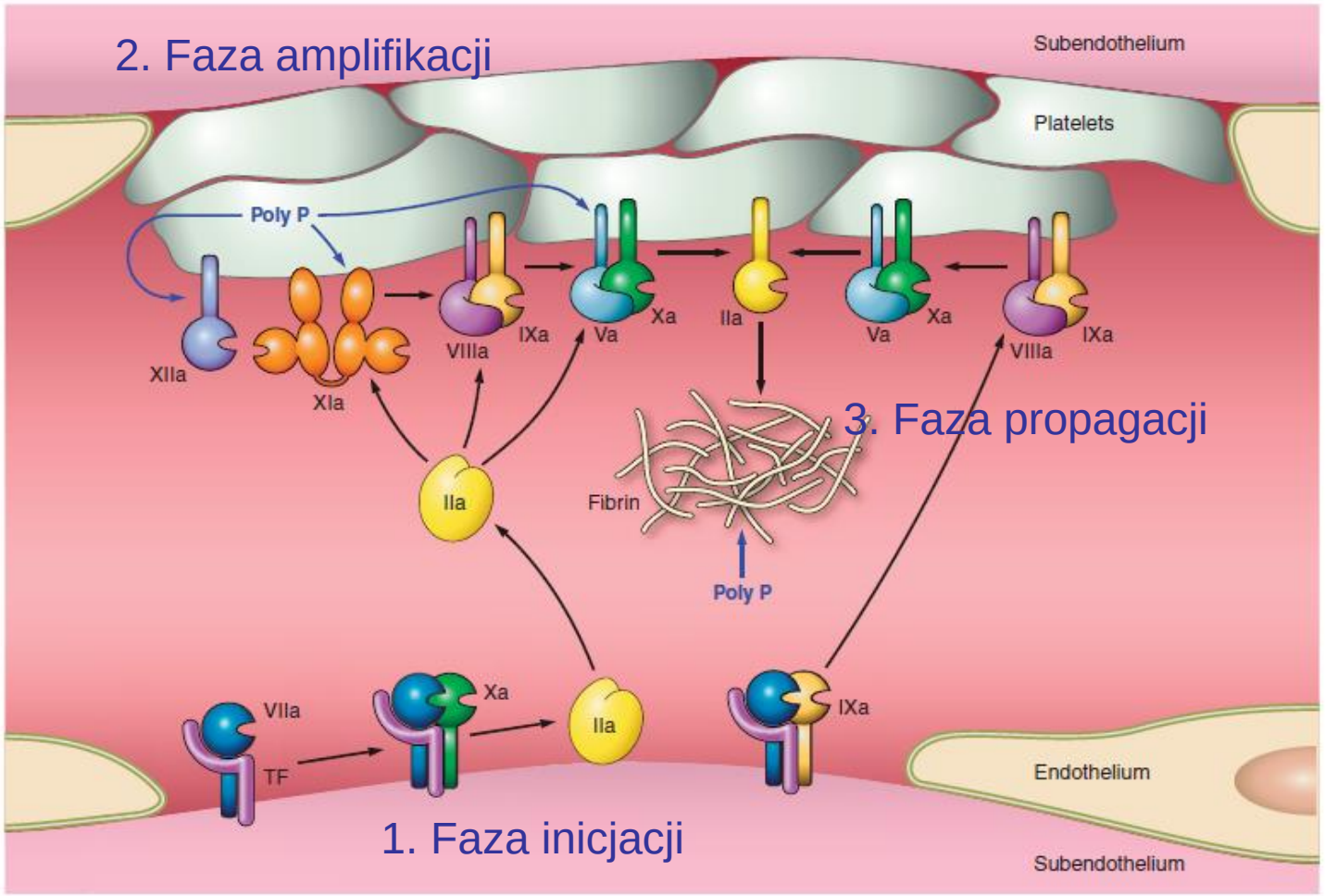

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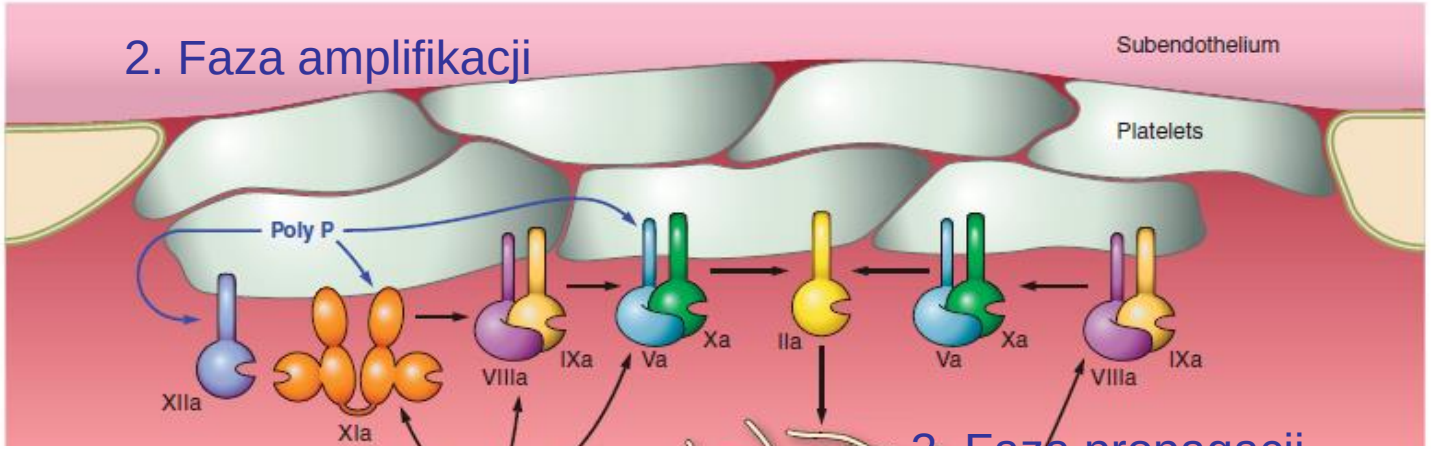
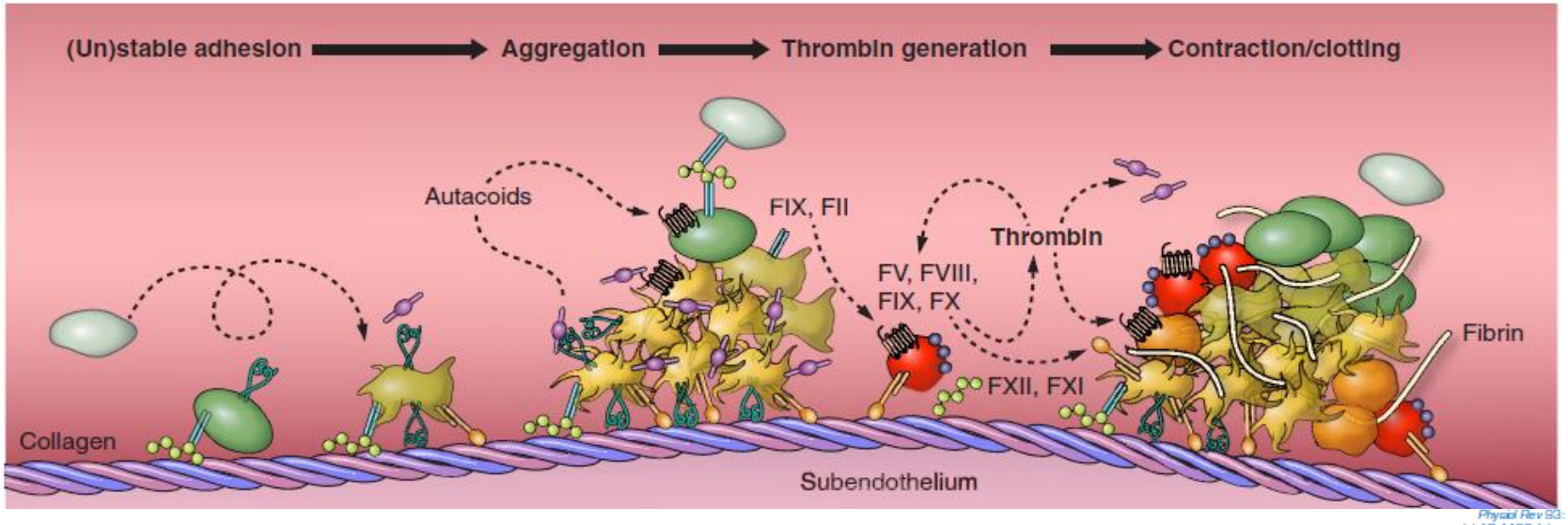
Skrzep krwi





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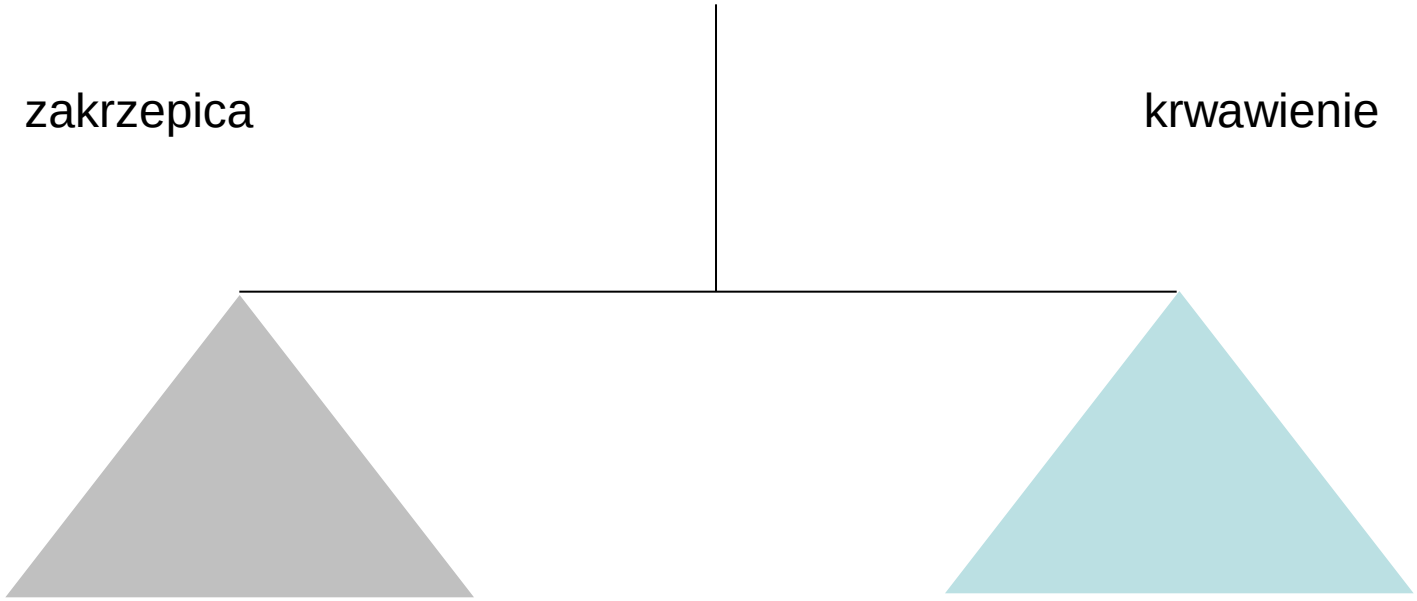
UKŁAD HEMOSTAZY



układ
pro-koagulacyjny

układ
anty-koagulacyjny

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Dziękuję