Gerinnung

Dr. Georg Pfanner

Abt. f. Anästhesie u. Intensivmedizin, LKH-Feldkirch

ltd. OA der AN-Ambulanz

Bereichsleitung perioperative Gerinnung

Transfusionsverantwortlicher des LKH-Feldkirch

ANÄSTHESIE FORUM

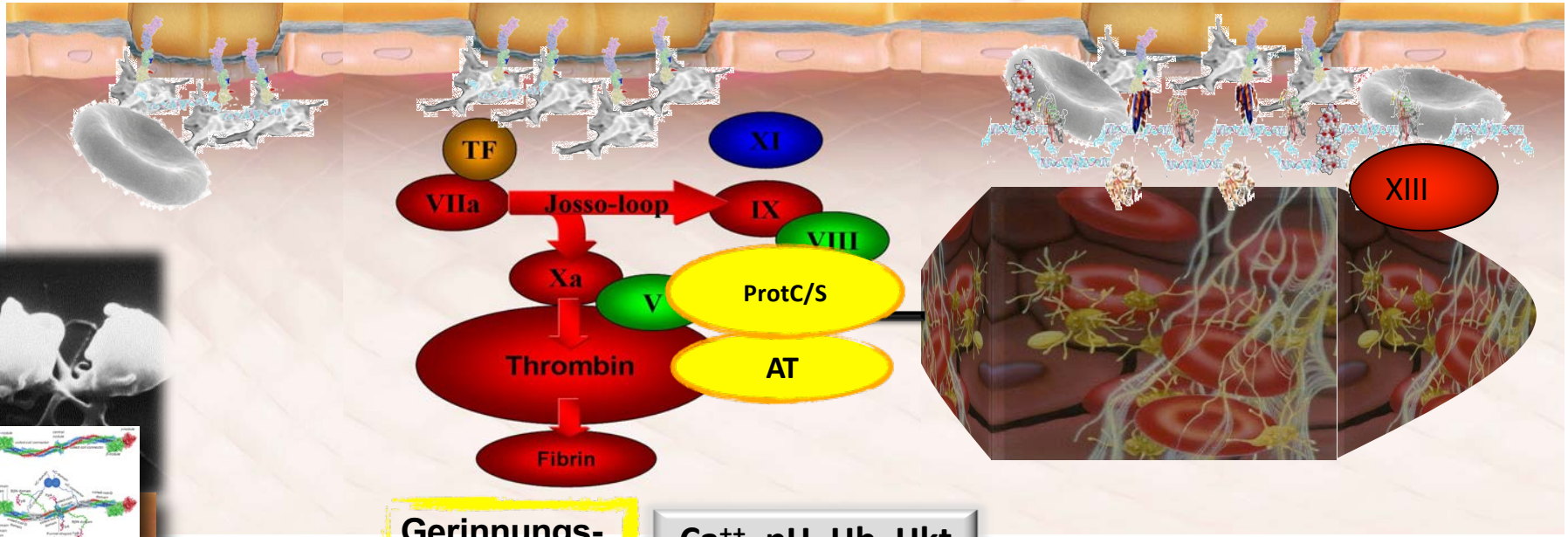
ALPBACH

REPETITORIUM

Gerinnungs-Physiologie keep it simple!

ANÄSTHESIE FORUM ALPBACH REPETITORIUM

Primäre Hämostase → Thrombin Generation → Clot Bildung → Clot Lyse



Gerinnungs-Inhibition

Ca^{++}, pH, Hb, Hkt

Temperatur

Gerinnung im klinischen Alltag…

Gerinnung im klinischen Alltag…

BOFS

Blood

On

Floor

Sign

WAS ist geschehen?

WO stehen wir?

WIE therapieren wir?

GERINNUNGS-PATHOLOGIEN

Gerinnungs-Pathologien

Primäre Hämostase → Thrombin Generation → Clot Lyse

Zitrat-Intox.

Hypocalcämie

Kreislaufschock

Azidose

Blutverlust

Anämie

Auskühlen

Hypothermie

Ca, pH, Hb, Hkt

Temperatur

Gerinnungs-Pathologien

Thorax-Becken-Trauma /OP

PPH

Kreislaufschock

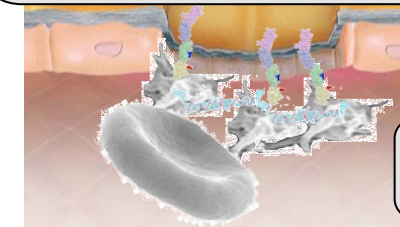
Polytrauma

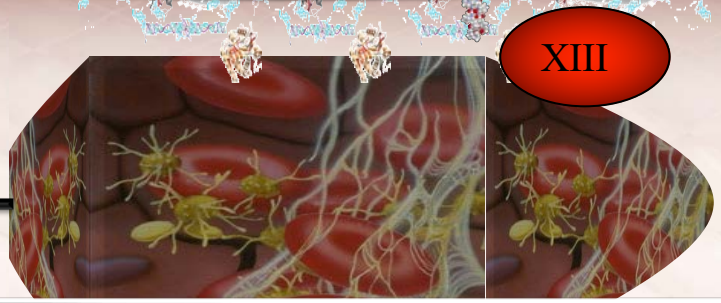
„große Wunde“

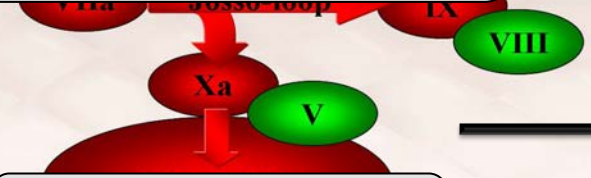
Clot Bildung → Clot Lyse

Hyperfibrinolyse

F-XIII-Def.



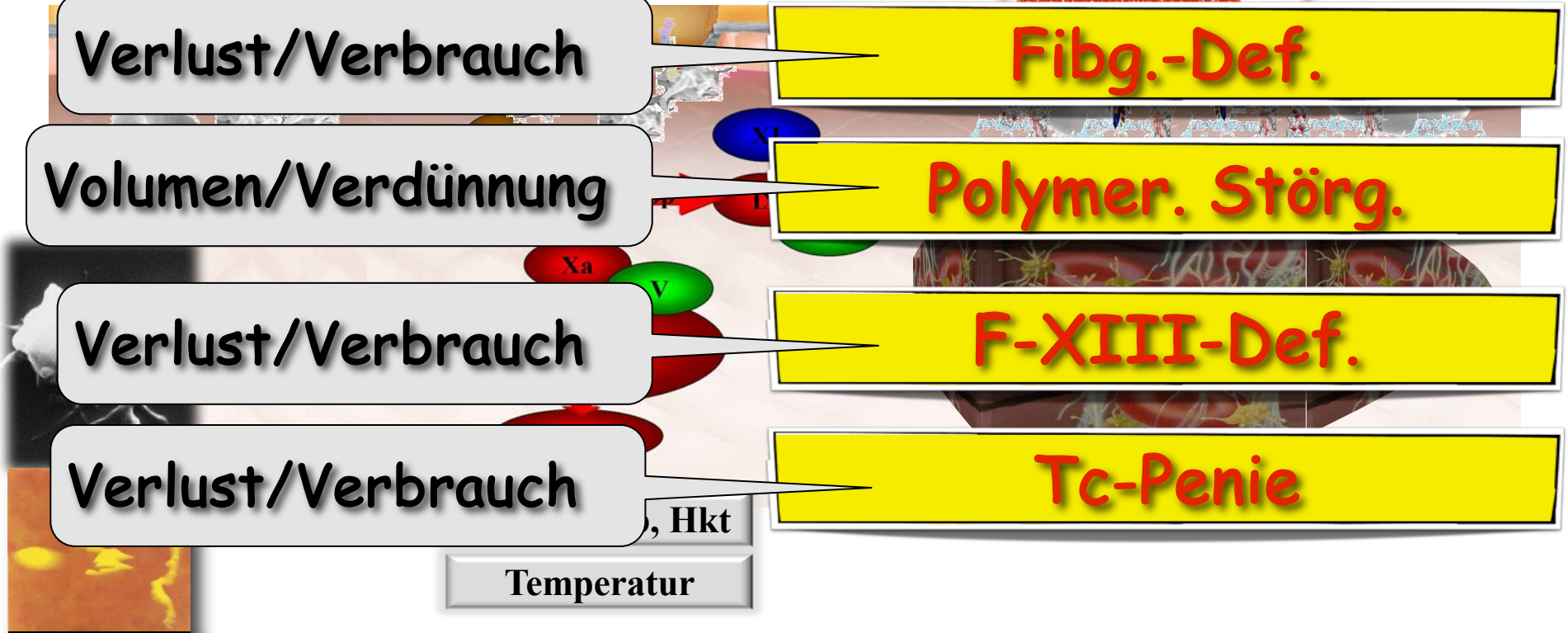




Temperatur

Gerinnungs-Pathologien

Primäre Hämostase → Thrombin Generation → **Clot Bildung** → Clot Lyse



Gerinnungs-Pathologien

Primäre Hämostase → Thrombin Generation

Med.Anamnese!!!

Fakt.-Blockade

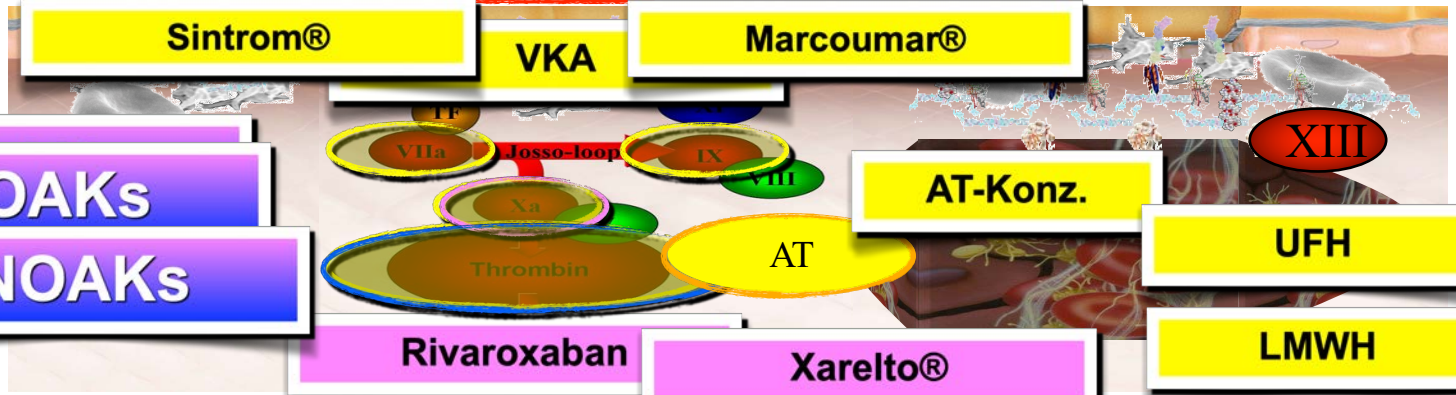
Fakt.-Defizit

Ca, pH, Hb, Hkt

Temperatur

Gezielte inhibitorische Gerinnungstherapie

Primäre Hämostase | Thrombin Generation | Clot Bildung | Clot Lyse



- Sintrom®
- VKA
- Marcoumar®
- DOAKs
- NOAKs
- AT-Konz.
- AT
- UFH
- LMWH
- Rivaroxaban
- Xarelto®
- XABANE
- Apixaban
- Eliquis®
- Fondaparinux
- Arixtra®
- Edoxaban
- Lixiana®
- Argatroban
- Dabigatran
- Pradaxa®
- Argatra®

Gerinnungs-Pathologien

Primäre Hämostase → Thrombin Generation → Clot Lyse

Med.Anamnese!!!

internist. Anamnese

Tc-Hemmung

vWS

Tc-Pathie

Ca, pH, Hb, Hkt

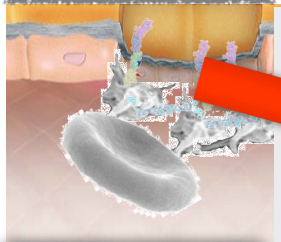
Temperatur

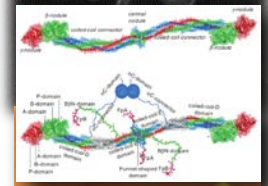
Primäre Hämostase

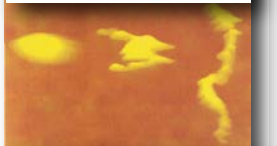
Thrombin Generation

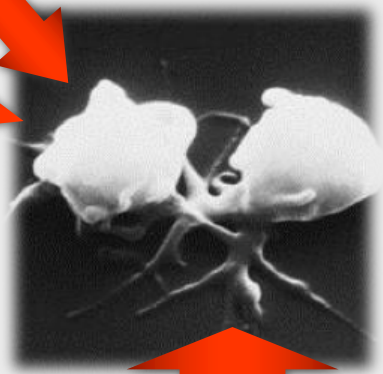
Clot Bildung

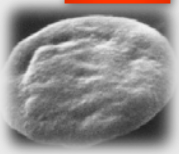
Clot Lyse

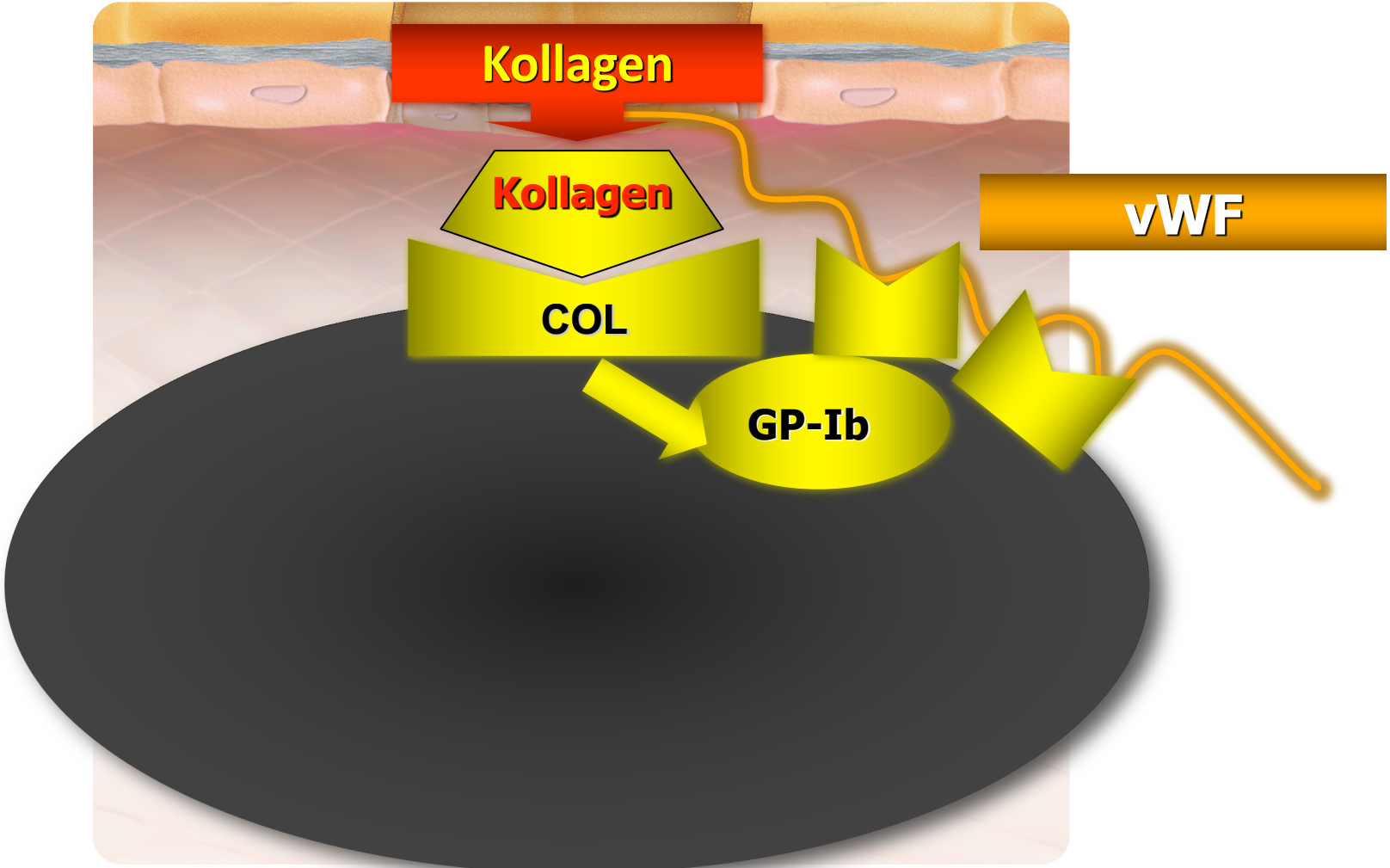


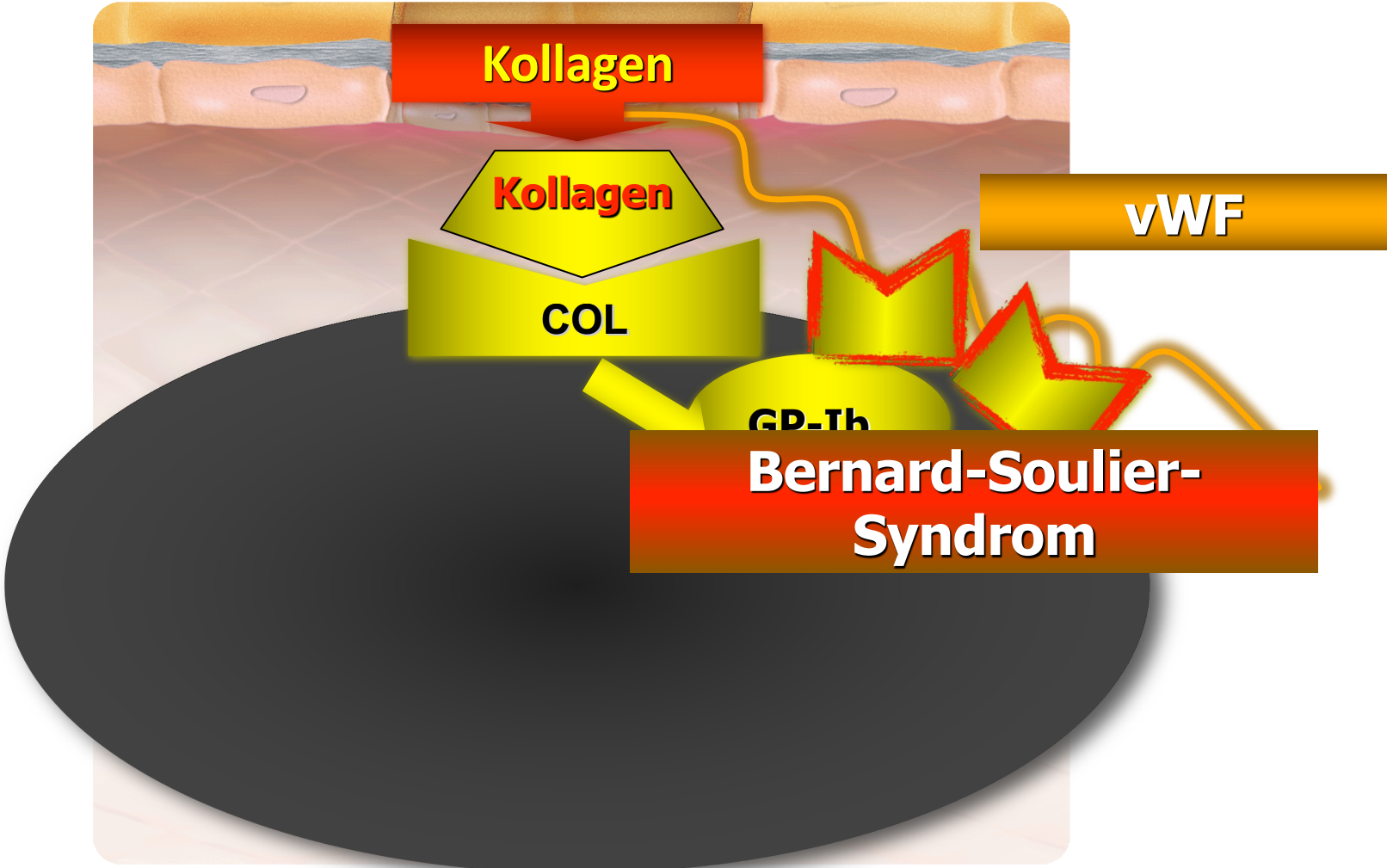


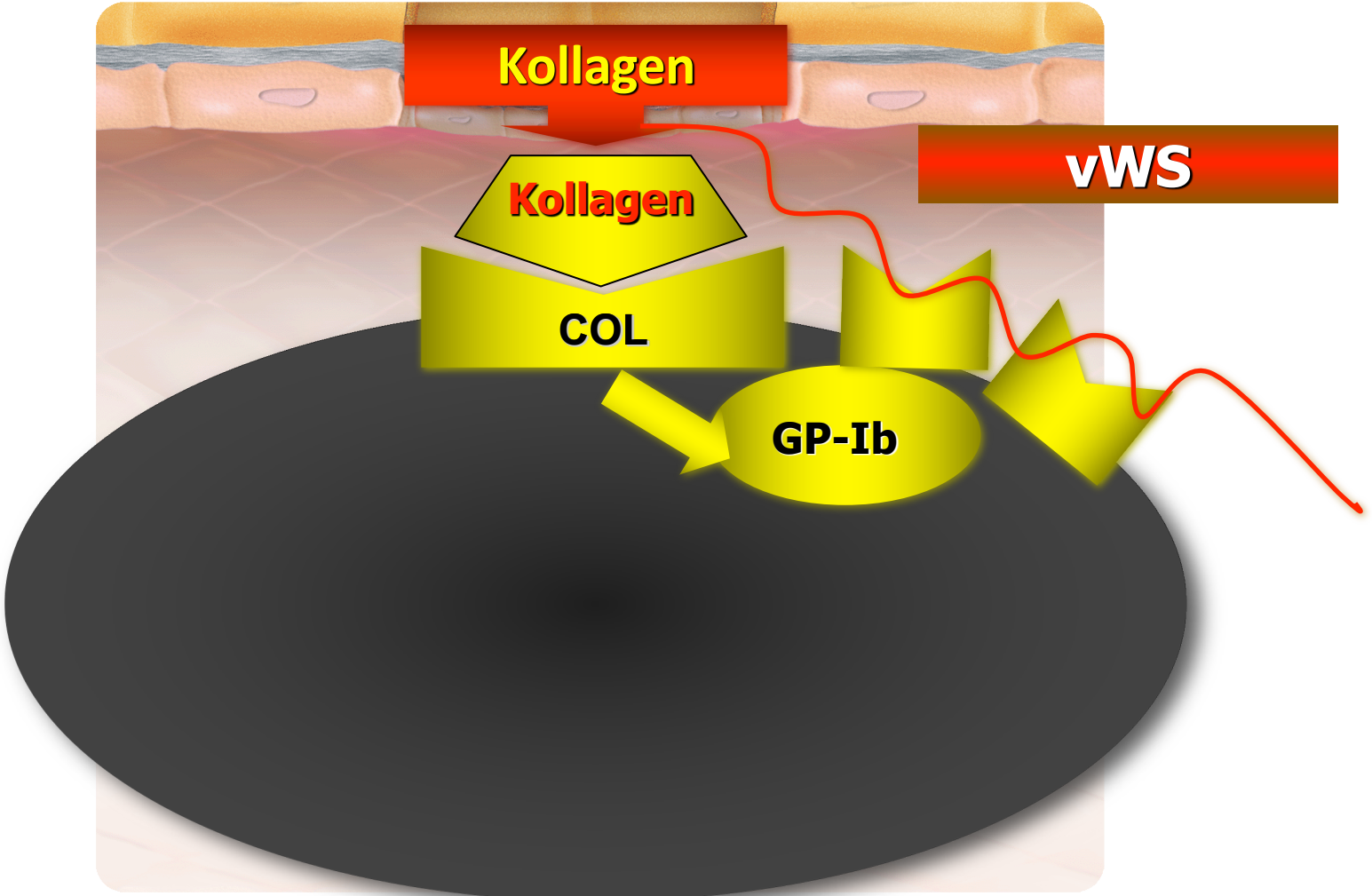


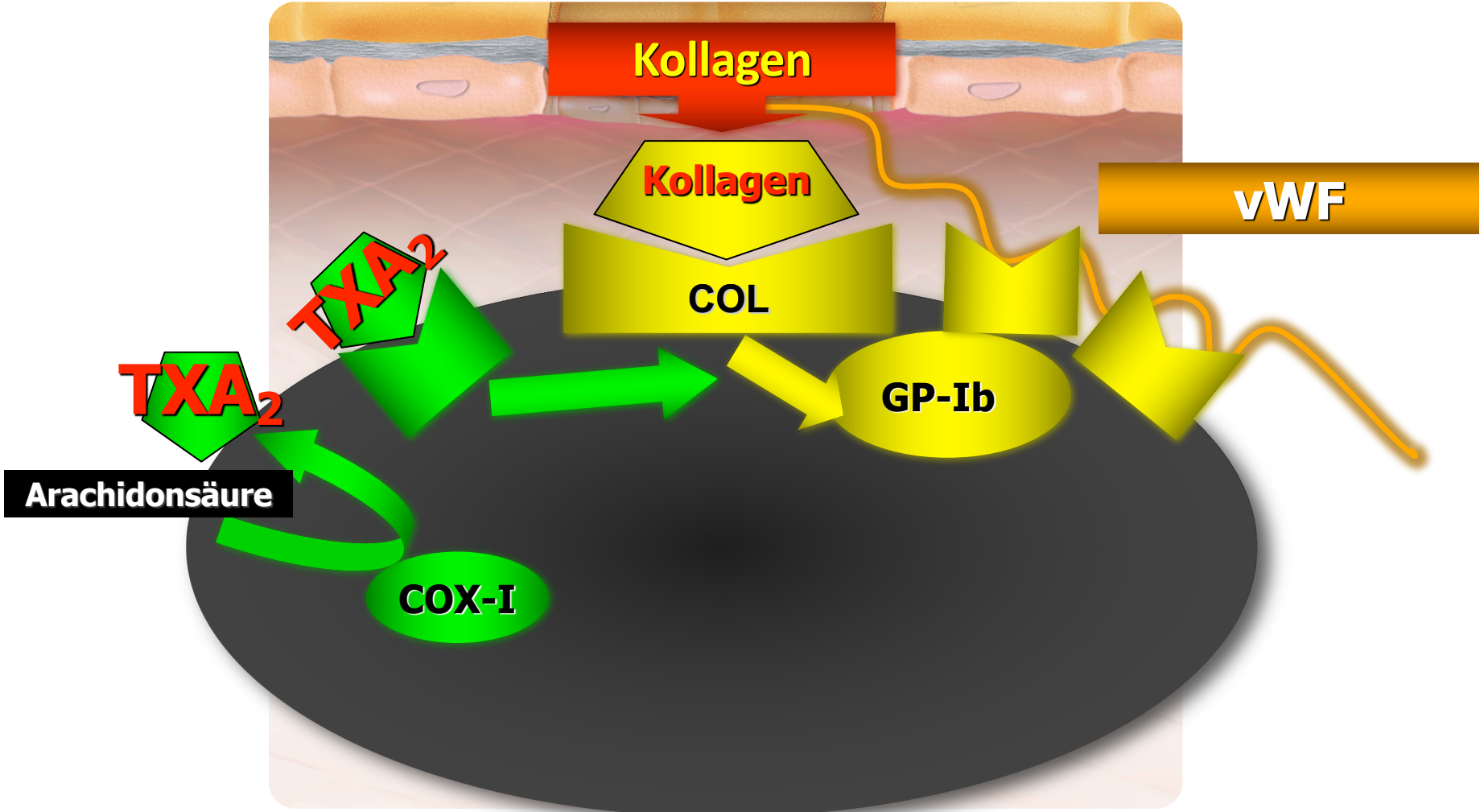


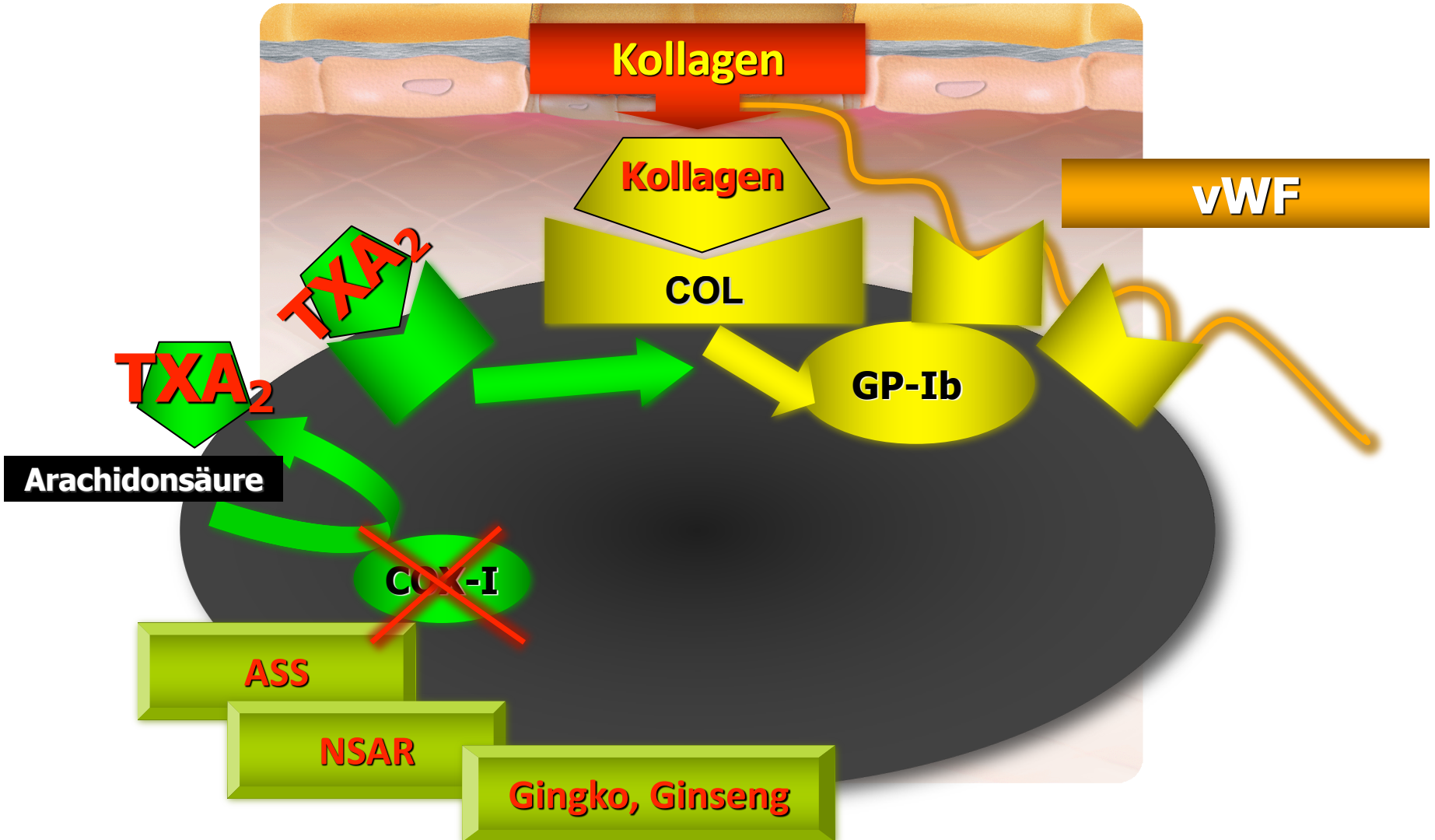


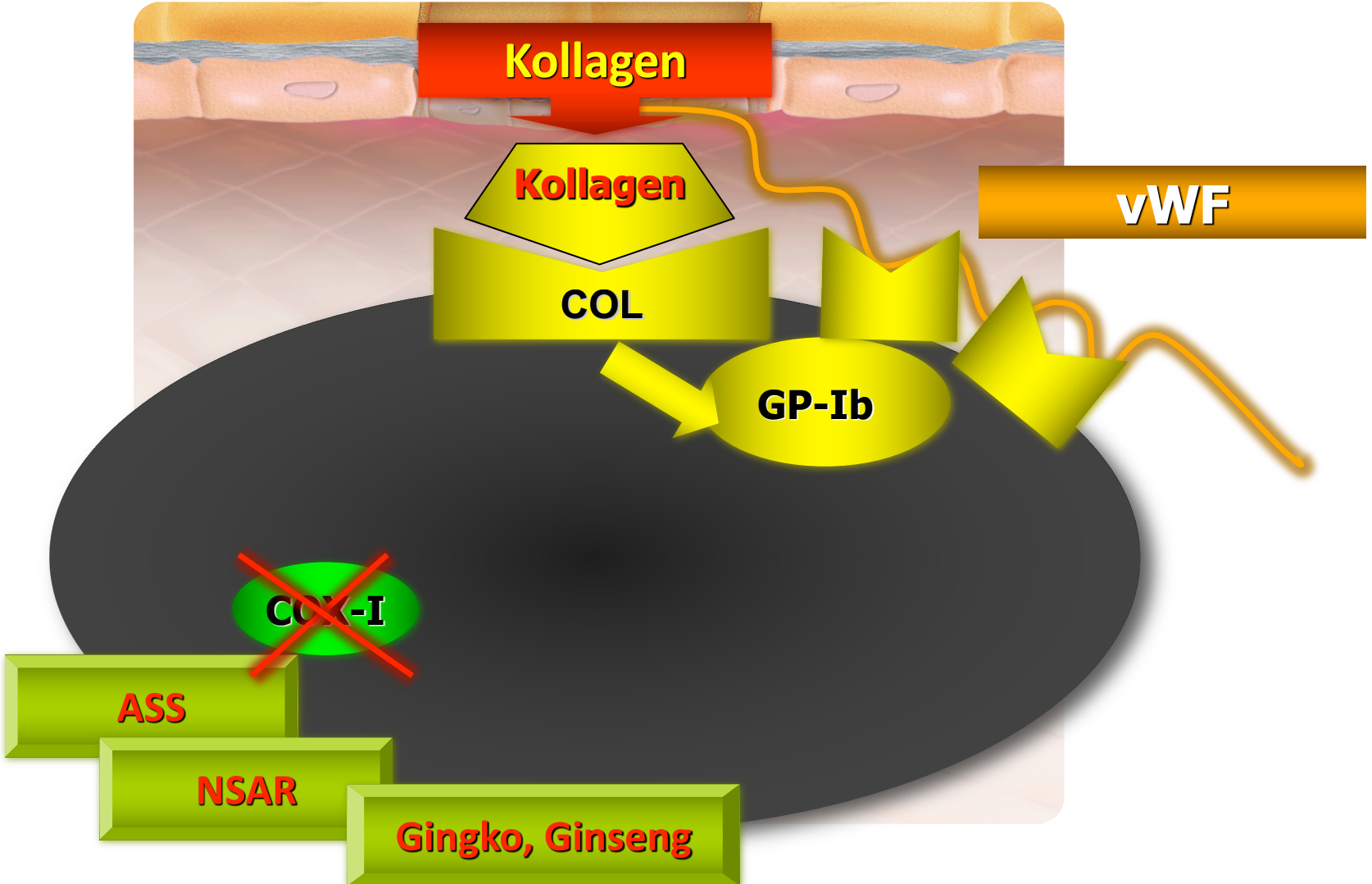

Kollagen
Kollagen
vWF
COL
GP-Ib

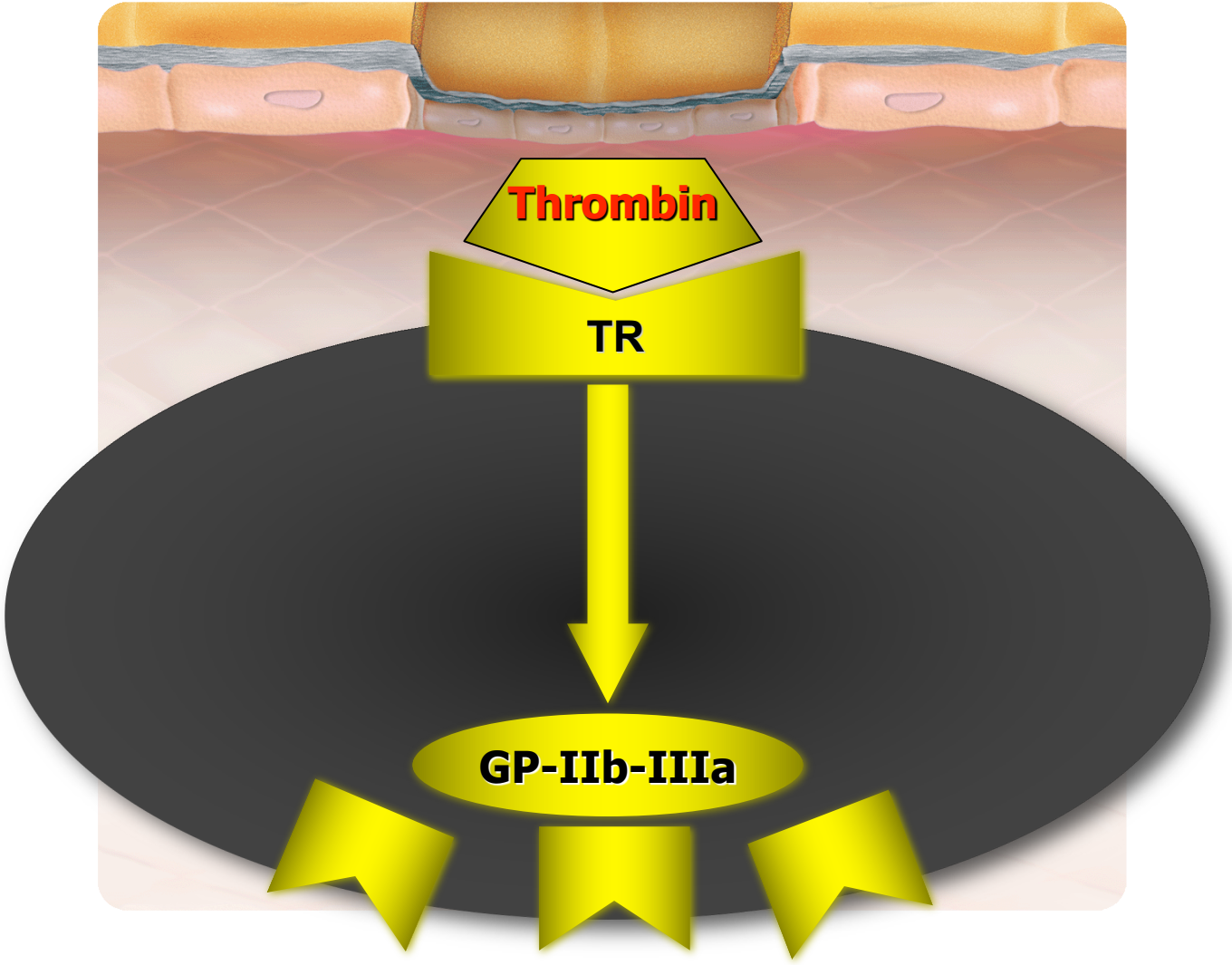

Kollagen
Kollagen
COL
vWF
Bernard-Soulier-
Syndrom

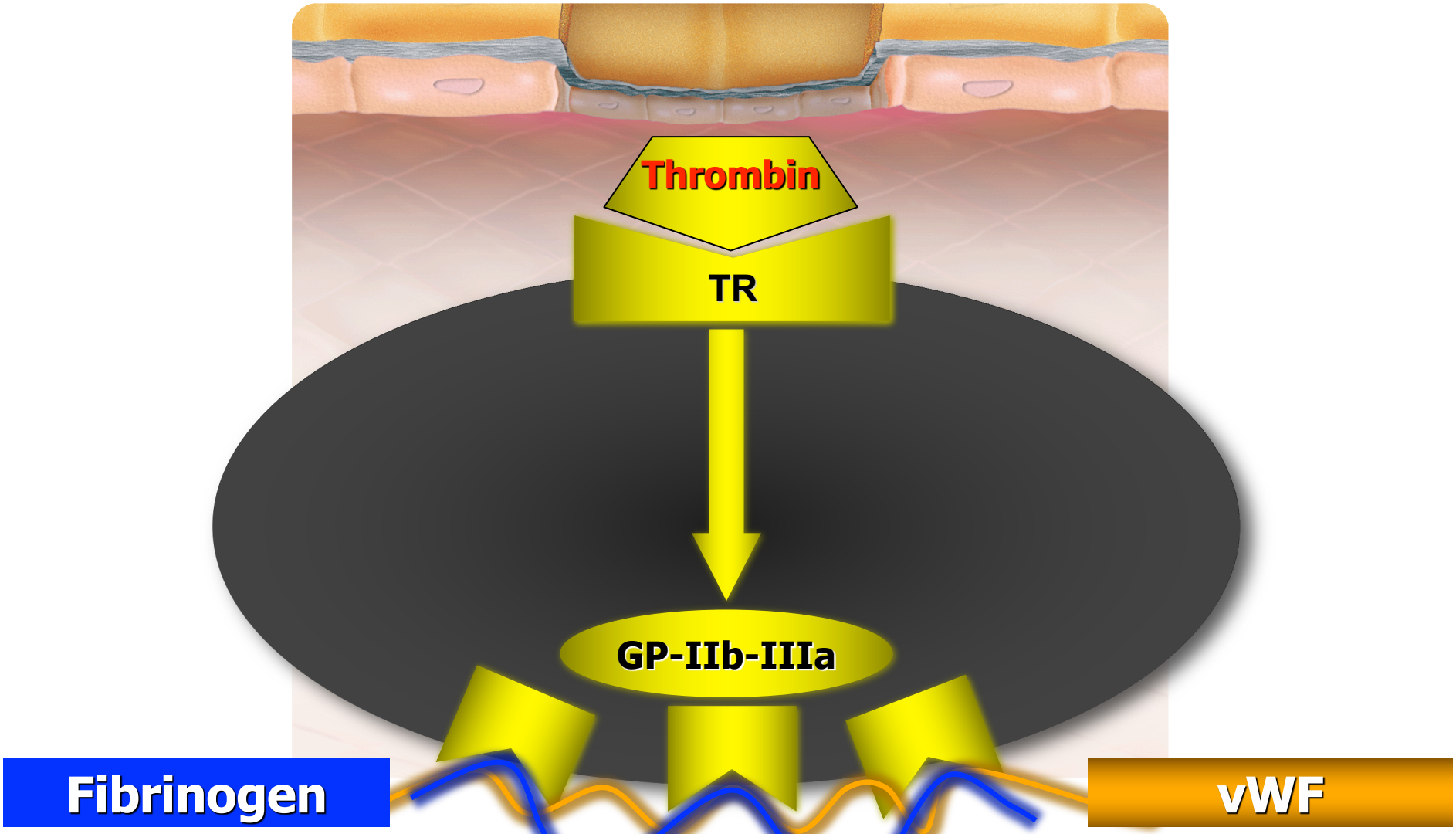

Kollagen
vWS
Kollagen
COL
GP-Ib

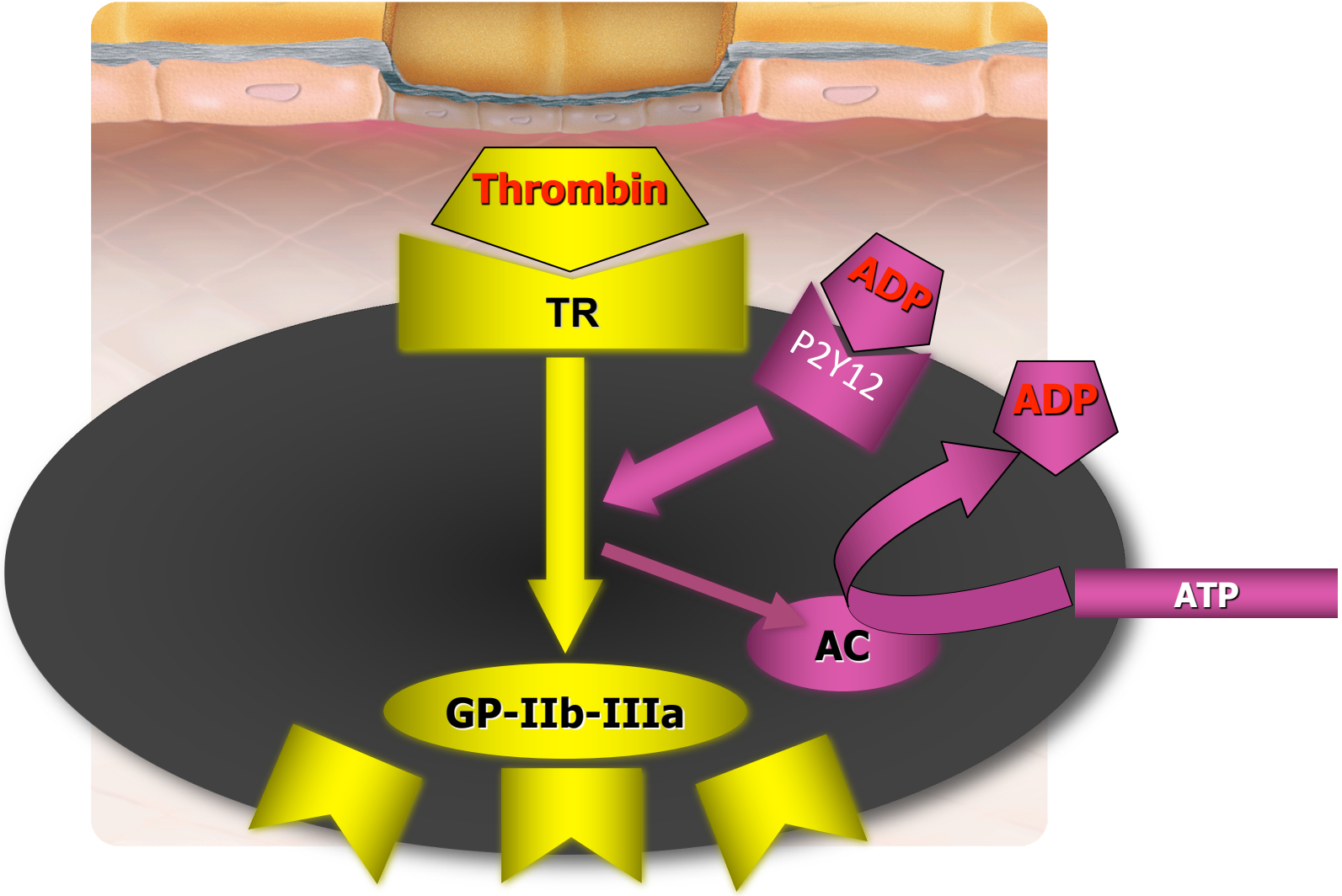

Kollagen
Kollagen
vWF
COL
TXA_2
TXA_2
GP-Ib
Arachidonsäure
COX-I

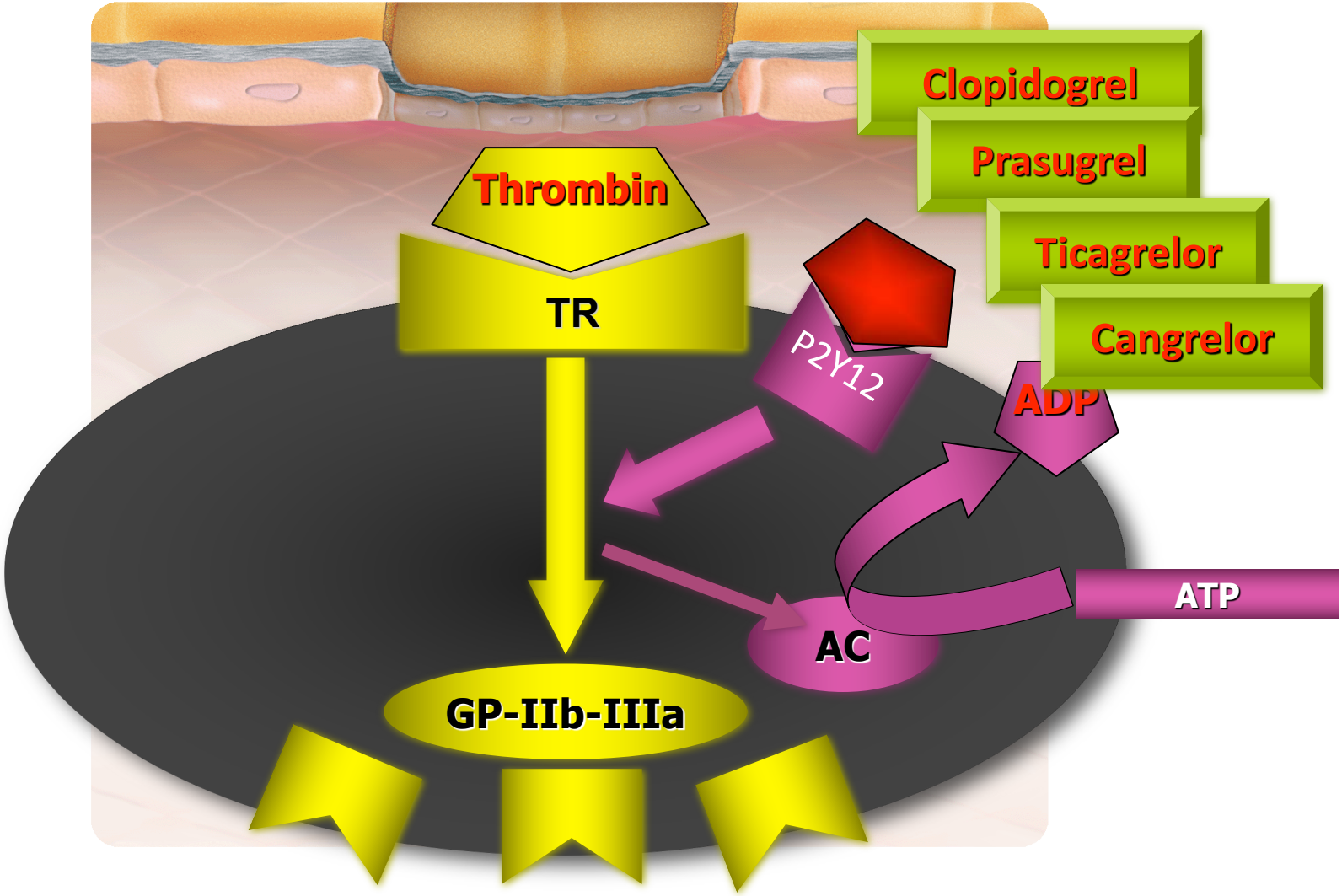

Kollagen
Kollagen
vWF
COL
TXA_2
TXA_2
GP-Ib
Arachidonsäure
COX-I
ASS
NSAR
Gingko, Ginseng

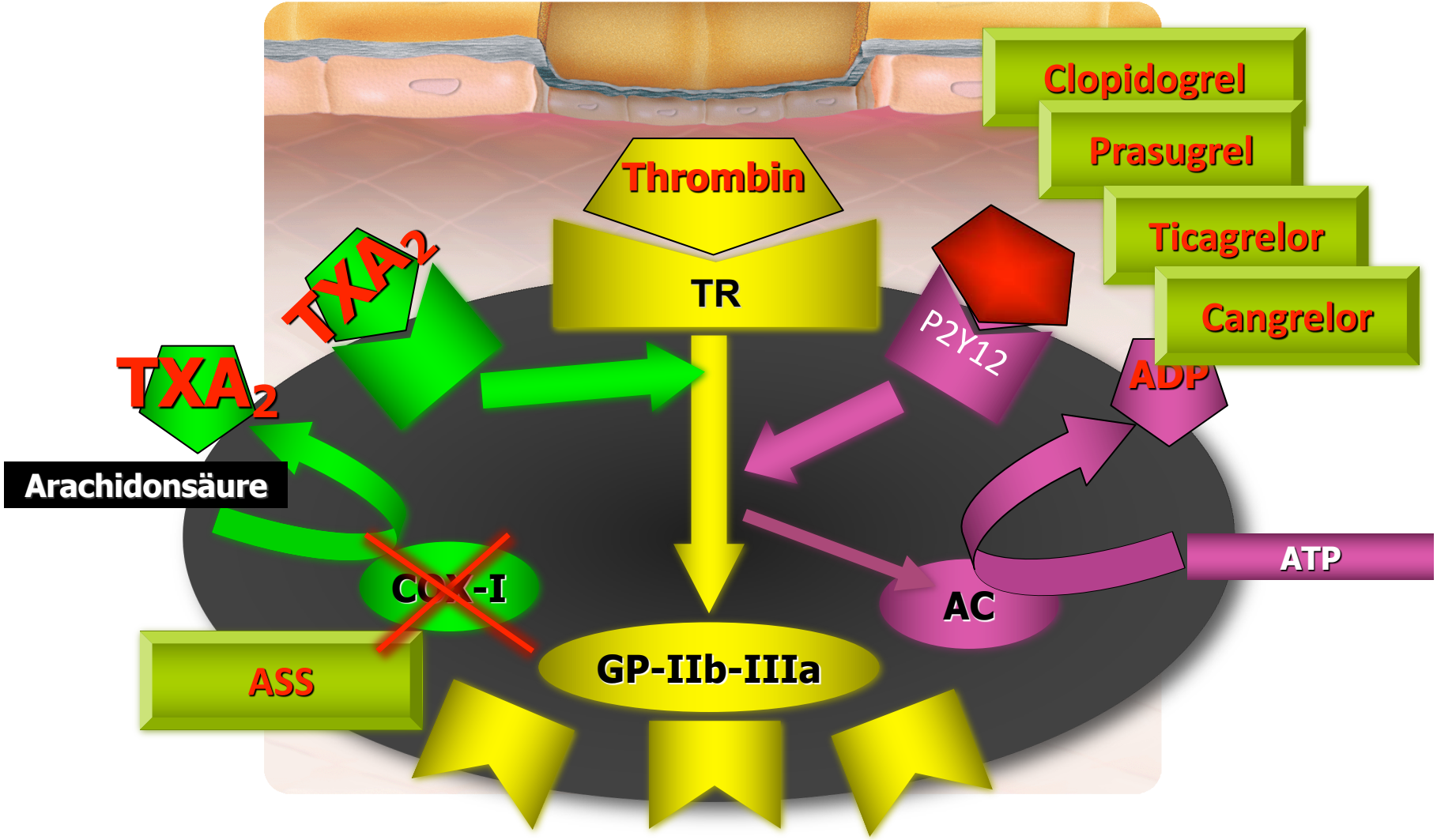

Kollagen
Kollagen
vWF
COL
GP-Ib
COX-I
ASS
NSAR
Gingko, Ginseng

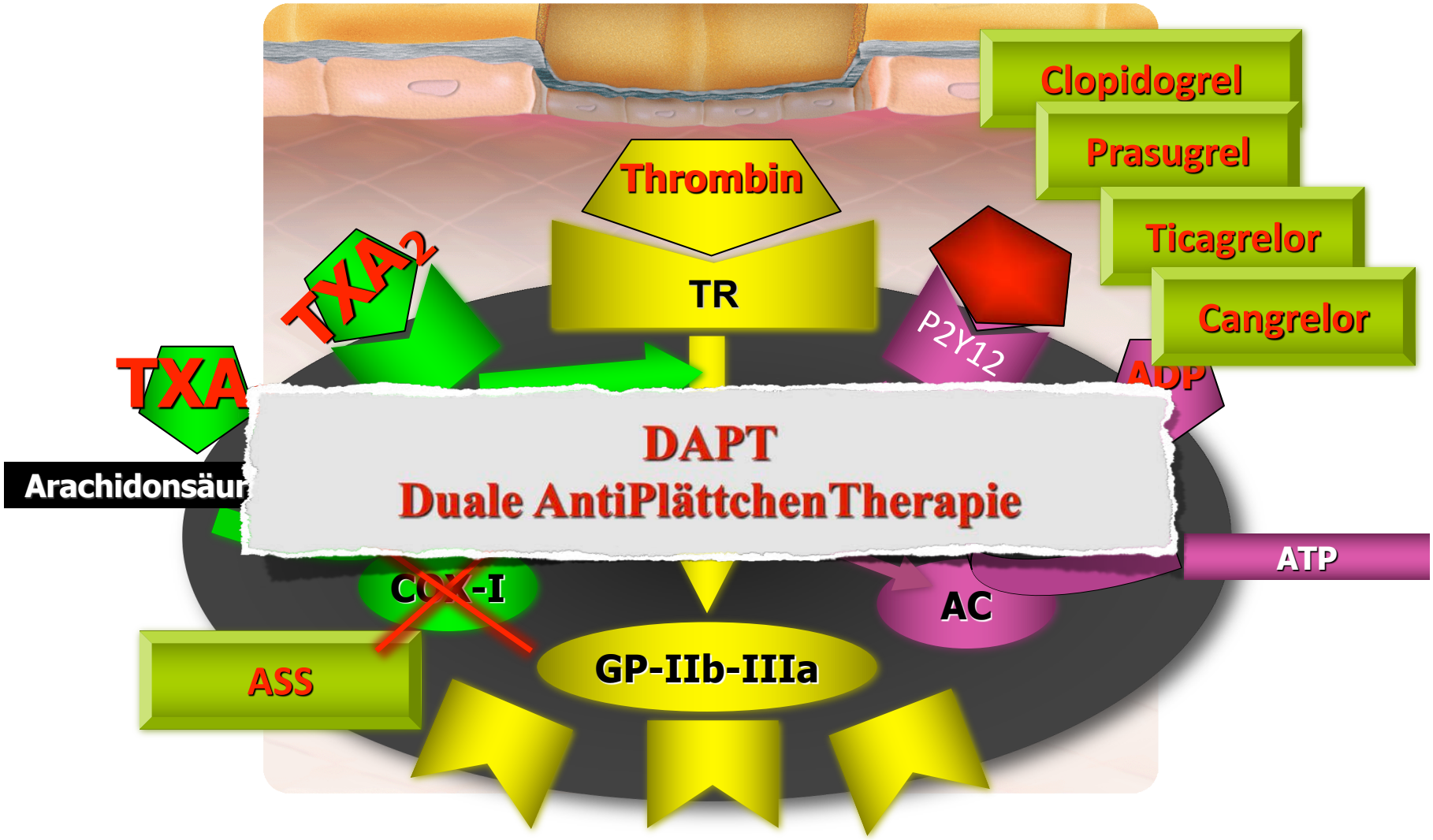

Thrombin
TR
GP-IIb-IIIa


Thrombin
TR
GP-IIb-IIIa
Fibrinogen
vWF


Thrombin
TR
ADP
P2Y12
ADP
ATP
AC
GP-IIb-IIIa


Clopidogrel
Prasugrel
Ticagrelor
Cangrelor
Thrombin
TR
P2Y12
ADP
ATP
AC
GP-IIb-IIIa


Clopidogrel
Prasugrel
Ticagrelor
Cangrelor
Thrombin
TR
TXA2
TXA2
P2Y12
ADP
Arachidonsäure
COX-I
ATP
AC
ASS
GP-IIb-IIIa

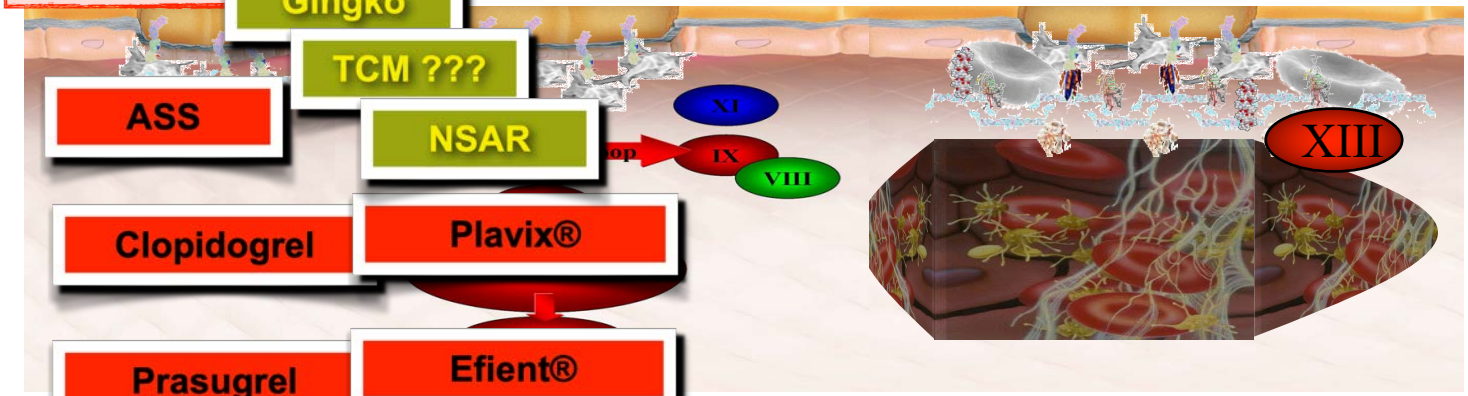

Clopidogrel
Prasugrel
Ticagrelor
Cangrelor
Thrombin
TR
TXA2
TXA
P2Y12
ADP
Arachidonsäur
DAPT
Duale AntiPlättchenTherapie
ATP
AC
COX-I
ASS
GP-IIb-IIIa

Ge[illegible]hibitorische Gerinnungstherapie

SSRI

Antibiotika

Primäre Hämos[illegible] Thrombin [illegible]eration Clot Bildung Clot Lyse



Gingko

TCM ???

ASS

NSAR

Clopidogrel

Plavix®

Prasugrel

Efient®

Ticagrelor

Brilique®

Cangrelor

Kengrexal®

WAS ist geschehen?

WO stehen wir?

WIE therapieren wir?

GERINNUNGS-DIAGNOSTIK

Gerinnungs-Diagnostik

Primäre Hämostase → Thro… Gene…

Blutverlust nach außen?

Blutverlust nach innen?

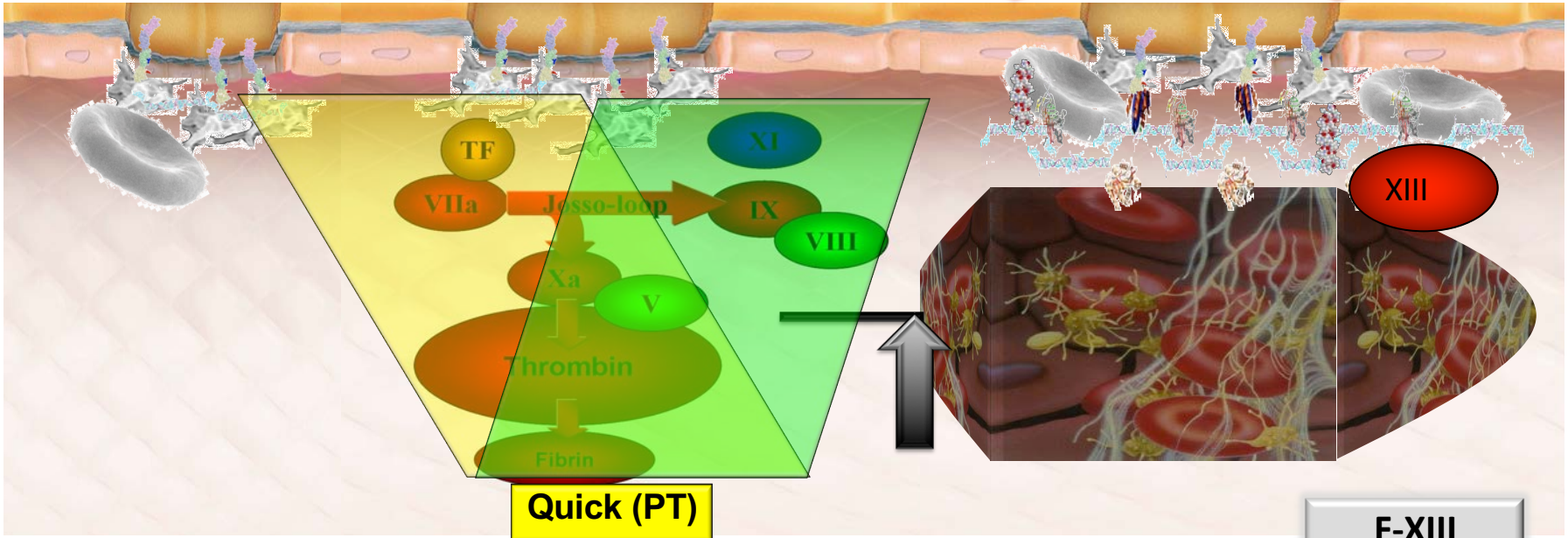
Blutverlust: wieviel?

Volumenersatz: was? wieviel?

Koagelbildung Ja/Nein?

Gerinnungs-Diagnostik

Primäre Hämostase → Thrombin Generation → Clot Bildung → Clot Lyse



Quick (PT)

aPTT

Tc

F-XIII

D-Dimere

Medikamenten-Anamnese: pos.

Lixiana®

Eliquis®

Xarelto®

Clot Lyse

ClotPro

APT

VKA

Biophen® DiXa-I

RVV-test

XIII

Multiplate

LMWH

Biophen® DTI

ECA-test

Thrombinzeit

Pradaxa®

Quick (PT)

aPTT

Tc

F-XIII

D-Dimere

Blutungs-Anamnese: pos.

Thrombin Generation → Clot Bildung → Clot Lyse

PFA

TF
VIIa
Josso-loop
XI
IX
VIII
Xa
V
Thrombin
Fibrin

Quick (PT)

aPTT

XIII

F-XIII

Tc

vWF-Ag / vWF-Act.

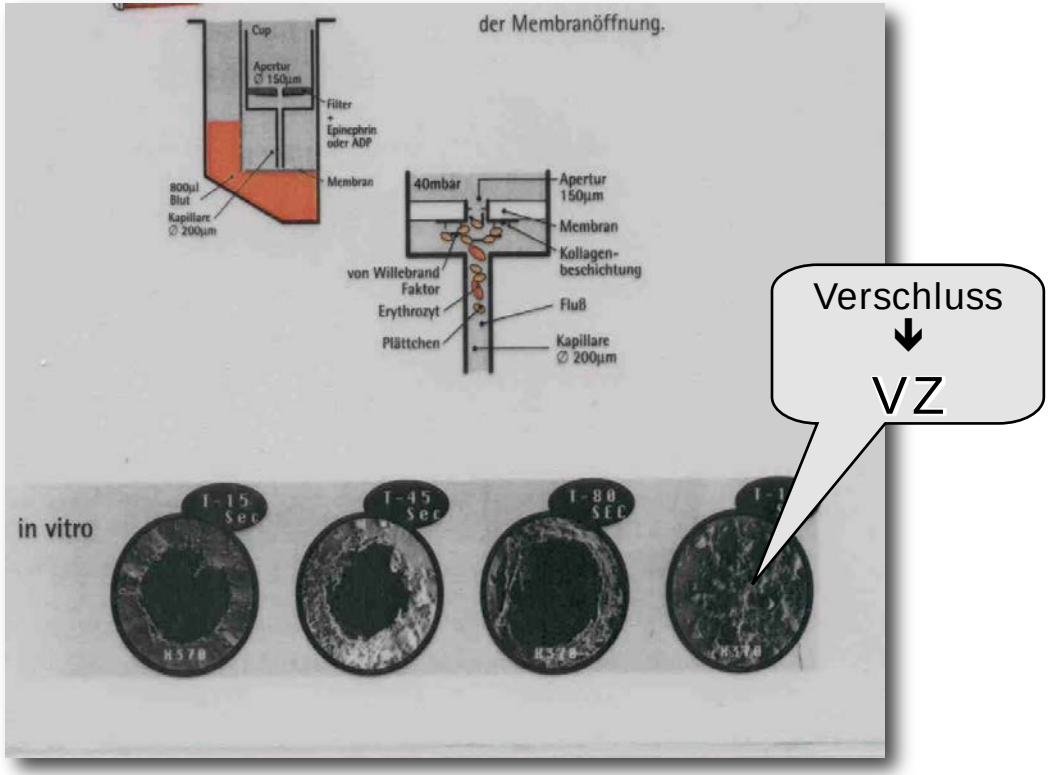
Bestimmung der

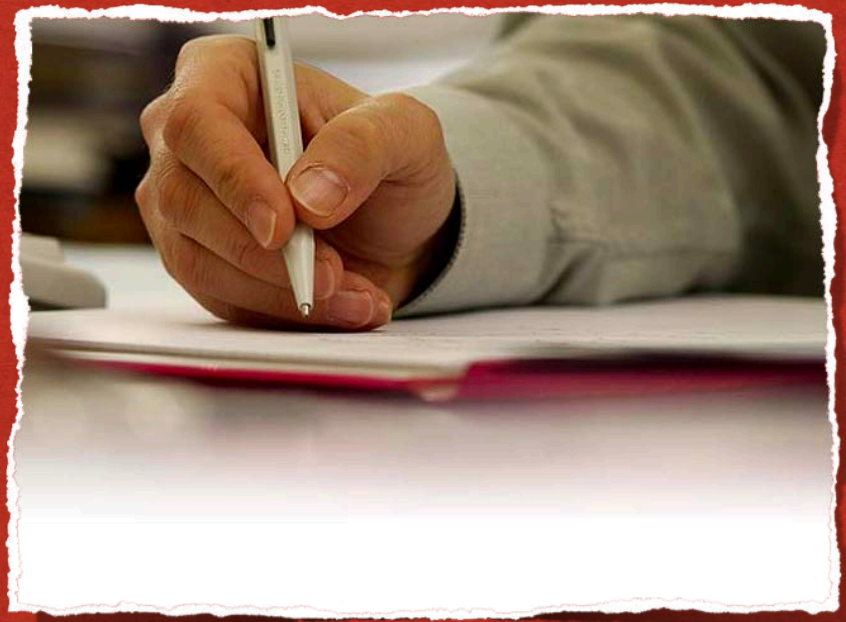
PHC

mit

Plättchen-**F**unktions-**A**nalysator **PFA-100™**

Funktionsweise





PRÄOPERATIVE BLUTUNGS-ANAMNESE

GUIDELINES

Management of severe peri-operative bleeding: Guidelines from the European Society of Anaesthesiology and Intensive Care

Second update 2022

Sibylle Kietaibl, Aamer Ahmed, Arash Afshari, Pierre Albaladejo, Cesar Aldecoa, Giedrius Barauskas, Edoardo De Robertis, David Faraoni, Daniela C. Filipescu, Dietmar Fries, Anne Godier, Thorsten Haas, Matthias Jacob, Marcus D. Lancé, Juan V. Llau, Jens Meier, Zsolt Molnar, Lidia Mora, Niels Rahe-Meyer, Charles M. Samama, Ecaterina Scarlatescu, Christoph Schlimp, Anne J. Wikkelsø and Kai Zacharowski

Recommendations
Präop. Evaluation

European Society of Anaesthesiology and Intensive Care

We suggest the use of bleeding assessment tools (BATs) for detecting and predicting the peri-operative risk of bleeding before surgery and invasive procedures in patients with suspected or confirmed inherited bleeding disorders (IBDs). (2B)

Recommendations
Präop. Evaluation

- *Before surgery or invasive procedures we recommend the use of a structured patient interview or questionnaire, which considers clinical and family bleeding history and detailed information on the patient's medication. (1C)*
- *We recommend the use of standardised questionnaires on bleeding and drug history as preferable to the routine use of conventional coagulation screening tests such as aPTT, INR and platelet count in elective surgery. (1C)*

HNO-OP

Fragebogen zur präoperativen Erhebung einer Gerinnungs-Anamnese

bei Kindern

	Bitte Zutreffendes ankreuzen, unterstreichen, bzw. ergänzen:			Zusatzfragen u. Notizen des Arztes:
1	Beobachten Sie bei Ihrem Kind folgende **Blutungsarten** – auch **ohne erkennbaren Grund?**			❑ ***pos. Blutungs-Anamnese***
1a	**Nasenbluten** (ohne andere Ursachen wie Schnupfen, trockene Luft, starkes Nasenputzen etc.)	N	J	▷ *Immer oder nur saisonal?* ▷ *Arztbesuch erfolgt?*
1b	**blaue Flecken** oder punktförmige Blutungen (auch am Körperstamm; auch ohne anzustoßen)	N	J	▷ *Ist Ihr Kind sehr stürmisch?* ▷ *Ohne jeglichen Zusammenhang mit Anstoßen, Zwicken etc.)* ▷ *immer schon oder ab wann?*
1c	**Zahnfleischbluten**	N	J	▷ *Zahnfleischstatus?* ▷ *Nur „rote Zanbürste“ oder echtes Zahnfleischbluten?*

2	Beobachten Sie bei Schnittwunden und/oder Schürfwunden ein längeres **Nachbluten**?	N	J	▷ *Wie lange genau?* ▷ *Welche Verletzung?*
3	Gab es in der Vorgeschichte eine **längere / verstärkte Blutung** während oder nach Operationen?	N	J	▷ *Welche Operationen?* ▷ *War die Blutung tatsächlich über der Norm?*
4	Heilen bei Ihrem Kind **Wunden** schlecht ab?	N	J	▷ *lange nässend, lange klaffend?* ▷ *Neigung zum Vereitern?* ▷ *Neigung zur Kelloidbildung?*
5	Gab es in der Vorgeschichte **längeres / verstärktes Nachbluten** beim Zahndurchtritt oder beim Zahnziehen?	N	J	▷ *Wie lange?* ▷ *War eine Nachbehandlung nötig?*
6	Gab / gibt es in der Blutsverwandtschaft Fälle von **Blutungsneigung**?	N	J	▷ *Angabe des Verwandtschafts-grades* ▷ *Ist die genaue Diagnose bekannt?*
7	Hat Ihr Kind in den **letzten Tagen** eines der **folgenden Medikamente** eingenommen: **Aspro®, Aspirin®, Voltaren®, Proxen-Saft®, Nureflex®**	N	J	▷ *Beobachten Sie eine Blutungsneigung (oder eine Zunahme der Blutungsneigung) erst seit die Medikamente eingenommen werden?*

2	Beobachten Sie bei Schnittwunden und/oder Schürfwunden ein längeres **Nachbluten**?	N	J	▷ *Wie lange genau?* ▷ *Welche Verletzung?*
3	Gab es in der Vorgeschichte eine **längere / verstärkte Blutung** während oder nach Operationen?	N	J	▷ *Welche Operationen?* ▷ *War die Blutung tatsächlich über der Norm?*
4	Heilen bei Ihrem Kind **Wunden** schlecht ab?	N	J	▷ *lange nässend, lange klaffend?* ▷ *Neigung zum Vereitern?* ▷ *Neigung zur Kelloidbildung?*
5	Gab es in der Vorgeschichte **längeres / verstärktes Nachbluten** beim Zahndurchtritt oder beim Zahnziehen?	N	J	▷ *Wie lange?* ▷ *War eine Nachbehandlung nötig?*
6	Gab / gibt es in der Blutsverwandtschaft Fälle von **Blutungsneigung**?	N	J	▷ *Angabe des Verwandtschafts-grades* ▷ *Ist die genaue Diagnose bekannt?*
7	Hat Ihr Kind in den **letzten Tagen** eines der **folgenden Medikamente** eingenommen: **Aspro®, Aspirin®, Voltaren®, Proxen-Saft®, Nureflex®**	N	J	▷ *Beobachten Sie eine Blutungsneigung (oder eine Zunahme der Blutungsneigung) erst seit die Medikamente eingenommen werden?*

Gerinnungslabor

- Quick 80 %
- PTT 28 sec
- Tc

- VZ EPI 220
  ADP

DDAVP-response

von Willebrand-Syndrom

von Willebrand-Syndrom Typ 1

Gerinnung im klinischen Alltag…

Blutung: akut +++

Primäre Hämostase → Thrombin Generation → Clot

ClotPro

Quantra

TEG

ROTEM

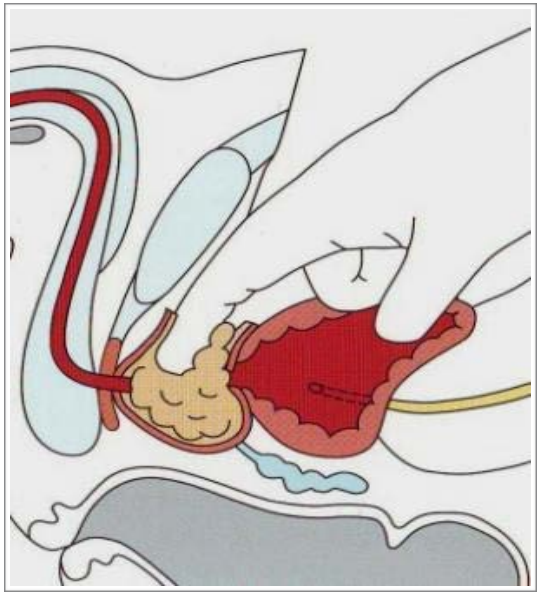
BGA

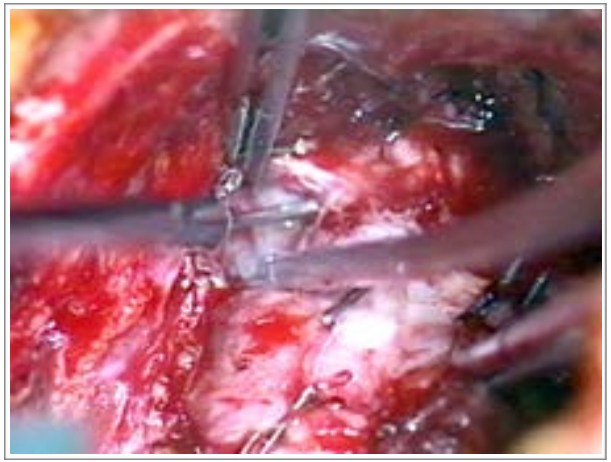
Ca, pH, Hb, Hkt

Temperatur

Tc

radikale Prostatektomie





Gerinnungslabor

• Quick	93 %
• PTT	21 sec.
• Tc	346 g/l
• F-XIII	87%
• Fbg.	456 mg/dl

…nach 2-stündigem „trockenem“ Verlauf…

Gerinnungslabor

- Quick 93 %
- PTT 21 sec.
- Tc 346 g/l
- F-XIII 87%
- Fbg. 456 mg/dl

- ✓ Chirurgische Blutung?
- ✓ Hämostaseologische Blutung?
- ✓ Verlust-Koagulopathie?
- ✓ Verdünnungs-Koagulopathie?
- ✓ What else???

Blutung: akut +++

Primäre Hämostase → Thrombin Generation → Clot

ClotPro

Quantra

TEG

ROTEM

BGA

Ca, pH, Hb, Hkt

Temperatur

Tc

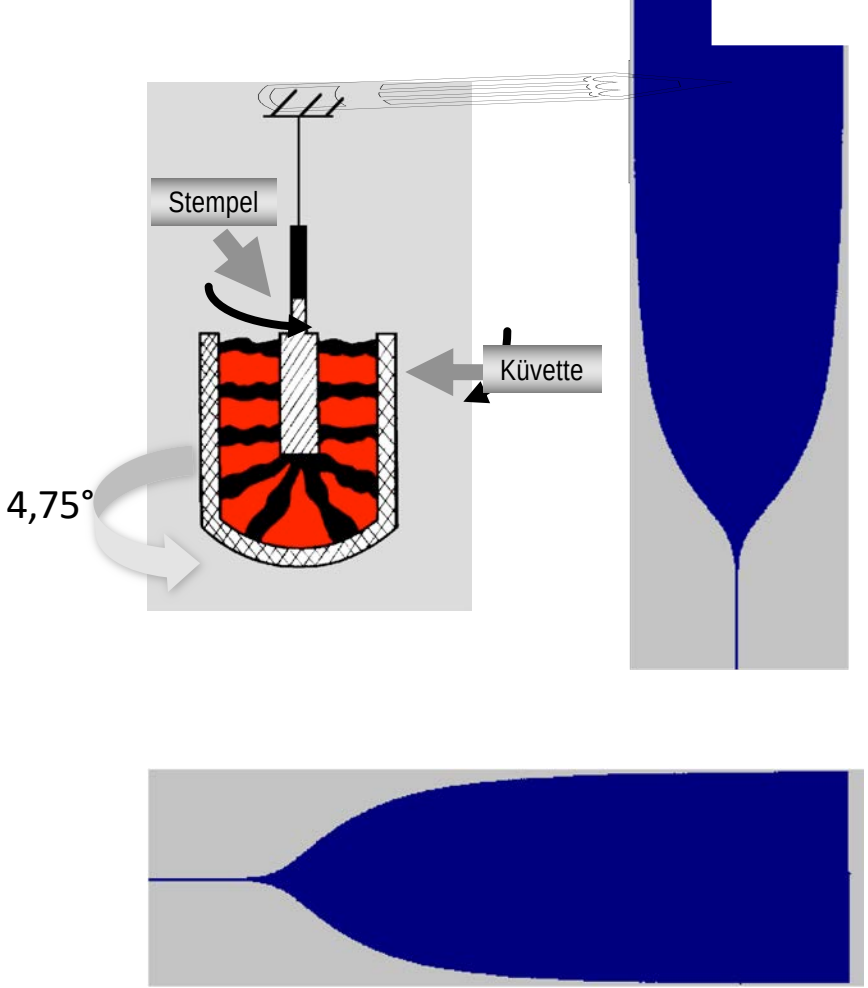
Das

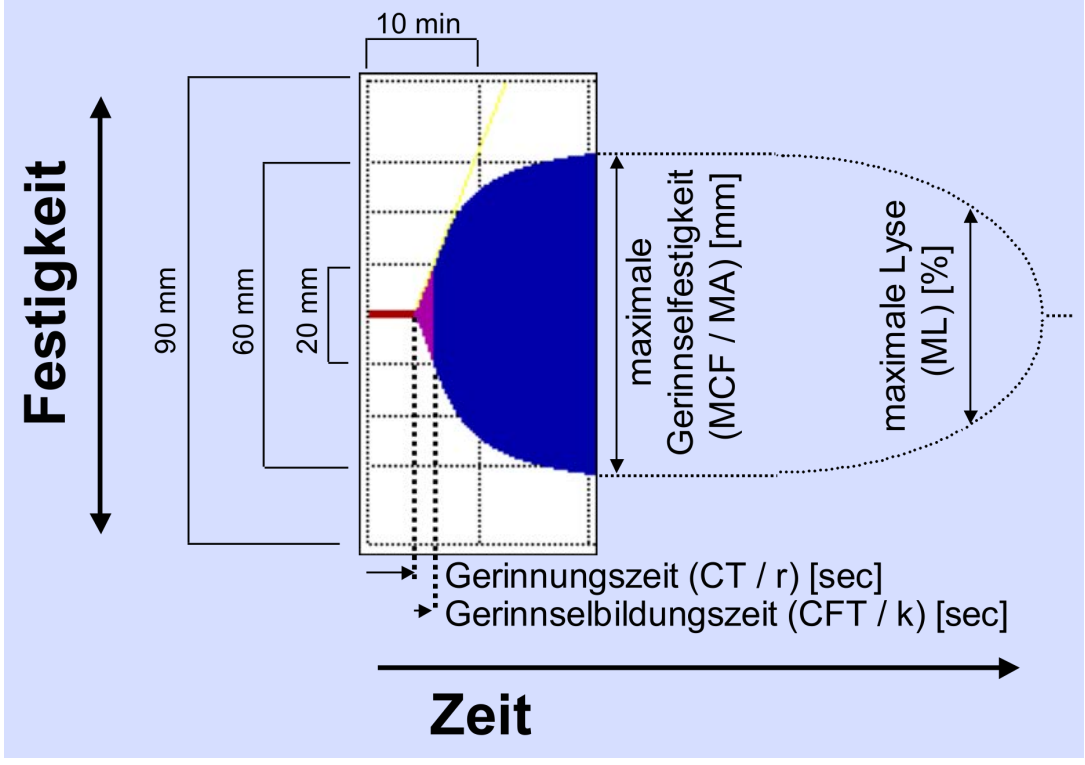
Thromb –

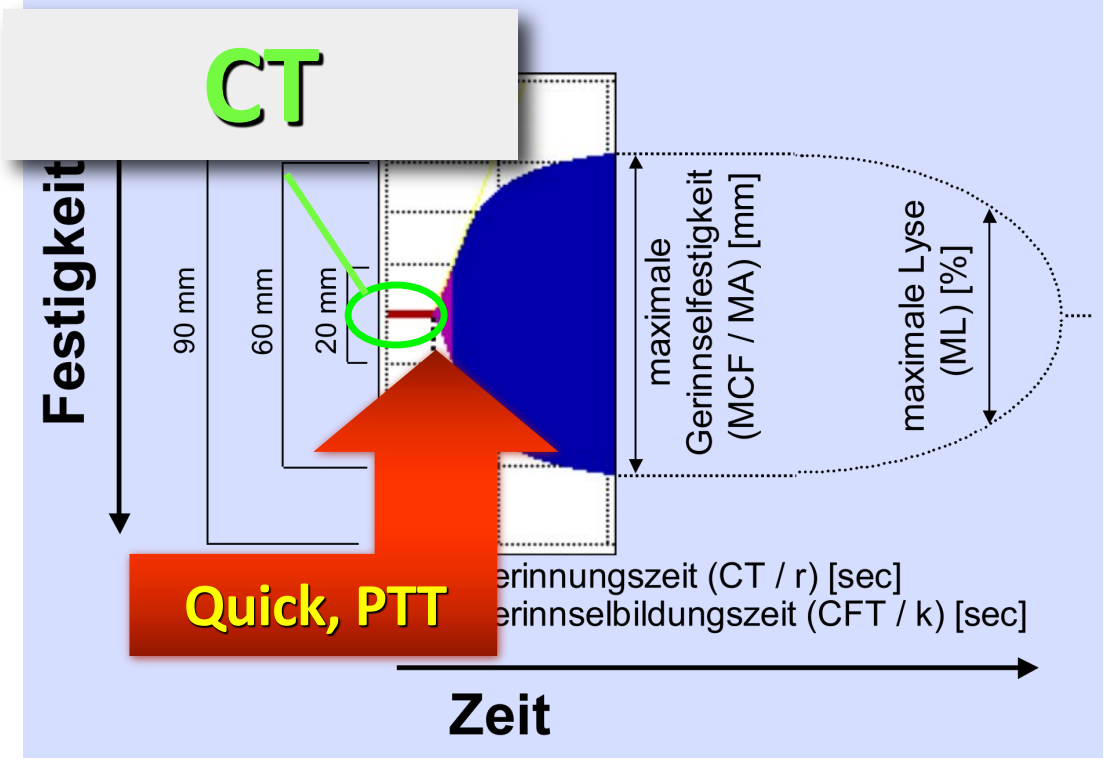
Elasto –

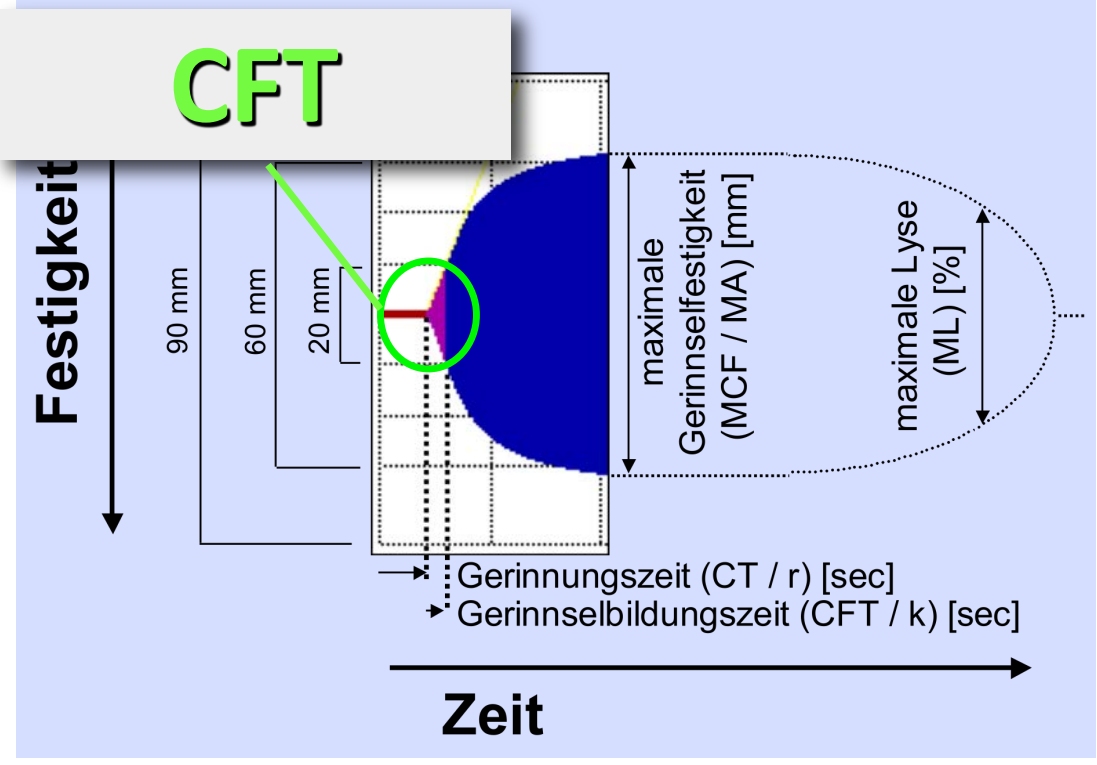
Gramm

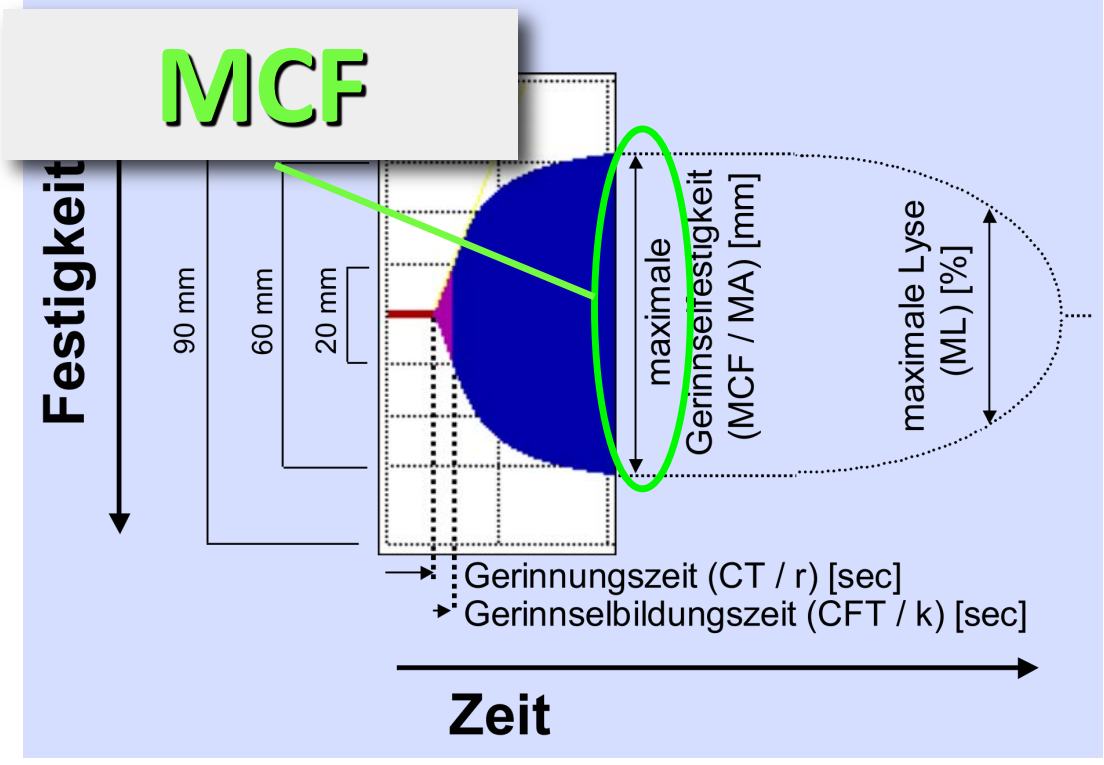
(Hartert 1948)




10 min
Festigkeit
90 mm
60 mm
20 mm
maximale Gerinnselfestigkeit (MCF / MA) [mm]
maximale Lyse (ML) [%]
Gerinnungszeit (CT / r) [sec]
Gerinnselbildungszeit (CFT / k) [sec]
Zeit


CT
Festigkeit
90 mm
60 mm
20 mm
maximale Gerinnselfestigkeit (MCF / MA) [mm]
maximale Lyse (ML) [%]
Quick, PTT
erinnungszeit (CT / r) [sec]
erinnselbildungszeit (CFT / k) [sec]
Zeit


CFT
Festigkeit
90 mm
60 mm
20 mm
maximale Gerinnselfestigkeit (MCF / MA) [mm]
maximale Lyse (ML) [%]
Gerinnungszeit (CT / r) [sec]
Gerinnselbildungszeit (CFT / k) [sec]
Zeit


MCF
Festigkeit
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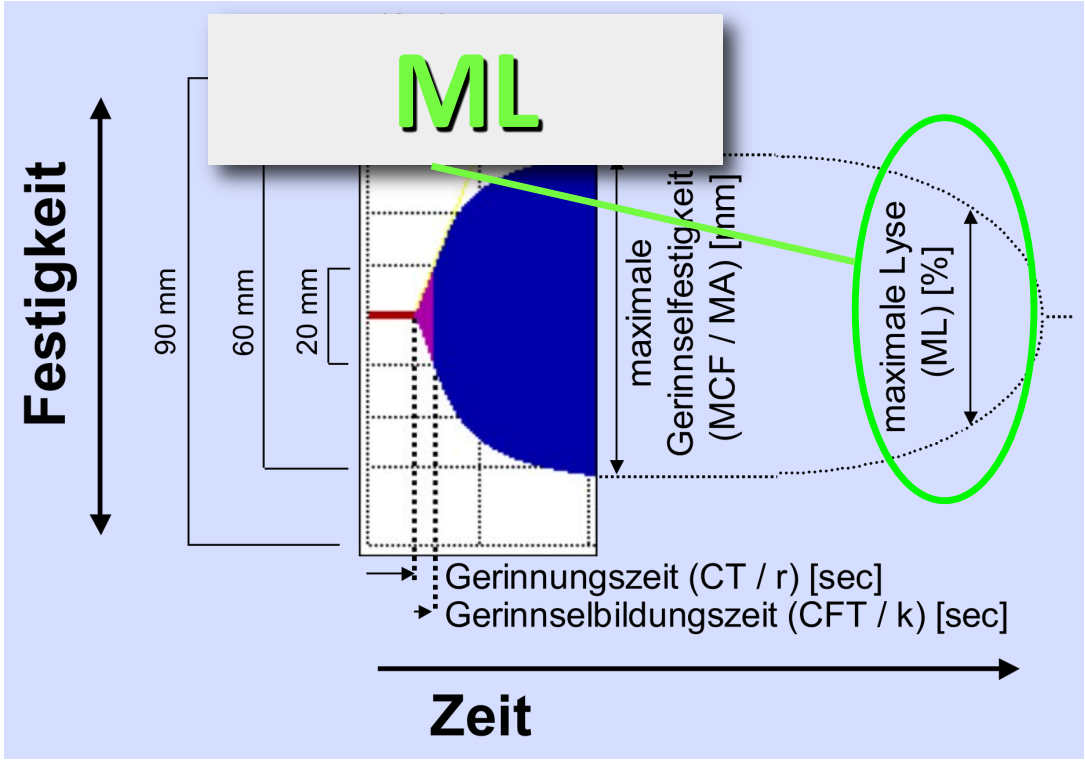
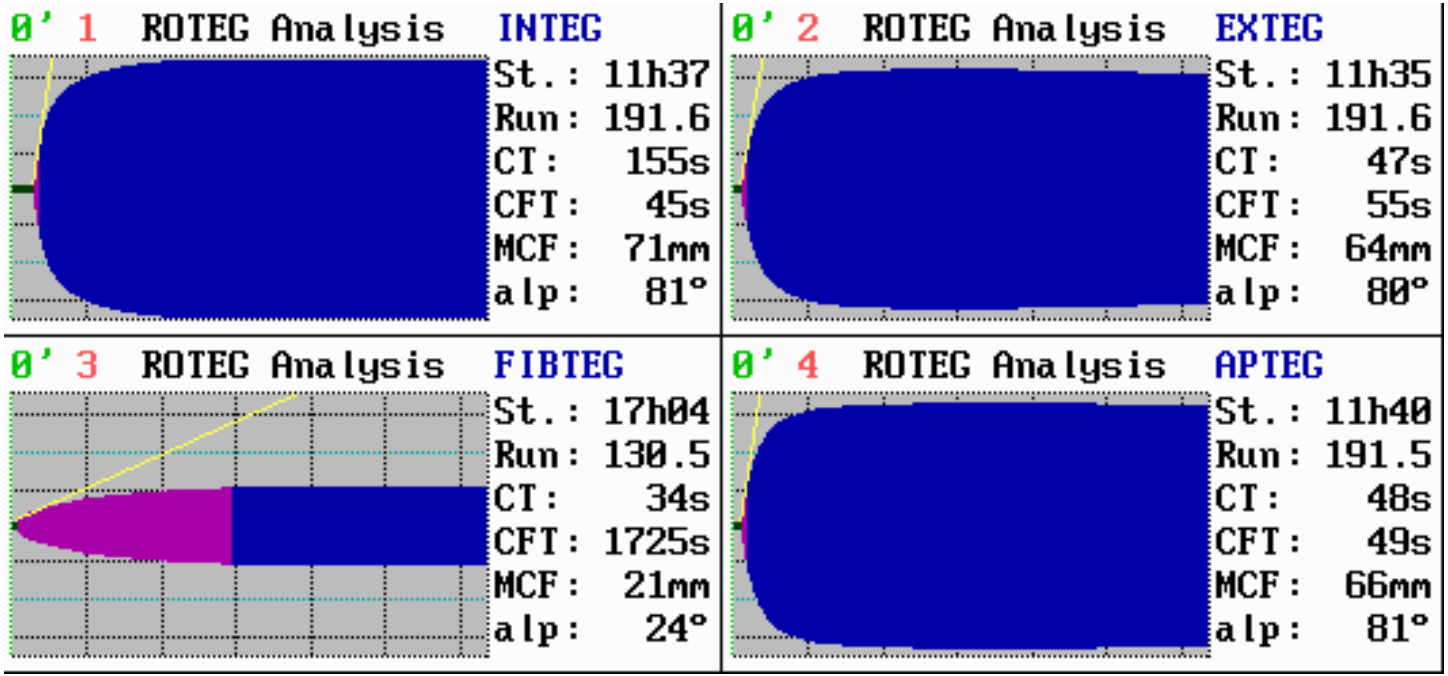
20 mm
maximale Gerinnselfestigkeit (MCF / MA) [mm]
maximale Lyse (ML) [%]
Gerinnungszeit (CT / r) [sec]
Gerinnselbildungszeit (CFT / k) [sec]
Zeit

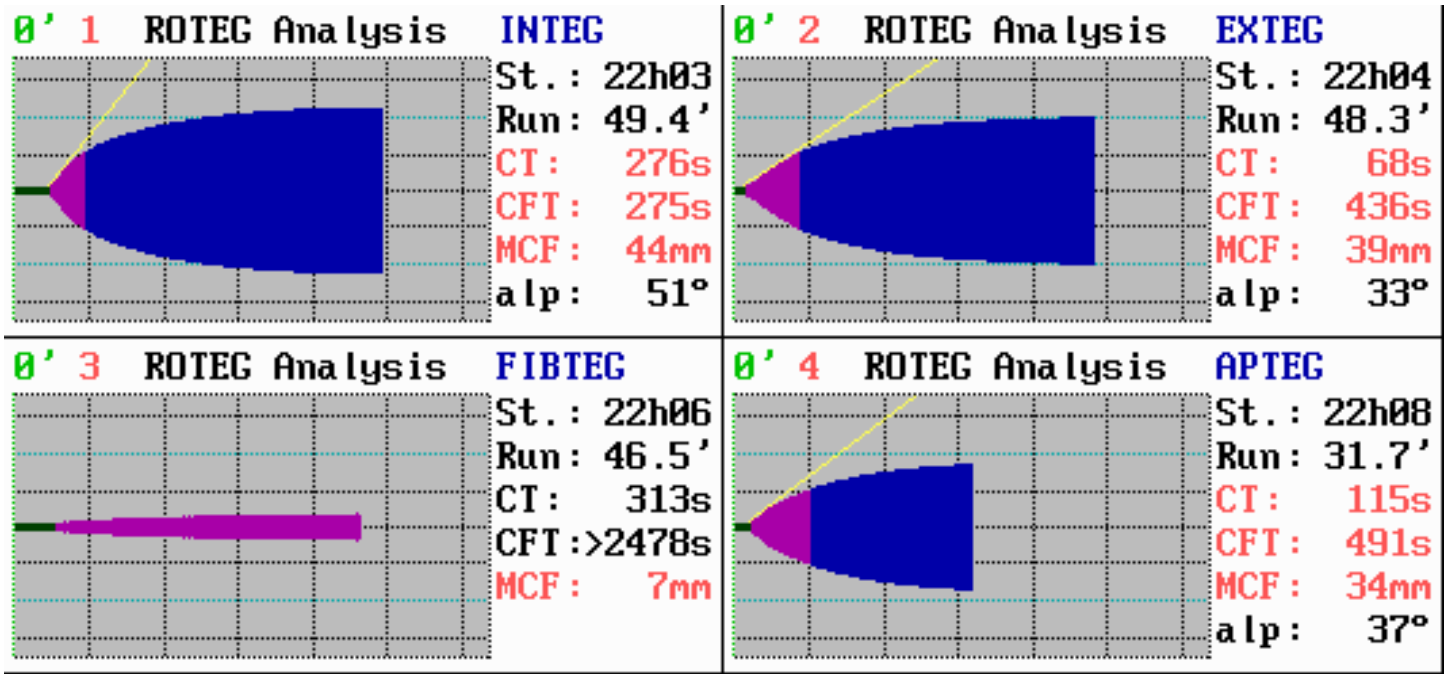

ML
Festigkeit
90 mm
60 mm
20 mm
maximale Gerinnselfestigkeit (MCF / MA) [mm]
maximale Lyse (ML) [%]
Gerinnungszeit (CT / r) [sec]
Gerinnselbildungszeit (CFT / k) [sec]
Zeit

ROTEM®
Normalbefund

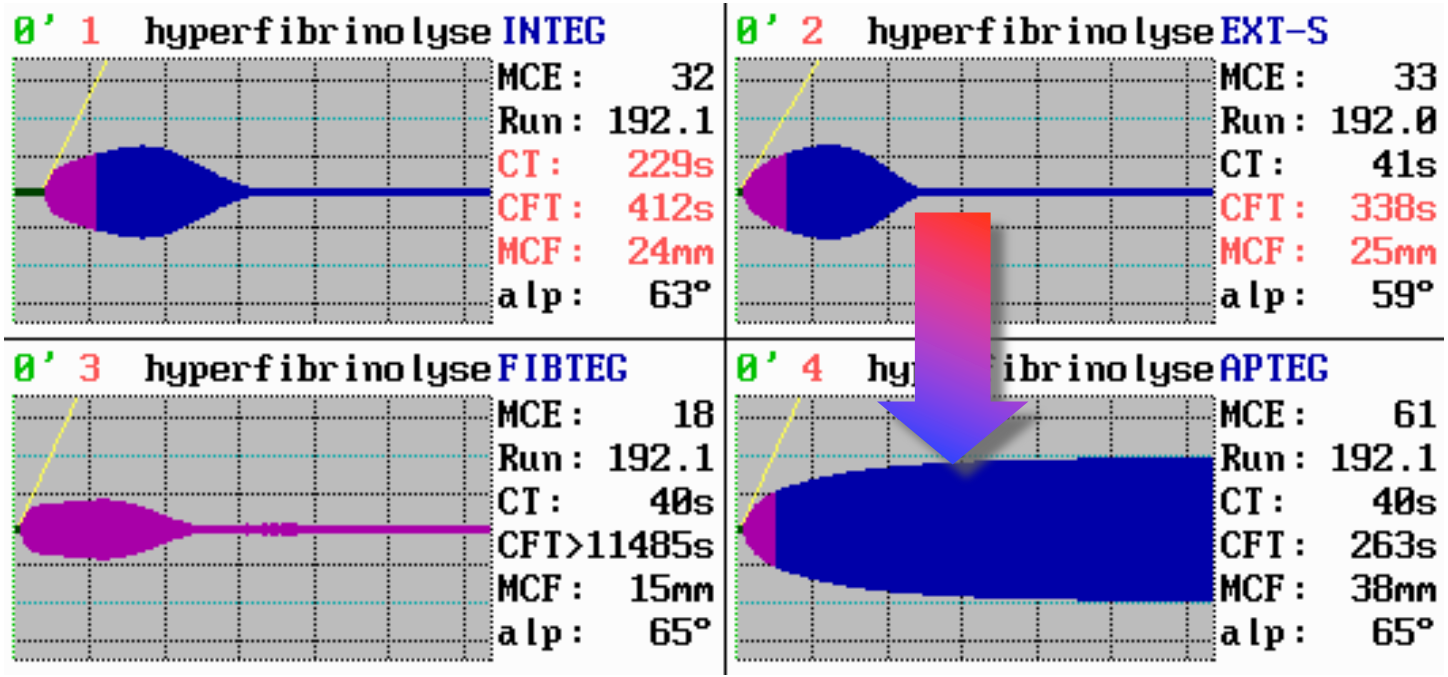


ROTEM®

„Fibrin-Mangel“
„Fibrin-Polymerisations-Störung“



ROTEM®
„Hyperfibrinolyse“



European Society of Anaesthesiology and Intensive Care

GUIDELINES

Management of severe peri-operative bleeding: Guidelines from the European Society of Anaesthesiology and Intensive Care

Second update 2022

Sibylle Kietaibl, Aamer Ahmed, Arash Afshari, Pierre Albaladejo, Cesar Aldecoa, Giedrius Barauskas, Edoardo De Robertis, David Faraoni, Daniela C. Filipescu, Dietmar Fries, Anne Godier, Thorsten Haas, Matthias Jacob, Marcus D. Lancé, Juan V. Llau, Jens Meier, Zsolt Molnar, Lidia Mora, Niels Rahe-Meyer, Charles M. Samama, Ecaterina Scarlatescu, Christoph Schlimp, Anne J. Wikkelsø and Kai Zacharowski

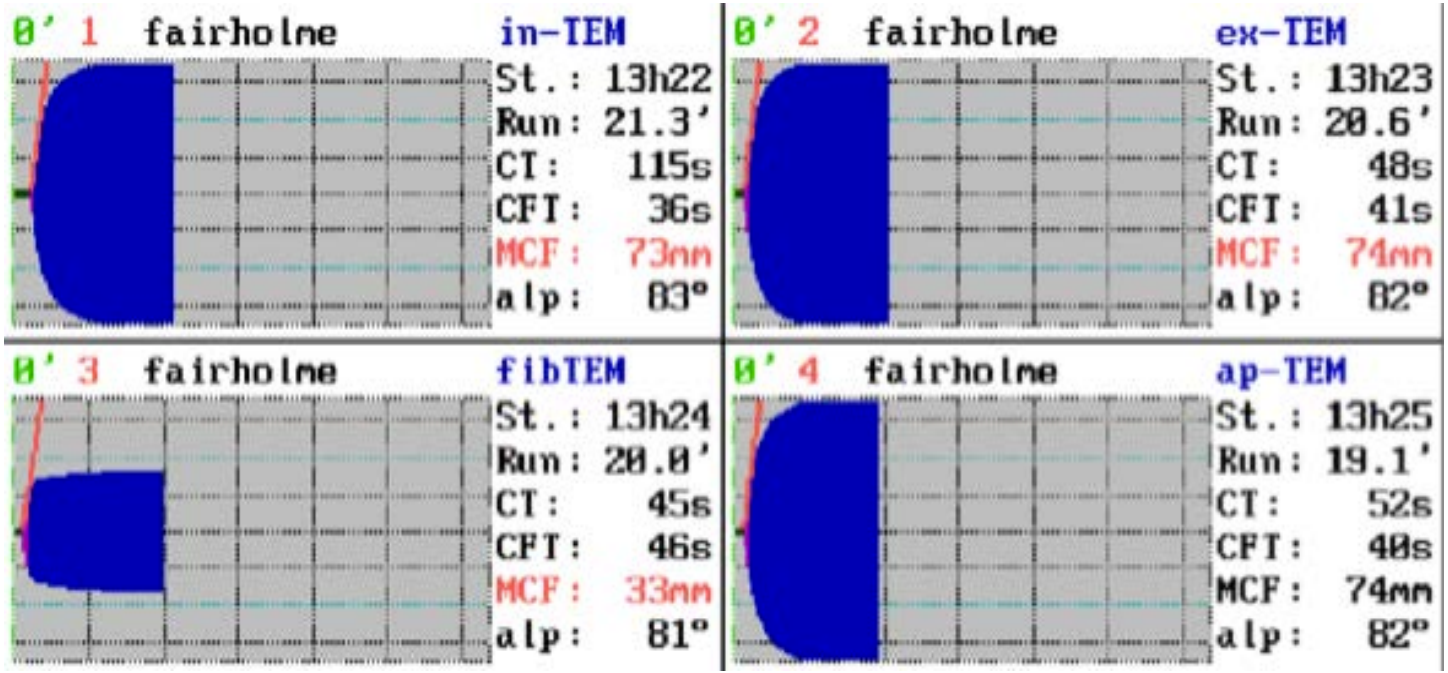
Recommendations

VHA - Viscoel. Haemostatic Assay

We recommend the application of intervention algorithms incorporating predefined triggers and targets based on viscoelastic haemostatic assay (VHA) coagulation monitoring to guide individualised haemostatic intervention in the case of perioperative bleeding.
(1C)

- ✓ Chirurgische Blutung?
- ✓ Hämostaseologische Blutung?
- ✓ Verlust-Koagulopathie?
- ✓ Verdünnungs-Koagulopathie?
- ✓ What else???

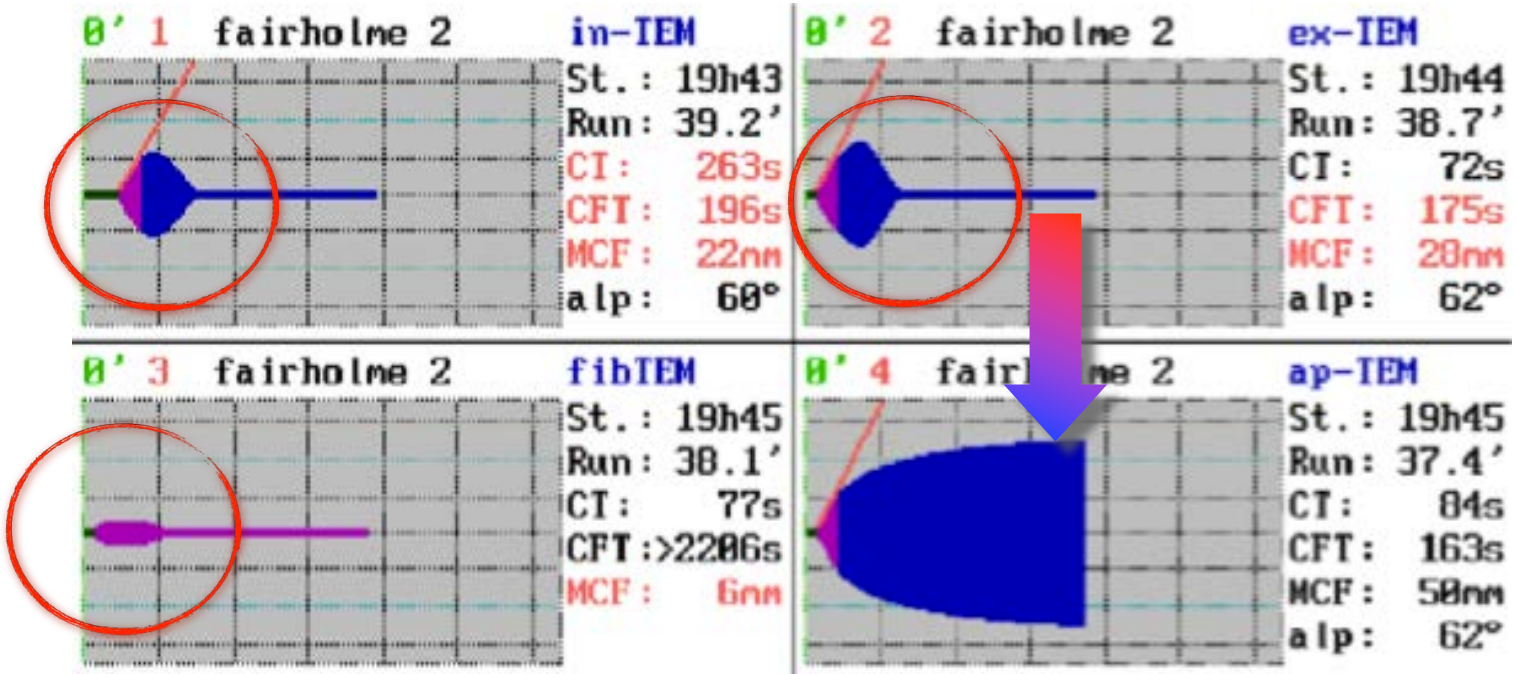
ROTEM
präoperativ



ROTEM

2 Std. unauff. dann:

diffuse Blutung

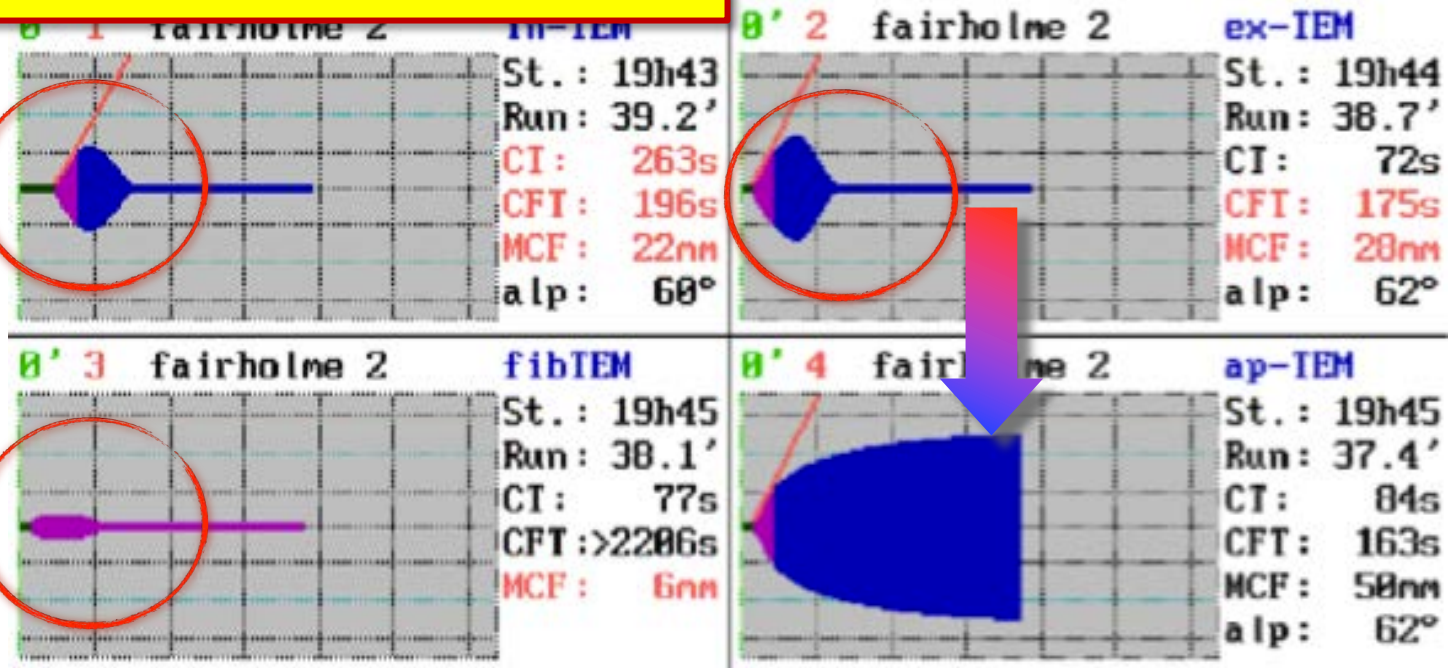


- ✓ Chirurgische Blutung?
- ✓ Hämostaseologische Blutung?
- ✓ Verlust-Koagulopathie?
- ✓ Verdünnungs-Koagulopathie?
- ✓ What else???

TEM

auff. dann:

Blutung

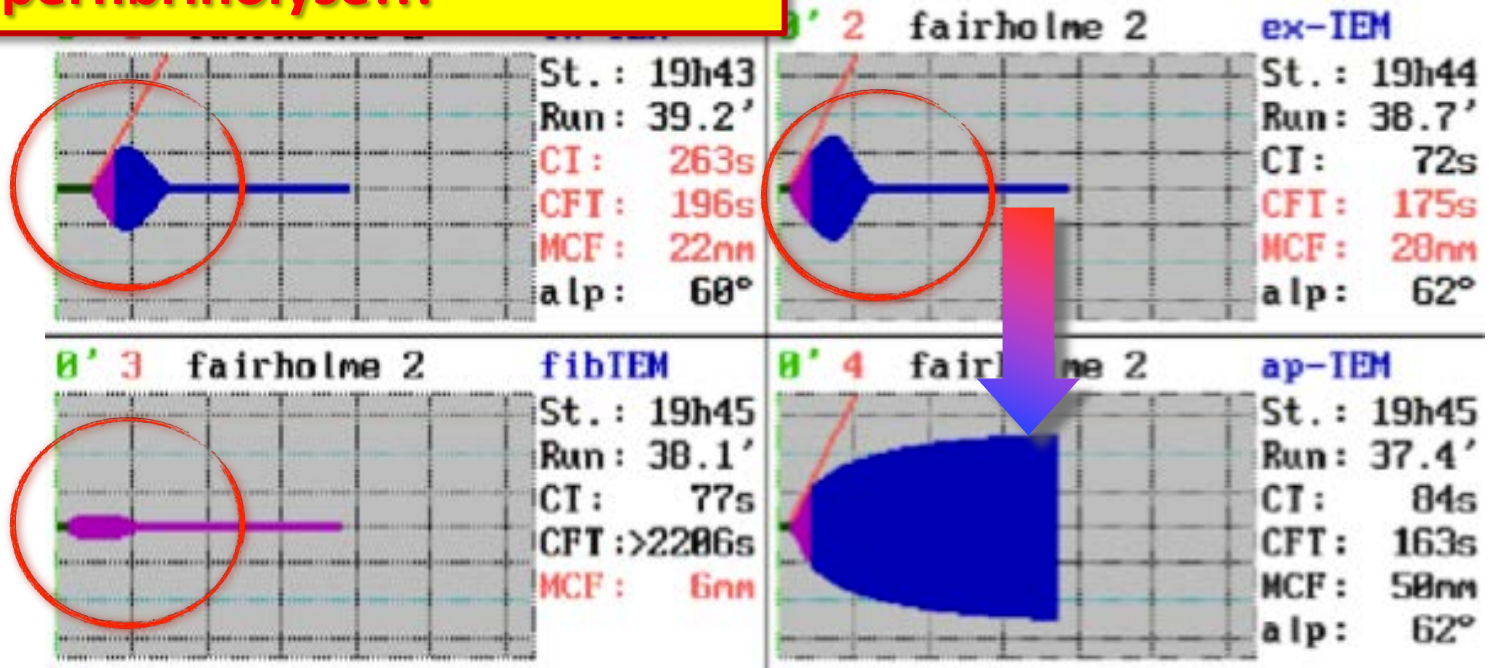


- ✓ Chirurgische Blutung?
- ✓ Hämostaseologische Blutung?
- ✓ Verlust-Koagulopathie?
- ✓ Verdünnungs-Koagulopathie?
- ✓ **Hyperfibrinolyse!!!**

EM

uff. dann:

lutung

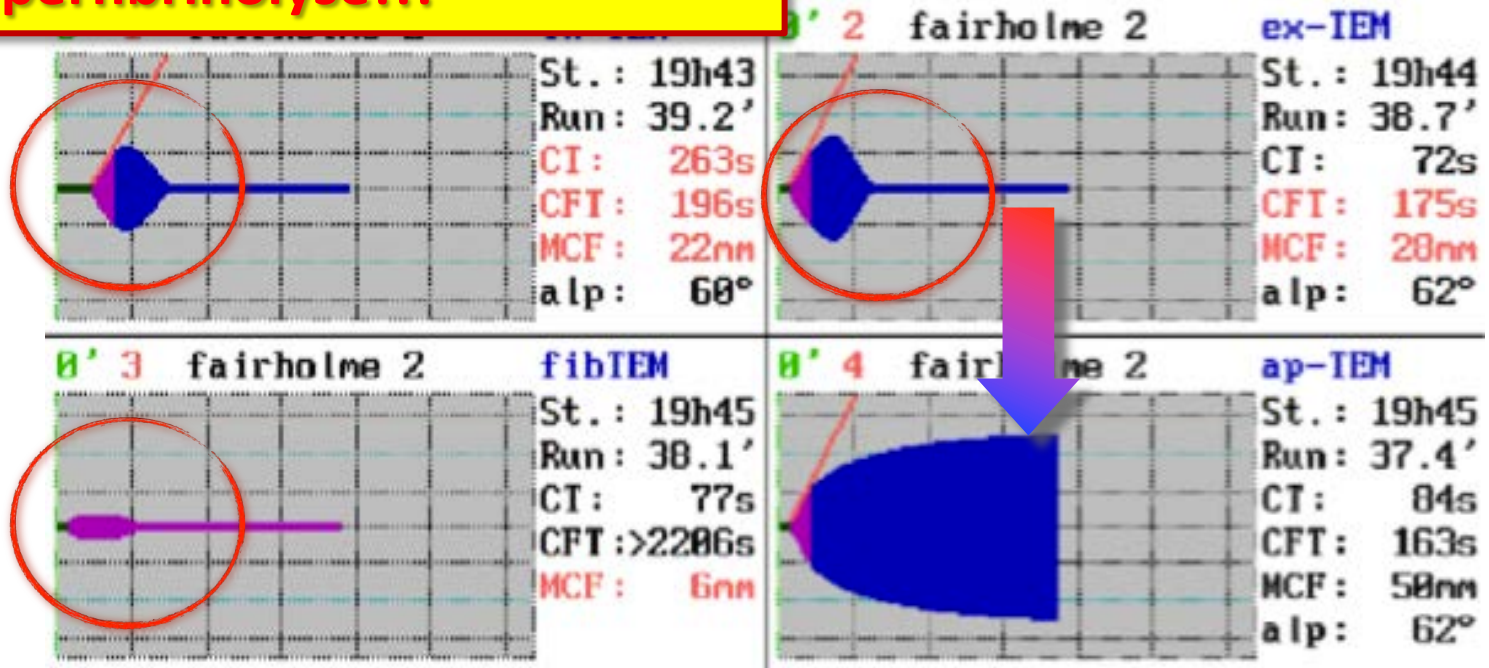


- ✓ Chirurgische Blutung?
- ✓ Hämostaseologische Blutung?
- ✓ **Verlust-Koagulopathie!!!**
- ✓ Verdünnungs-Koagulopathie?
- ✓ **Hyperfibrinolyse!!!**

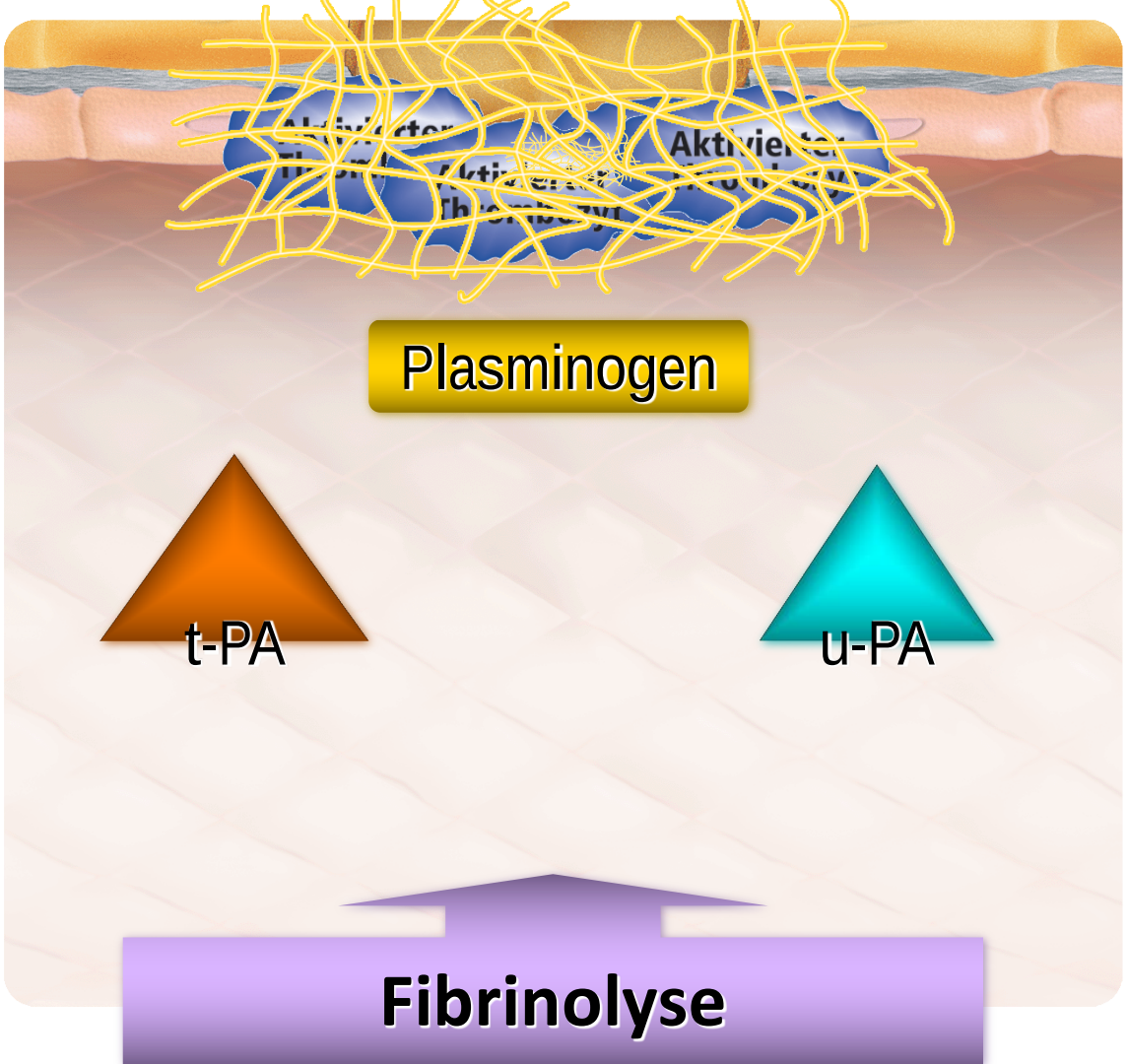
EM

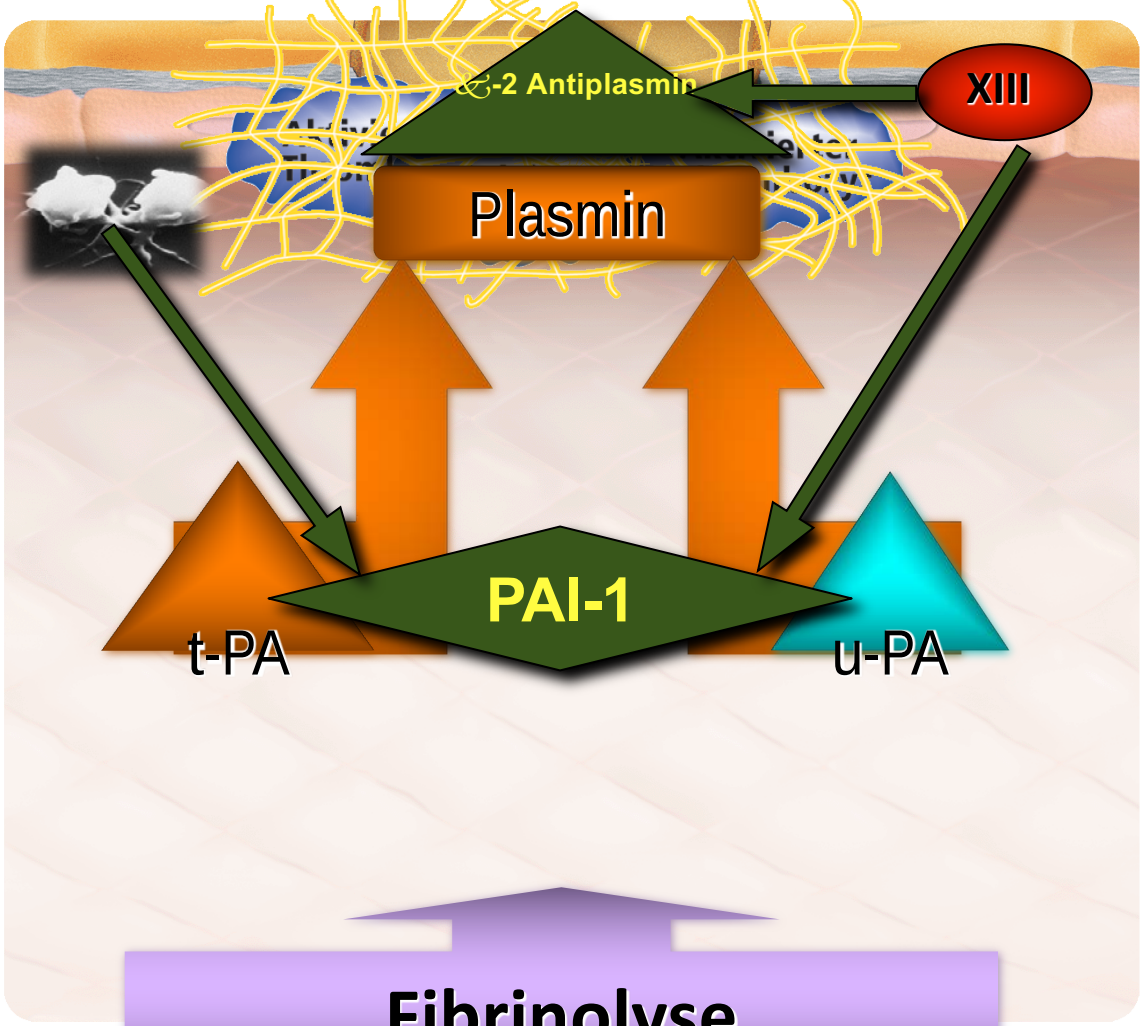
uff. dann:

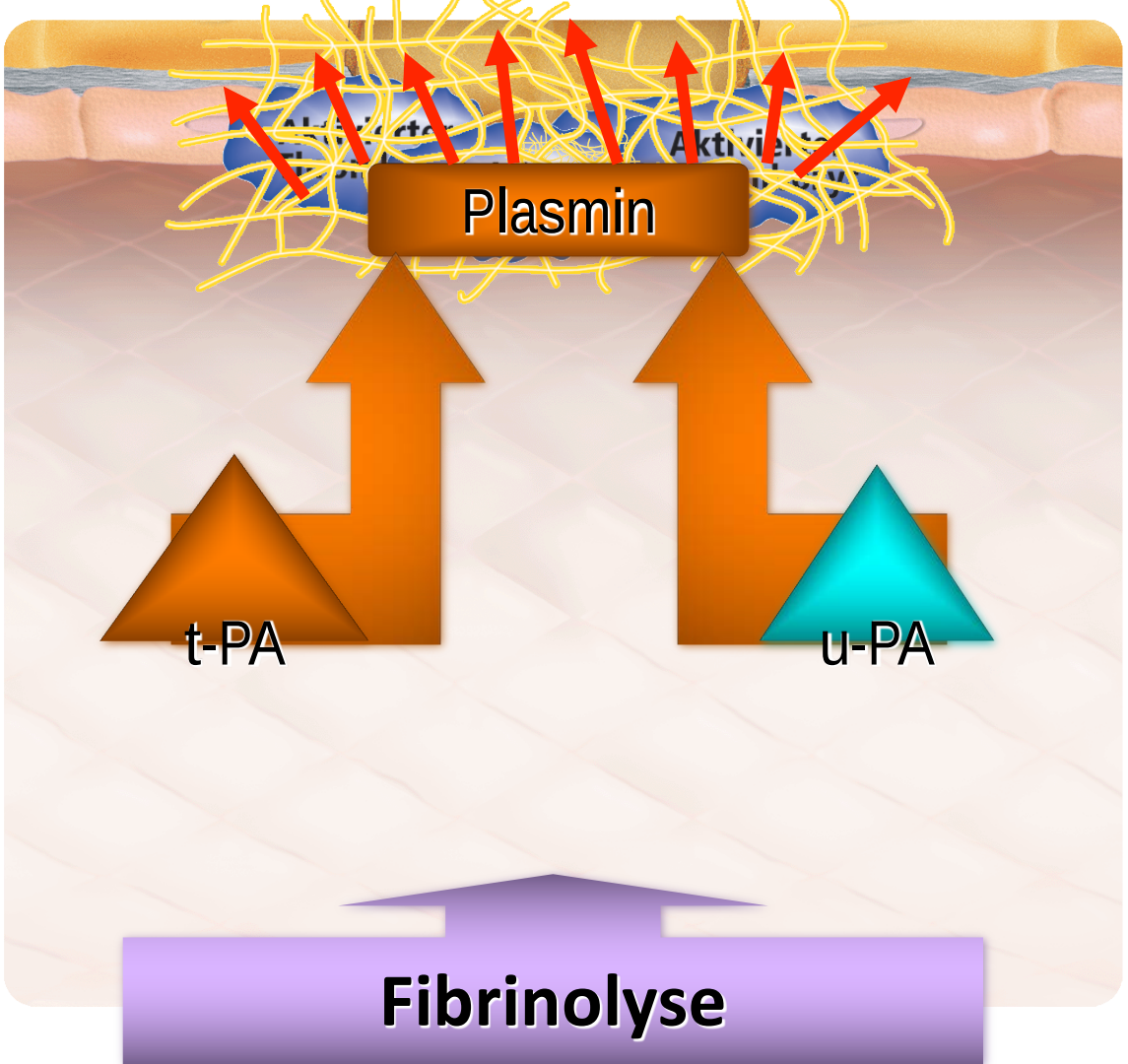
lutung

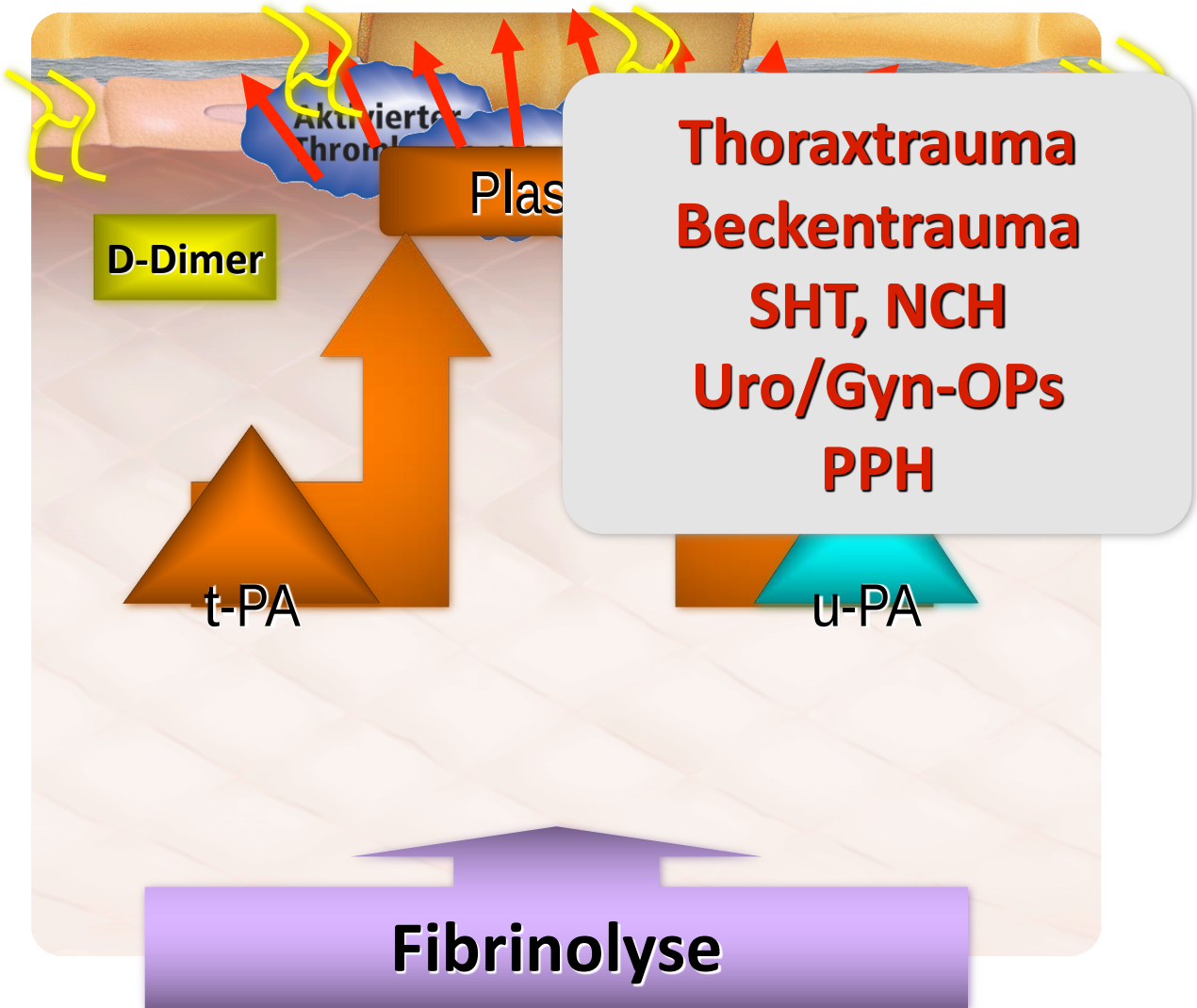



Fibrinolyse


Plasminogen
t-PA
u-PA
Fibrinolyse


&-2 Antiplasmin
XIII
Plasmin
PAI-1
t-PA
u-PA
Fibrinolyse


Plasmin
t-PA
u-PA
Fibrinolyse


Aktivierter
Thrombus
Plas
D-Dimer
t-PA
u-PA
Thoraxtrauma
Beckentrauma
SHT, NCH
Uro/Gyn-OPs
PPH
Fibrinolyse

WAS ist geschehen?
WO stehen wir?
WIE therapieren wir?

GERINNUNGS-THERAPIE IM ÜBERBLICK

FFP

Primäre Hämostase

Thromb… Generati…

„theragnostic tools“

TK

EK

DDAVP

Minirin®

Octostim®

vWF-Konz.

PPSB

Vitamin K

Andexanet Alfa

Ondexxya®

VIIa

VIII

Xa

V

Thrombin

Idarucizumab

Praxbind®

F-XIII

TXA

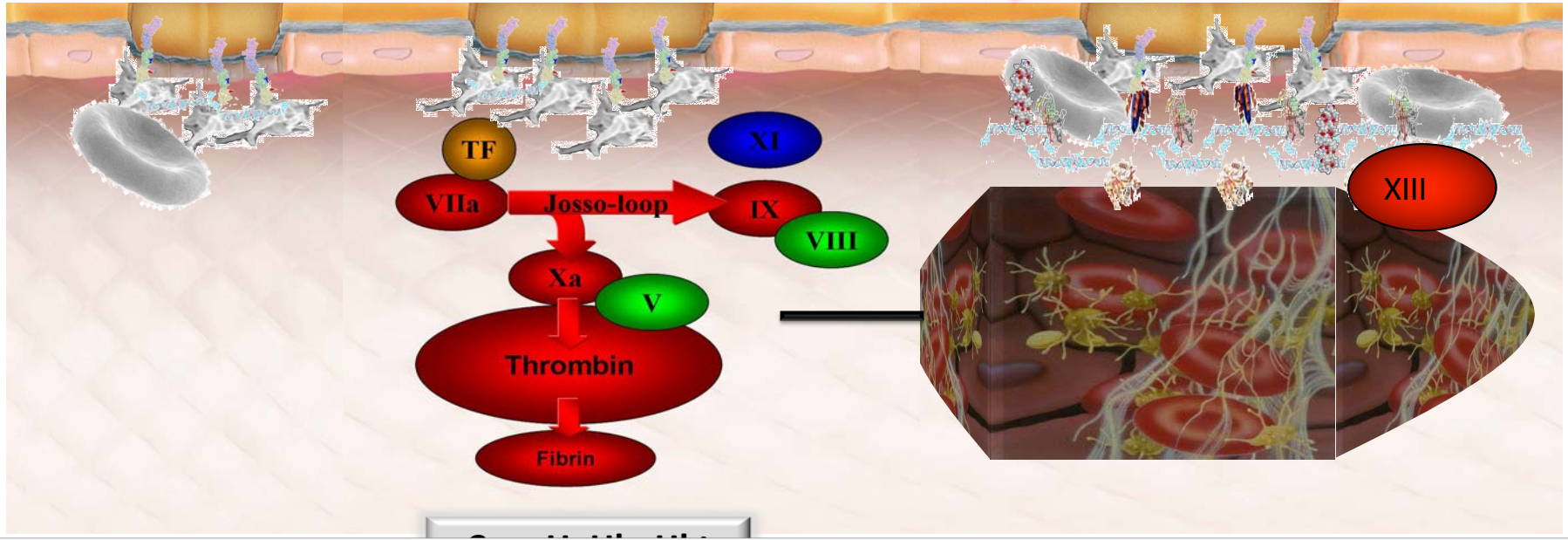
…protinin

Ca > 0,8 / pH > 7,2 / Normothe…

TK

Gezielte prokoagulative Gerinnungstherapie

Primäre Hämostase → Thrombin Generation → Clot Bildung → Clot Lyse



Ca > 0,8 / pH > 7,2 / Normothermie

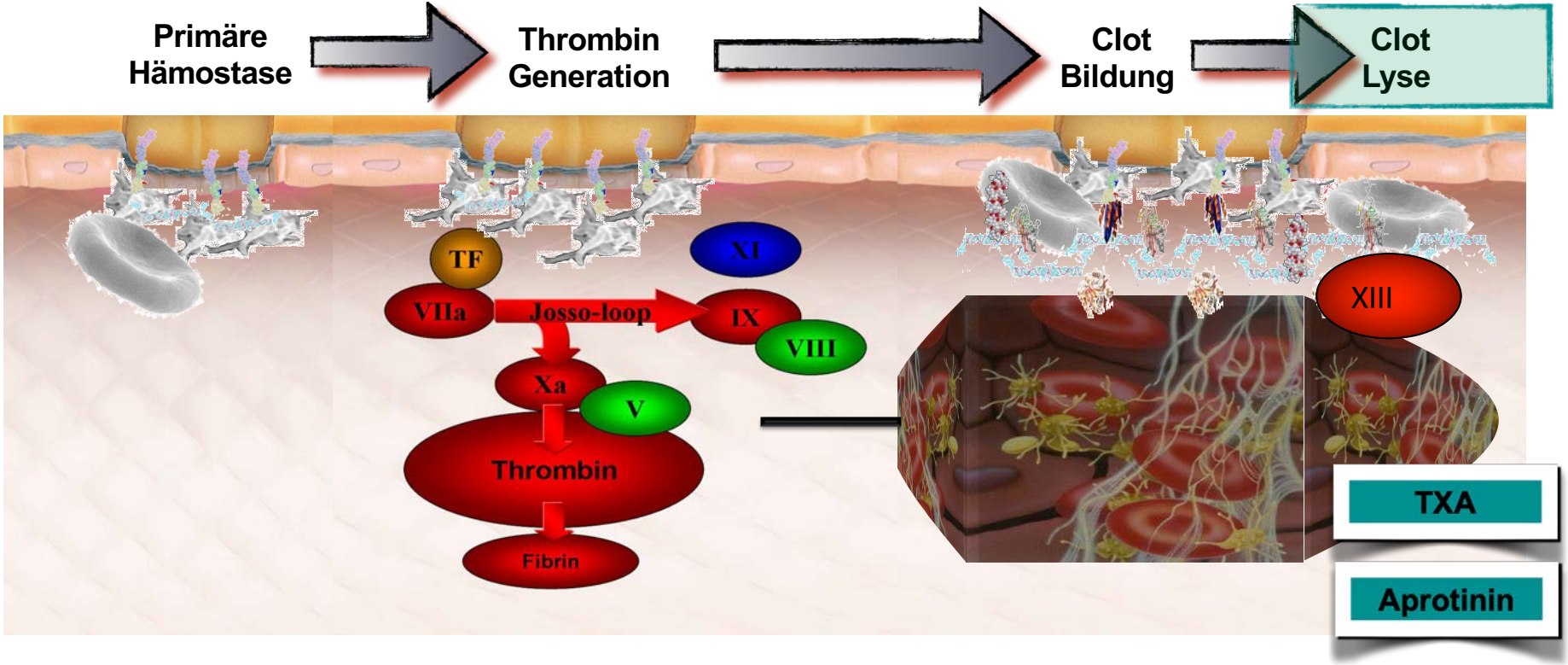
Recommendations
preconditions for coagulation

- *We recommend maintaining perioperative normothermia because it reduces blood loss and transfusion requirements. (1B)*
- *While pH correction alone cannot immediately correct acidosis-induced coagulopathy, we recommend that pH correction should be pursued during treatment of acidotic coagulopathy. (1C)*

Recommendations
preconditions for coagulation

- *We suggest that calcium should be administered during massive transfusion if Ca-concentration is low, in order to preserve normocalcaemia (> 0.9 mmol/l). (2B)*

Gezielte prokoagulative Gerinnungstherapie



Recommendations
TXA

European Society of Anaesthesiology and Intensive Care

We recommend tranexamic acid to prevent bleeding during major surgery and/or treat bleeding due to (or at least suspected) hyperfibrinolysis (e.g. a dose of 10 to 15 mg/ kg).
(1B)

Lysine analogues (tranexamic acid and e-aminocaproic acid; EACA) reduce perioperative blood loss and transfusion requirements; this can be highly cost-effective in several settings of major surgery and trauma.
(1A)

Recommendations
TXA

TXA may be considered in order to decrease perioperative blood loss in prostate surgery.

(2B)

We recommend the prophylactic use of TXA as a safe pharmacological agent to reduce blood loss and transfusion requirements in patients with a relevant risk for bleeding undergoing major orthopaedic surgery.
(1A)

PostPartale Haemorrhagie

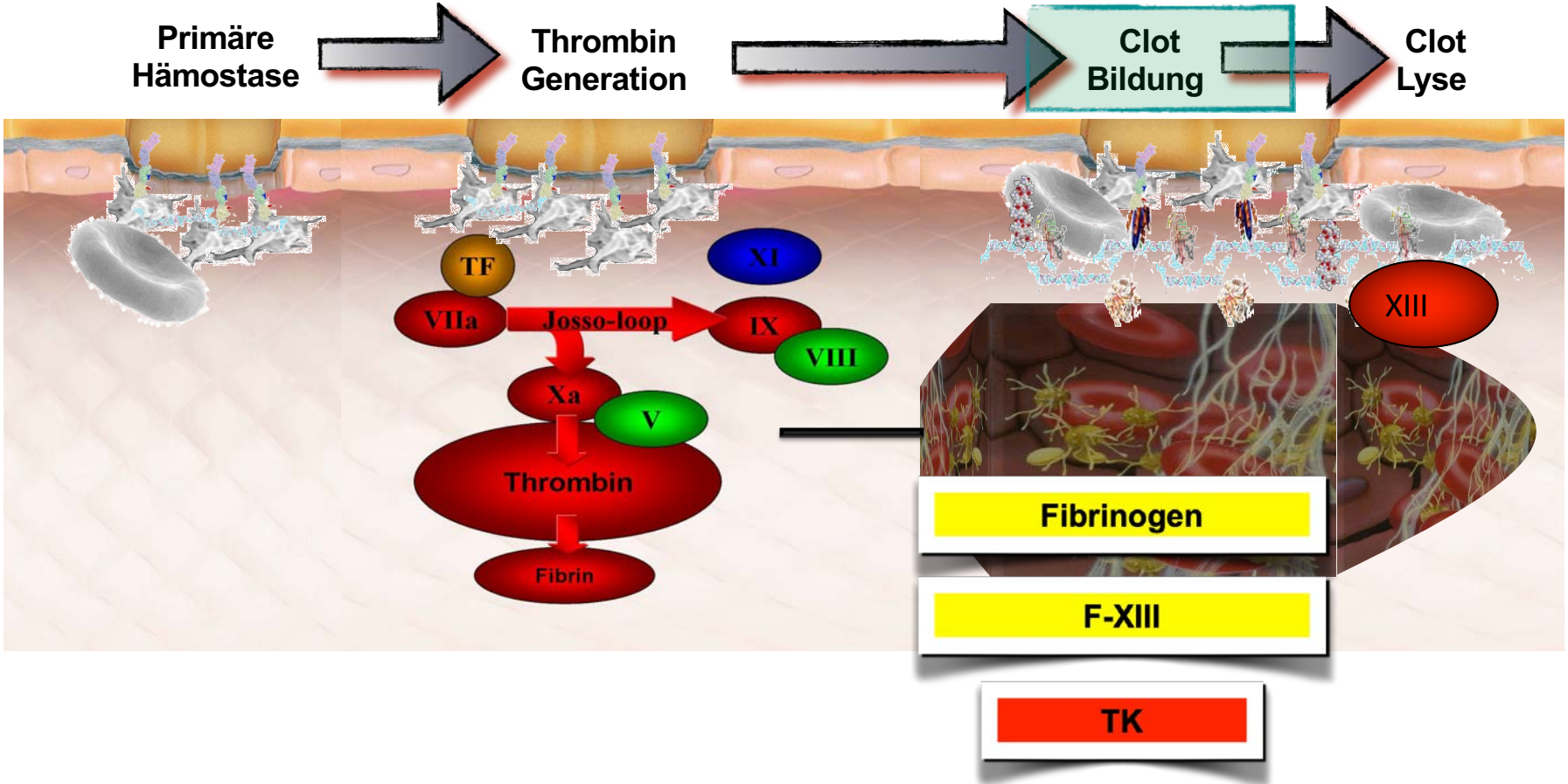
PeriPartale Haemorrhagie

Recommendations
TXA

European Society of Anaesthesiology and Intensive Care

We recommend the administration of TXA in postpartum haemorrhage at a dose of 1g intravenously as soon as possible within 3h, which can be repeated if bleeding continues.
(1B)

Gezielte prokoagulative Gerinnungstherapie



Recommendations
fibrinogen

Fibrinogen concentration of less than 1.5 to 2g/kg is considered as hypofibrinogenaemia in acquired coagulopathy and is associated with increased bleeding risk.
(C)

We recommend treatment of hypofibrinogenaemia in bleeding patients.
(1C)

We suggest an initial fibrinogen concentrate dose of 25–50 mg/kg.
(2C)

Recommendations
fibrinogen

Plasma transfusion alone is

not sufficient to correct hypofibrinogenaemia.
(C)

Recommendations
factor XIII

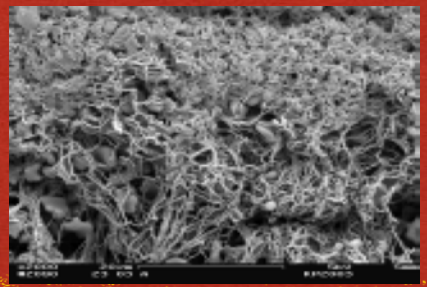
In cases of bleeding and low factor XIII activity (< 60%) we suggest administration of factor XIII concentrate (30 IU kg).
(2C)

We suggest if ongoing bleeding unresponsive to multimodal coagulation therapy or wound healing defects in the critically ill to monitor FXIII and correct deficiency.
(2C)

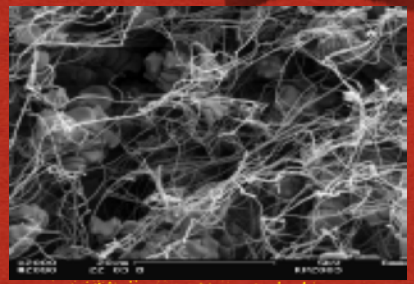
Recommendations
platelets

We suggest platelet concentrate transfusion in bleeding situations clearly related to antiplatelet drugs or thrombocytopenia less than 50 G/l (2C)

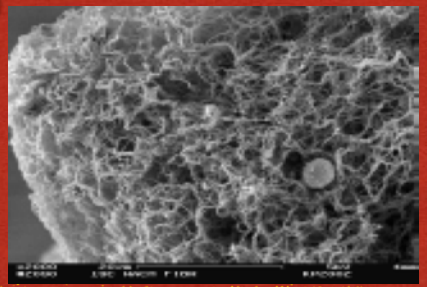

Voluven® 6% mg/ml
500 ml



baseline



dilution



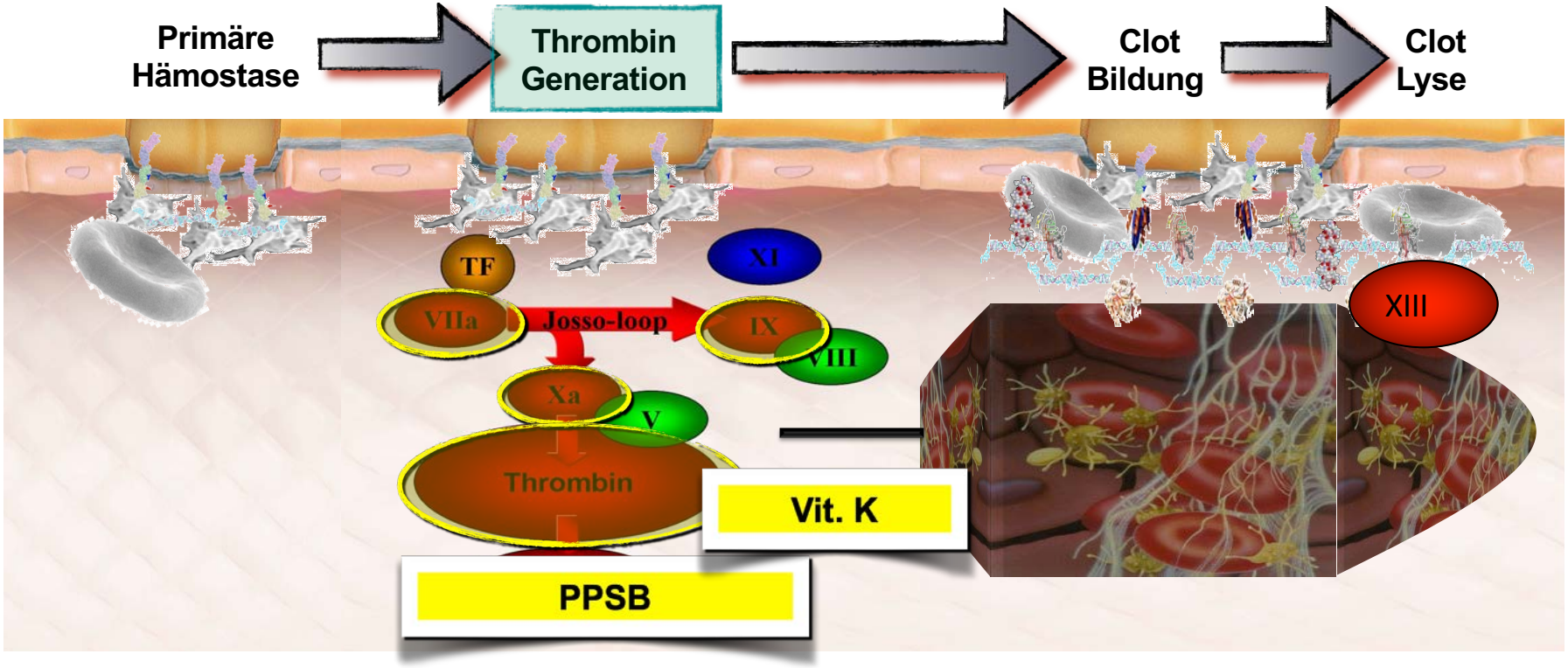
fibrinogen

DILUTIONS-KOAGULOPATHIE

Recommendations
dilutional coagulopathy

- *Infusion of colloids in patients with severe bleeding can aggravate dilutional coagulopathy by additional effects on fibrin polymerisation and platelet aggregation. (C)*

Gezielte prokoagulative Gerinnungstherapie



Recommendations
PCC

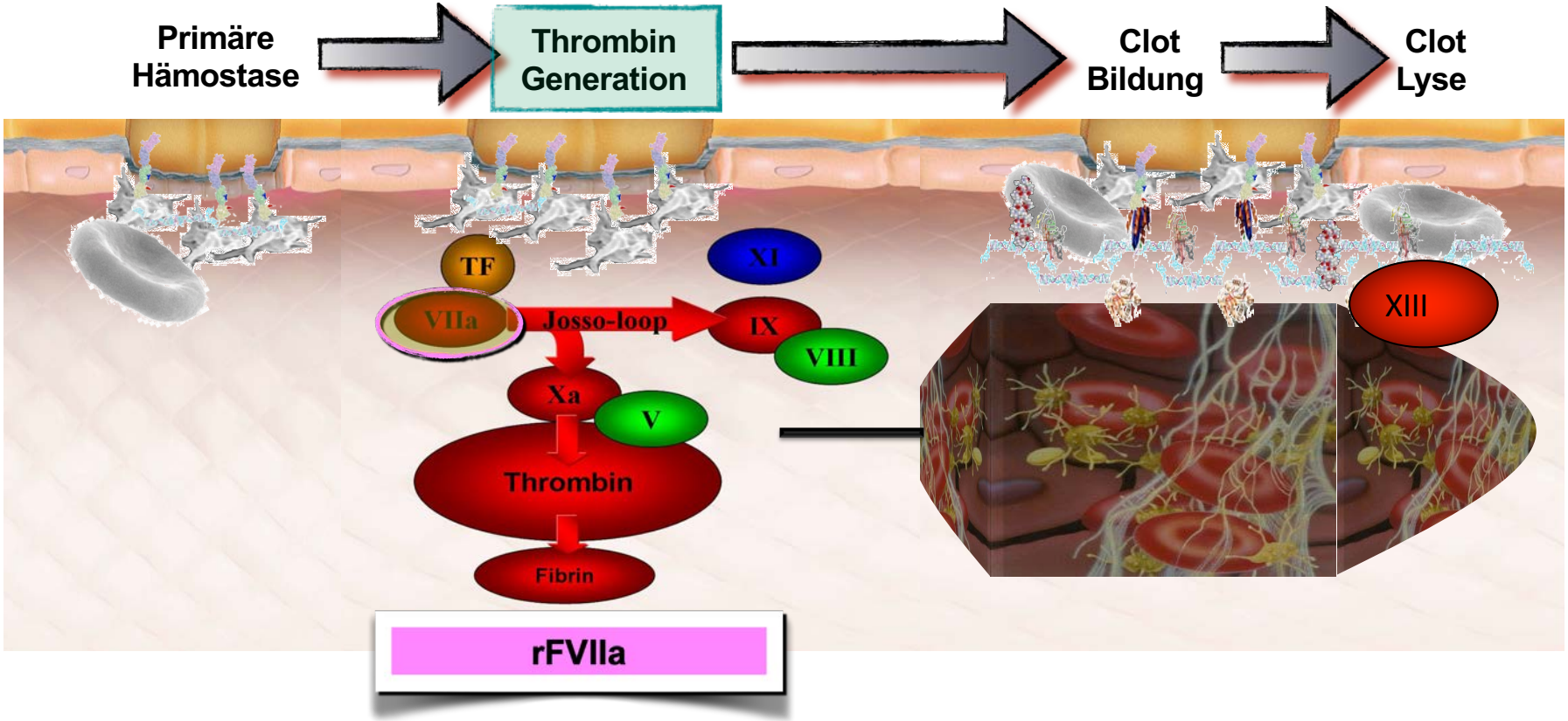
In severe perioperative bleeding we recommend that patients on vitamin K antagonists (VKAs) should be given

prothrombin complex concentrate (PCC) and

intravenous vitamin K

before any other coagulation management steps. (1B)

Gezielte prokoagulative Gerinnungstherapie



Recommendations
rFVIIa

We recommend against the prophylactic use of recombinant activated factor VII (rFVIIa) due to increased risk of fatal thrombosis.
(1B)

Recommendations
rFVIIa

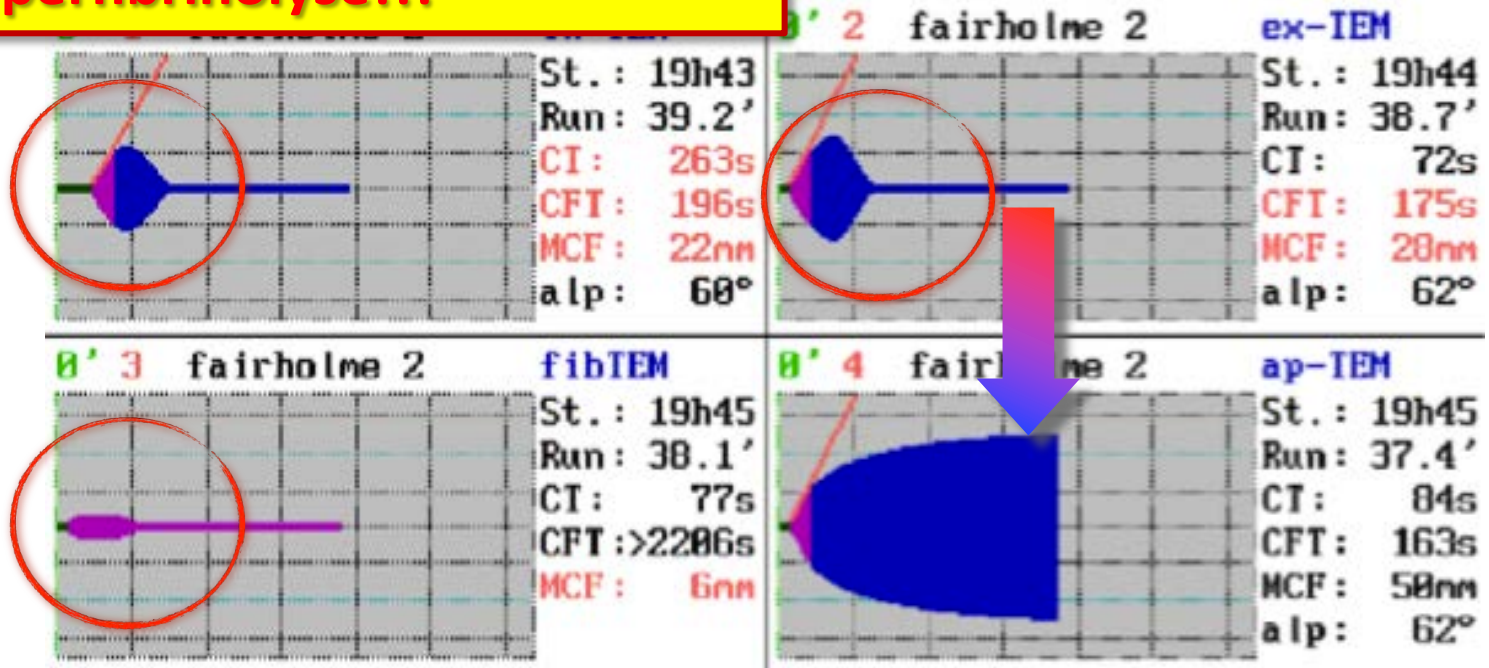
We suggest that off-label administration of rFVIIa can be considered for life-threatening bleeding which cannot be stopped by conventional, surgical or interventional radiological means and/or when comprehensive coagulation therapy fails.
(2C)

- ✓ Chirurgische Blutung?
- ✓ Hämostaseologische Blutung?
- ✓ **Verlust-Koagulopathie!!!**
- ✓ Verdünnungs-Koagulopathie?
- ✓ **Hyperfibrinolyse!!!**

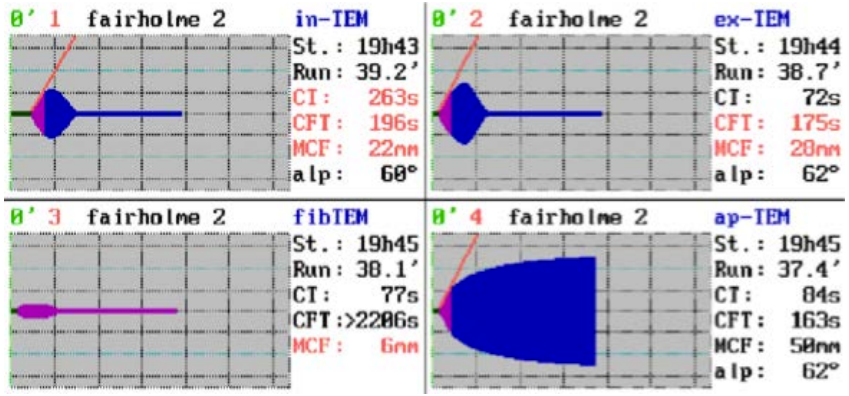
EM

uff. dann:

lutung



gezielte Therapie = goal directed therapy



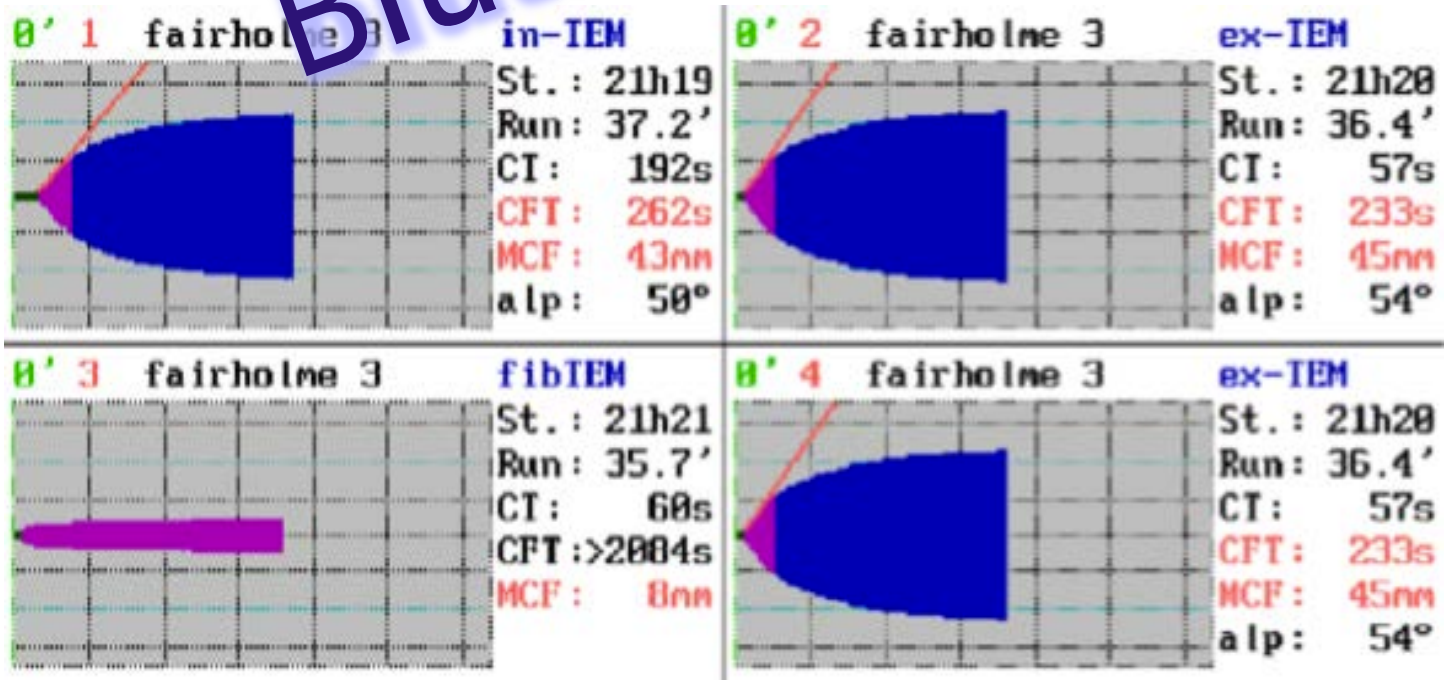
TXA: Cyklokapron®

- 20mg/kgKG
- 1mg/kgKG bis Hautnaht

Fbg: Haemocomplettan®

- 4g

Blutung steht!



FFP

Primäre Hämostase

Thromb… Generati…

„theragnostic tools“

TK

EK

DDAVP

Minirin®

Octostim®

vWF-Konz.

PPSB

Vitamin K

Andexanet Alfa

Ondexxya®

VIIa

VIII

Xa

V

Thrombin

Idarucizumab

Praxbind®

F-XIII

TXA

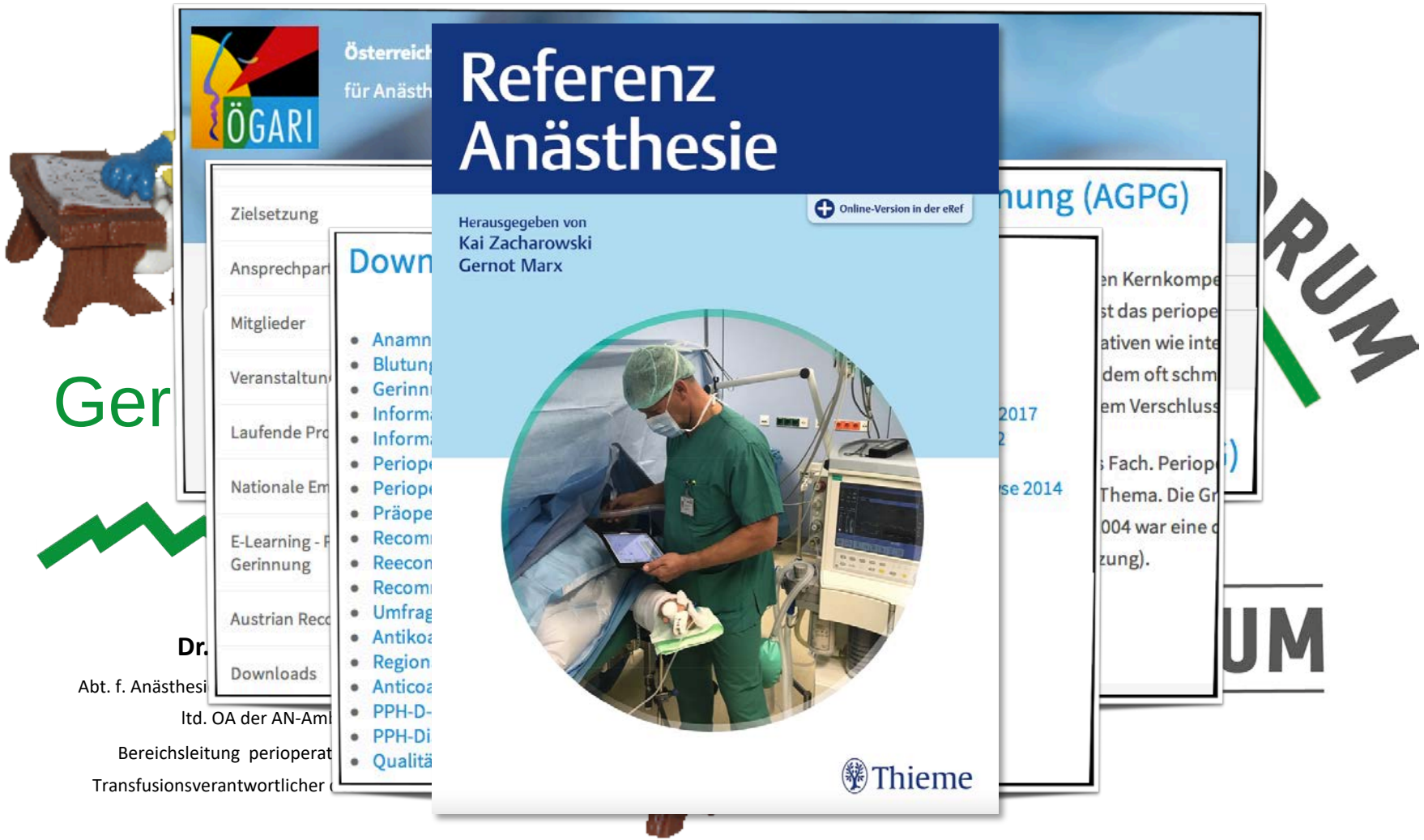
…protinin

Ca > 0,8 / pH > 7,2 / Normothe…

TK

TAKE-HOMES FÜR DIE FA-PRÜFUNG ANÄSTHESIE / INTENSIVMED.

TAKE-HOMES FÜR DEN KLINIK-ALLTAG IN ANÄSTHESIE UND INTENSIVMEDIZIN


ÖGARI
Österreich
für Anästh
Zielsetzung
Ansprechpart
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Veranstaltun
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Recom
Reecon
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Kai Zacharowski
Gernot Marx
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Dr.
Abt. f. Anästhesi
ltd. OA der AN-Aml
Bereichsleitung perioperat
Transfusionsverantwortlicher
RUM
UM