

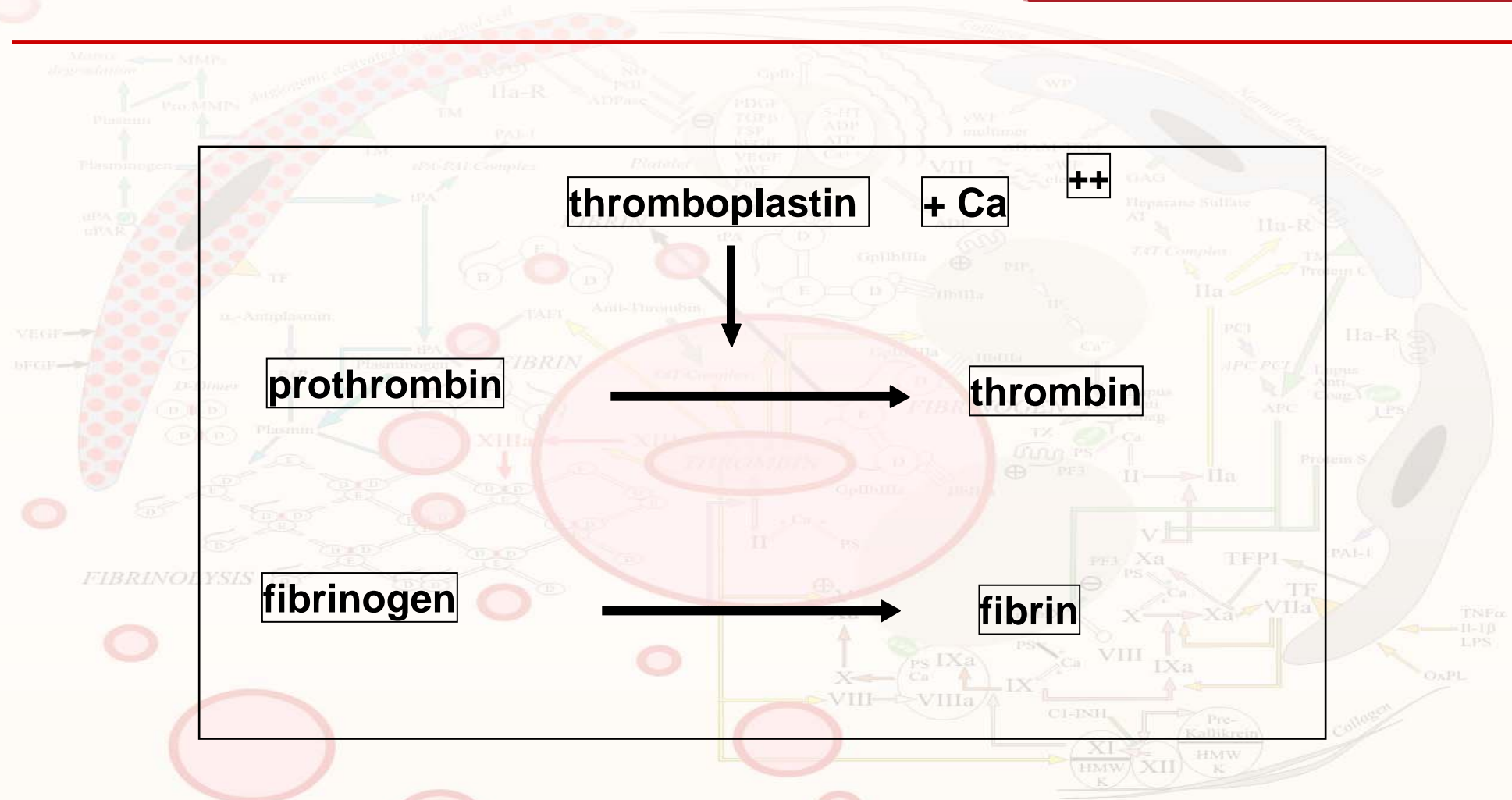


- Why measure thrombin generation ?
- How does measurement of thrombin generation work?
- Sample material / pre-analytics
- Test performance
- Applications

Theory of coagulation, 1905

TECHNOTHROMBIN® TGA

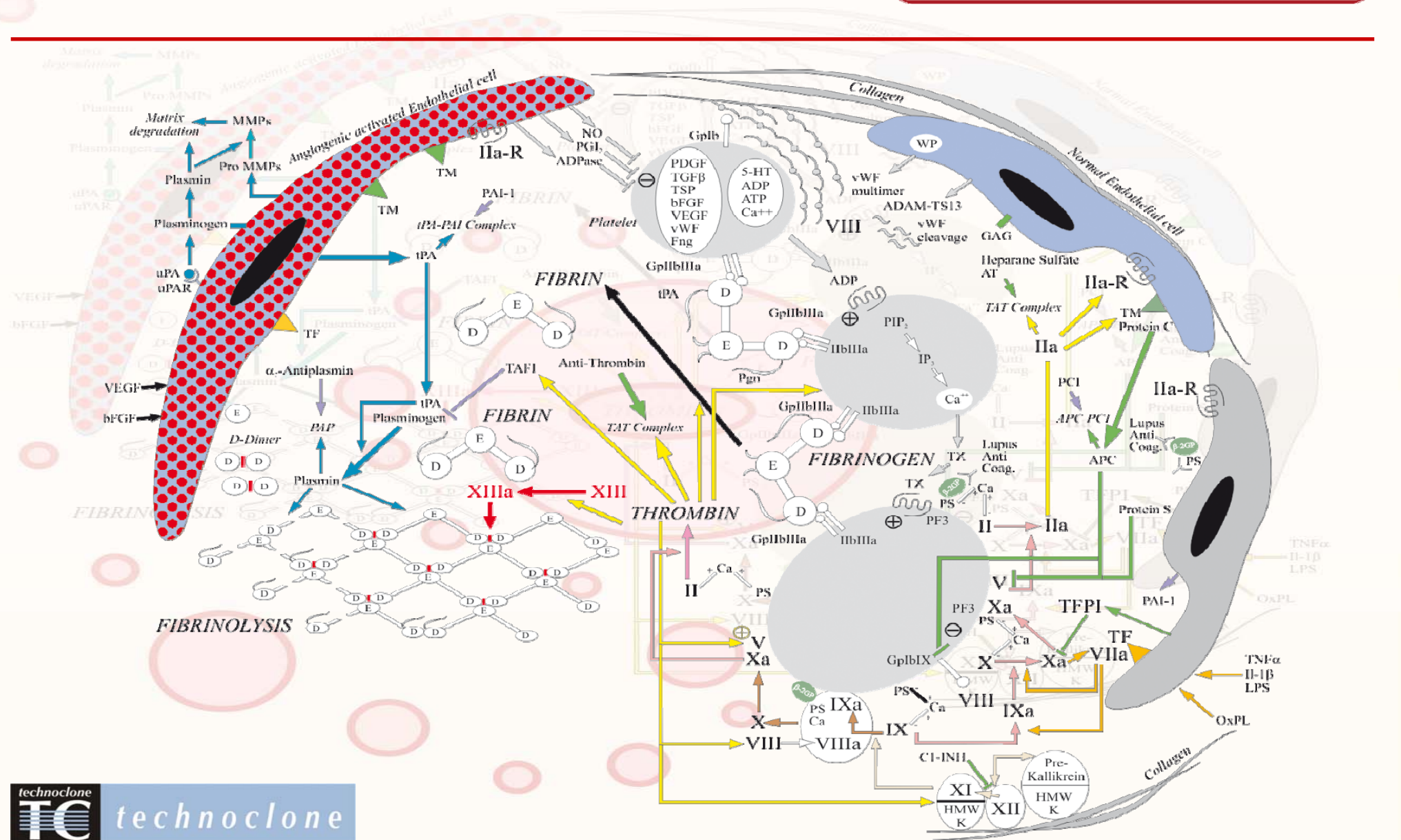
Thrombin Generation Assay



Coagulation today

TECHNOTHROMBIN® TGA

Thrombin Generation Assay



Why measure thrombin generation?

The status of haemostasis can be measured in vivo with help of thrombin generation.

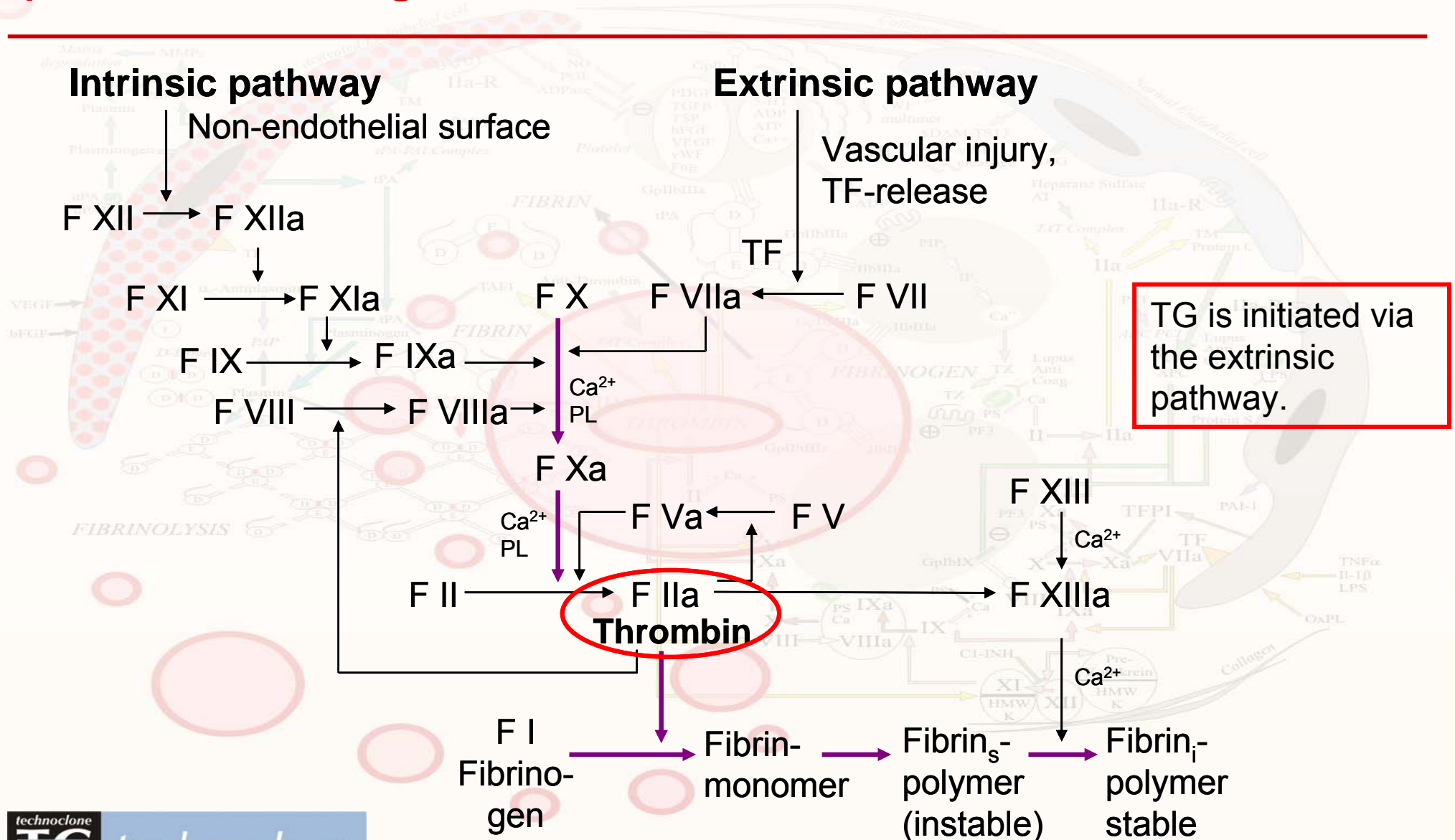
This includes:

- **plasmatic coagulation**
 - > the endogenous system
 - > the exogenous system
- **cellular coagulation**
 - > influence of platelets
 - > influence of microparticles
- **formation of cross linked fibrin**

Scheme of plasmatic coagulation

TECHNOTHROMBIN® TGA

Thrombin Generation Assay



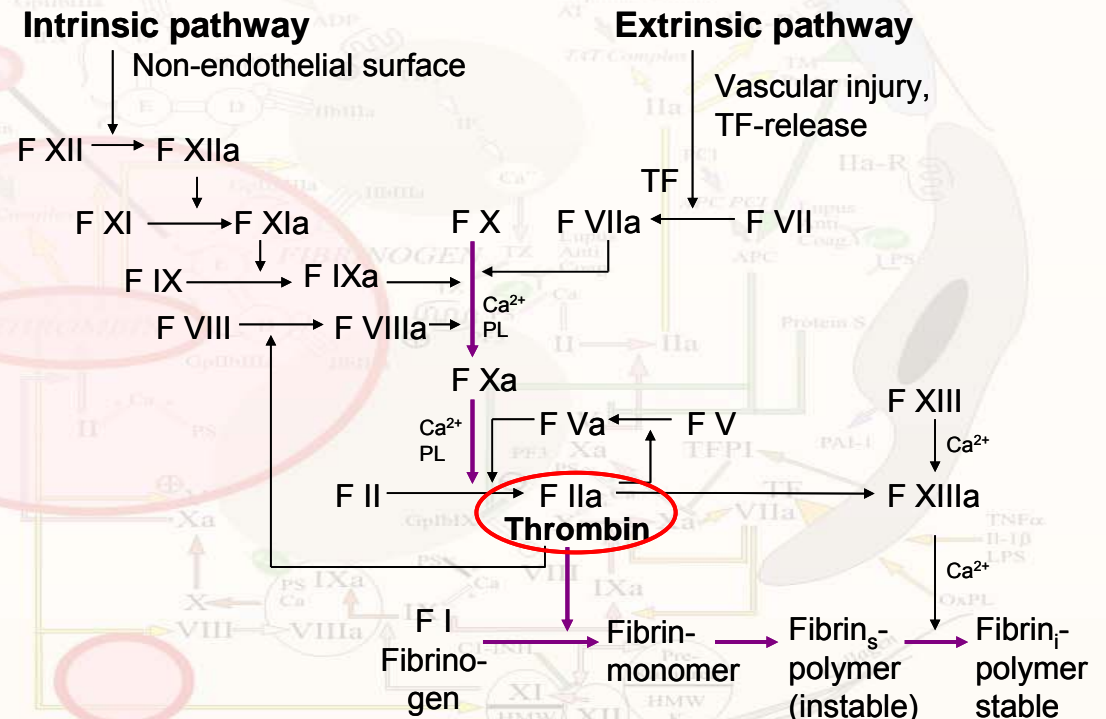
Scheme of plasmatic coagulation

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

For thrombin generation a TRIGGER is needed

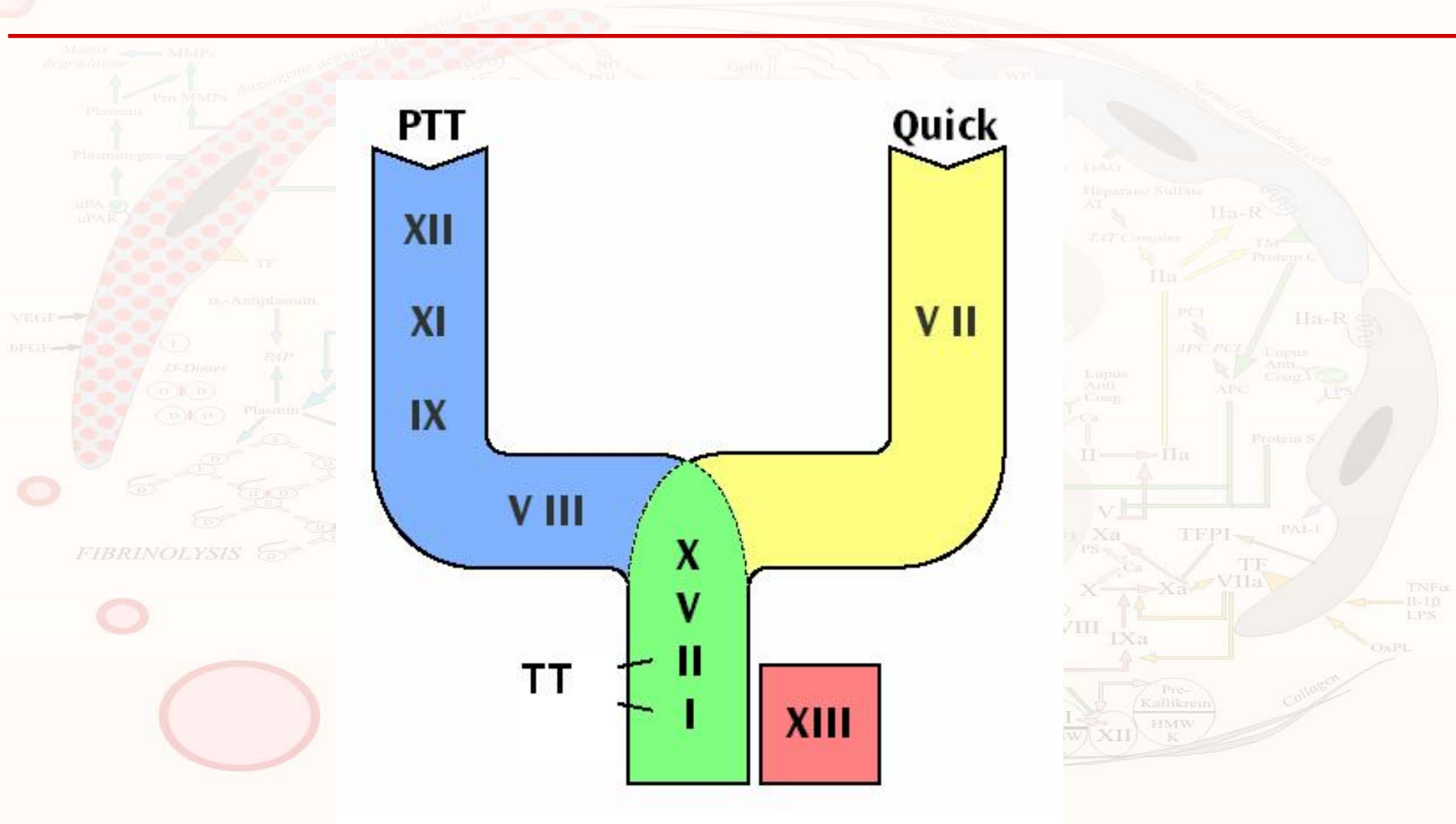
- The trigger forms a small amount of initial thrombin,
- this leads to formation of fibrin
- It is rapidly inactivated in a TF/FVIIa/FXa complex by TFPI
- Activates by positive feedback the intrinsic system. This means, via factor XI, IX and VII more FXa and thrombin are built.
- When „thrombin burst“ gets too big, differences in e.g. FVIII or FIX can't be measured any more.



Screening tests for plasmatic coagulation

TECHNOTHROMBIN® TGA

Thrombin Generation Assay



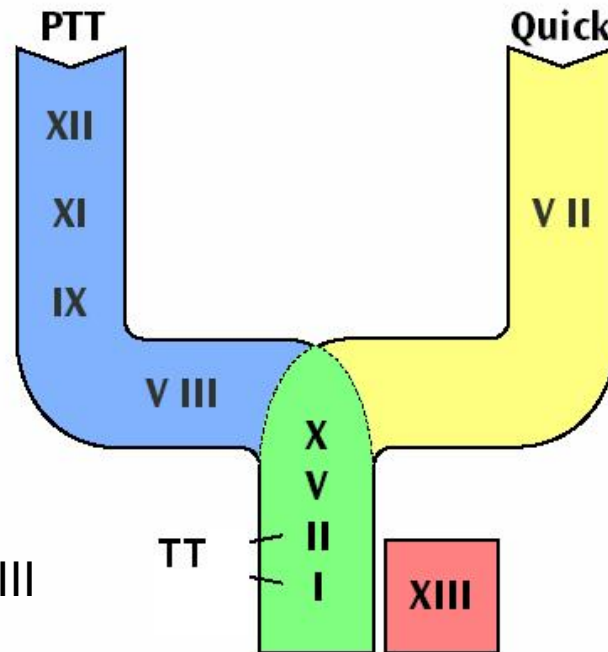
Screening tests for plasmatic coagulation

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

Trigger **RD** also activated via FXII, XI, IX and VIII - the intrinsic pathway.

Trigger **RB, RCL** is also activated via the intrinsic pathway due the positive feedback activation of FVIII and FIX.



Trigger **RA, RB, RCL, RCH** is activated via the extrinsic pathway. Crucial difference is the trigger concentration.

Method dependent continuous detection of formed thrombin

Choice of suitable trigger for simulating physiological in vivo situations

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

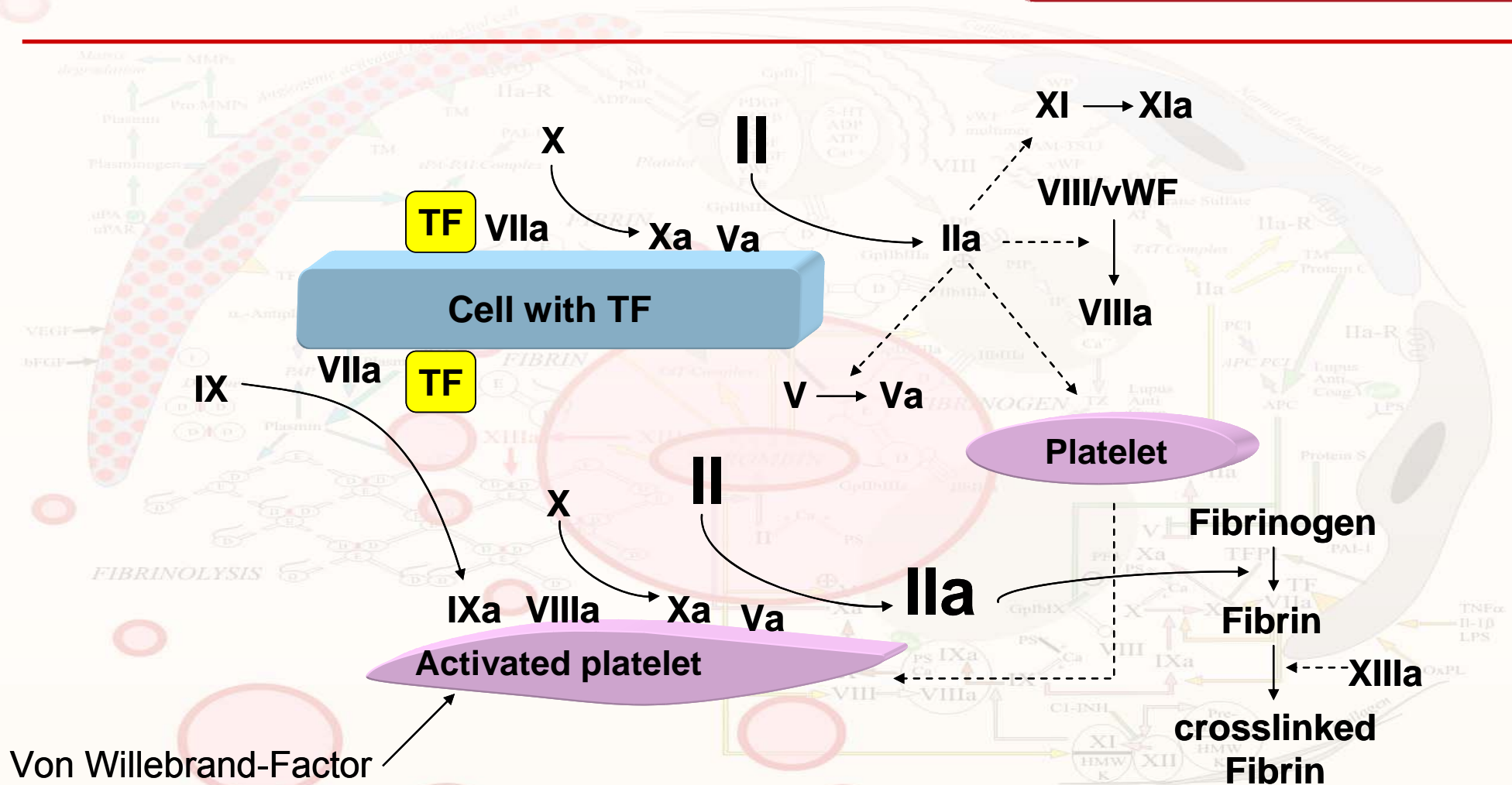
Trigger	Corresponding „in vivo“ situation
no Trigger	no trigger, only endogenous TF and PL in plasma (e.g. microparticles)
Low PL No TF	resting platelets, no relevant cell activation and/or tissue damage
Low PL low TF	small vessel damage, without relevant platelet activation and minimal cell activation
Low PL High TF	Increased TF due to cell activation or tissue damage
High PL No TF	platelet activation, lipemia
High PL High TF	increased PL due to platelet activation, increased TF due to cell activation and/or tissue damage

K.Varadi-Pkelharing symposium Leipzig, April 2007

Pattern of the cellular haemostasis

TECHNOTHROMBIN® TGA

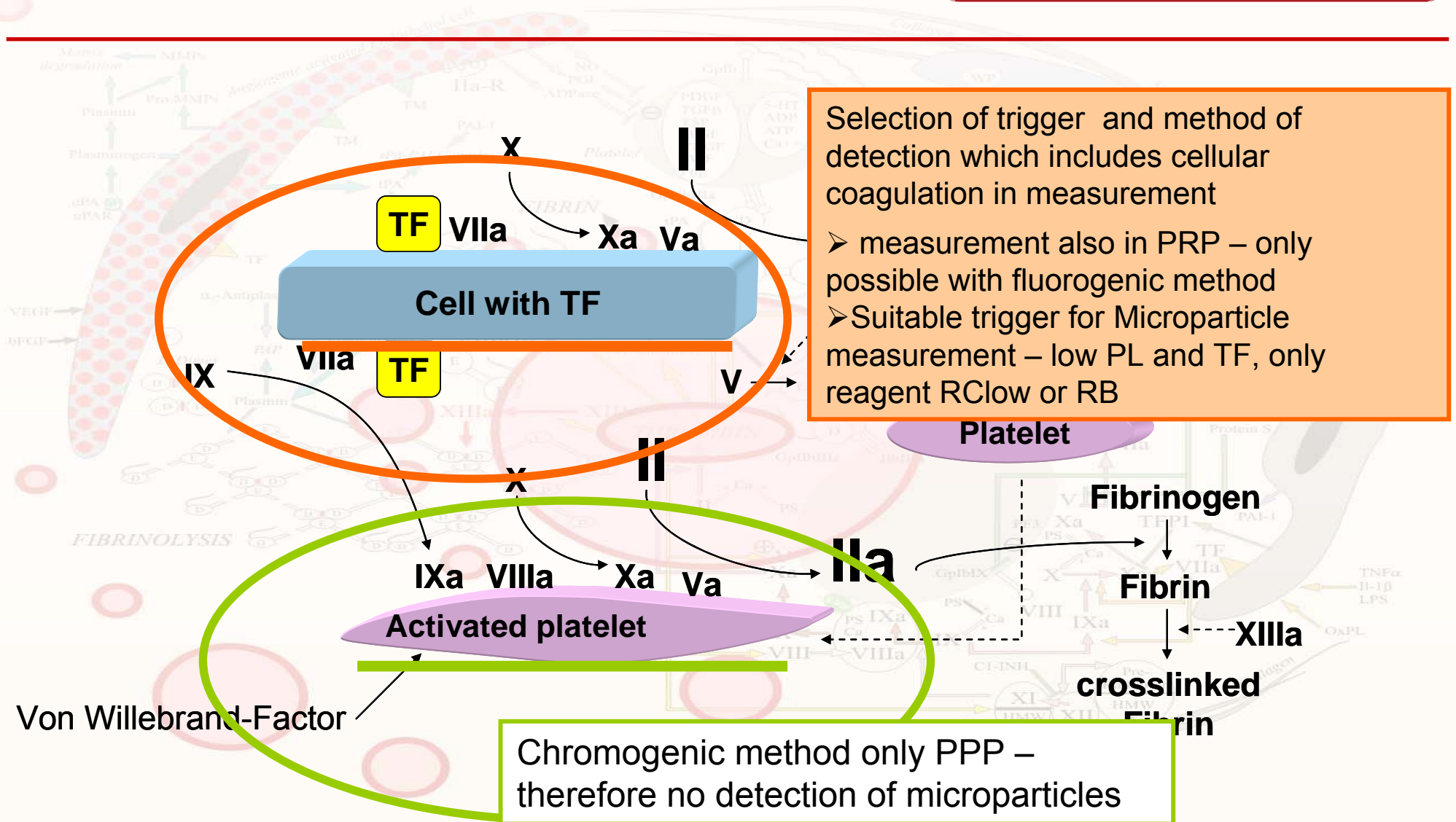
Thrombin Generation Assay



Pattern of the cellular haemostasis

TECHNOTHROMBIN® TGA

Thrombin Generation Assay



The structure of fibrin is dependent on thrombin concentration

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

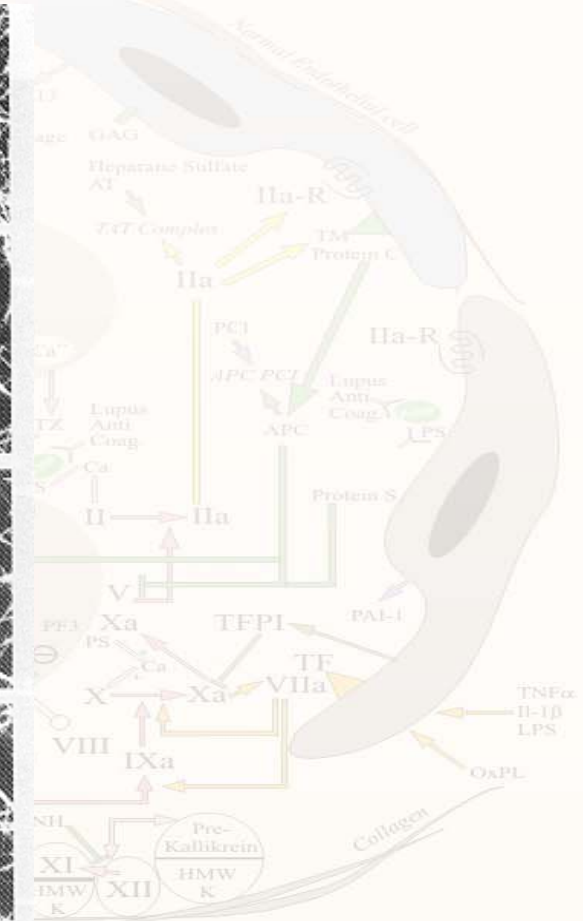
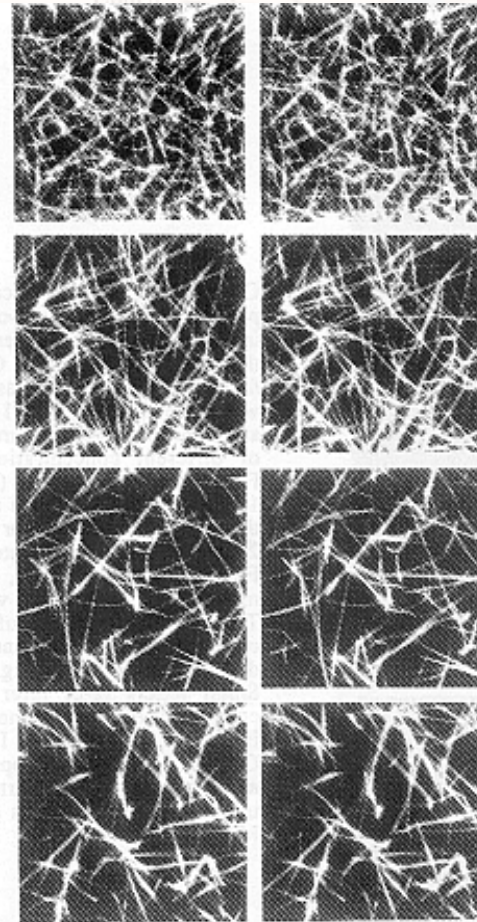
Thrombin (U / ml):

0,60

0,10

0,05

0,03



Generated amount of thrombin is dependent on formation of the fibrinnet

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

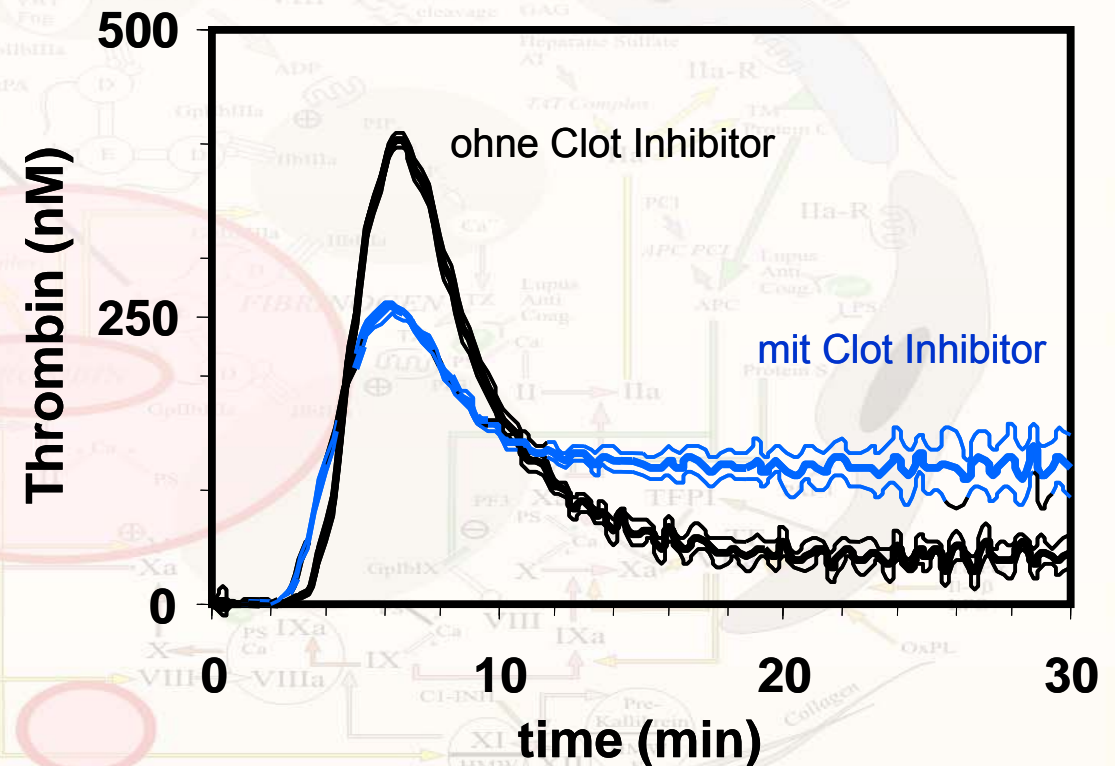
Generated amount of thrombin is dependent on formation of the fibrinnet.

By addition of INH the fibrin net can't be formed.

➤ Peak Thrombin one third lower

Choice of detection method which allows formation of the fibrinnet

➤ no addition of clot inhibitor – only in fluorescence measurement possible



Thrombin Generation Assay



Based on: Hoffman et al. (1998) Blood Coag Fibrinol 9 (suppl 1): S61-S65

Physiological balance of coagulation

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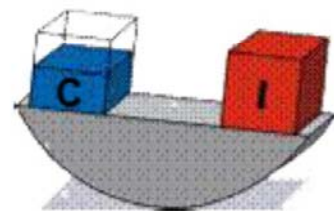
Thrombin Generation Assay

FI fibrinogen-fibrin
FII prothrombin-thrombin
FIII tissue factor TF
FIV Ca⁺
FV/FVI/FVII/FVIII/FIX/FX/FXI/FXIII

AT antithrombin
PC Protein C
PS Protein S
TFPI tissue factor pathway inhibitor
Thrombomodulin

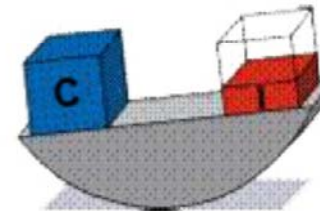
**Balance between
coagulation factors (C) and inhibitors (I)**

Deficiency of factors



Risk of bleeding

Deficiency of inhibitors



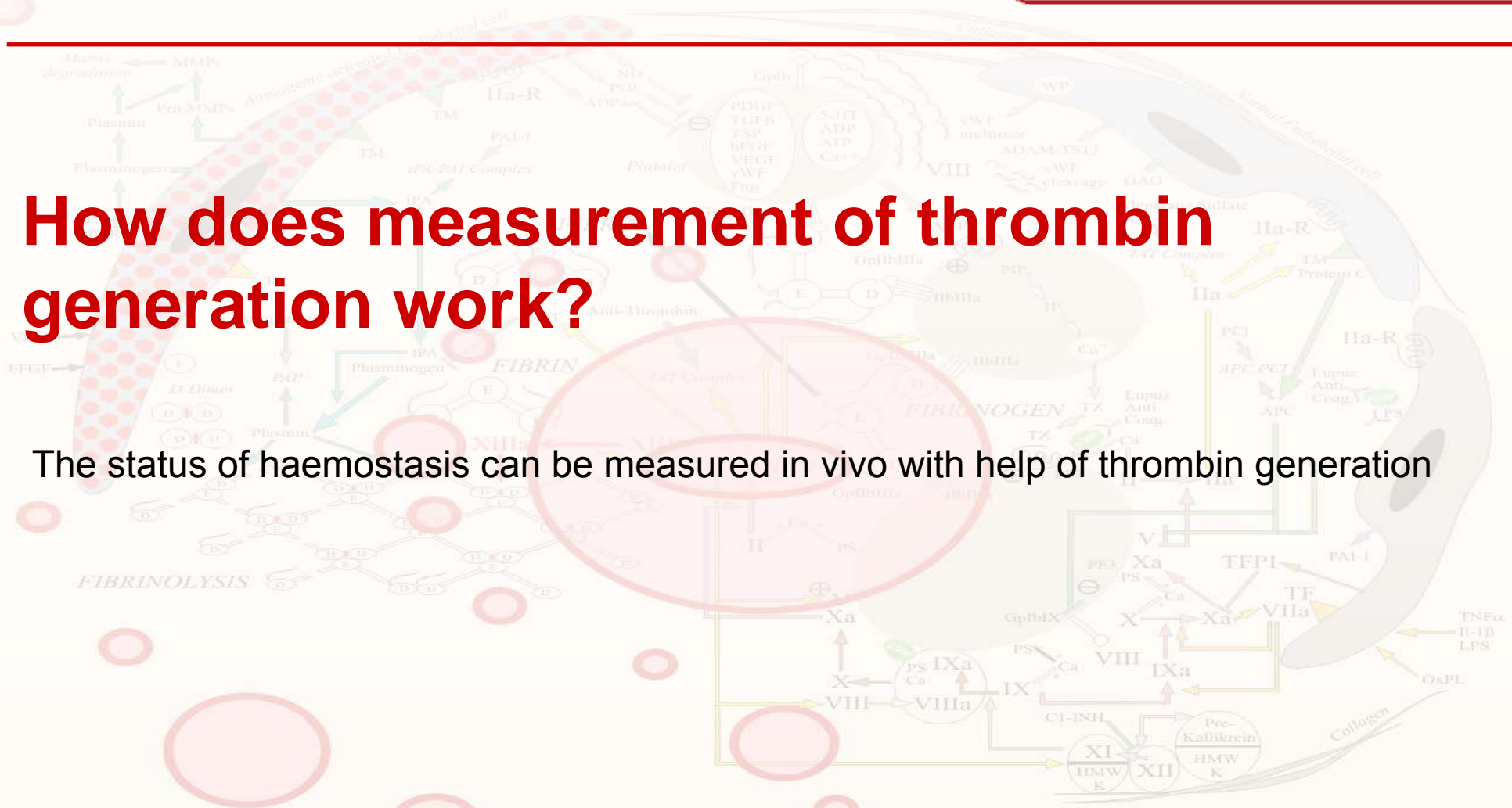
Risk of thrombosis

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

How does measurement of thrombin generation work?

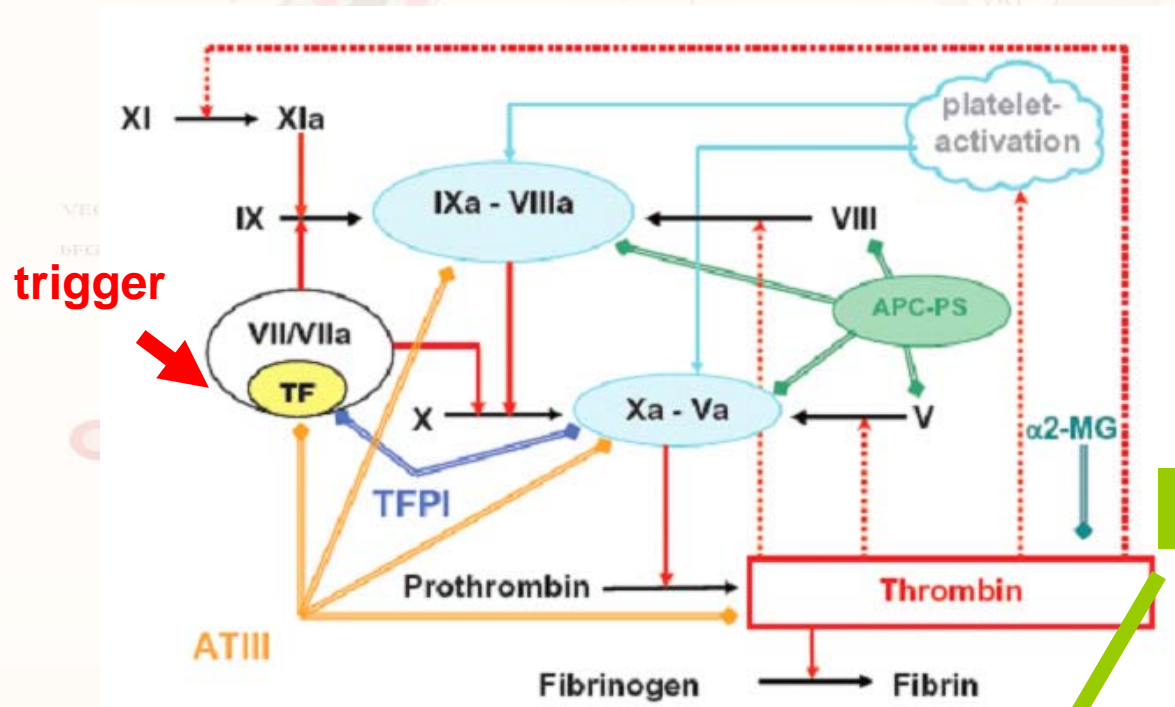
The status of haemostasis can be measured in vivo with help of thrombin generation



THROMBIN GENERATION

TECHNOTHROMBIN® TGA

Thrombin Generation Assay



The coagulation cascade is activated by addition of a TRIGGER.

The formed thrombin is cleaved by an external substrate and the signal is continuously recorded.

substrate

Alternatively generation of fibrin is recorded

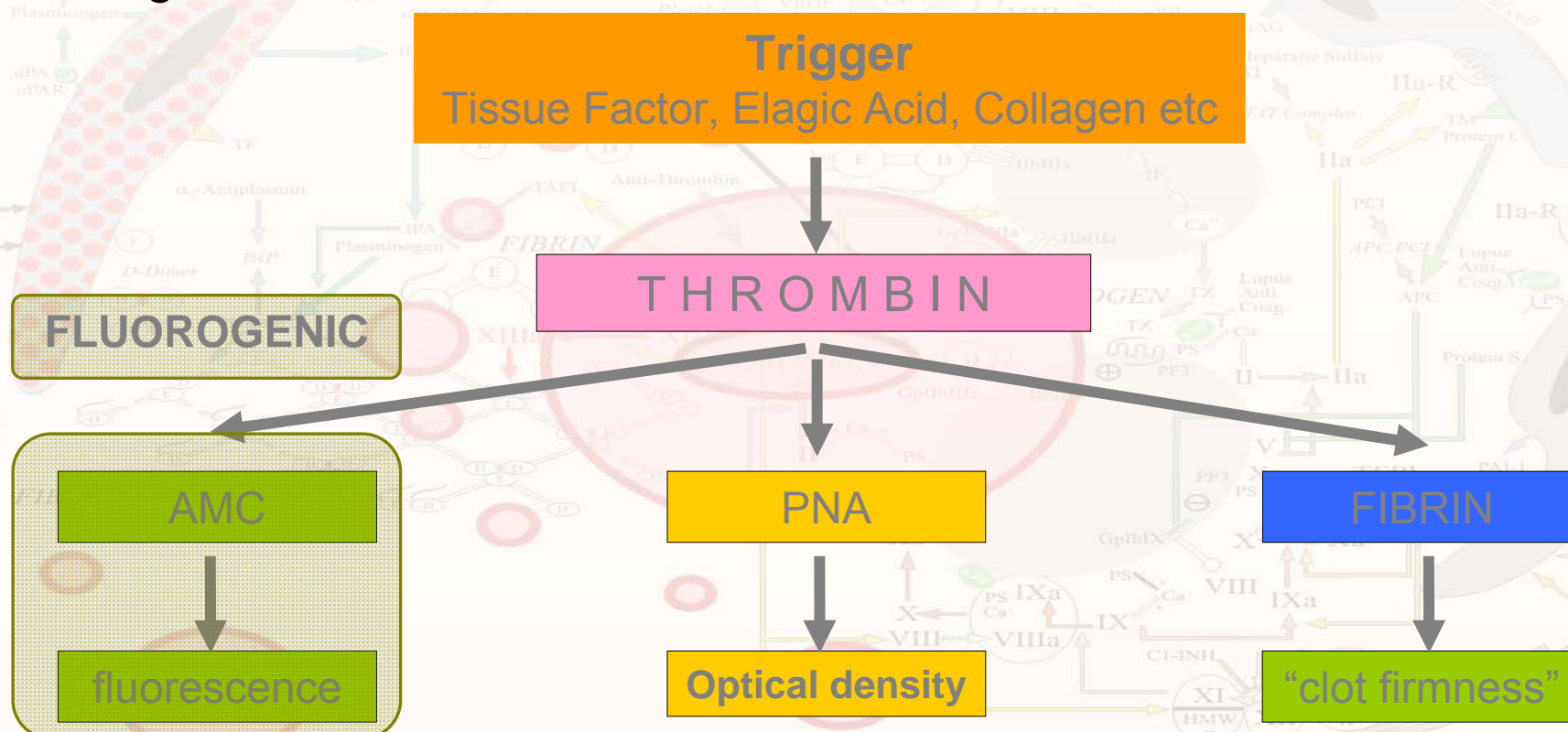
signal

METHODS

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

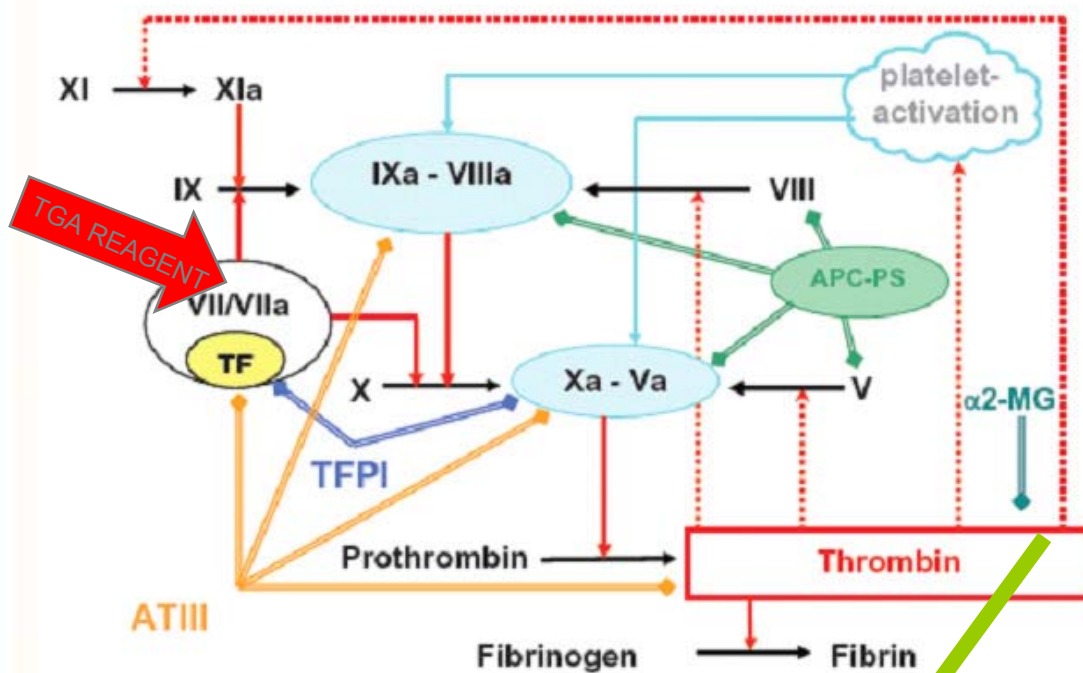
Currently there are three commercially available methods for measurement of thrombin generation



METHODE – Fluorogenic

TECHNOTHROMBIN® TGA

Thrombin Generation Assay



Coagulation cascade is activated by addition of different concentrations of

- Tissue factor and
- phospholipids

ZGGR-AMC

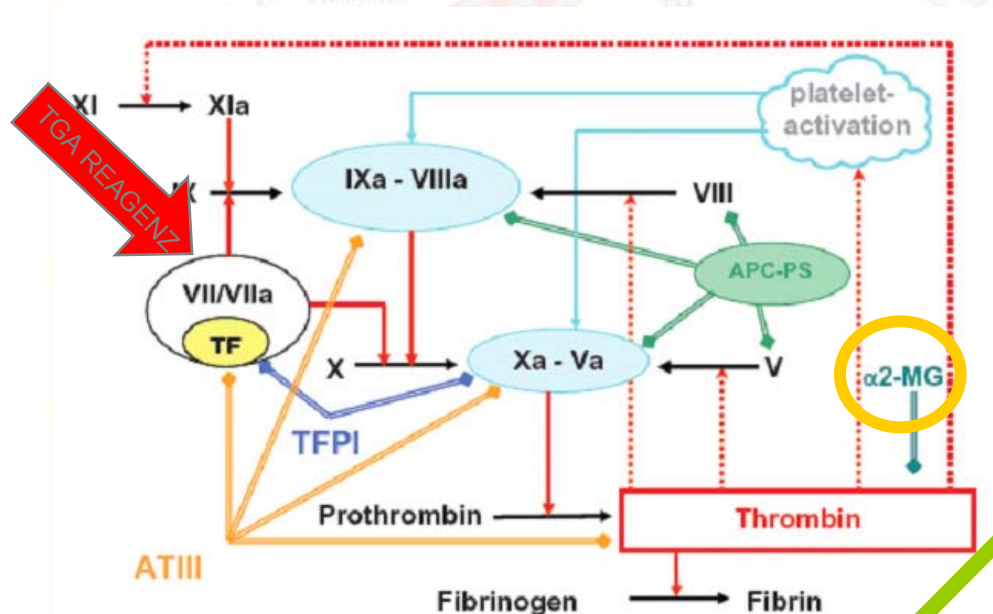
AMC

Thrombin generation is based on measurement of changes in fluorescence, which are caused by cleavage of a fluorogenic substrate by thrombin

Why TECHNOTHROMBIN® TGA does not correct for α 2MG- Thrombin complex

TECHNOTHROMBIN® TGA

Thrombin Generation Assay



„in vivo“ the complex α 2MG- Thrombin is inactive, because Fibrinogen the natural substrate for Thrombin has no access to the active center.

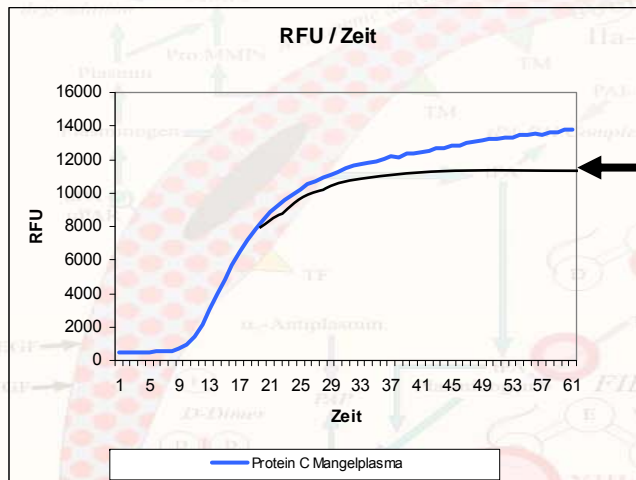
ZGGR-AMC

Small substrates such as the fluorogenic substrate ZGGR-AMC are cleaved by α 2MG-Thrombin.

AMC

Why TECHNOTHROMBIN® TGA does not correct for α 2MG- Thrombin complex

TECHNOTHROMBIN® TGA Thrombin Generation Assay

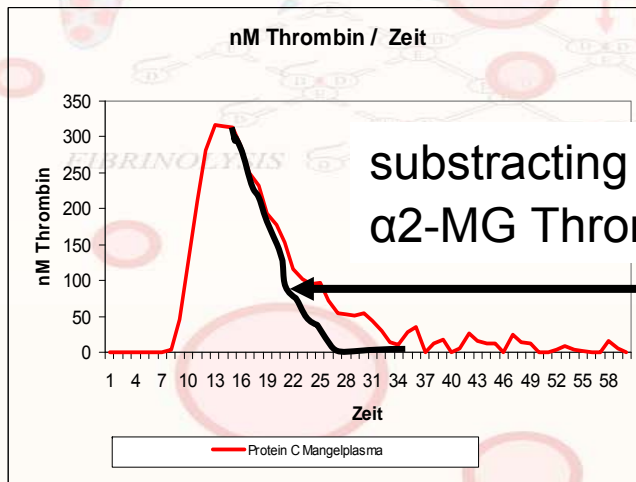


subtracting α 2-MG Thrombin

α 2-MG Thrombin can be corrected
mathematically

but:

- **Peak Thrombin** is not influenced significant by α 2-MG
- α 2-MG concentrations can vary significantly in newborn, children, and different patient groups, so that **a mathematical correction can rise the measurement error** (Ignatovic, BJH 138(3), 2007)



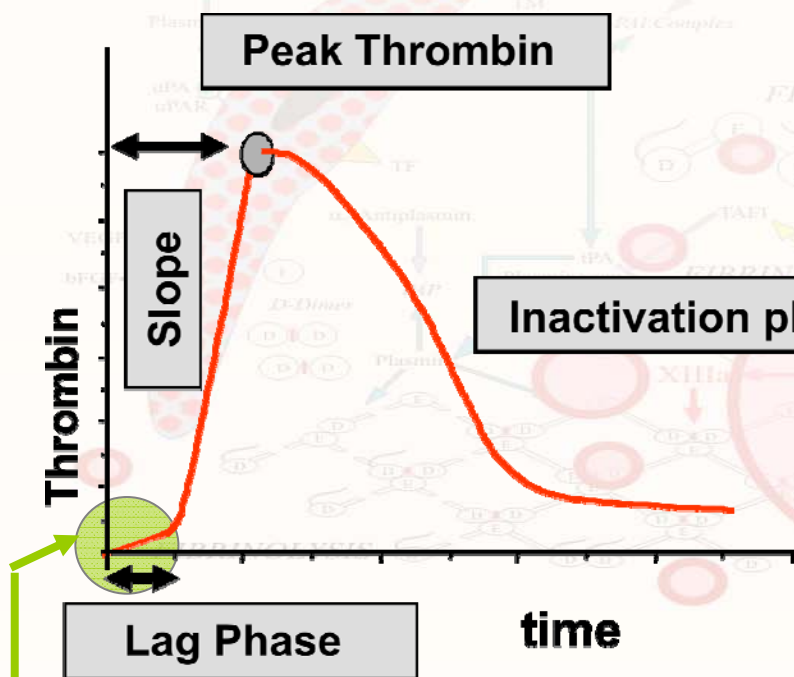
subtracting
 α 2-MG Thrombin

METHOD - Fluorogenic

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

Thrombin generation tests detect the whole kinetic of Thrombin generation



- lag phase
- peak time
- slope / velocity index

$$\text{velocity index} = \frac{\text{peak thrombin}}{\text{peak time} - \text{lag phase}}$$

- peak thrombin
- area under the curve (AUC)

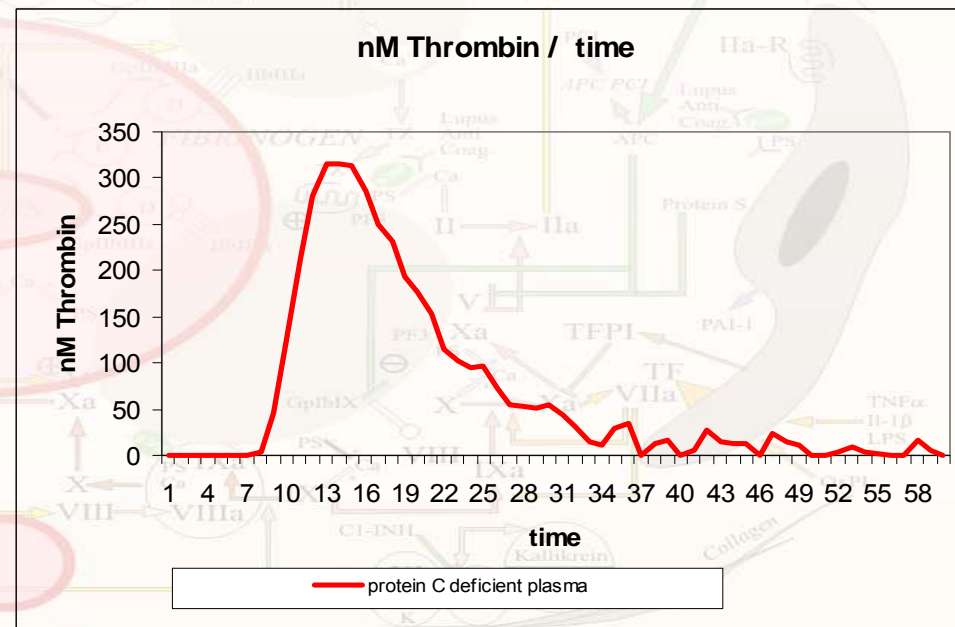
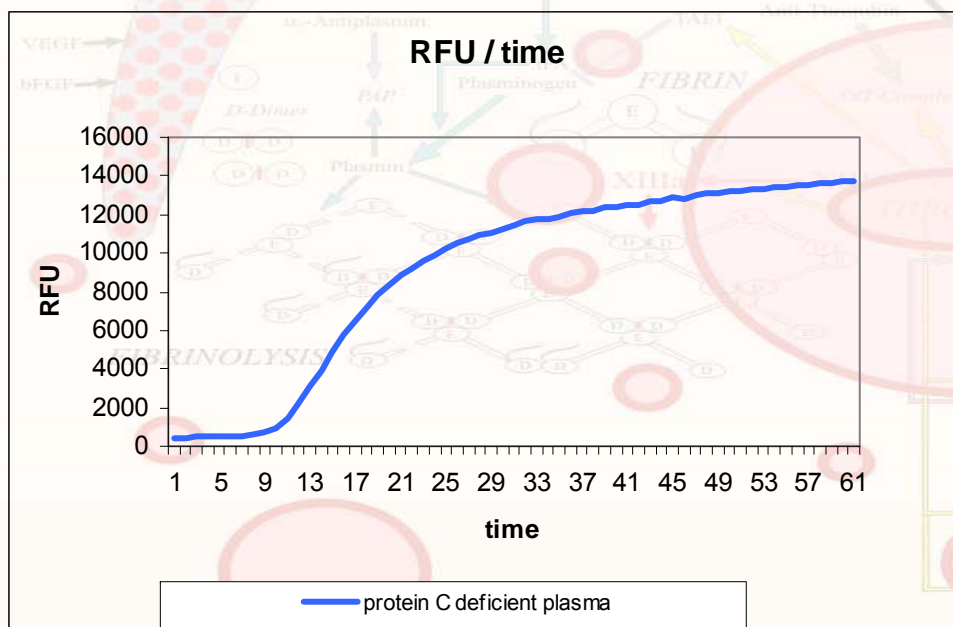
Using conventional coagulation tests only detect the initial phase of thrombin generation with endpoint "generation of first fibrin"

METHOD - Fluorogenic

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

When thrombin concentration in function of time is plotted, a thrombin generation curve is obtained, which shows different phases of thrombin generation



TECHNOTHROMBIN® TGA

Thrombin Generation Assay

Sample material / pre-analytics



Sample material

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

- platelet rich plasma (PRP)
- platelet poor plasma (PPP)
- platelet- and microparticle free plasma (PFP) can be used

Preparation of:

Platelet rich plasma (PRP) :

centrifuge 5 minutes at 100 x g and carefully pipette off the obtained PRP

Platelet poor Plasma (PPP):

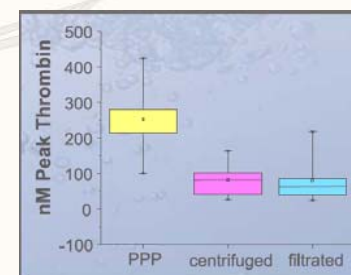
centrifuge PRP 10 minutes at 1.500 x g and carefully pipette off the obtained PPP.

alternative

centrifuge whole blood 15 minutes at least 2500 x g (according to norm DIN 58905).

Platelet- and microparticle free Plasma (PFP):

- centrifuge PPP 30 minutes at least at 15.000 x g and carefully pipette of the obtained PFP
- or by 2 minutes of filtration via Ceveron® MFU 500



Sample material

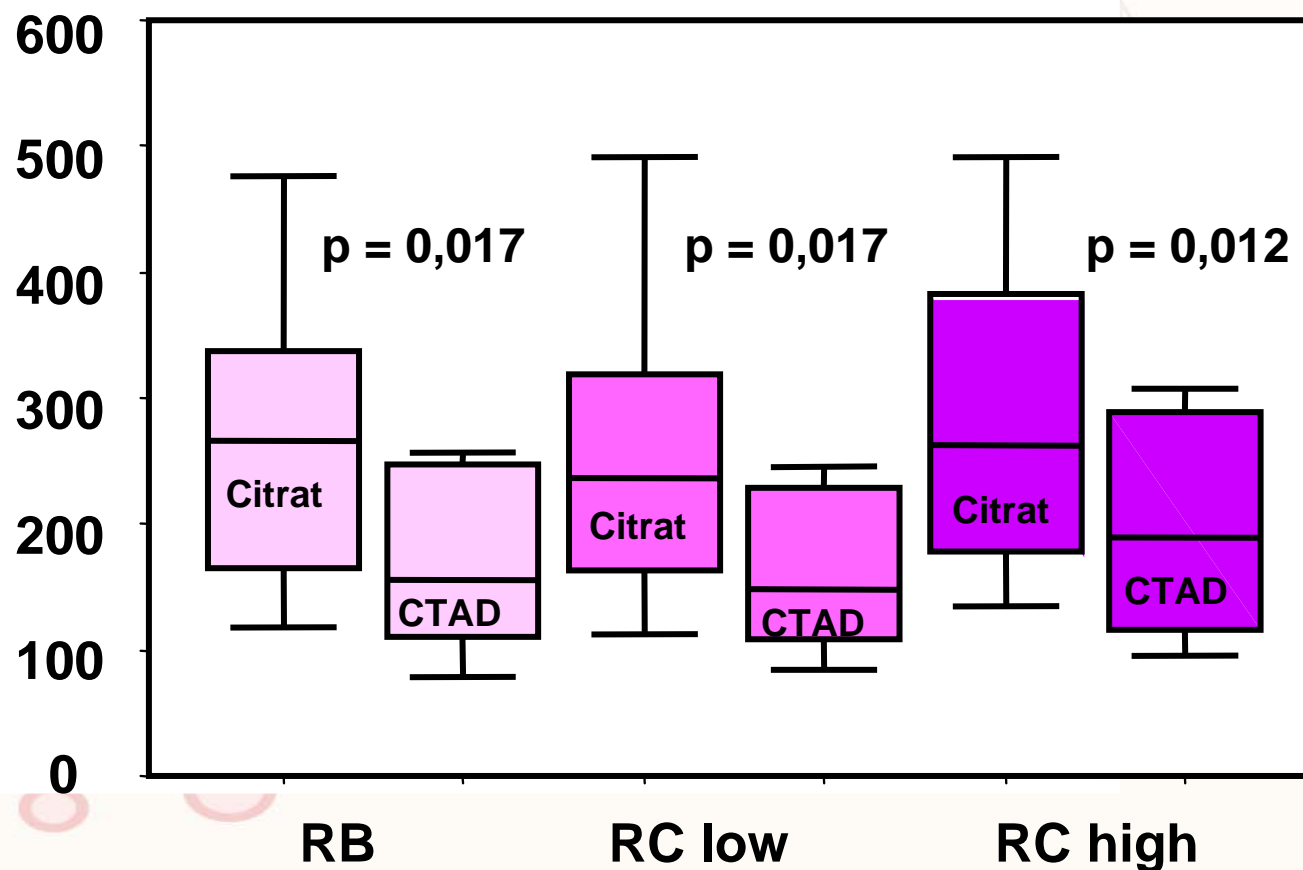
TECHNOTHROMBIN® TGA

Thrombin Generation Assay

A blood sample can be collected with:

- Citrated blood collection tubes
- **CTAD tubes**

nM Thrombin



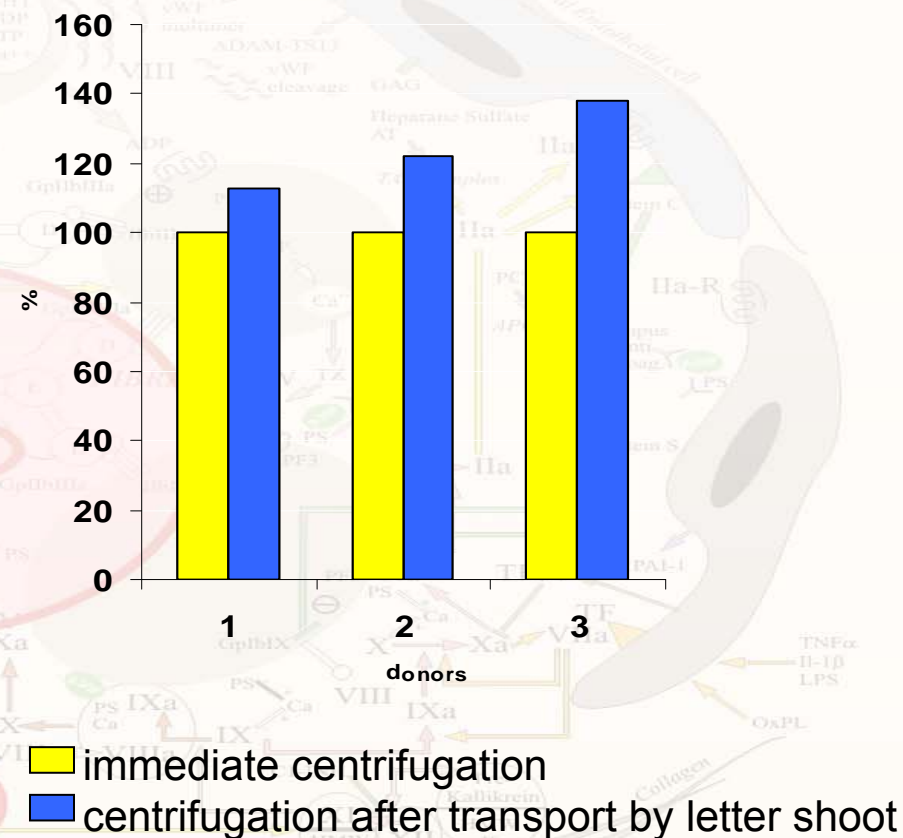
Sample material - transport

TECHNOTHROMBIN® TGA Thrombin Generation Assay

Mechanical agitation (sample transport by letter shoot) can lead to significant changes in thrombin generation.

Influence of sample transport on thrombin generation in 3 healthy donors (TECHNOTHROMBIN® TGA, RB Reagent).

Samples should be transported only after centrifugation!



L. Wiens, Magdeburg Poster 140 GTH 2006

Sample material

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

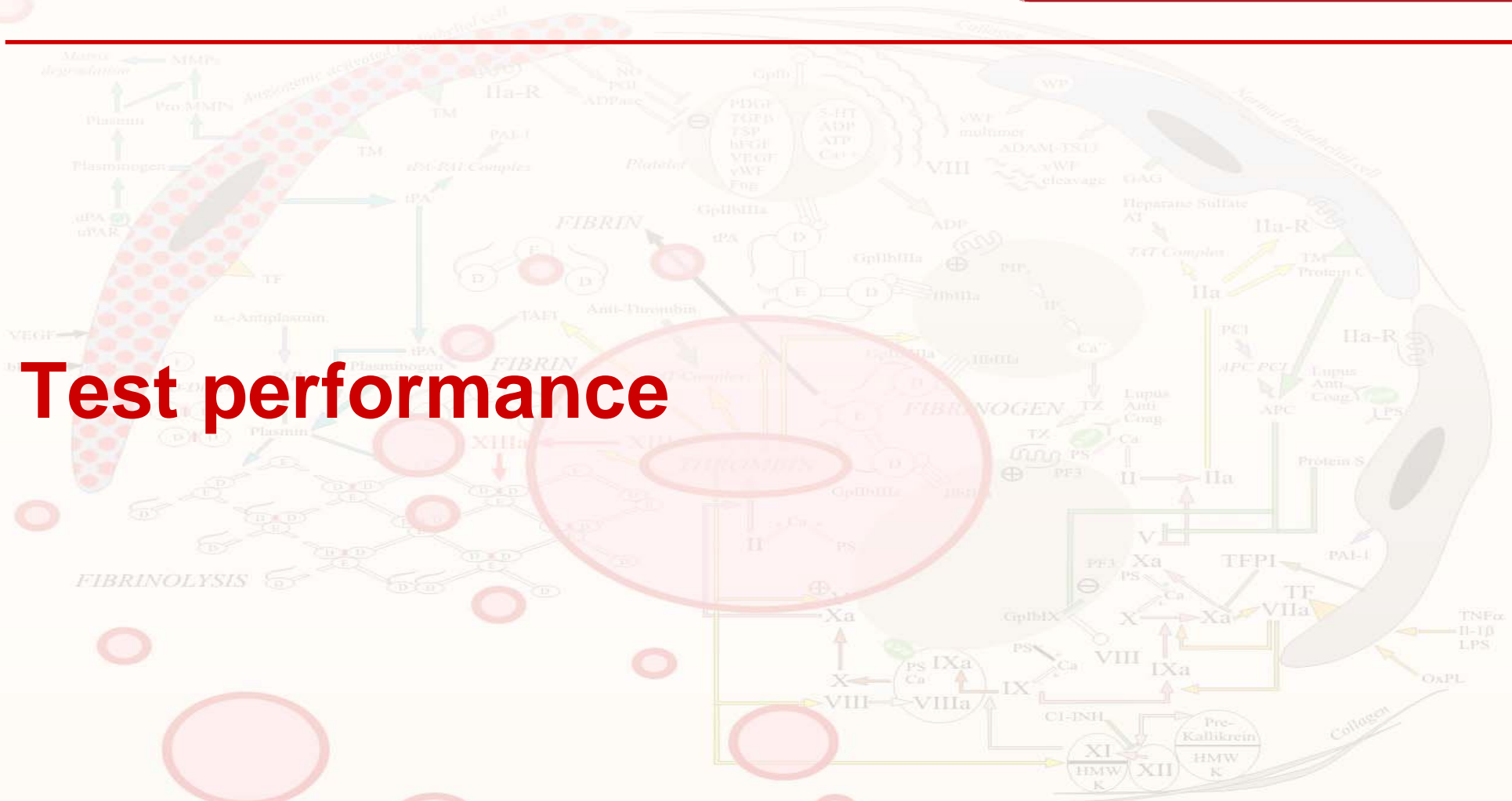
We recommend:

- CTAD tubes for blood collection
- Samples should be centrifuged right after collection
- Samples should only be transported after centrifugation
- Plasma samples which need to be stored should be frozen immediately after centrifugation
- Frozen samples should be stored at constant temperature – avoid temperature variations during storage.

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

Test performance



Reagent preparation

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

We recommend:

- The lyophilized reagents must be dissolved in the volume of distilled water indicated on the vials.
- After exactly **20 minutes of reconstitution time** and thorough mixing (Vortex), controls, calibrator and substrate are ready to use.
- The trigger reagents (RA, RB, RClow, RChigh and RD) have a reconstitution time of exactly 20 minutes and should be used immediately afterwards.
- The reagent mixture (trigger reagent + substrate) is made after the recommended reconstitution time for the trigger of 20 minutes and should be used – like all reagents – immediately afterwards.
- All reconstituted reagents including the aqua dest should reach room temperature before usage.

TEST PERFORMANCE – CAL

TECHNOTHROMBIN® TGA Thrombin Generation Assay

- The calibration curve (thrombin curve) enables conversion of results from RFU/min to nM thrombin.
- The calibration curve is created **separately from sample measurement**.
- For each **lot of substrate** only **one calibration curve** has to be created.

CALIBRATION CURVE (CAL)

40 µL dilution of calibrator (CAL)

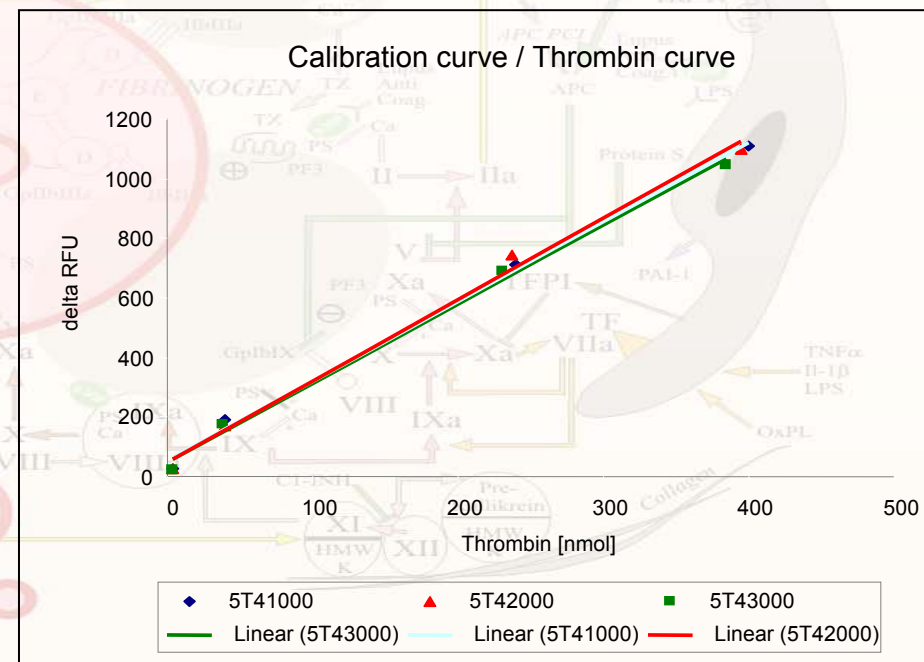
50 µL TGA substrate (SUB)

Measurement period: **10 min**

Filters: ~ 360 nm / ~ 460 nm

Measurement interval: **30 sec**

4 different dilutions of thrombin calibrator



TEST PERFORMANCE - SPL

TECHNOTHROMBIN® TGA Thrombin Generation Assay

- **Sample measurement** is performed **separately from calibration curve**.
- As an alternative, a reagent/substrate mixture can be prepared in advance to reduce pipetting steps.

SAMPLES

40 µL sample

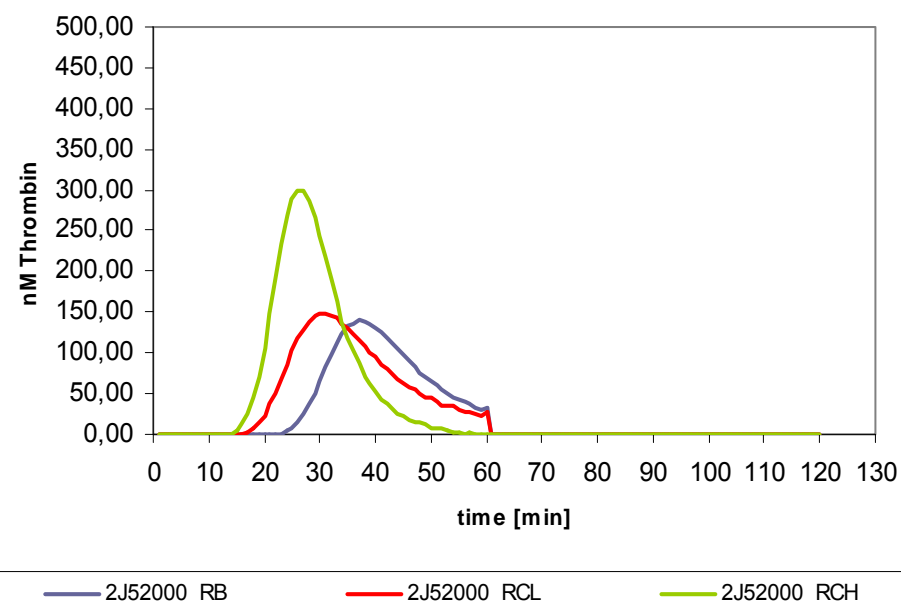
10 µL reagent (**RA, RB, RC low, RC high***)

50 µL substrate (SUB)

measurement period: **60 / 120 min**

Filters: ~ 360 nm / ~ 460 nm

measurement interval: **1 min**



TEST PERFORMANCE - SPL

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

- **Sample measurement** is performed **separately from calibration curve**.
- As an alternative, a reagent/substrate mixture can be prepared in advance to reduce pipetting steps.

SAMPLES

20 µL sample

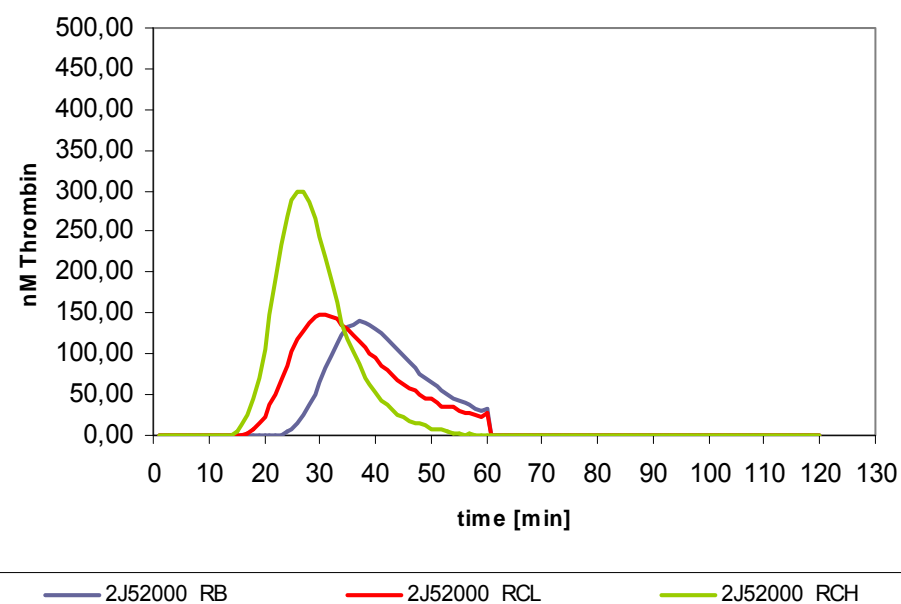
30 µL reagent (**RD**)

50 µL substrate (**SUB**)

measurement period: **60 / 120 min**

Filters: ~ 360 nm / ~ 460 nm

measurement interval: **1 min**



TEST APPLICATIONS

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

We recommend following reagents for the determination of:

Reagent	purpose
TGA RA	- to monitor the activity of microparticles
TGA RB and RC Low	<ul style="list-style-type: none">- Measurement of thrombophilic tendency (preferentially with platelet poor plasma PPP)- Measurement of bleeding tendency- For monitoring FVIII inhibitor Bypass therapy with rFVIIa and FEIBA- hF VII, hF Xa, hF XIa- to monitor the thrombogenicity of microparticles
TGA RC High	- for monitoring of anticoagulant therapy
TGA RD	<ul style="list-style-type: none">- For monitoring heparin, direct thrombin and Xa inhibitor therapy- hF XIIa, plasma callicrein, callicrein1 (Tissue Factor)

TRIGGER CONCENTRATION

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

The concentration of the different TGA reagents are:

Reagent	Concentration
TGA RA	Low conc. of phospholipid micelles containing no rhTF Tris-Hepes-NaCl buffer
TGA RB	Low conc. of phospholipid micelles containing low rhTF in Tris-Hepes-NaCl buffer
TGA RC Low	Low conc. of phospholipid micelles (same as in RB) containing High rhTF in Tris-Hepes-NaCl buffer
TGA RC High	High conc. of phospholipid micelles containing High rhTF (same as in RCL) in Tris-Hepes-NaCl buffer
TGA RD	Special composition of phospholipids

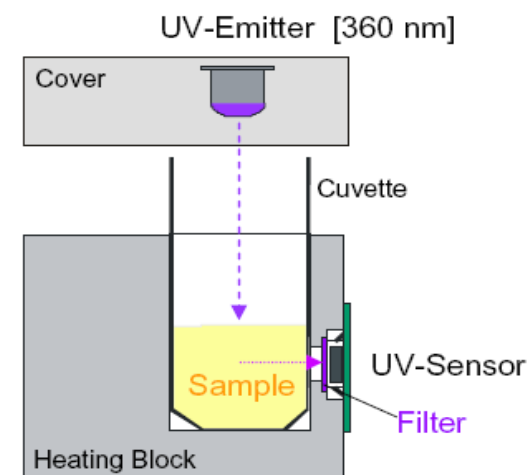
MEASUREMENT

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

For determination of thrombin generation a fluorescence reader, which is equipped with filters of wavelength ~360/~460 (excitation/emission) is needed.

- **Fluorescence reader**
with Excel evaluation software
- Or
- **Ceveron® alpha**
fully automated coagulation analyzer



Fluorescence reader

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

AVAILABLE READER APPLICATIONS

- ✓ BioTek® FLx 800™ TBI (Software Gen 5/ KC 4 / KC Junior)
- ✓ BMG Labtech FLUOstar OPTIMA
- ✓ Molecular Devices Gemini / SpectraMax
- ✓ Perkin Elmer® Victor Wallac
- ✓ TECAN Genios / Infinite
- ✓ Thermo Fluoroskan

ATTENTION: For accurate results we recommend to change the lamp of your reader every year.

Evaluation software example

TECHNOTHROMBIN® TGA Thrombin Generation Assay

Plate Layout

TECHNOTHROMBIN® TGA Evaluation Software
BIOTEK - KC4

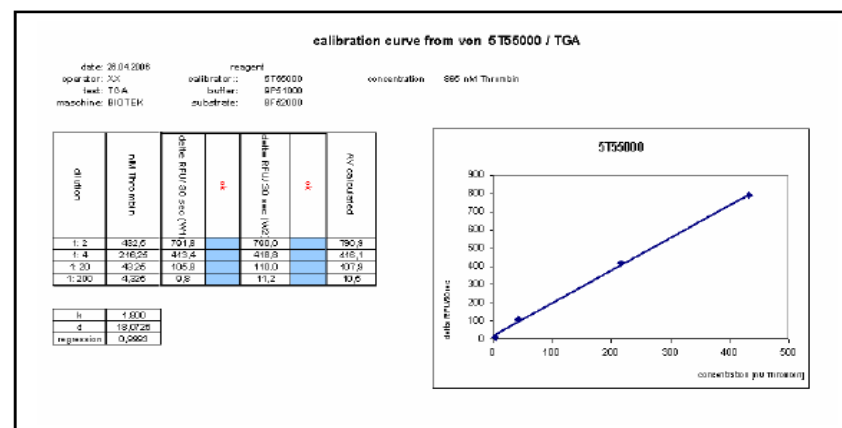
concentration: 100 nM Thrombin

volume: 100 µl

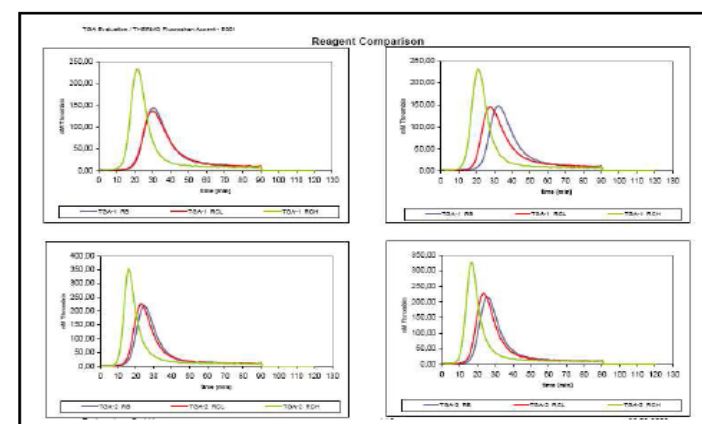
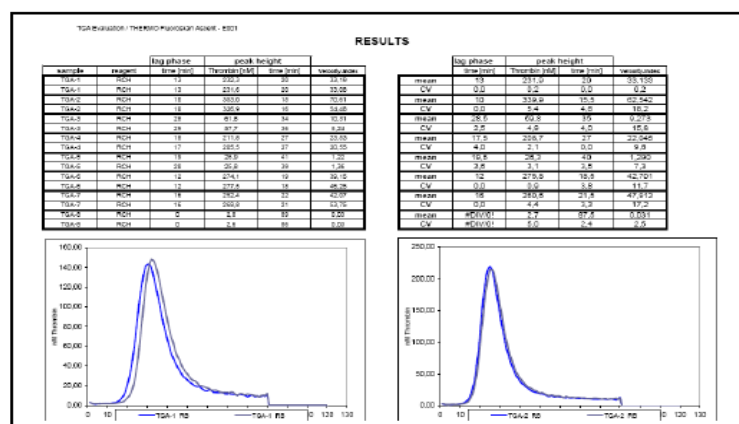
sample and control input

reagent	1	2	3	4	5	6
A						
B						
C						
D						
E						
F						
G						
H						

Calibration Curve



Results



Evaluation software download www.technoclone.com

TECHNOTHROMBIN® TGA Thrombin Generation Assay

The screenshot displays two Microsoft Internet Explorer windows from the year 2006. The left window, titled 'welcome - Microsoft Internet Explorer', shows the Technoclone homepage. A red arrow points to the 'New Products' section, which lists 'TECHNOTHROMBIN® TGA' as 'JUST APPEARED! JAMA 2006, Vol 296'. The right window, titled 'Reagent Kits - Microsoft Internet Explorer', shows the 'Reagent Kits' page. A red arrow points to the 'EVALUATION SOFTWARE' link under the 'NEW!' section. The page also lists various reagent kits and their applications, including 'TECHNOTHROMBIN® TGA KIT' and 'TECHNOTHROMBIN® TGA Kit WB'.

Technoclone
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New Products

- TECHNOTHROMBIN® TGA
JUST APPEARED! JAMA 2006, Vol 296
- TECHNOZYM® ADAMTS-13 INH
- TECHNOZYM® ADAMTS-13

Ceveron

ceveron alpha

ceveron website

Login

Register now!
Customer Registration, Distributor Registration

Username:
Password:

Downloads

Coagulation and fibrinolysis scheme

Product Catalogue 2005/2006

Contact

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Fax: +43 1 863 73 - 44
Email: sales@technoclone.com

Reagent Kits

Coagulation

Quality Control Reagents
Global Tests
Thromboplastin Time
aPTT
Thrombin Time
Fibrinogen
Thrombin Generation
Reagent Kits
Modular Reagents
Controls and calibrator
Equipment
Calibration Plasma
Control Plasma
Single Factors
Inhibitors
Protein S, Protein C
APC Response
Acquired Inhibitors
Chromogenic Substrates
Supplementary Reagents
Accessories
Equipment

TECHNOTHROMBIN® TGA KIT

The TECHNOTHROMBIN® TGA kit is an assay system for determination of thrombin generation over time in plasma (PPP or PRP) upon activation of the clotting cascade by micelles of negatively charged phospholipids containing different amounts of human tissue factor and CaCl₂.

The kit can be used:

- to monitor hemophiliacs during inhibitor bypassing therapy
- to monitor anticoagulation therapy and to calculate INR values for patients
- to determine states of bleeding disorders or thrombophilia
- to determine the activity of circulating micro particles.

This broad range of applications is made possible by providing different tissue factor concentrations and by monitoring the whole kinetics of thrombin generation during initiation, amplification and down regulation of thrombin formation.

Applications are available (sales@technoclone.com) for the fluorescence microplate reader systems:

BioTek® FLx 800™ TC
BMG Labtech FLUOstar OPTIMA
Molecular Devices Gemini / SpectraMax
Perkin Elmer® Victor Wallac
TECAN Genios
Thermo Fluoroskan

NEW !

EVALUATION SOFTWARE

TECHNOTHROMBIN® TGA Kit WB

The TECHNOTHROMBIN® TGA kit WB is an assay system for determination of thrombin generation over time in whole

REF	Package Size	MSDS
5006010	3 x 16 tests	
5006015	48 tests	

Evaluation software download www.technoclone.com

TECHNOTHROMBIN® TGA
Thrombin Generation Assay

TECHNOCLONE **DIAGNOSTICS**
Coagulation | Thrombophilia | Thrombosis | Fibrinolysis |
Lipid Metabolism | Plasma Proteins | Point of care |
Density Gradient Media | Infectious Diseases | ELISAs |
PCR | Antibodies | Proteins | Tissue Culture | Ceveron |

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Evaluation Software for TGA

EVALUATION SOFTWARE
To download the respective evaluation software and description, please click on the corresponding symbol.

PRODUCT	READER SETTINGS READER PROTOCOL	EVALUATION SOFTWARE	SOFTWARE DESCRIPTION
TECHNOTHROMBIN® TGA BioTek FLx800 KC4	E01	E002	E002
TECHNOTHROMBIN® TGA BioTek FLx800 Gen5	E01	E001	E001
TECHNOTHROMBIN® TGA BioTek FLx800 TBI KC Junior		-	-
TECHNOTHROMBIN® TGA FLUostar OPTIMA	E03	E003	E002
TECHNOTHROMBIN® TGA Perkin Elmer Wallac Viktor	E02	E002	E002
TECHNOTHROMBIN® TGA SpectraMax M5 / SoftMax Pro5	E02	E002	E003
TECHNOTHROMBIN® TGA TECAN Genios Magellan 5	E01	singlespace: E002	E002
TECHNOTHROMBIN® TGA Thermo Fluoroskan Ascent	E02	E002	E002
TECHNOTHROMBIN® TGA Thermo Fluoroskan Ascent + dispenser	E02	E002	E002

- ✓ Reader Settings
- ✓ Reader protocols
(for corresponding reader software)
- ✓ Evaluation software
- ✓ Software description

Ceveron[®] alpha

TECHNOTHROMBIN[®] TGA

Thrombin Generation Assay

FULLY AUTOMATED COAGULATION ANALYZER

For **routine**, **research** and **new generation tests**!



clotting

TPT, aPTT, TT, Fibrinogen, ...
II, V, VII, IX, X, XI, XII, XIII; ...
Protein C, Lupus, APC, ...

chromogenic

AT III, Protein C, C1 INH,
FVIII:C, ...

turbidimetric

Lp(a), D-Dimer, CRP, ...

fluorometric

Thrombin Generation

Ceveron[®] alpha

TECHNOTHROMBIN[®] TGA

Thrombin Generation Assay

For thrombin generation measurement a special fluorometric TGA module is placed over the cuvette rotor with a UV emitter (365nm)



TGA
Module



Ceveron[®] alpha

TECHNOTHROMBIN[®] TGA

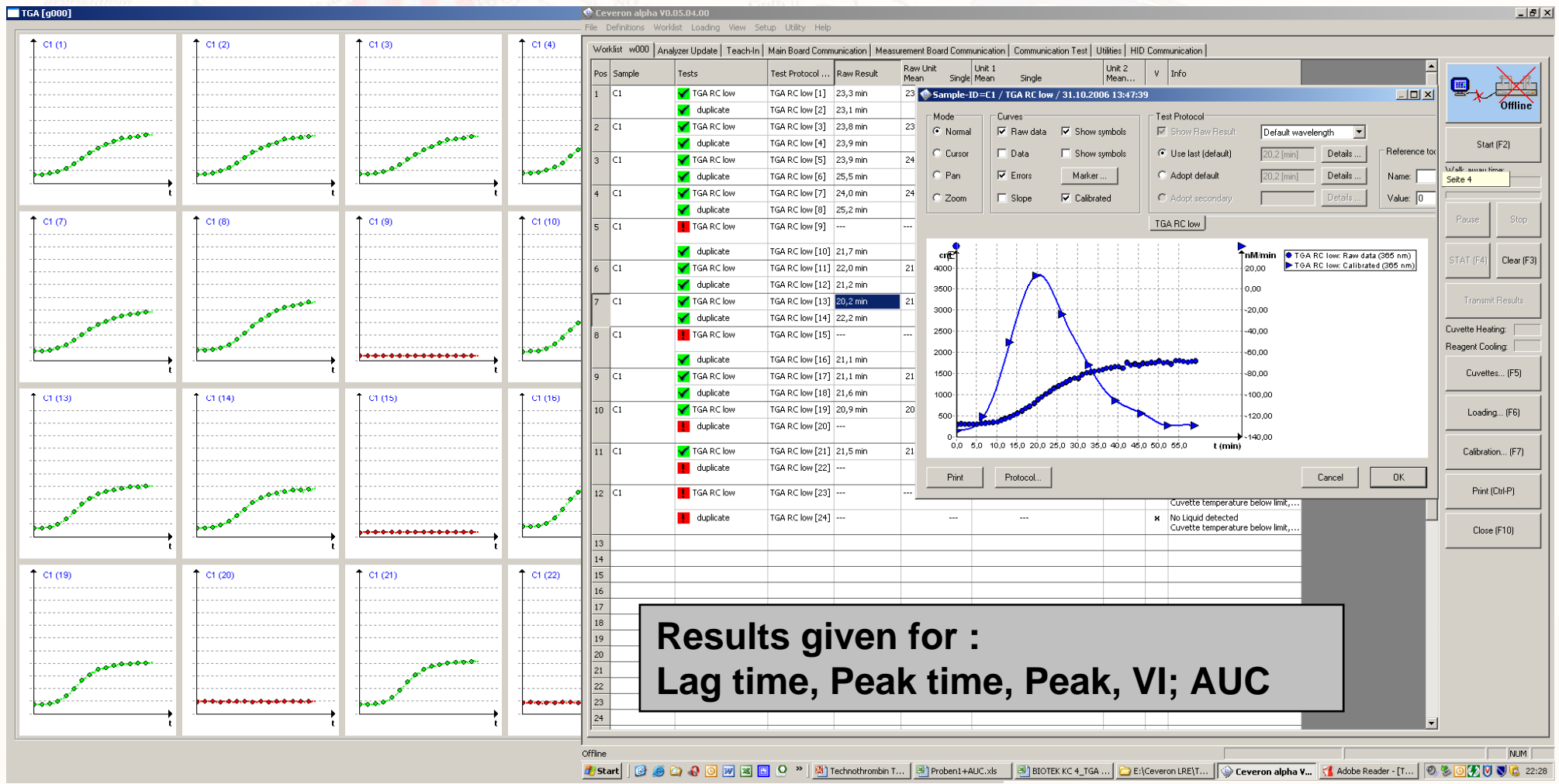
Thrombin Generation Assay

TGA monitoring of
each individual
sample over
measurement
period possible



Ceveron[®] alpha software

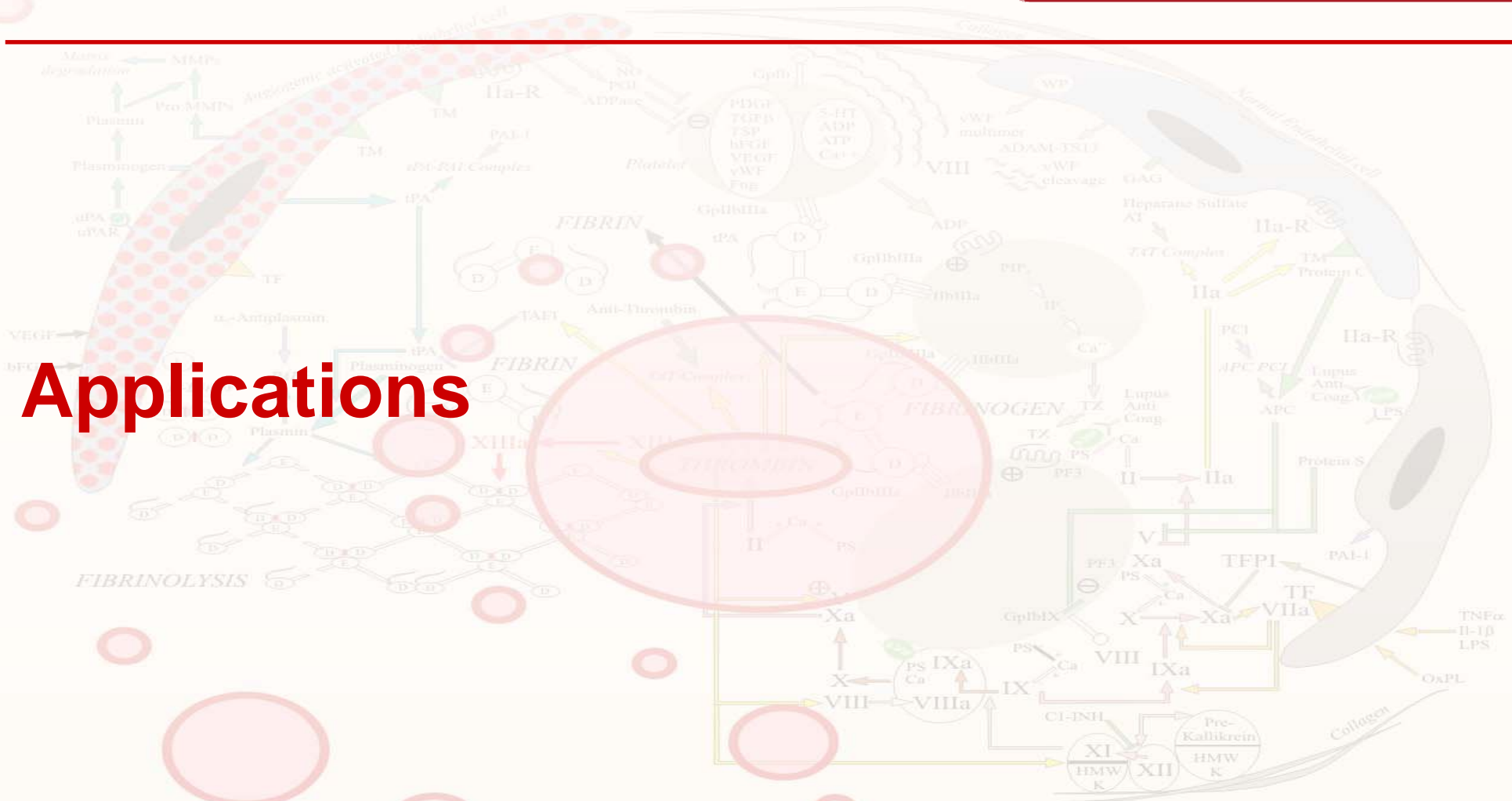
TECHNOTHROMBIN[®] TGA Thrombin Generation Assay



TECHNOTHROMBIN® TGA

Thrombin Generation Assay

Applications



Goal

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

- Measurement of an individual coagulation potential in relation to a phenotypic diagnostic.
- Correlation of bleeding events
- Detection of hypercoagulability
- Measurement of the effect of anticoagulant drugs (independent of the class of medication)

Hemophilia

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

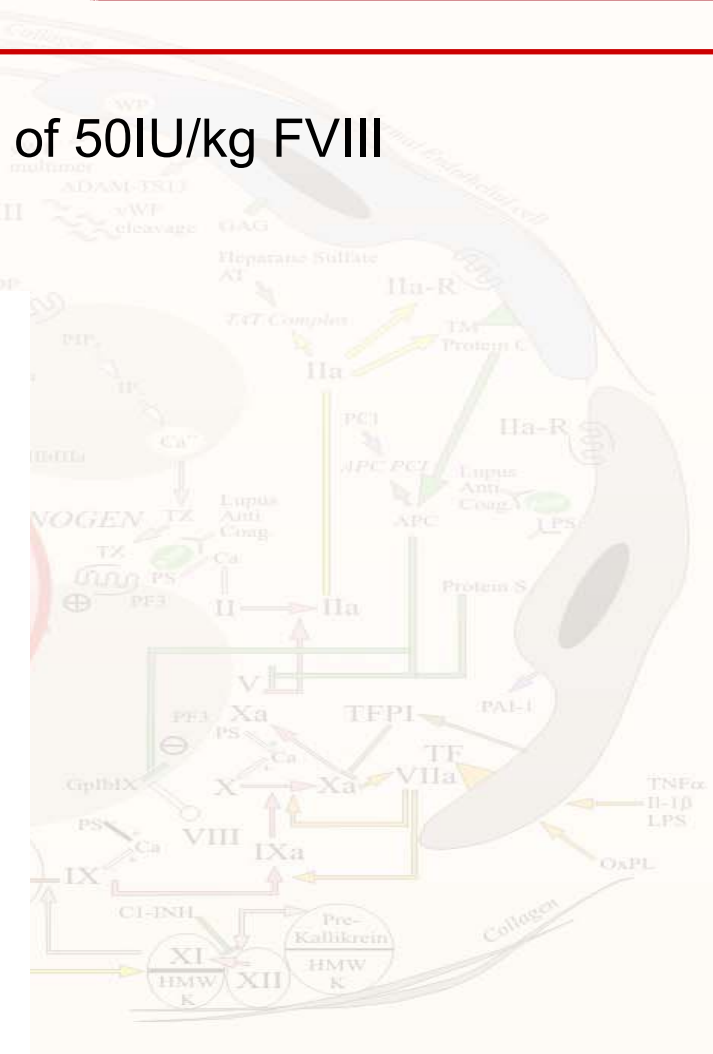
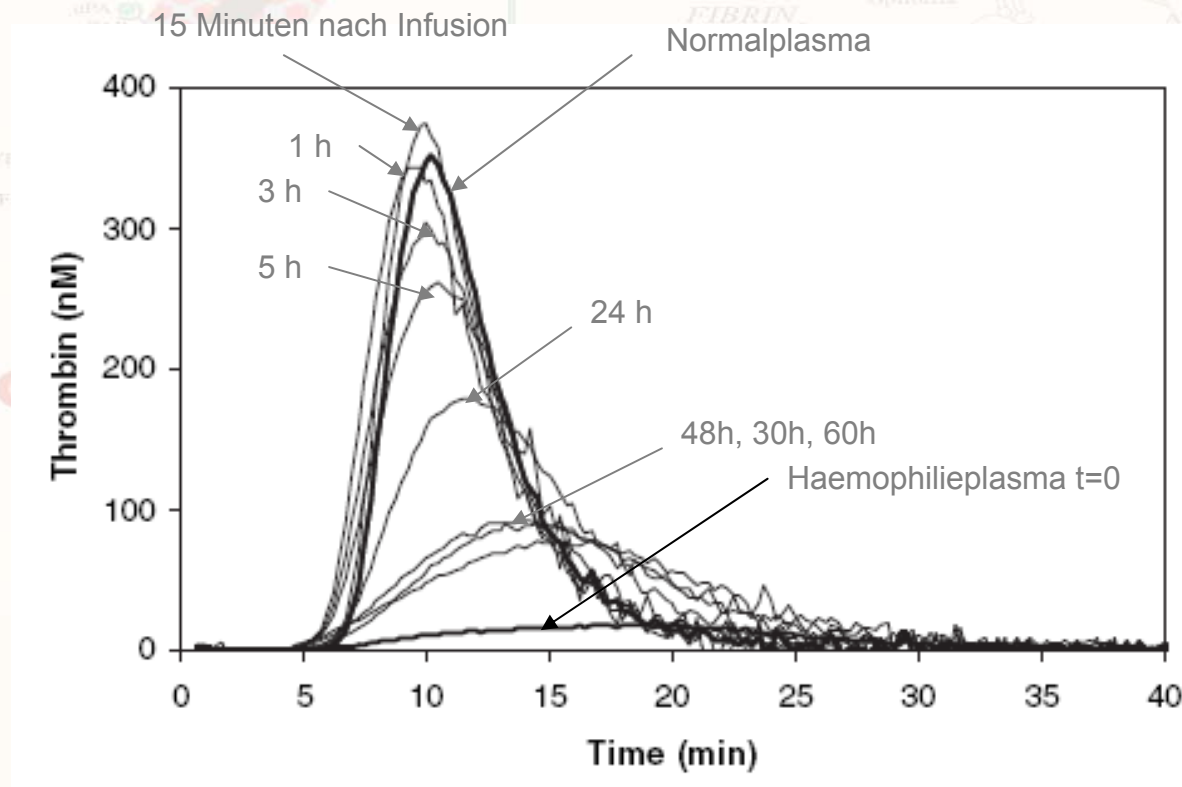
- Differentiating the grade of hemophilia (Santagostino et al. Haemophilia 2005)
- Improved monitoring of substitution therapy
- Monitoring of therapy with bypassing-concentrates (Varadi et al. Haemophilia 2004)

Hemophilia

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

Thrombin generation in hemophilia A after infusion of 50IU/kg FVIII



Barrowcliffe; Haemophilia 2006, 12(Suppl.3)

Thrombophilia

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Thrombin Generation Assay

- Identification of thrombotic risk factors
- Factor II mutation
- Factor V mutation (under addition of activated protein C) (N. Hezard et al. Clinical Chemistry 2006)

Thrombophilia

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

AUREC STUDY / TECHNOTHROMBIN TGA RC LOW

- N=914
 - First ideopathic venous thromboembolism
 - Prospective cohort study
 - observation 47 month after ending of oAc.
- N=100 patients with VTE-recurrency (11%)
 - Thrombin generation > 400nM probability of recurrence 20%
 - Thrombin generation < 400 nM 6,5% after 4 years

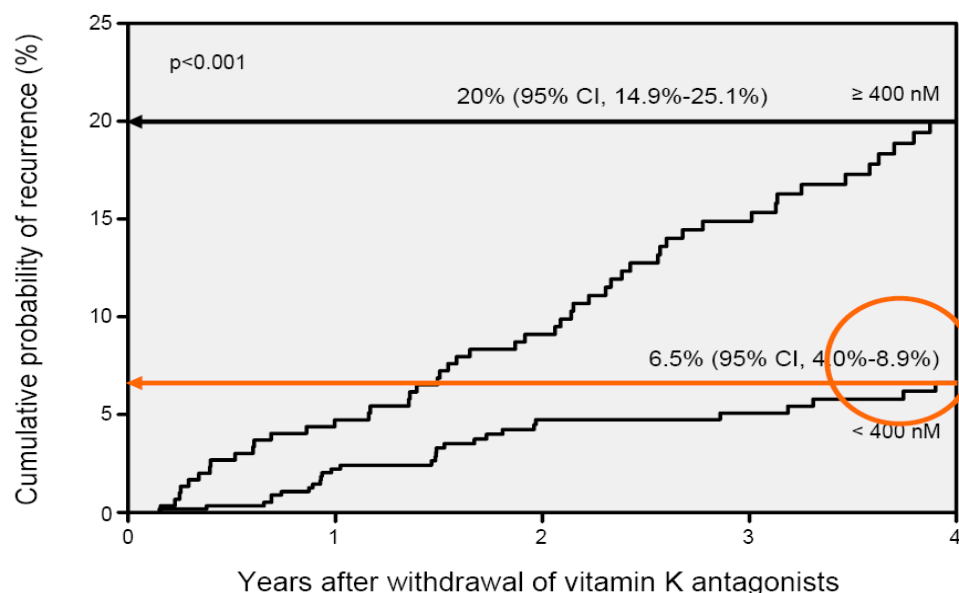
Thrombophilia

TECHNOTHROMBIN® TGA

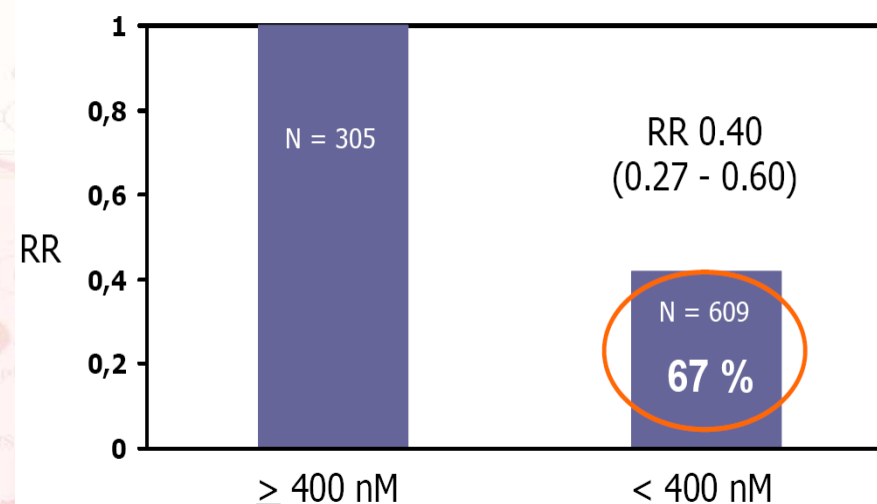
Thrombin Generation Assay

AUREC STUDY TECHNOTHROMBIN® TGA – Reagent C Low

Peak thrombin - Probability of Recurrent VTE



Peak thrombin - Relative Risk of Recurrence



after adjustment for age, sex, BMI, location of first thrombosis, duration of oral anticoagulation, F V Leiden, and F II G20210A

Patients can be stratified according to their risk of recurrence by a simple global coagulation assay

Low risk patients represent 2/3 of patients

- ☐ no need for anticoagulants
- ☐ lower risk of bleeding

Pregnancy/postpartum

TECHNOTHROMBIN® TGA Thrombin Generation Assay

Thrombin generation during pregnancy and postpartum

Abbildung 1:
Peak-Thrombin (nM),
RB-Reagenz

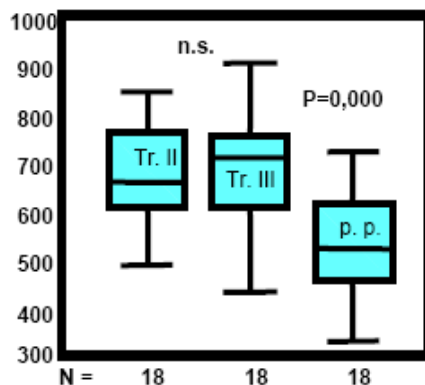


Abbildung 2:
Peak-Thrombin, nM
RC low-Reagenz

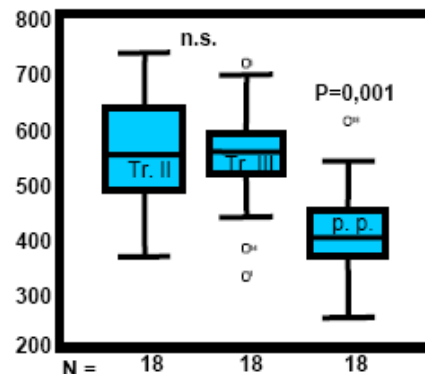


Abbildung 3:
Peak-Thrombin, nM
RC high-Reagenz

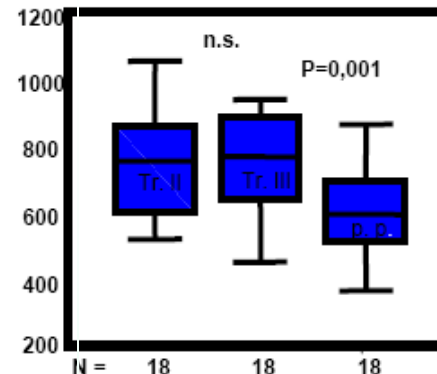
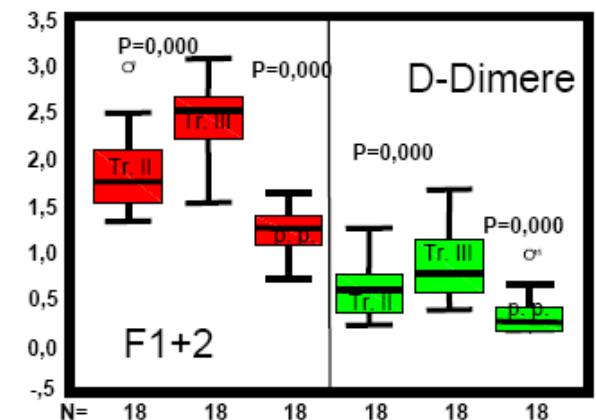


Abbildung 4:
D-Dimere (mg/l) und Prothrombin-
fragment 1+2 (nmol/l)



Figures 1, 2 and 3 clearly show that thrombin generation significantly increases during pregnancy. This increase can be monitored with all three reagents which differ in their concentrations of tissue factor and phospholipid concentration. In contrast to the classical activation markers –Prothrombin fragment 1+2 and D-Dimer (Fig. 4) – there is no significant difference in thrombin generation between 2nd and 3rd trimester.

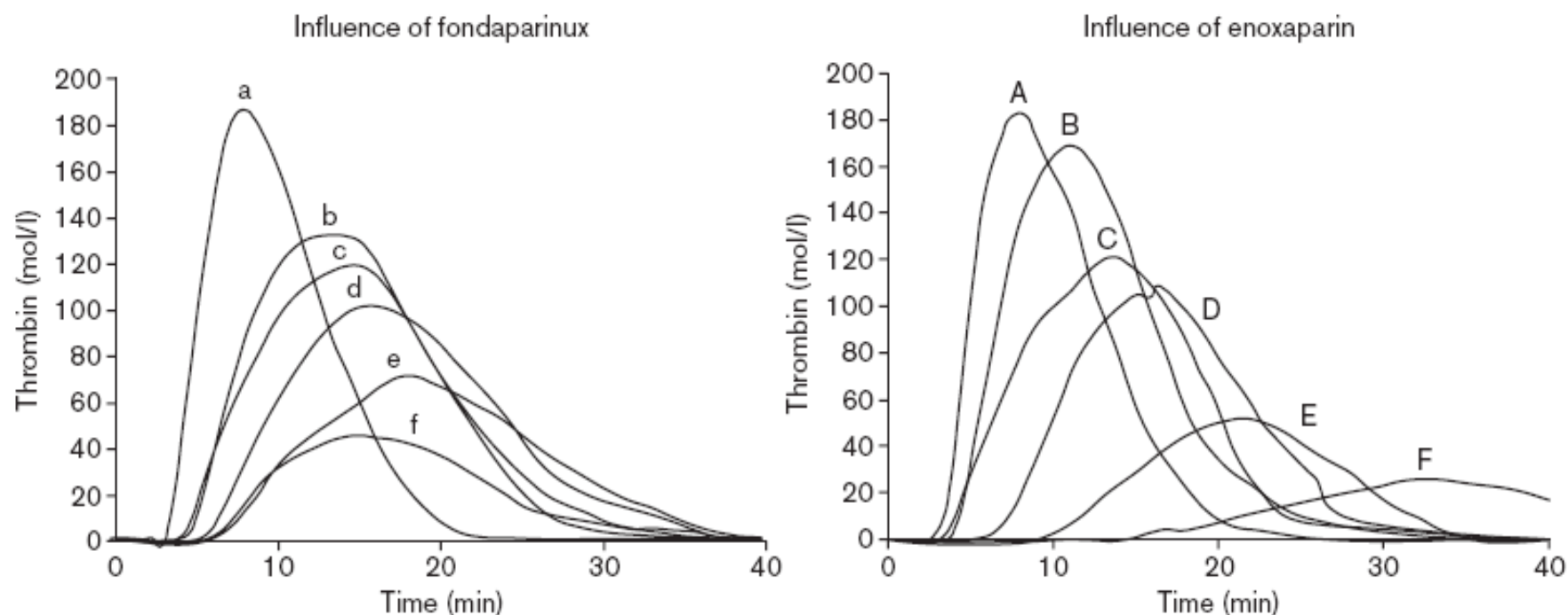
Anticoagulation therapy

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

Fondaparinux and Enoxaparin

Thrombin generation in PRP



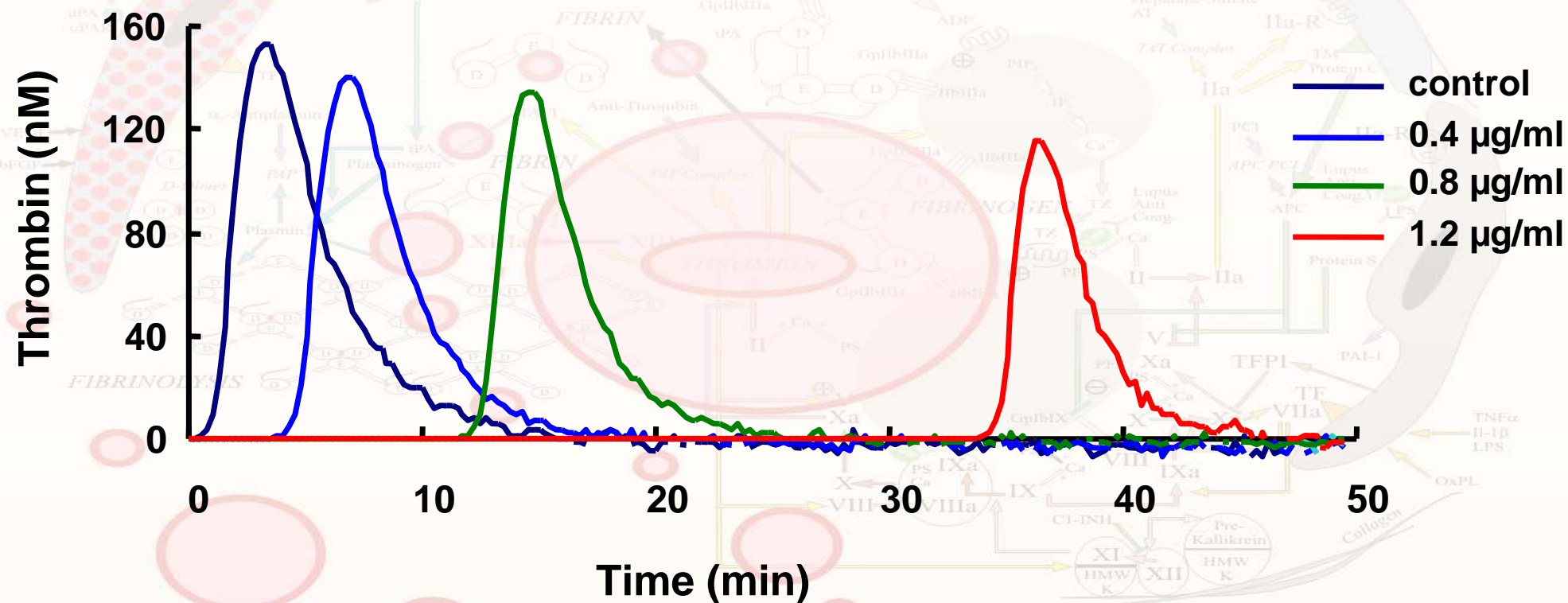
Effect of increasing concentrations of fondaparinux (left panel) and enoxaparin (right panel) on thrombin generation in platelet-rich plasma (PRP) after tissue factor pathway activation. Representative 'thrombograms' of one out of seven experiments. a, control; b, 0.11 anti-FXa IU/ml; c, 0.28 anti-FXa IU/ml; d, 0.57 anti-FXa IU/ml; e, 0.91 anti-FXa IU/ml; f, 1.14 anti-FXa IU/ml of fondaparinux. A, control; B, 0.1 anti-FXa IU/ml; C, 0.25 anti-FXa IU/ml; D, 0.5 anti-FXa IU/ml; E, 0.8 anti-FXa IU/ml; F, 1 anti-FXa IU/ml enoxaparin.

Anticoagulation therapy

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

Hirudin

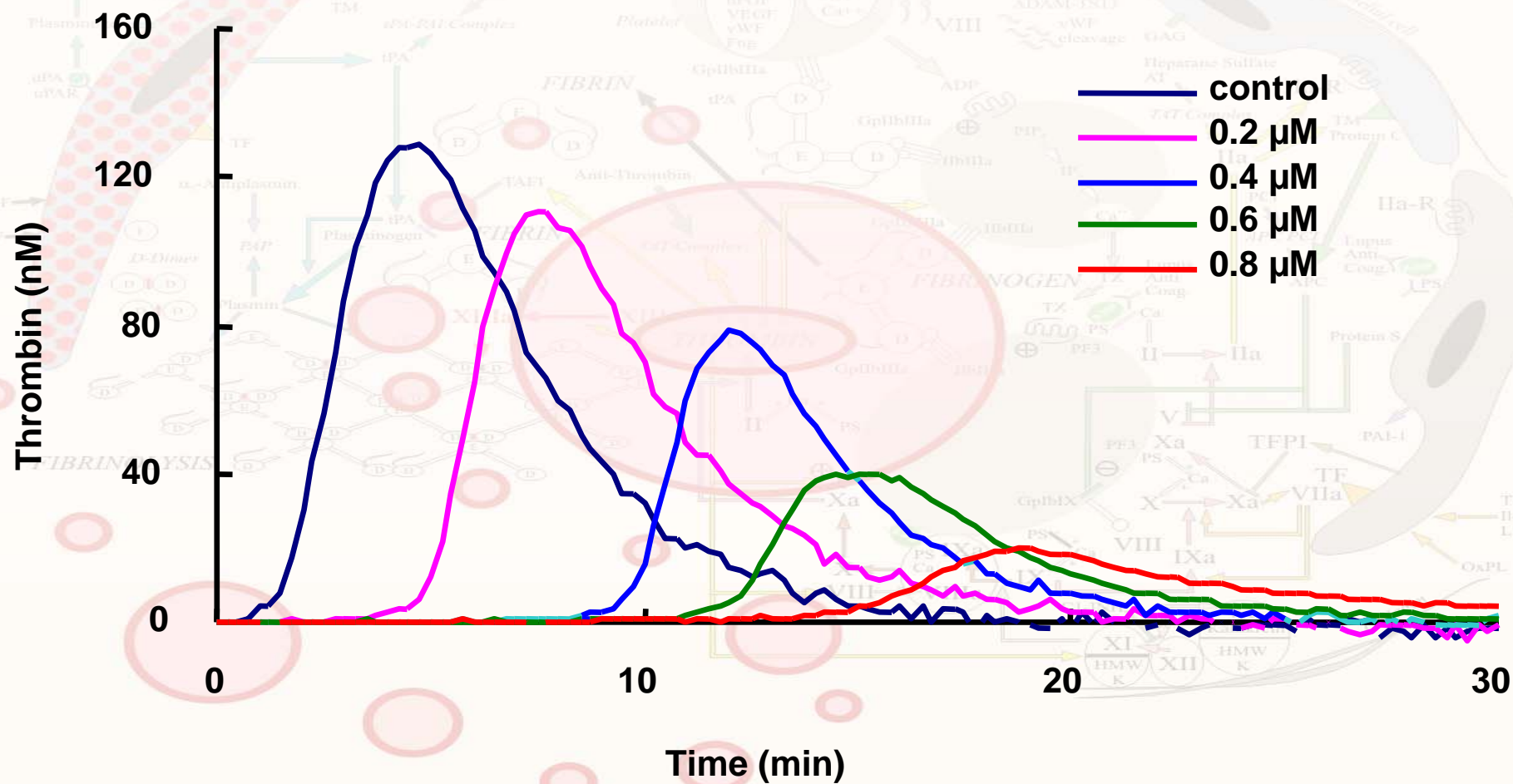


Anticoagulation therapy

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

Melagatran



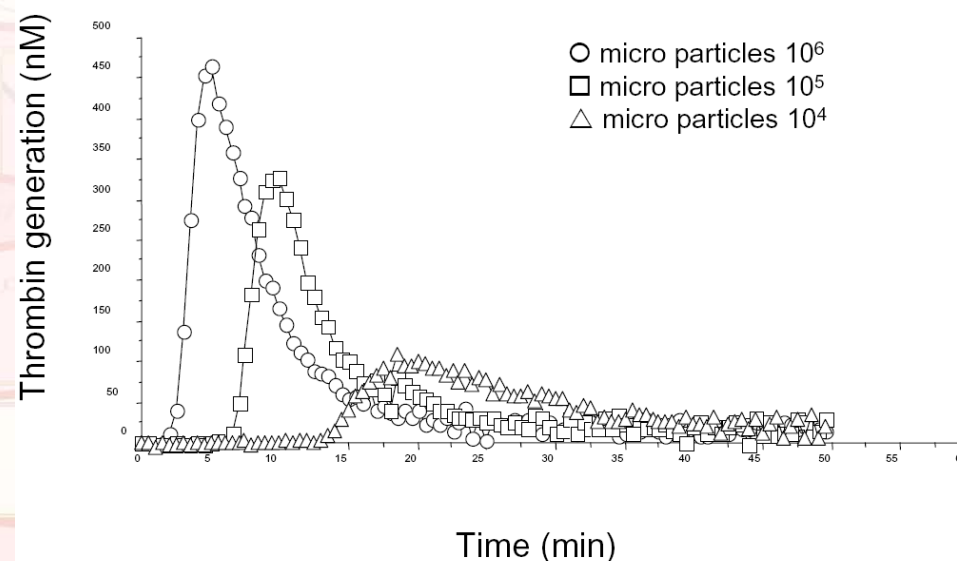
Microparticles

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

- Plasma microparticles are spherical cell membrane fragments derived from apoptotic or activated cells.
- They are rich in phospholipids and proteins, e.g. tissue factor, and thus are thrombogenic.
- Microparticles are thought to be one of the major risk factors for thrombosis in atherosclerotic patients.
- Determination thrombin generation by microparticles would allow to directly relate their circulating levels to the micro particle-induced thrombotic tendency.

TGA by micro particles



How do we use the thrombin potential?

TECHNOTHROMBIN® TGA

Thrombin Generation Assay

- Risk stratification after venous thromboembolism
- Thrombophilia
 - Monitoring of anticoagulant therapy?
 - pregnancy?
- hemophilia
 - Individually monitoring of therapy
 - Until now no diagnostic benefit for bleeding tendency