

# NOAC Monitoring? Bei Wem?

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# NOVA Monitoring Bei Wem?

***Es gibt kein HbA1c in der  
Blutgerinnung!***

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# Coagulation simplified ...

而形成红色凝血块，至此凝血过程全部完成（图 5-3-2）。

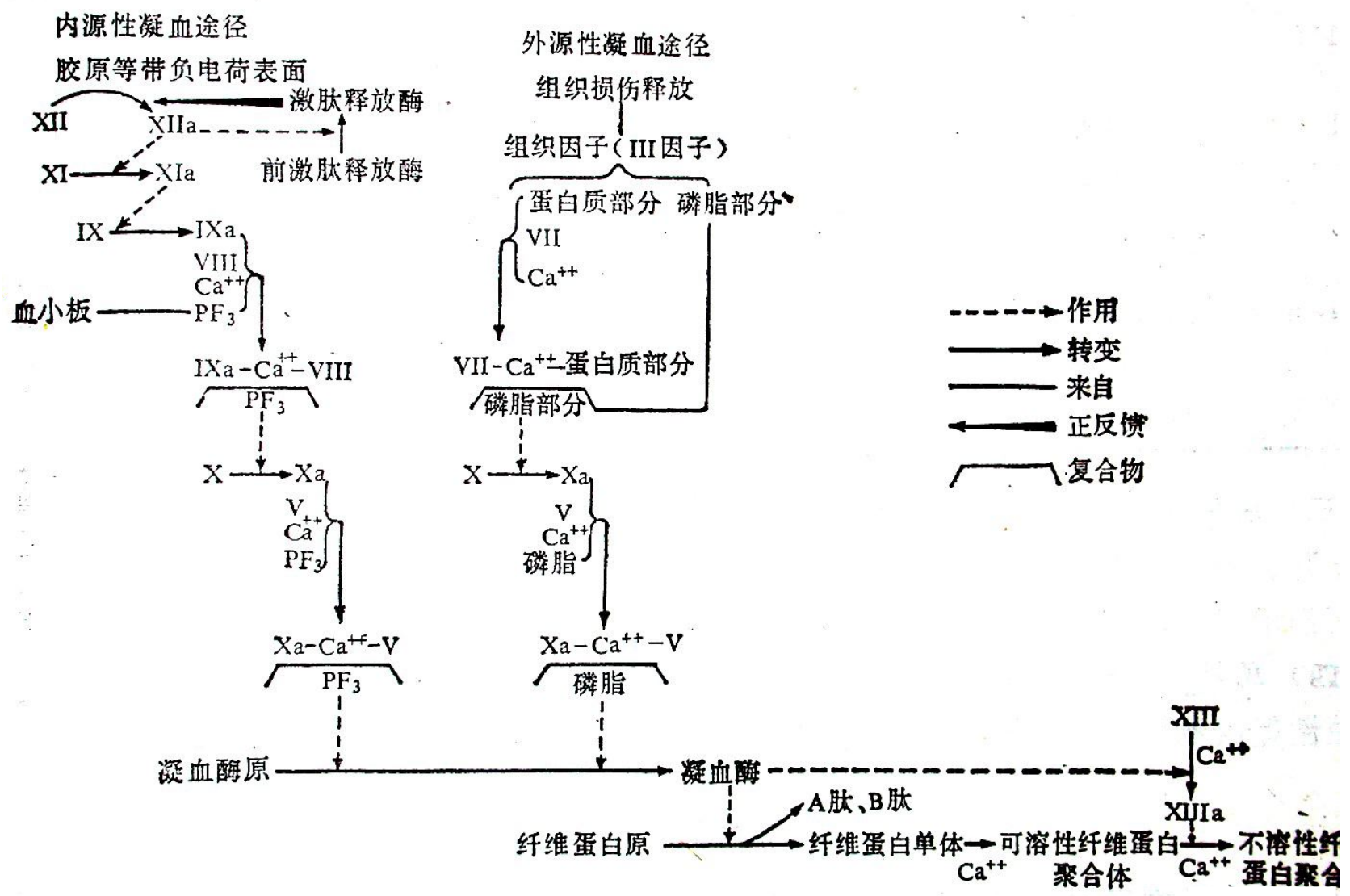
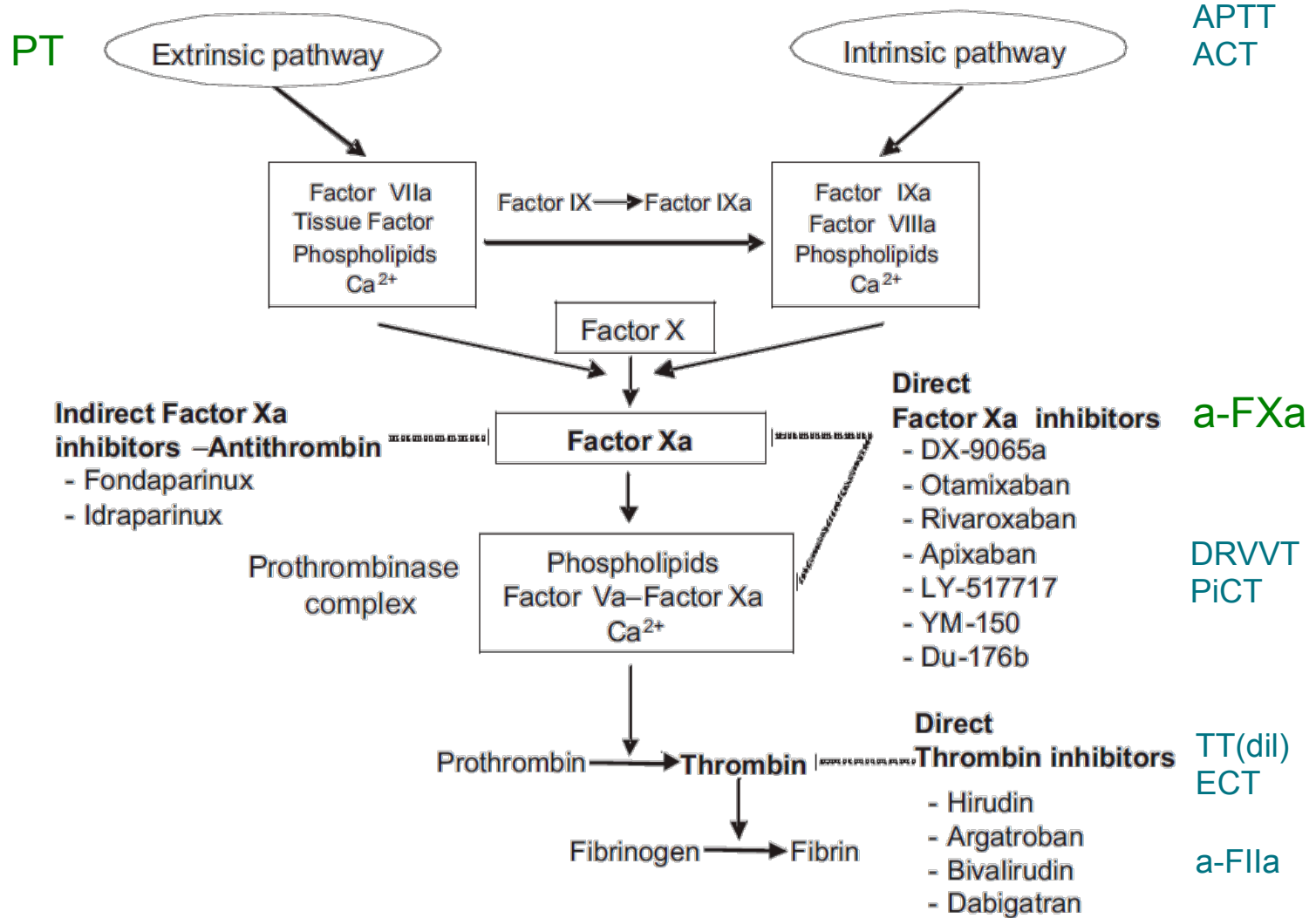
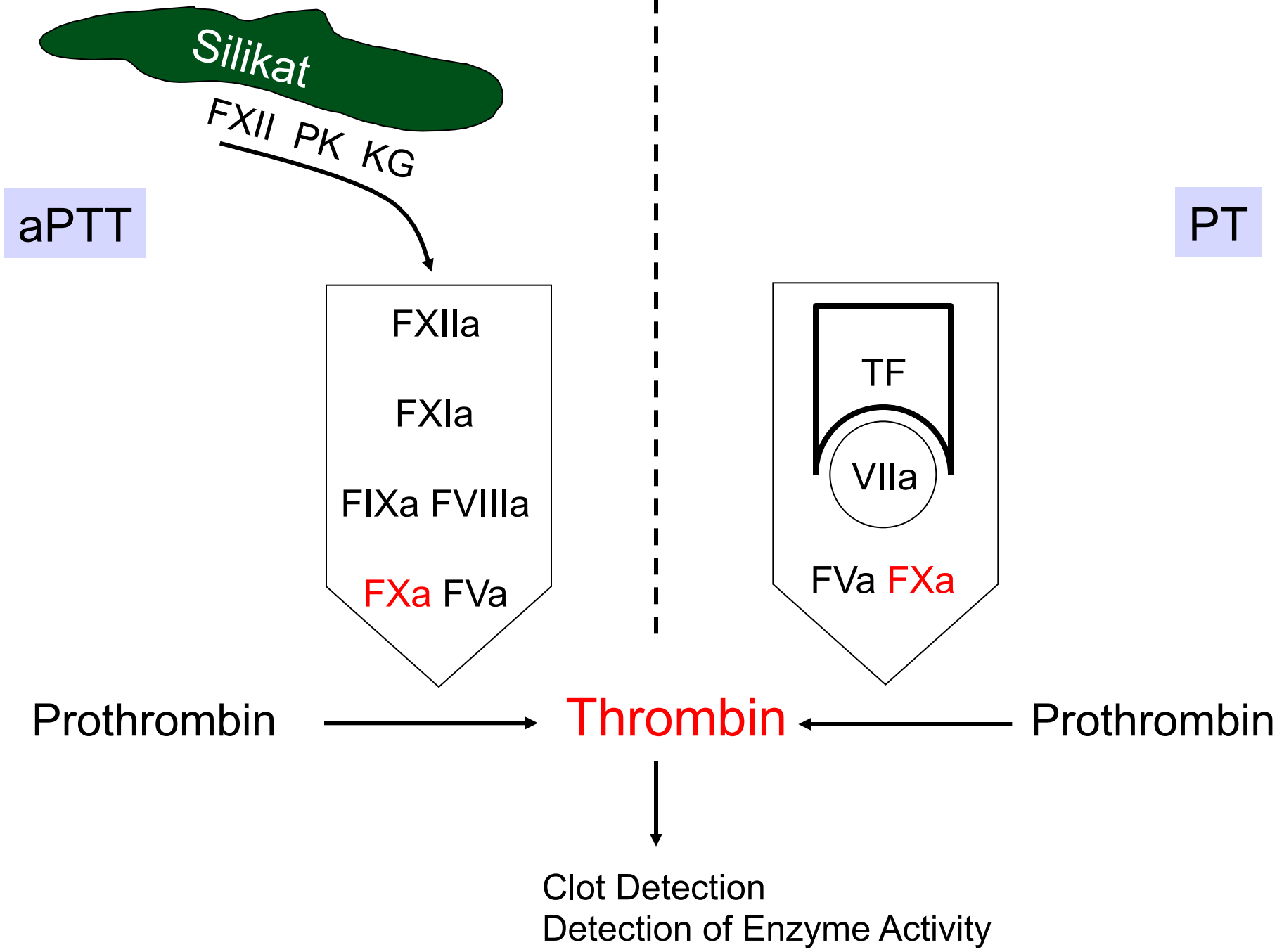


图 5-3-2 血液凝固机理

# NOAC - DAOC

## Drug Monitoring





# Hemochron® Cuvette Tests

THE **POINT** OF CARE

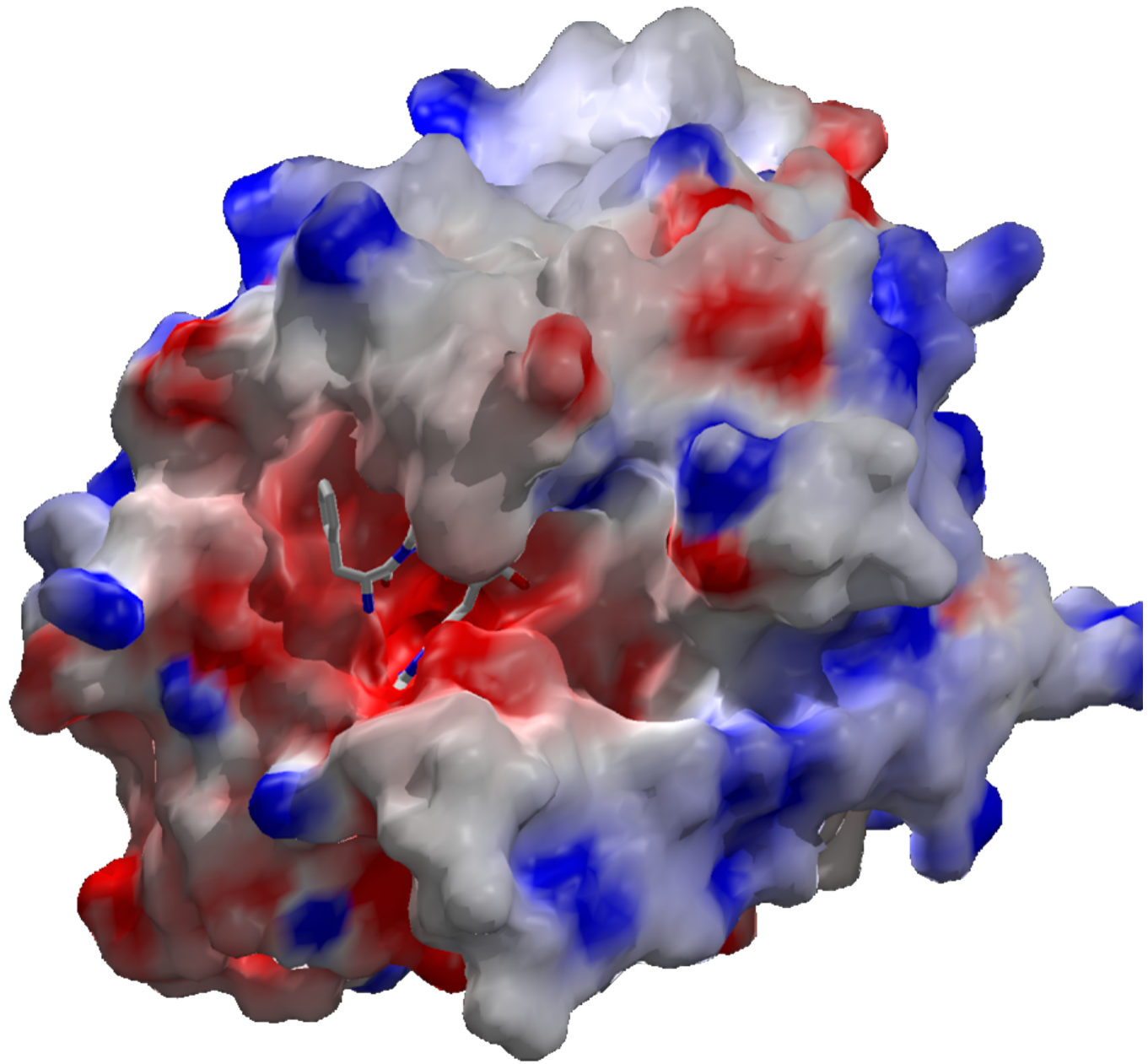
- ACT+
- ACT-LR
- APTT
- Citrate APTT
- PT
- Citrate PT
- Anti Xa



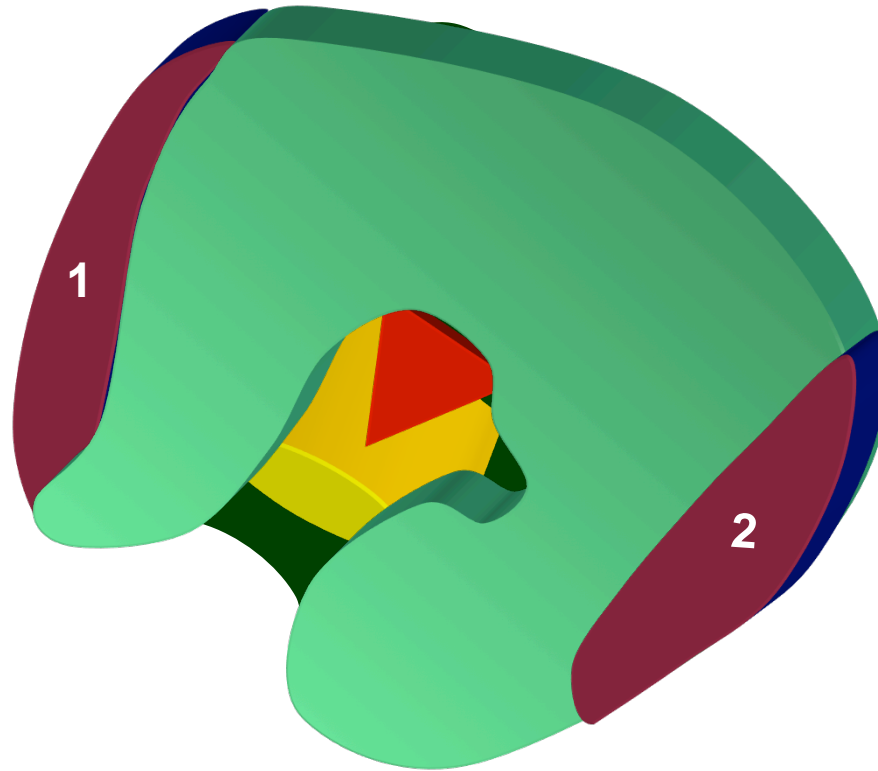


Bode, Mayr, Baumann,  
Huber, Stone,  
Hofsteenge (1989)  
EMBO J. 8, 3467 - 3475.

Bode, Turk &  
Karshikov (1992)  
Prot. Science 1, 426-471



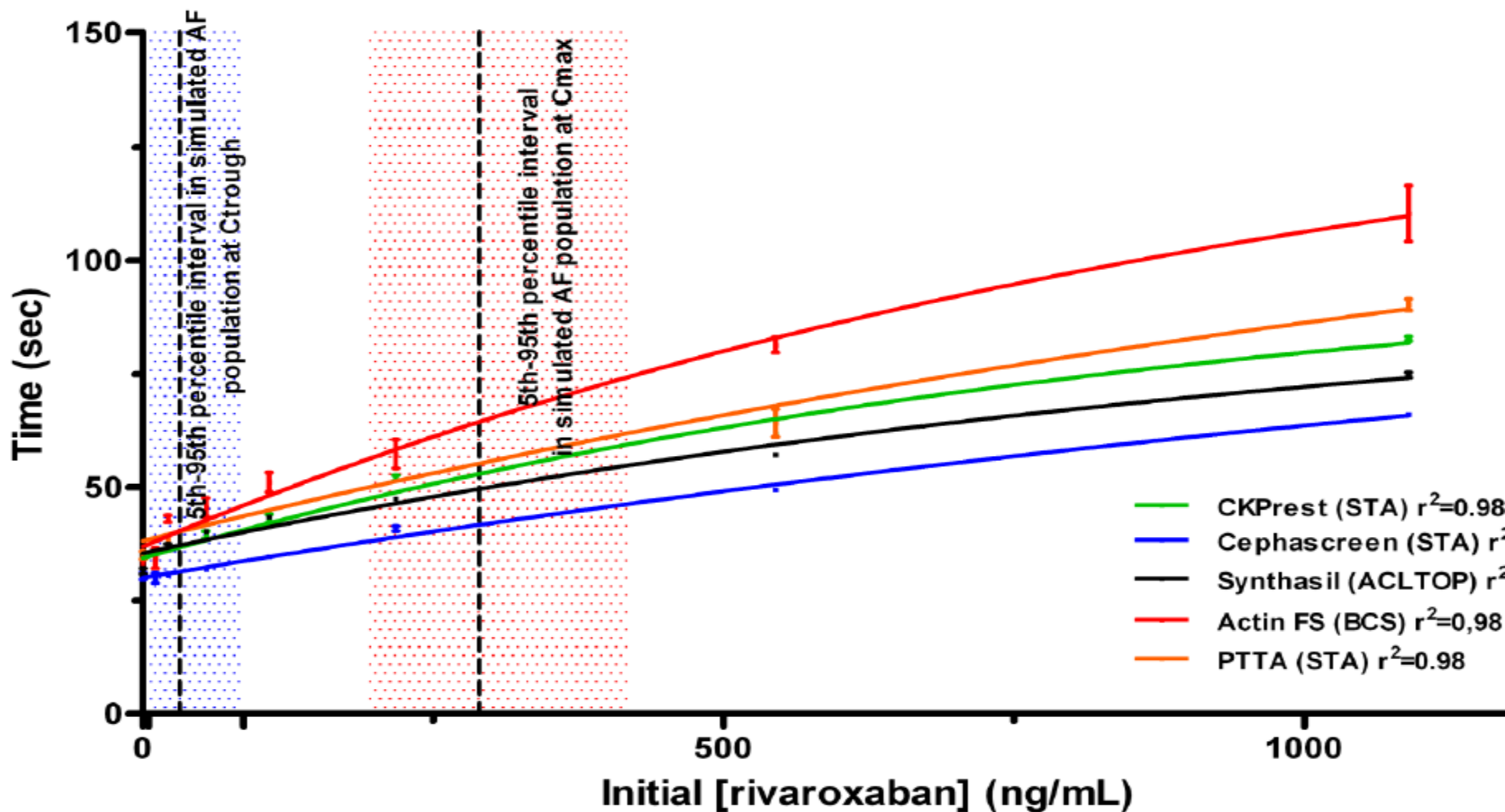
# Direct Inhibitor



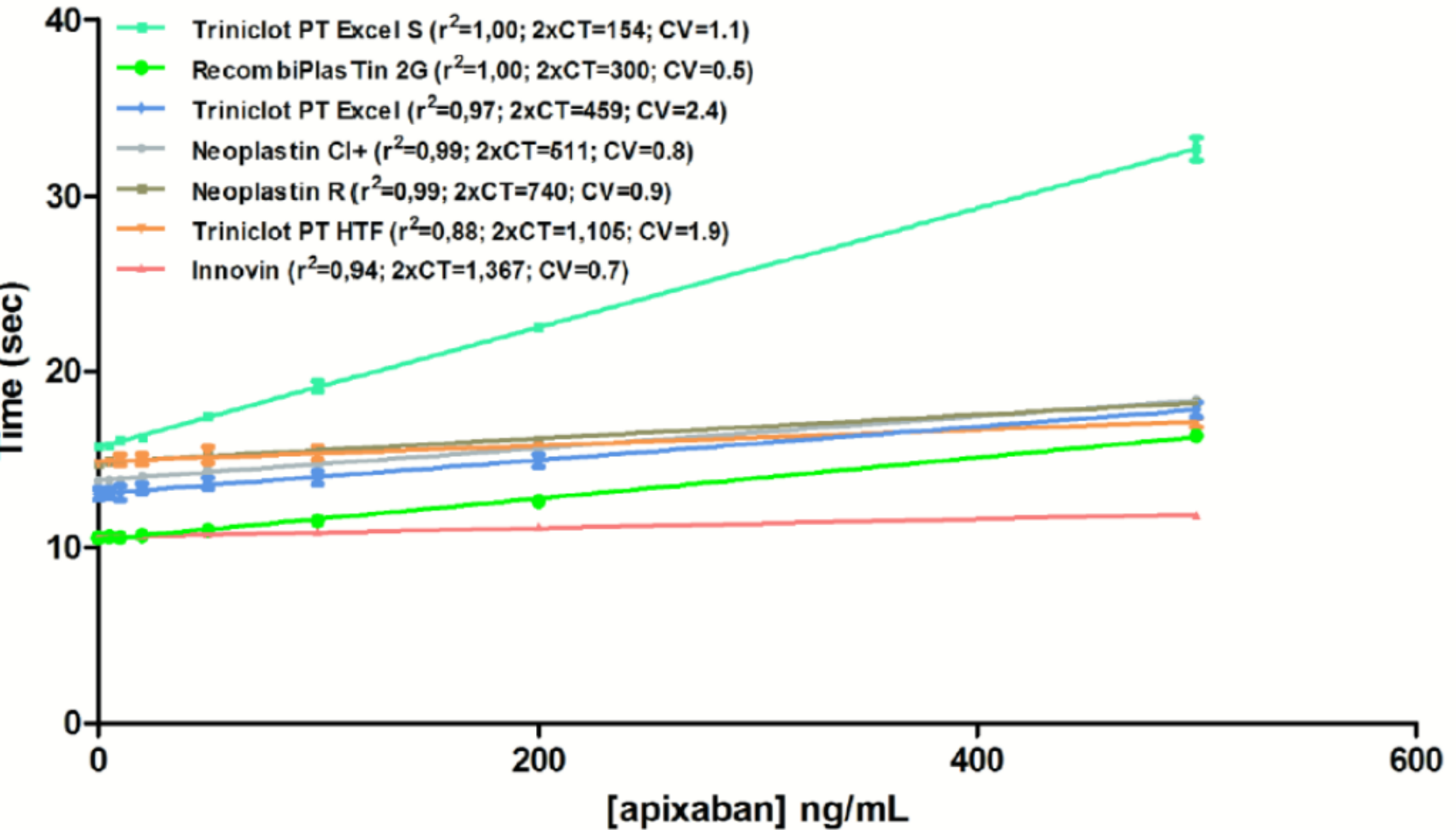
*Reversible*



# APTT and Rivaroxaban

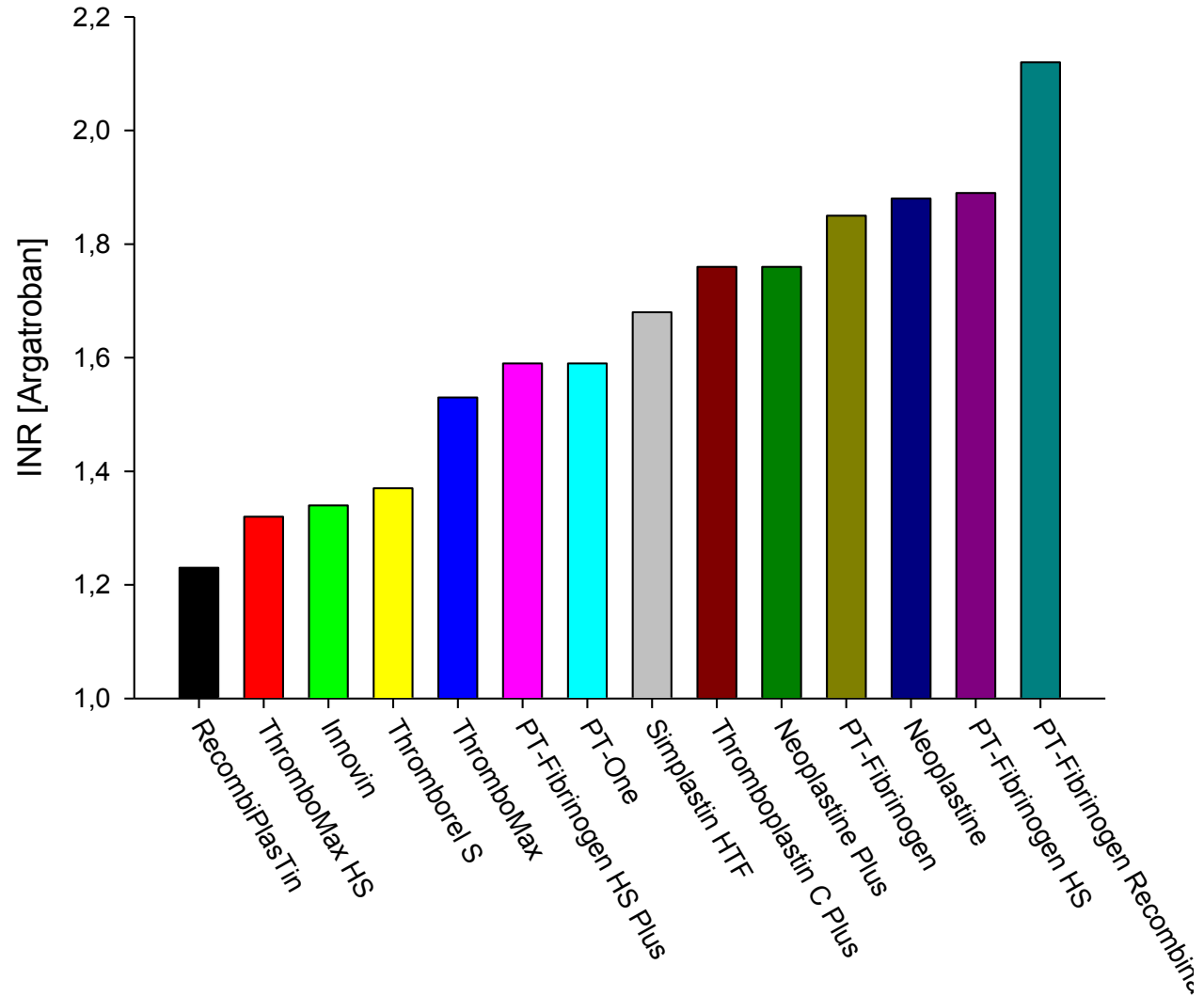


# PT and Apixaban

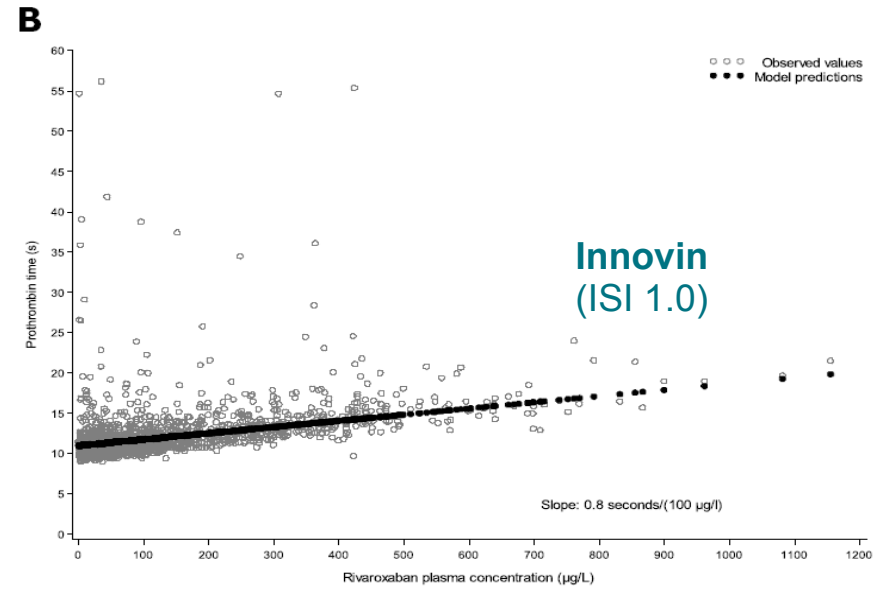
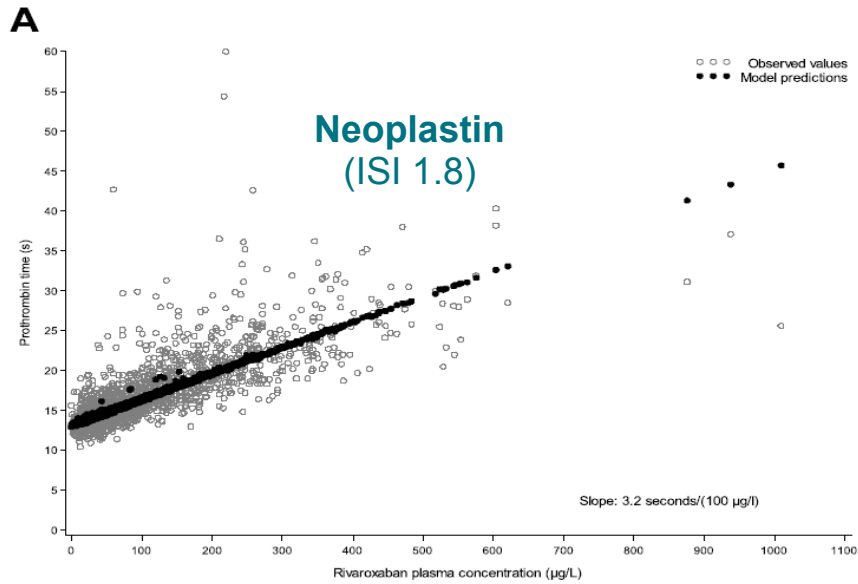


# INR and argatroban therapy

Influence of the thromboplastin



# Rivaroxaban



# PRE/ANALYTICS - MATRIX

**Whole Blood  
ACT**

**aPTT  
diITT**

**Anti- IIa/Xa  
Synth. Substrate**

**+  
Powder/Gel  
Reagent**

**Reagent  
2/3**

**Plasma  
1/3**

**Reagent  
99%**

**Plasma  
1%**



# DOACs : Clotting Tests

	Dabigatran	Rivaroxaban	Apixaban
TPZ (sek/%/INR))	↑ - ∅	↑ - ∅	↑ - ∅
aPTT	↑ - ∅	↑ - ∅	↑ - ∅
Thrombinzeit	↑	-	-
Fibrinogen n. Clauss	↓ - ∅	-	-

# **DOACs : DRUG MONITORING (TDM)**

**Dabigatran - kalibrierte Thrombinzeit**

**Xa Inhibitoren - Xa Hemmtest**  
(bezogen auf den jeweiligen Xa Inhibitor)

**ERGEBNISMITTEILUNG in ng/ml**

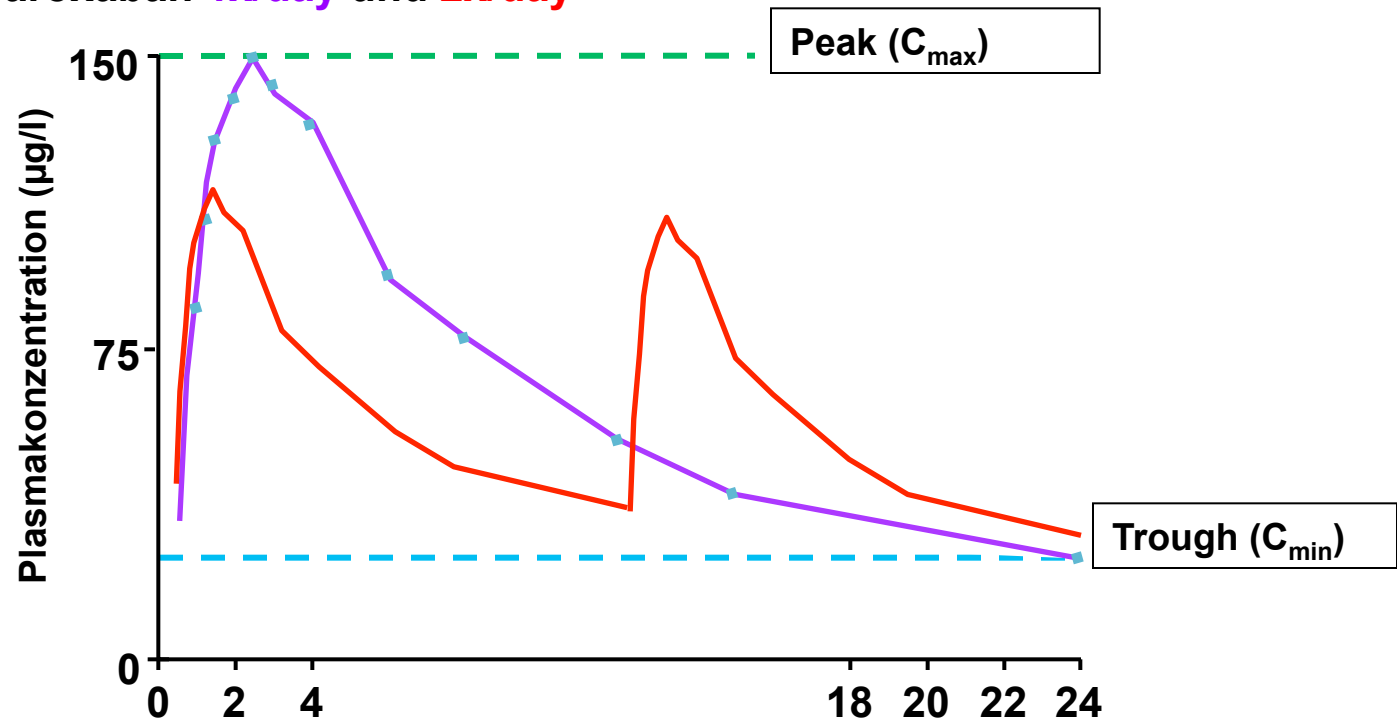
**Klinische Bedeutung der Tal – bzw.  
Therapiespiegel ? Hohe Variabilität!**



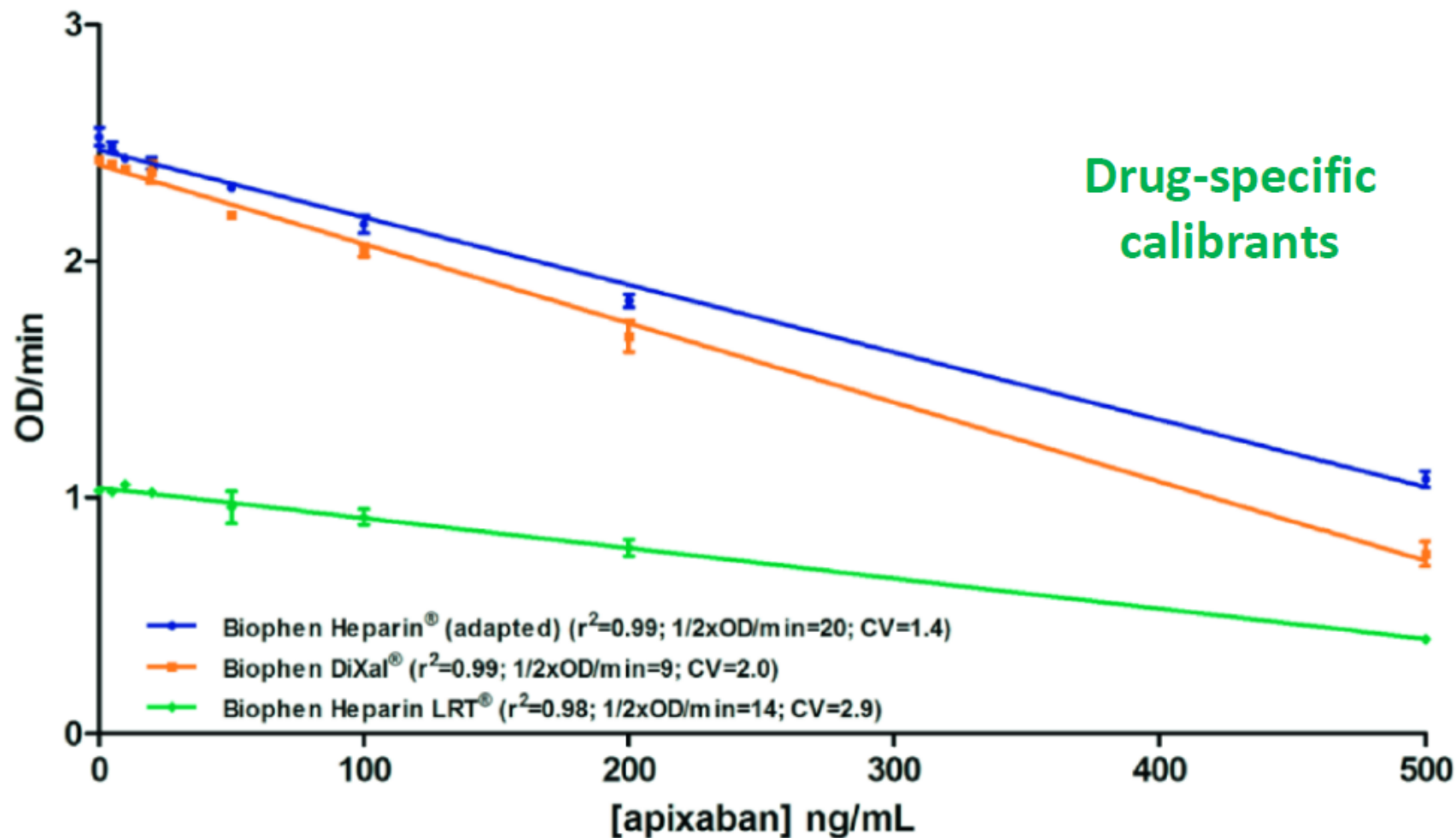
# Rivaroxaban PK

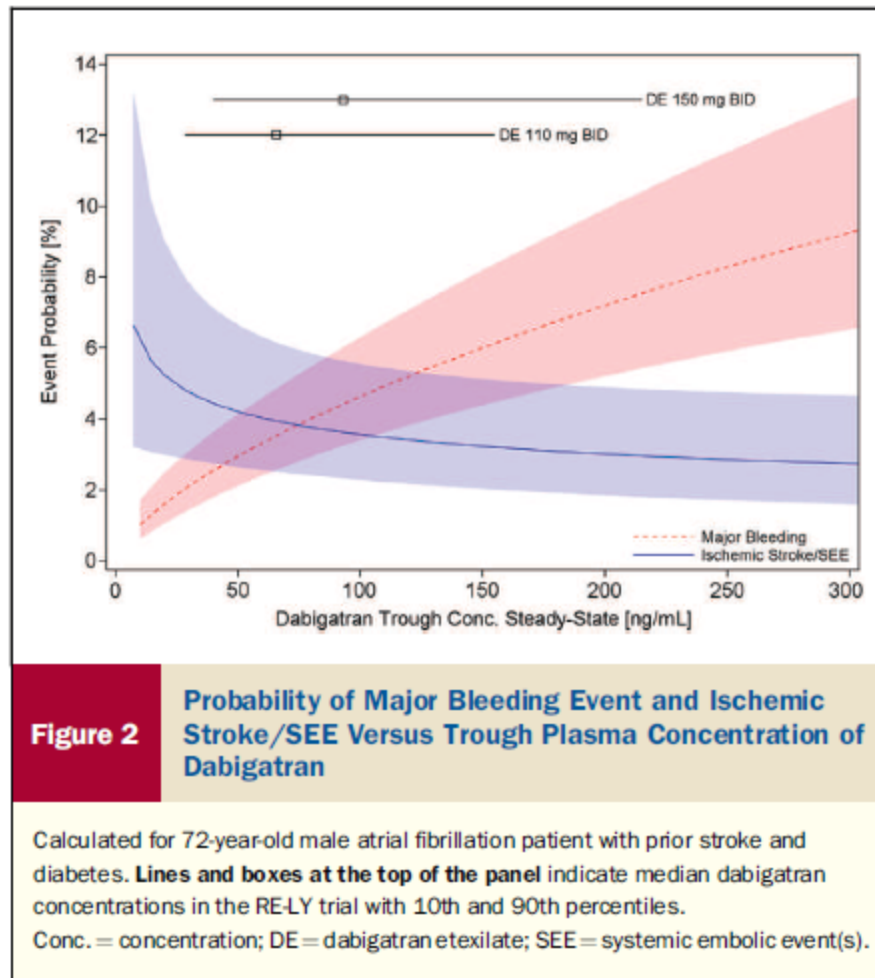
## Peak-Trough

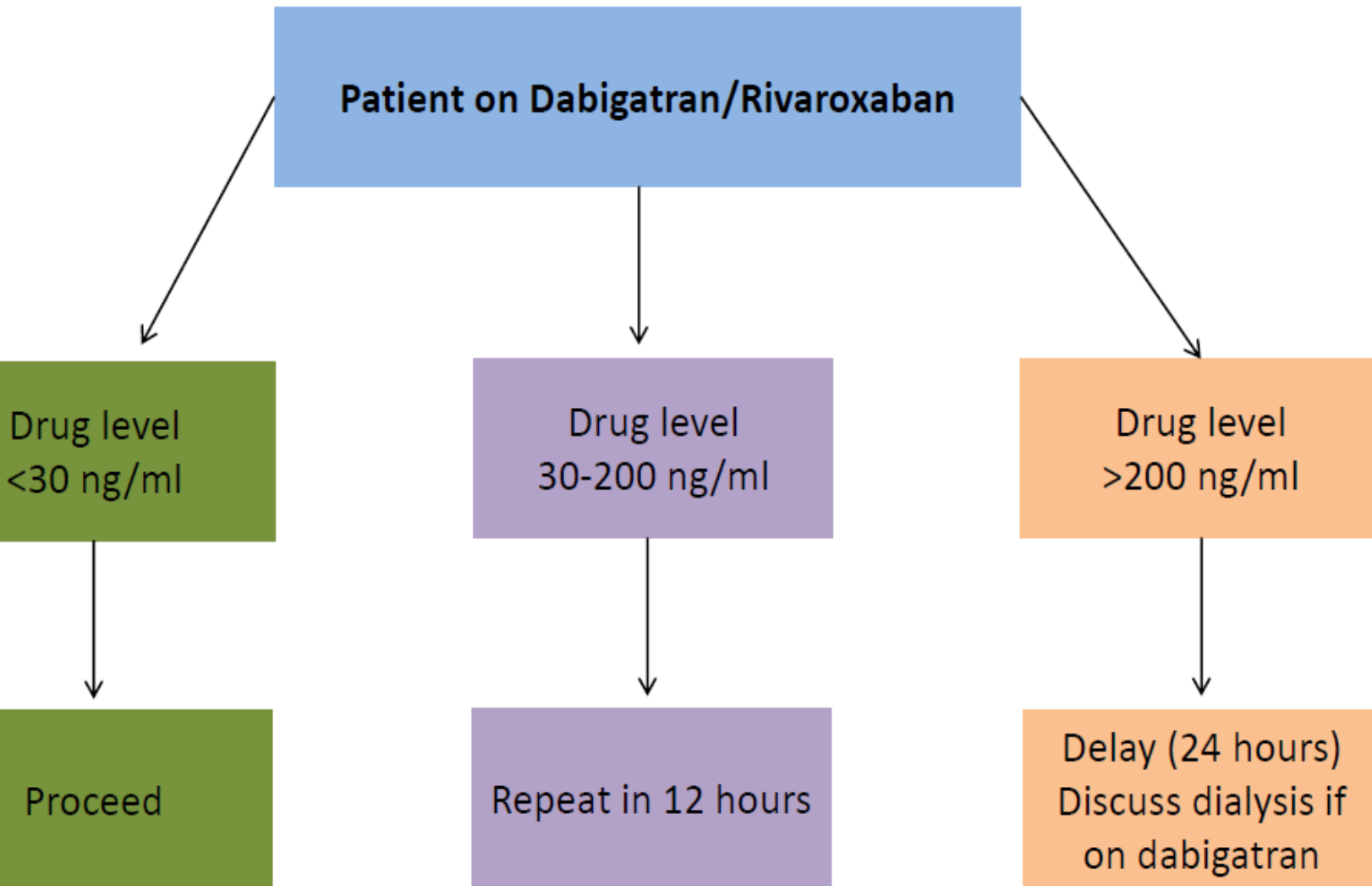
Rivaroxaban **1x/day** und **2x/day**



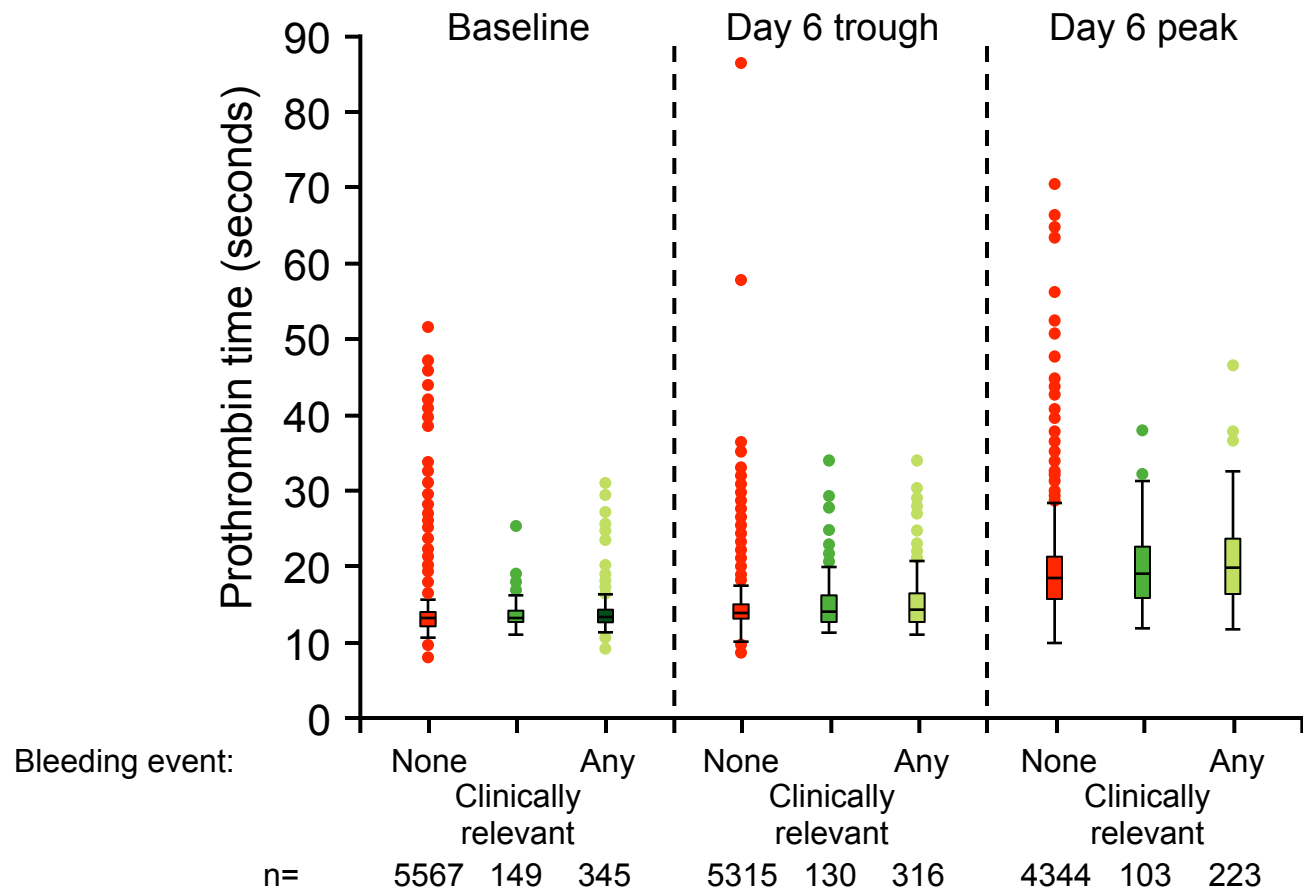
# Anti-Xa assay for Apixaban



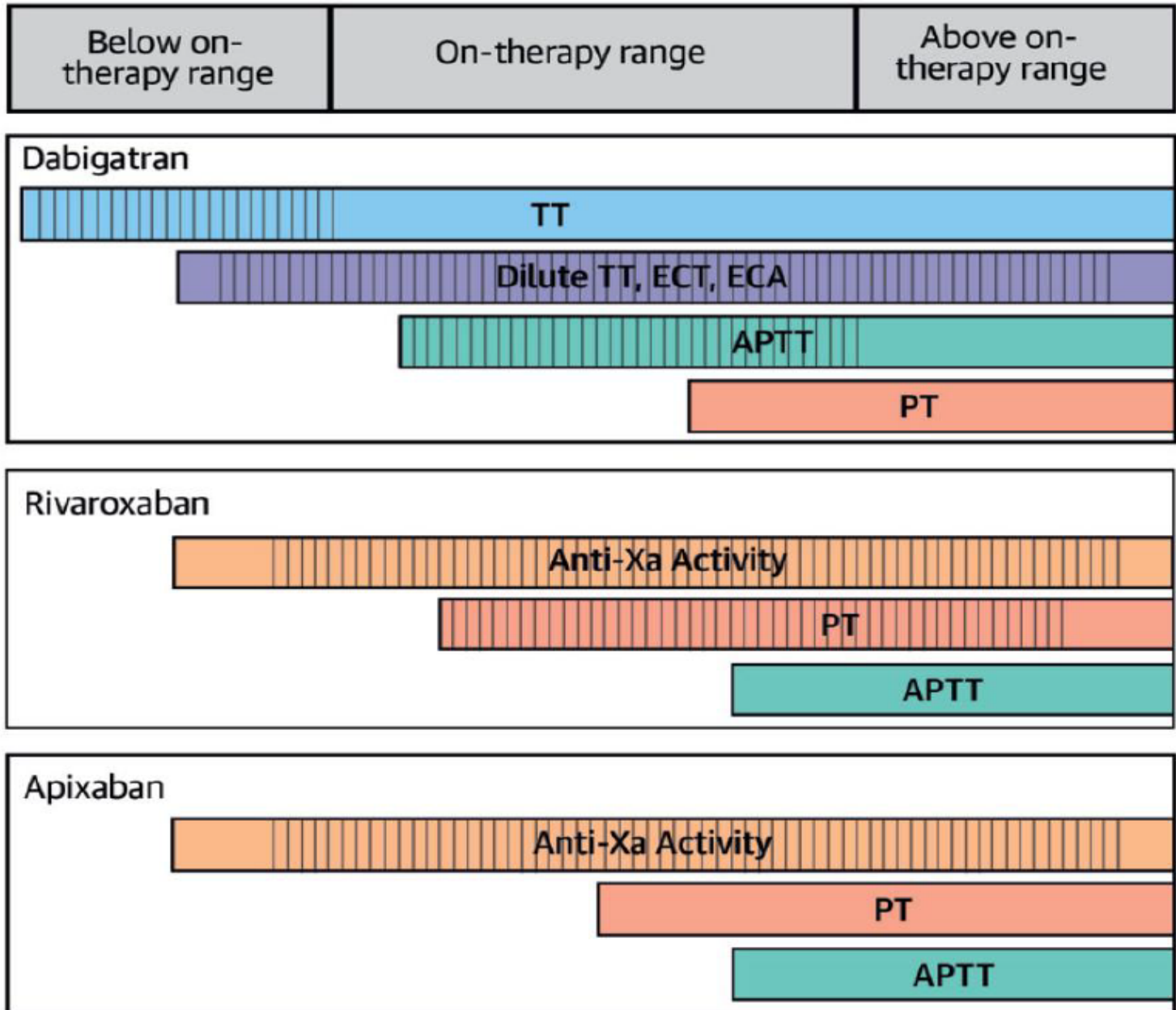




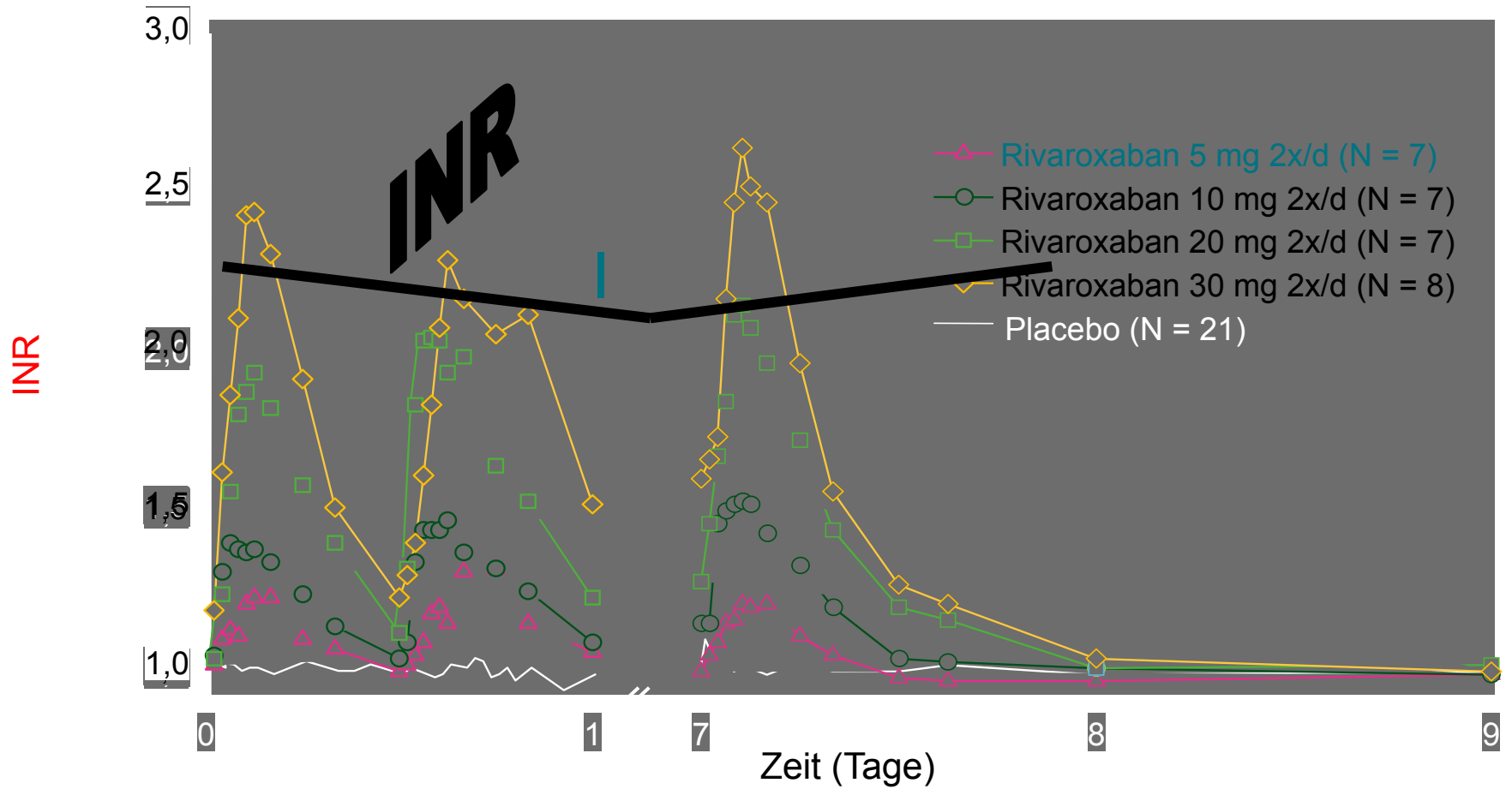
# No clear correlation between PT (or plasma concentrations) and bleeding risk



- ◆ In RECORD1–4 trials (hip and knee replacement surgery and VTE prophylaxis with rivaroxaban) no correlation between plasma concentrations, PT and bleeding risk



# PK vs PD





## Labormonitoring NOAK?

- Medikamentenhersteller:

Nicht nötig

- Labor, Reagentienhersteller:

Warten dringend auf Anforderungen

- Klinik:

Sollte auf den Notfall vorbereitet sein

# Monitoring Antikoagulantien im klinischen Alltag

- Stroke / Neurotrauma
- Herz/Gefäßchirurgischer Notfall
- Akutes Abdomen
- Schockraum Traumatologie
- ...
  
- (Compliance)
  
- *TAT/POCT*

# Monitoring DOAK

- Nicht in der Routine
- DOAK Antagonisierung in der gerinnungsphysiologischen Messung nicht möglich (Viele Gerinnungstest antagonisieren Heparin in vitro)
- Unterscheide Drug Monitoring vs biol. Wirksamkeit
- Drug Monitoring mit spezifischen Kalibratoren (ng/ml)
- Vor Ort Konzept erstellen
- Ausblick POCT – qualitativ! - im Urin...



**Thank you for Attention**

