

Extrakorporální léčba pacientů v septickém šoku – update 2014



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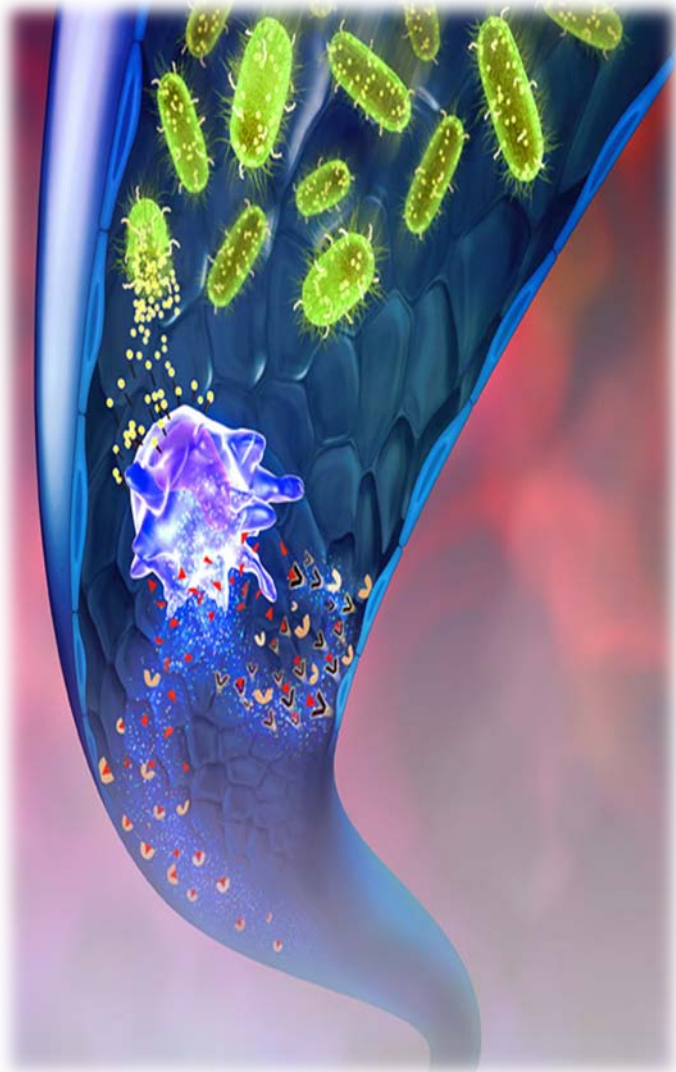
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Outline

- Patofyziologické východisko
- Fakta - co víme k dnešnímu dni
- RRT v praxi – any game changers?
 - IHD versus CRRT (modalita)
 - Méně = více? (dávka)
 - Časněji = lépe? (timing)
 - Citrát – dobrý sluha, zlý pán (antikoagulace)

Sepsis



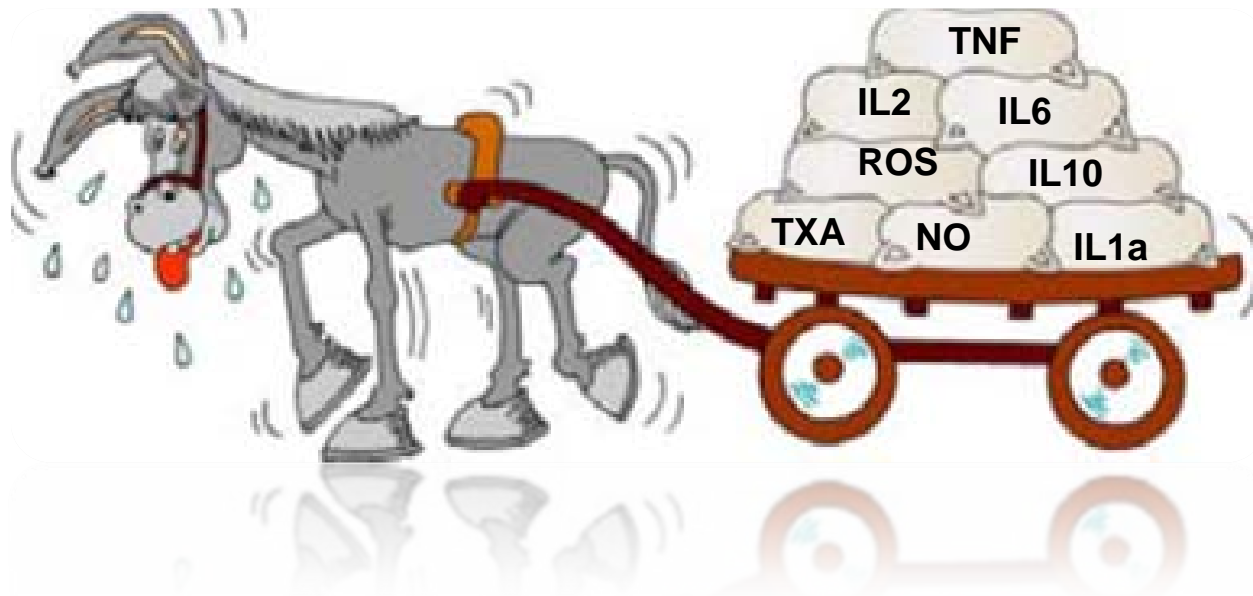
„a perfect genomic storm“

- affecting >80% of the cellular functions and pathways
- dual (harmful/protective) role host response

Biological rationale for BPT - the donkey analogy



Circulating plasma inflammatory, pro-apoptotic and pro-necrotic mediators participate in sepsis-induced organ dysfunction



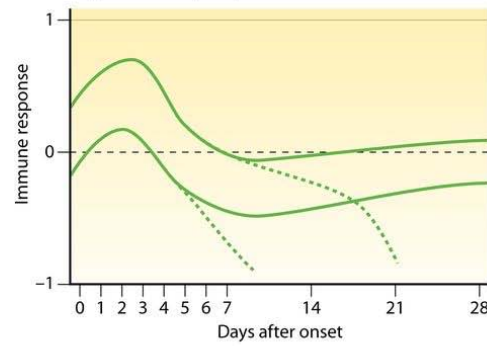
Biological rationale - the donkey analogy



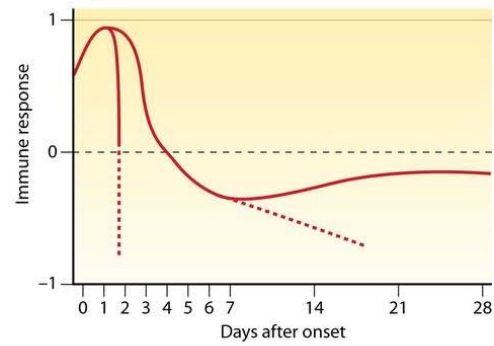
Blood purification techniques may non-selectively reduce the number of toxic sacks on the wagon...



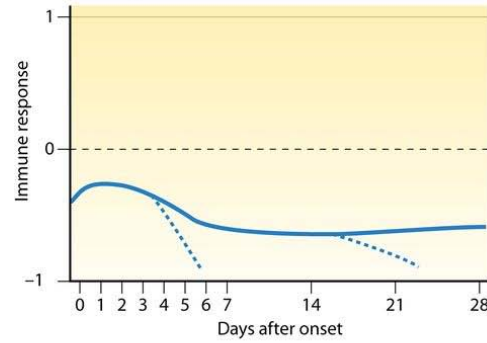
A. Healthy individual (young/old) common course



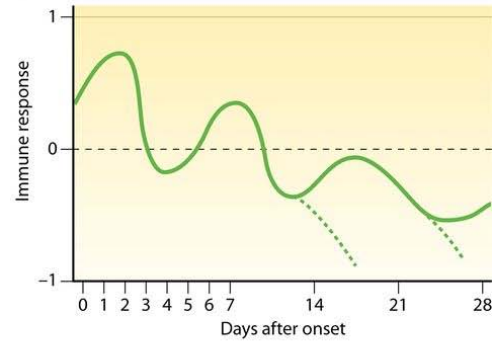
B. Healthy individual severe course



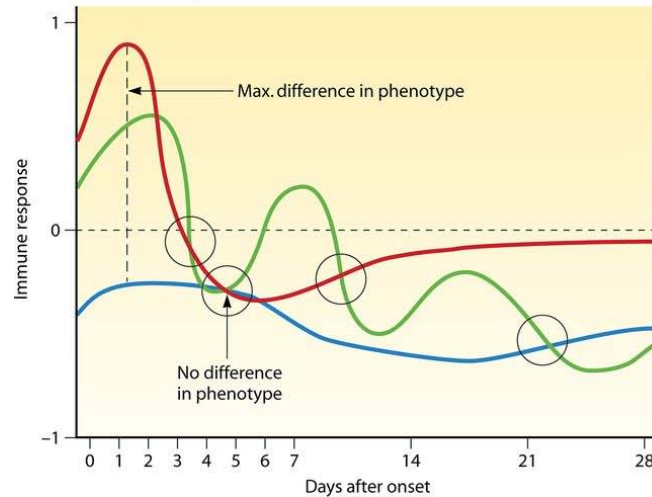
C. Immune suppressed individual



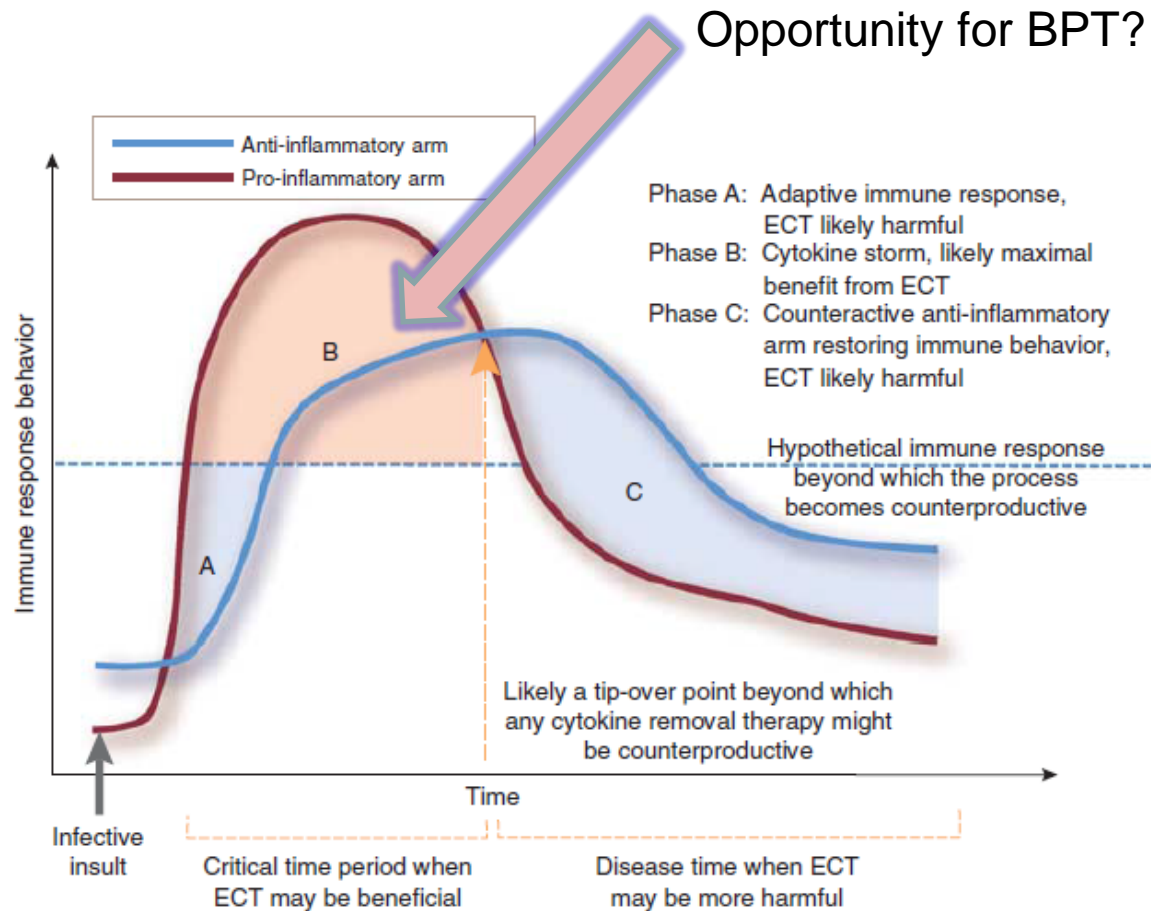
D. Healthy individual no source control



E. Various immune responses



Is there promise for clearing the blood in sepsis?





**ДЕВЯТАЯ
МЕЖДУНАРОДНАЯ КОНФЕРЕНЦИЯ**

**«АКТУАЛЬНЫЕ АСПЕКТЫ
ЭКСТРАКОРПОРАЛЬНОГО ОЧИЩЕНИЯ КРОВИ
В ИНТЕНСИВНОЙ ТЕРАПИИ»**

Москва

22–23 мая 2014 года

NINTH INTERNATIONAL CONFERENCE

**«ACTUAL ASPECTS OF EXTRACORPOREAL
BLOOD PURIFICATION
IN INTENSIVE CARE MEDICINE»**

Moscow

May 22–23, 2014

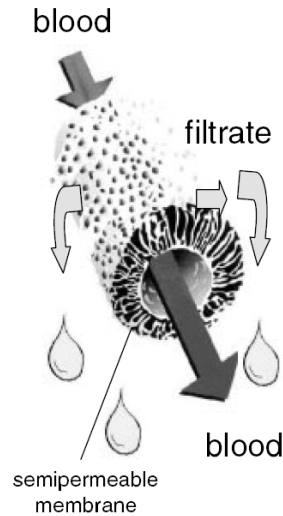
Bakoulev Scientific Center for Cardiovascular Surgery of the Russian Academy of Medical Sciences



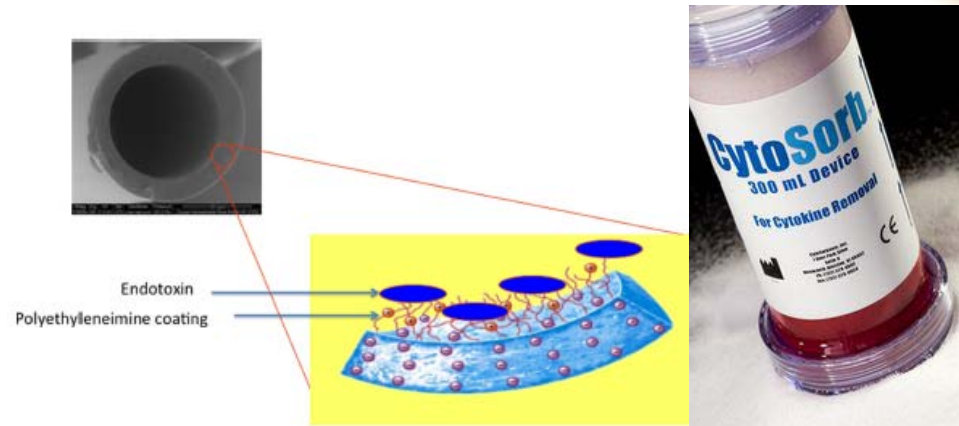
Fakta - co víme k dnešnímu dni



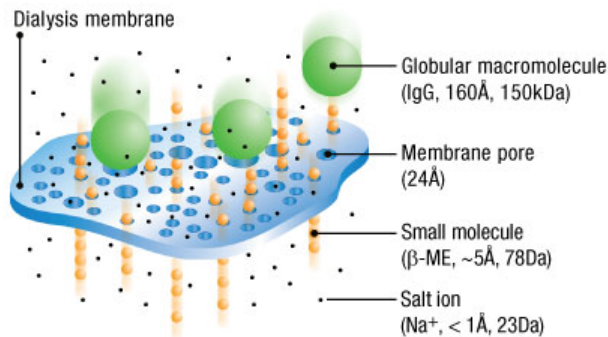
HV - hemofiltration



Hemoadsorption, CPFA



High cut-off hemodialysis



PMX hemoperfusion

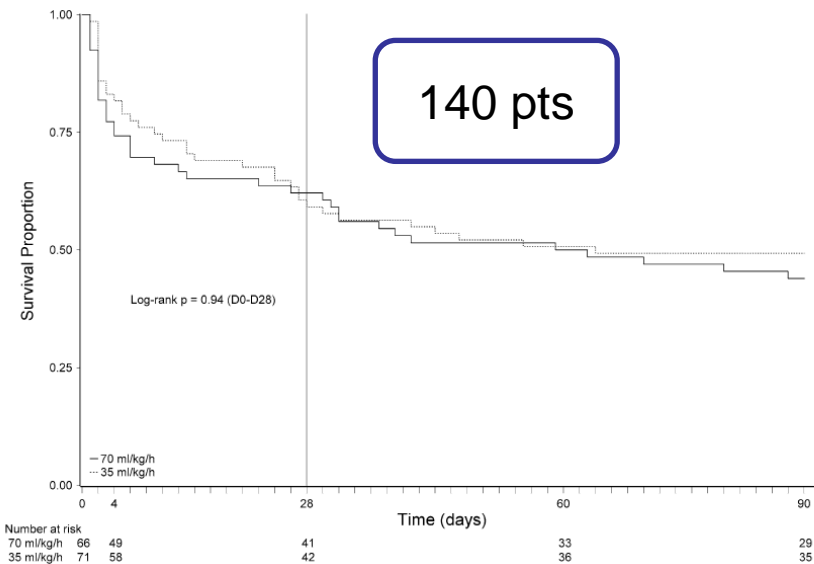


35
ml/kg/h

70
ml/kg/h

Olivier Joannes-Boyau
Patrick M. Honoré
Paul Perez
Sean M. Bagshaw
Hubert Grand
Jean-Luc Canivet
Antoine Dewitte

High-volume versus standard-volume haemofiltration for septic shock patients with acute kidney injury (IVOIRE study): a multicentre randomized controlled trial



„ No evidence that HVHF reduces mortality or contributes to early improvements in hemodynamic profile or organ function...

HVHF cannot be recommended as adjuvant treatment for septic shock“



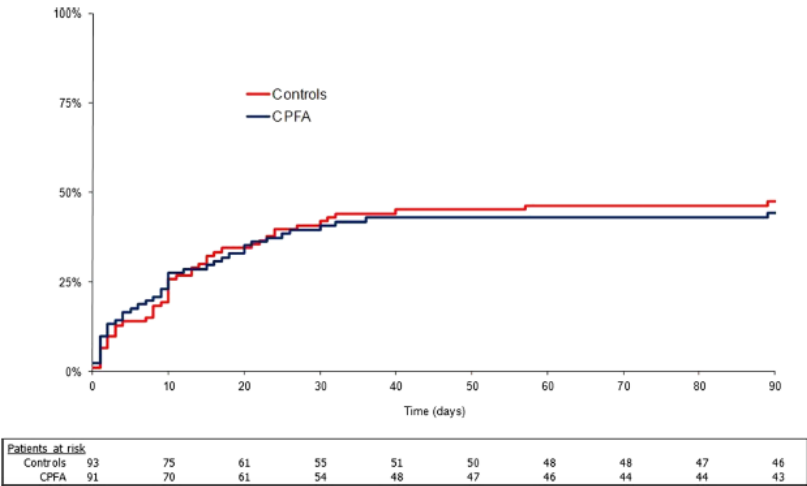
Efficacy of coupled plasma filtration adsorption (CPFA) in patients with septic shock: A multicenter randomised controlled clinical trial

BMJ Open 2014;**4**:e003536. doi:10.1136/bmjopen-2013-003536

Sergio Livigni,¹ Guido Bertolini,² Carlotta Rossi,² Fiorenza Ferrari,¹
Michele Giardino,² Marco Pozzato,³ Giuseppe Remuzzi,² GiViTI: Gruppo Italiano

192 pts

Interventions: CPFA was to be performed daily for 5 days, lasting at least 10 h/day.

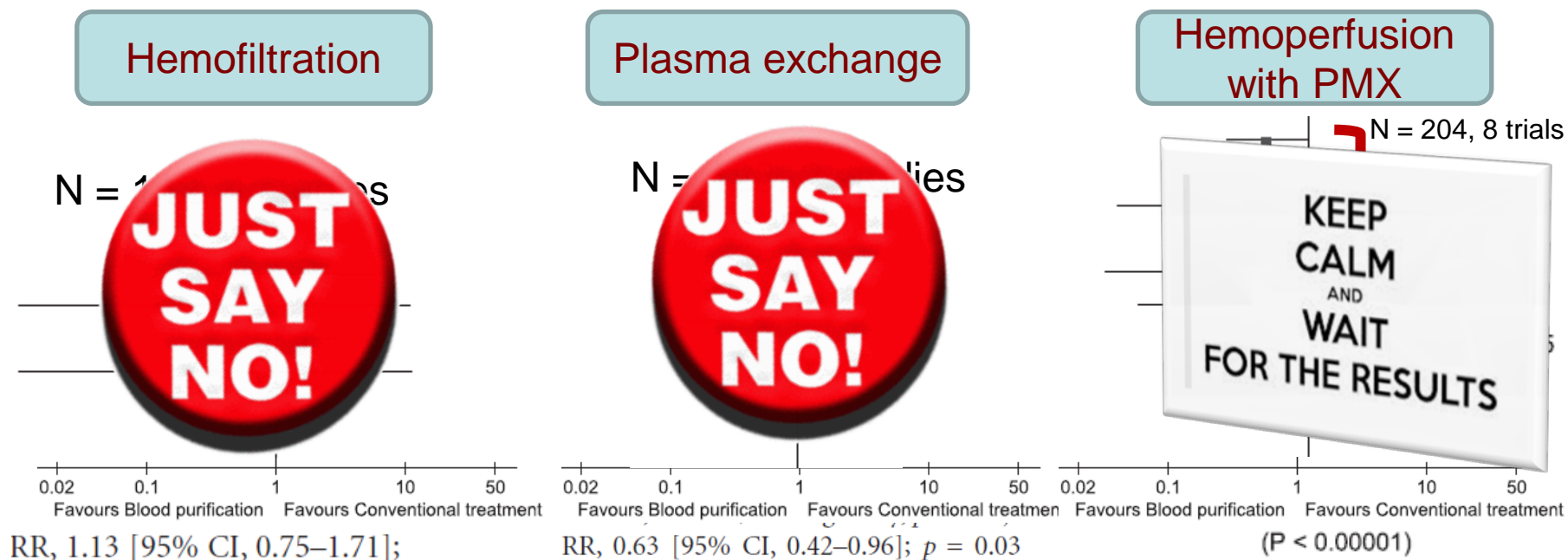


septic shock. This result strongly discourages the use of CPFA in the everyday clinical practice, as it was implemented in this study. Unfortunately, we were not able to

Blood Purification and Mortality in Sepsis: A Meta-Analysis of Randomized Trials*

Feihu Zhou, MD, PhD^{1,2}; Zhiyong Peng, MD, PhD¹; Raghavan Murugan, MD, MS, FRCP¹; John A. Kellum, MD, MCCM¹

(*Crit Care Med* 2013; 41:2209–2220)



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Nephrology Division
University of Nebraska Medical Center
Omaha, NE

Potential survival benefit from HP-PMX performed in one country with high control mortality rate (60-80%)

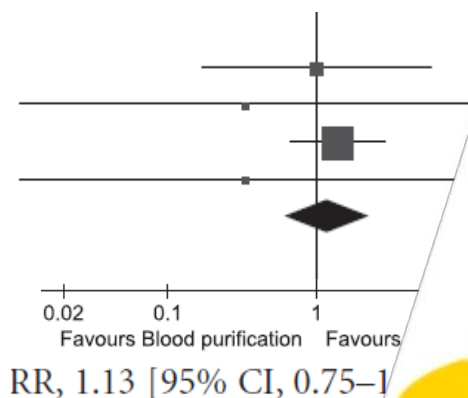
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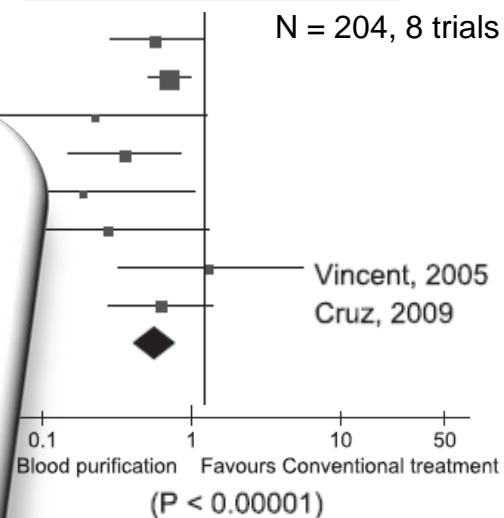
Hemofiltration

N = 142, 4 studies

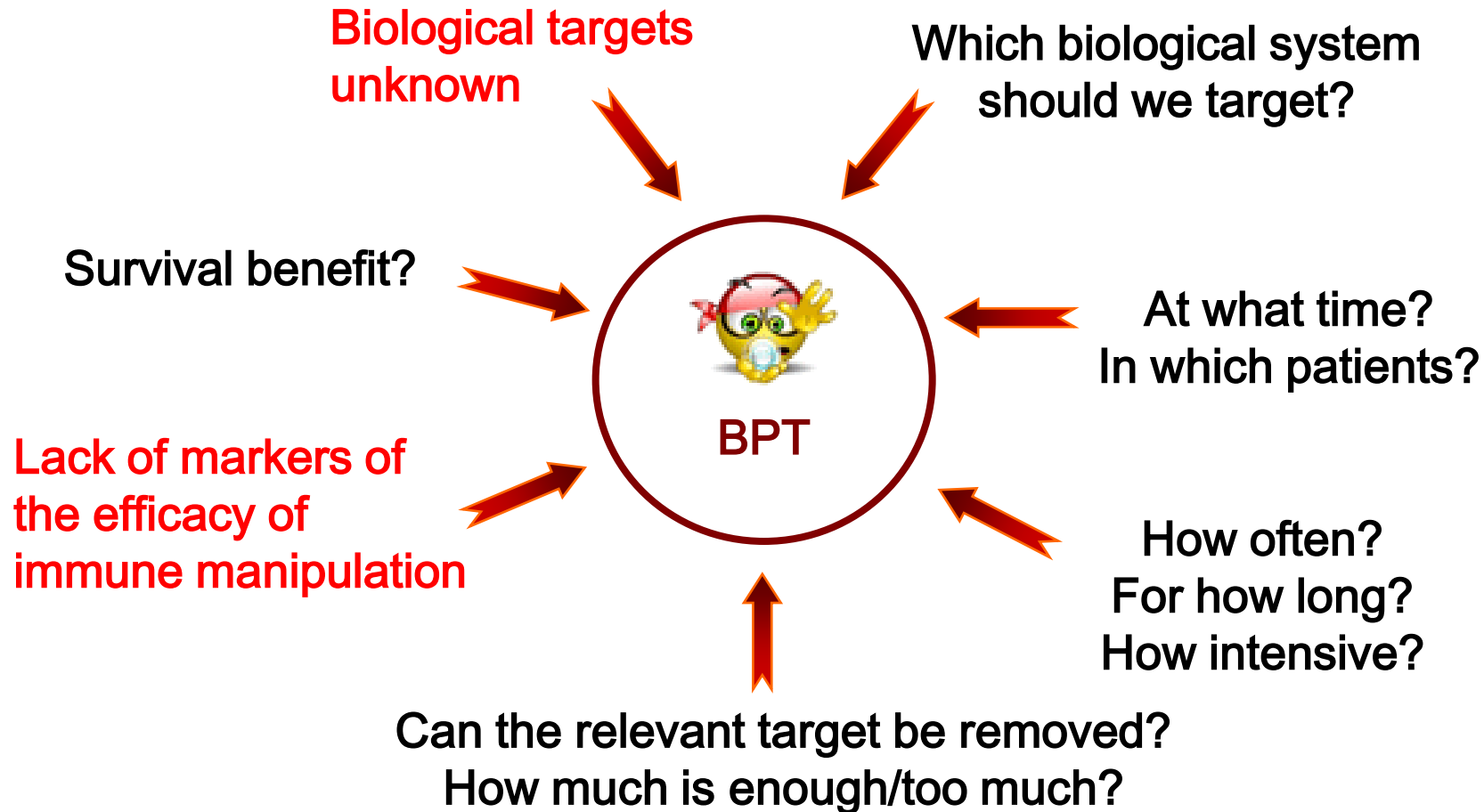


Hemoperfusion with PMX

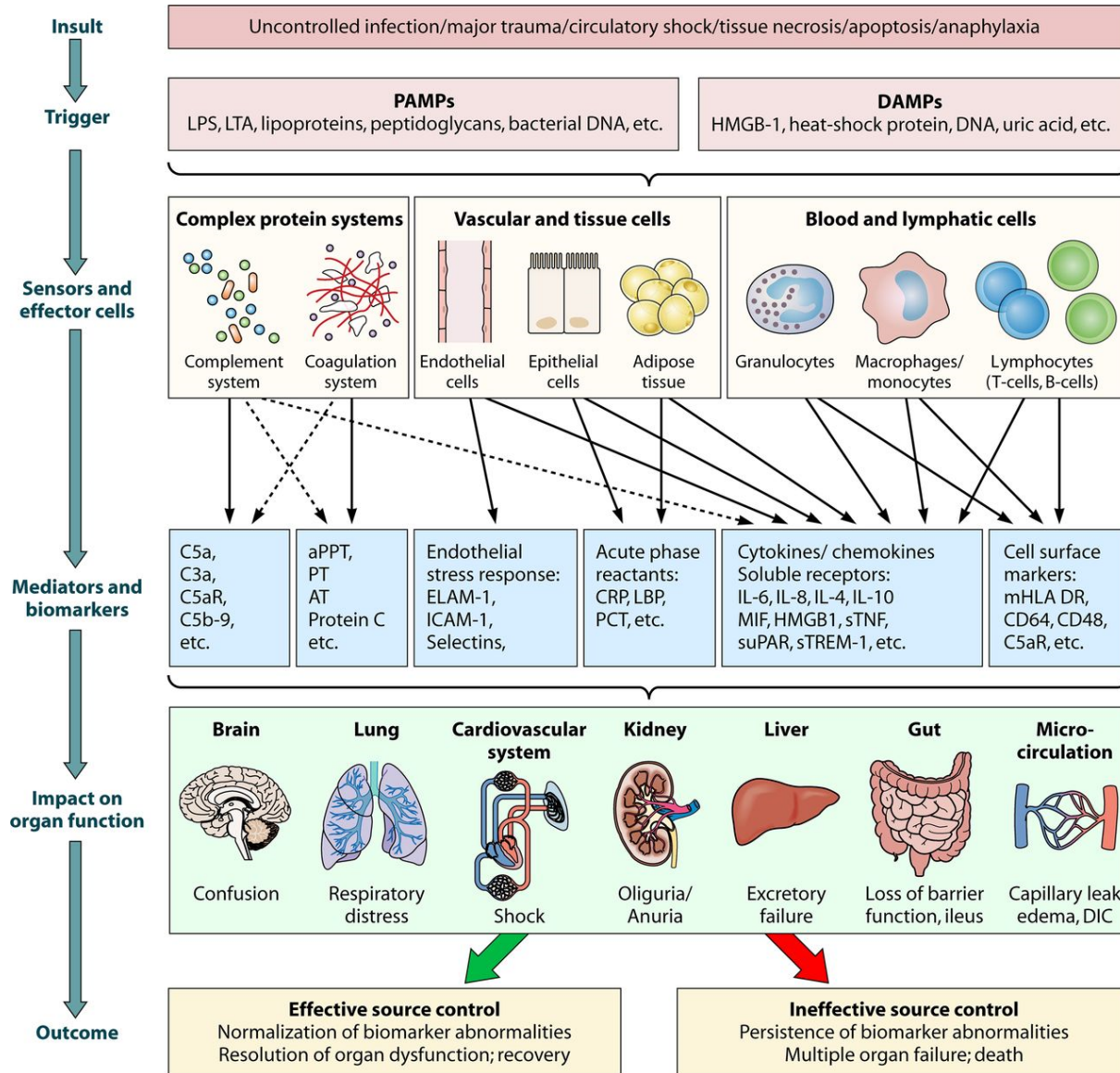
N = 204, 8 trials



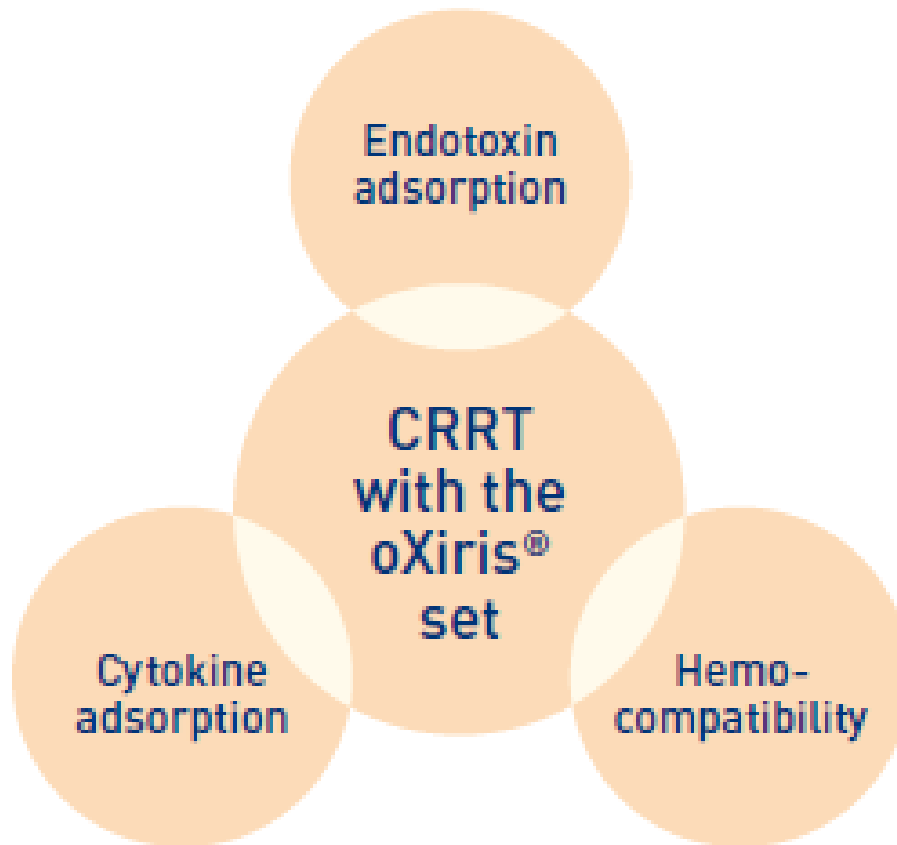
The big challenges in BPT in sepsis



Danger signals- nový cíl?



Blízká budoucnost



CRRT



IHD

The effect of continuous versus intermittent renal replacement therapy on the outcome of critically ill patients with acute renal failure (CONVINT): a prospective randomized controlled trial

- Monocentric, 128 vs 122 pts, APACHE 30
- 2/3 **septický šok**, mortalita 40%



- Mortalita 14 a 30 dní, dny na RRT, potřeba vazopresorů, ventilator-days, ICU/hospital LOS



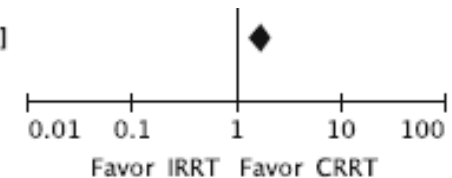
Antoine G. Schneider
Rinaldo Bellomo
Sean M. Bagshaw
Neil J. Glassford
Serigne Lo
Min Jun
Alan Cass
Martin Gallagher

Choice of renal replacement therapy modality and dialysis dependence after acute kidney injury: a systematic review and meta-analysis

- 50 studií, 6500 pacientů

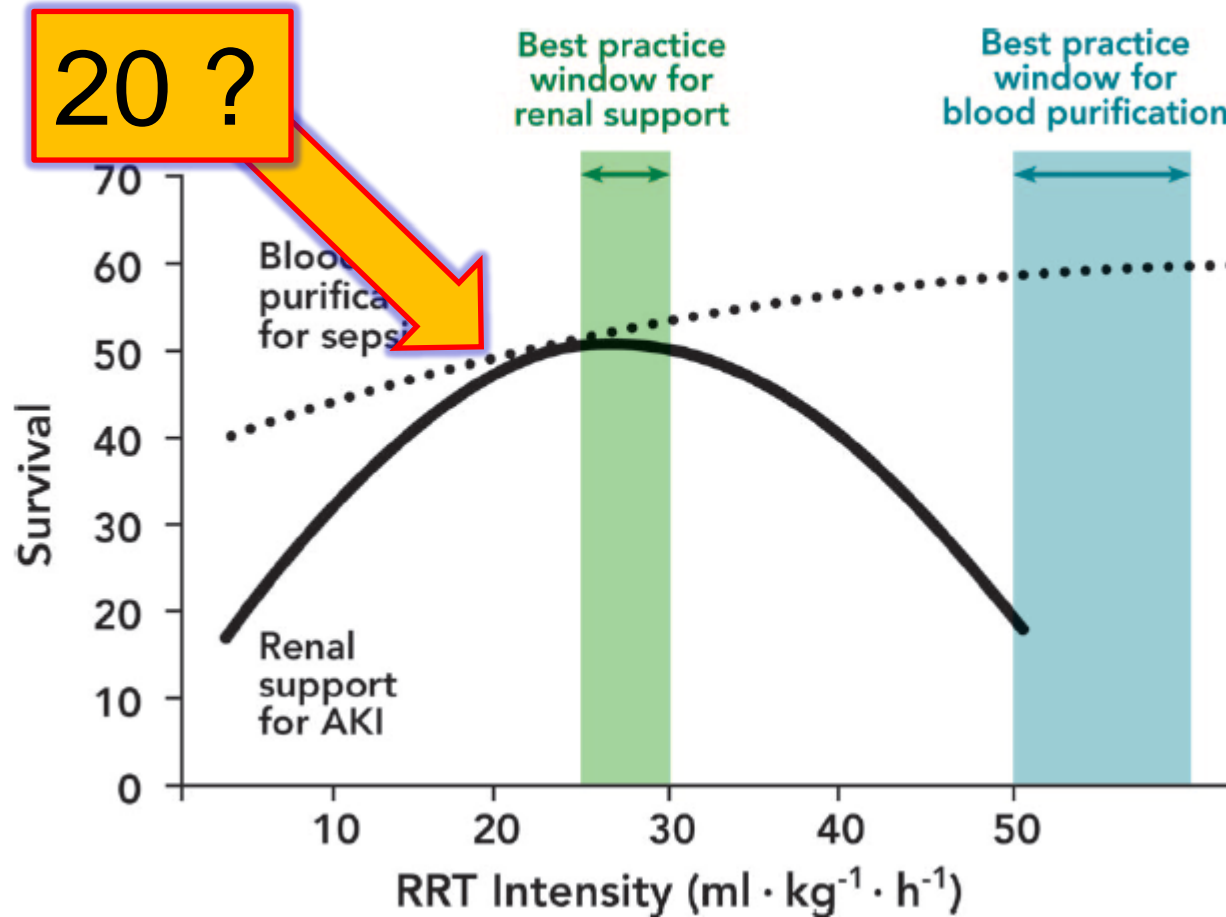
Total (95% CI)	1716	2255	100.0%	1.73 [1.35, 2.20]
Total events	517	256		

Heterogeneity: $\text{Tau}^2 = 0.12$; $\text{Chi}^2 = 37.19$, $\text{df} = 21$ ($P = 0.02$); $I^2 = 44\%$
Test for overall effect: $Z = 4.36$ ($P < 0.0001$)
Test for subgroup differences: $\text{Chi}^2 = 5.45$, $\text{df} = 1$ ($P = 0.02$), $I^2 = 81.7\%$



- IHD jako úvodní modalita je spojena s 1.7x vyšším rizikem trvalé závislosti na dialýze
- Neexistuje definitivní důkaz

CRRT – existuje skutečně vztah „intenzita-outcome“?



Validity of Low-Intensity Continuous Renal Replacement Therapy*

JSEPTIC

BEST

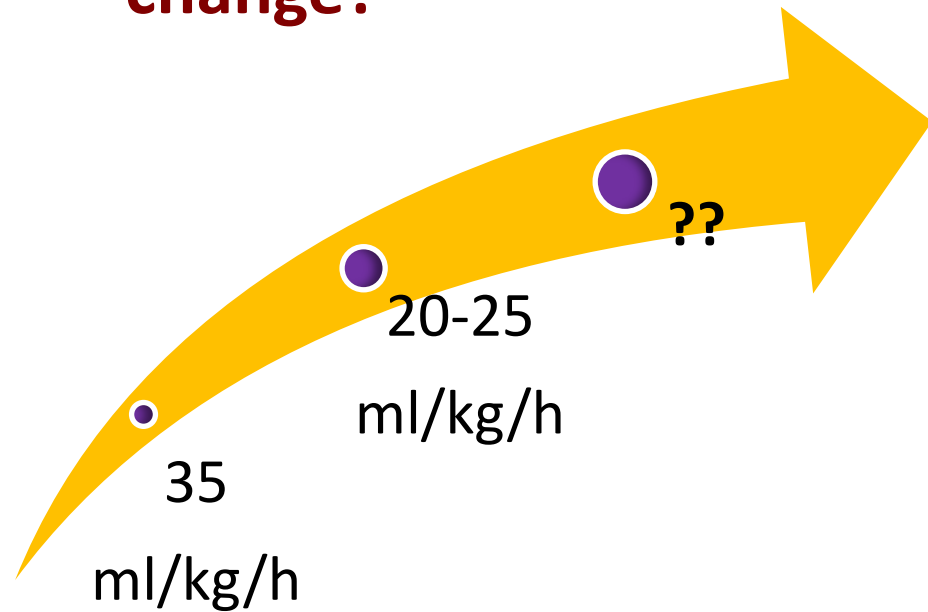
14 ml/kg/h

20 ml/kg/h

Time for paradigm change?



- no dose outcome relationship
- valid for septic patients as well



Not yet, but...

Think different.





Timing – časněji = lépe?

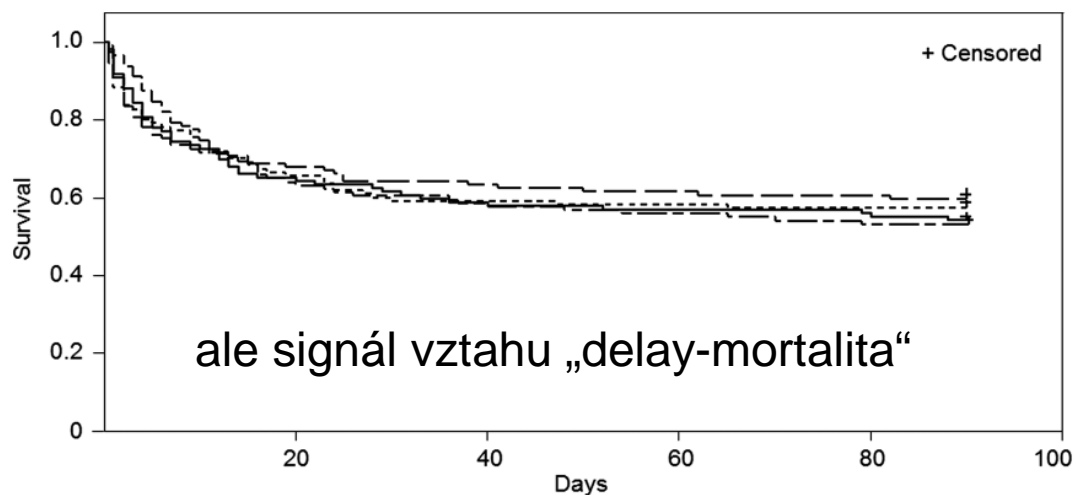
Timing of Renal Replacement Therapy and Patient Outcomes in the Randomized Evaluation of Normal Versus Augmented Level of Replacement Therapy Study

Stage	Serum creatinine criteria	Urine output criteria
1	Increase of $\geq 26.4 \mu\text{mol/l}$ (0.3 mg/dl) OR to 150–200% of baseline (1.5–2.0-fold)	$< 0.5 \text{ ml/kg/h}$ for $> 6 \text{ h}$



CRTT (n=439)

-  $< 7 \text{ h}$
-  $7 \text{ h} - 18 \text{ h}$
-  $18 \text{ h} - 46 \text{ h}$
-  $> 46 \text{ h}$



ale signál vztahu „delay-mortalita“

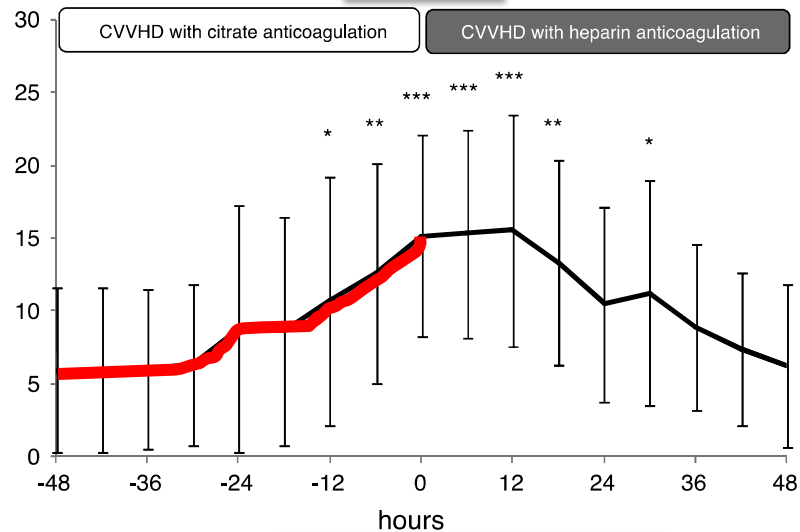
Time from AKI
(RIFLE-I) to
randomization

----- $< 7.1 \text{ hrs}$ $\geq 7.1 \text{ to } < 17.6 \text{ hrs}$ ——— $\geq 17.6 \text{ to } < 46.0 \text{ hrs}$ -.-.- $\geq 46.0 \text{ hrs}$

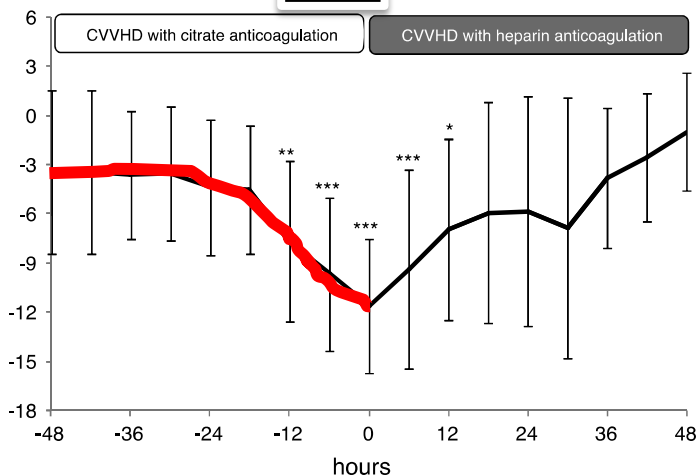
Citrát – nejen dobrý sluha

BE ALERT!!
EXPECT THE UNEXPECTED

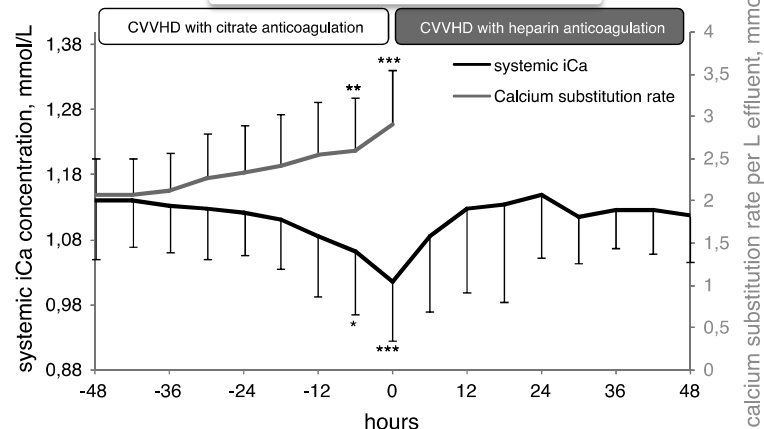
laktát



BE

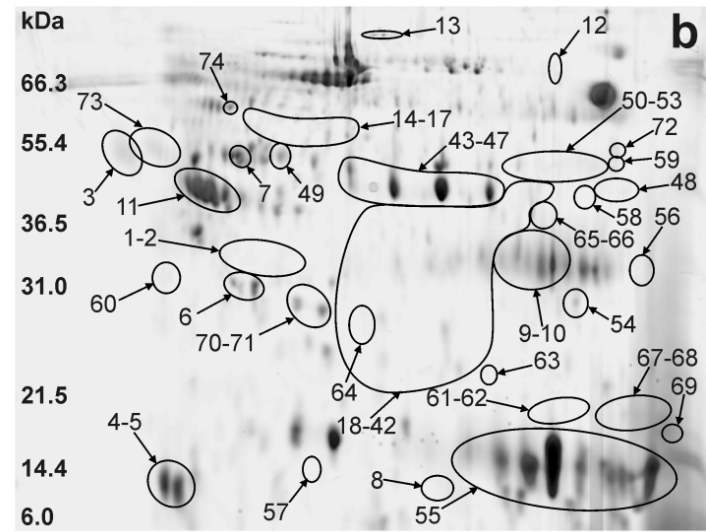
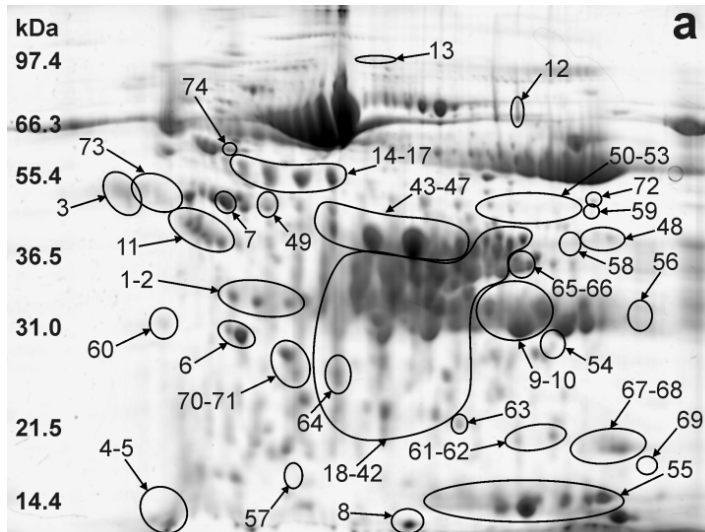


Timecourse of systemic **iCa + substitute** substitution rate



Citrát - nejen antikoagulace

Blood-dialyzer interactome – opening a new window into citrate anticoagulation.



SHRNUTÍ



- Dostupné hemopurifikační metody z indikace sepse jen v kontextu RCT
- Úloha dávky, metody, načasování pravděpodobně nadhodnocené
- Citrát dvousečná zbraň v těžkých šokových stavech s hyperlaktatemií