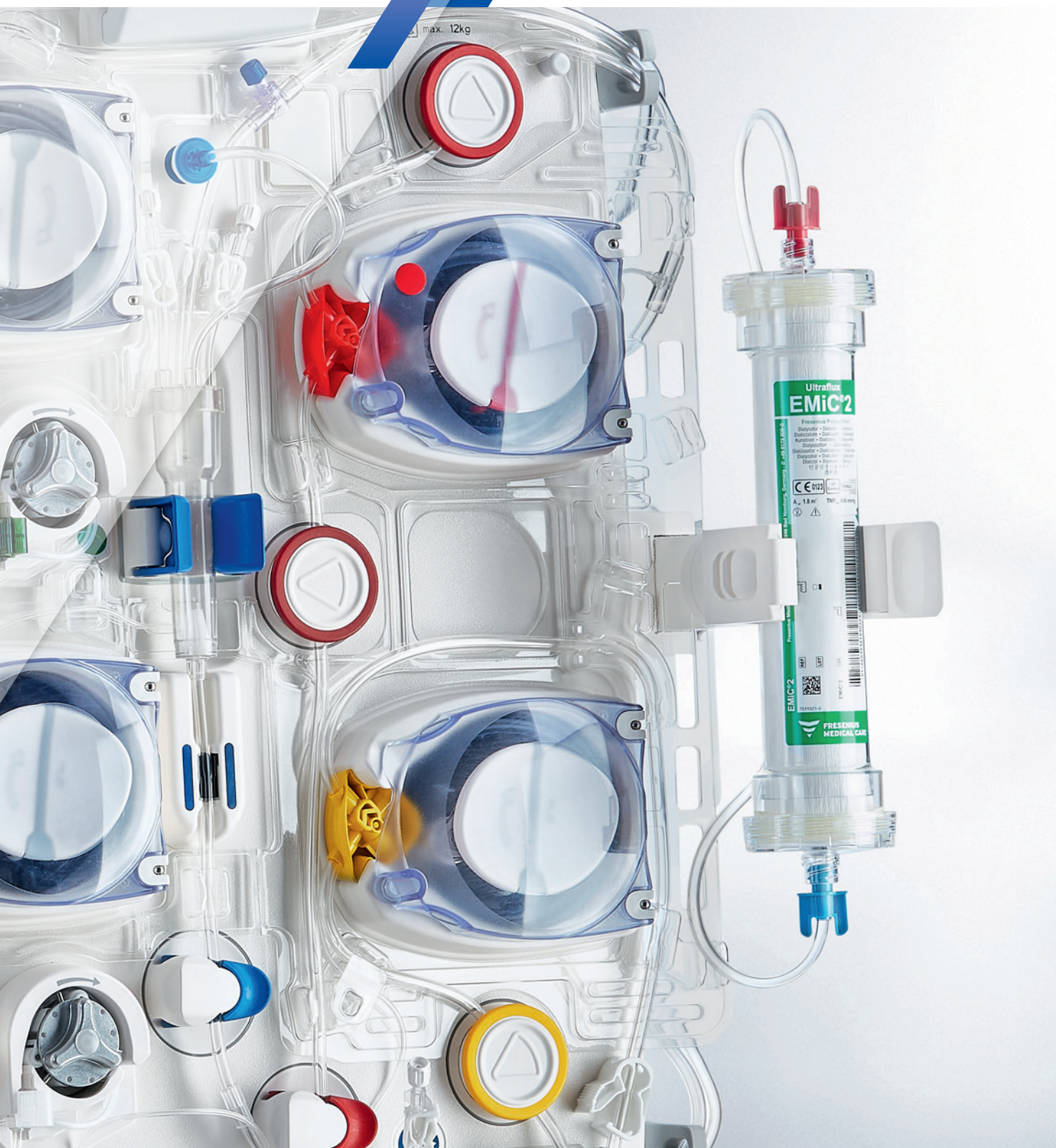




Ultraflux EMiC 2

Enhanced Middle Molecule Clearance

Targeting middle molecules? Explore Ultraflux EMiC 2.

Advanced diffusive efficiency for kidney replacement therapy in Acute Kidney Injury

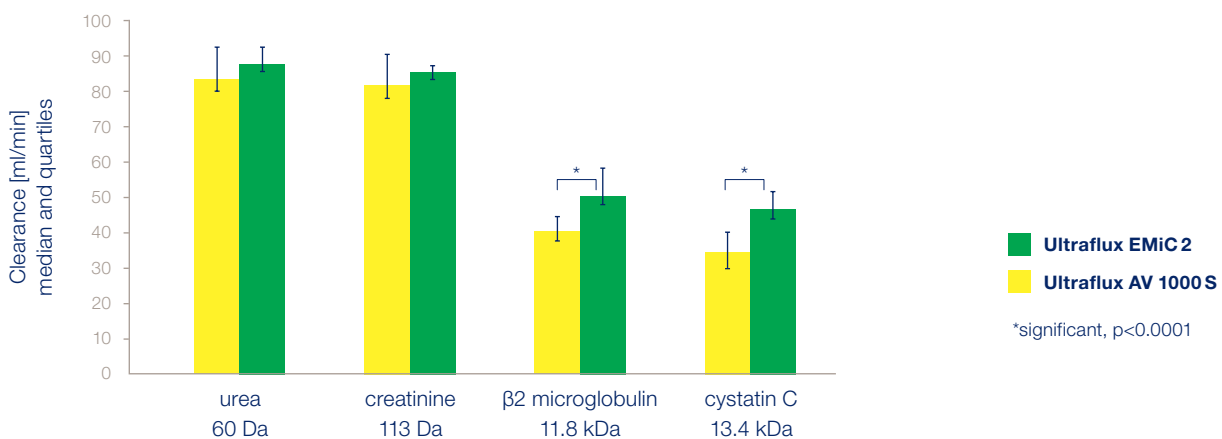
Ultraflux EMiC 2 enhances the removal of molecules that exceed the molecular weight of typical small uremic toxins, like urea and creatinine, while effectively retaining essential proteins such as albumin.¹⁻⁴

Remove middle molecules – retain albumin

The following results were observed in kidney replacement treatments using the high permeability membrane Ultraflux EMiC 2 in extended dialysis, a form of prolonged intermittent hemodialysis:⁵

- **Effective control of uremic toxins:** Ultraflux EMiC 2 effectively cleared common uremic toxins, like urea and creatinine, matching the performance of conventional hemofilters.
- **Lower middle molecule levels:** Ultraflux EMiC 2 resulted in significantly reduced serum levels of middle molecules such as $\beta 2$ microglobulin and cystatin C, demonstrating greater efficiency than standard cutoff hemofilters.
- **Albumin retention:** Ultraflux EMiC 2 maintained a low and clinically insignificant albumin loss during hemodialysis, ensuring essential protein retention.

Control of uremic toxin accumulation and lower middle molecule levels: Clearance of Ultraflux EMiC 2 versus Ultraflux AV 1000 S⁵



$Q_B=150$ ml/min, $Q_D=150$ ml/min, duration: 10 hours (extended dialysis)

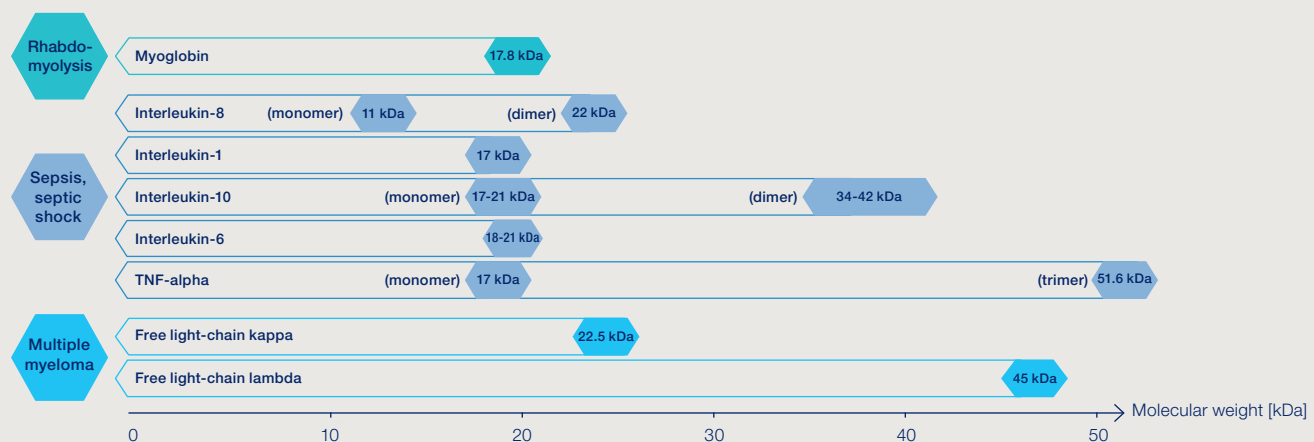
Adapted from Schmidt JJ
et al. Blood Purif. 2012⁵

Middle molecule associated AKI

Middle molecules may play a role in the development of Acute Kidney Injury (AKI) requiring kidney replacement therapy (KRT).

Traditionally, middle molecules were thought to be more efficiently removed by using convection rather than diffusion. Advances in membrane technology enable high cutoff hemofilters like Ultraflux EMiC 2 to achieve high levels of middle molecular clearance through diffusion.¹⁻⁴ Thus, the high cut-off filter Ultraflux EMiC 2 used in a diffusive therapy mode adds an alternative to convective therapy modes for patients in whom clinicians target middle molecule removal.

Exemplary middle molecules and mediators involved in pathophysiology of certain etiologies of AKI:⁶⁻⁸

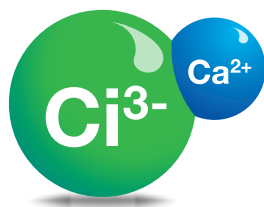


Ci-Ca CVVHD combined with Ultraflux EMiC 2

The combination Ci-Ca CVVHD with EMiC 2 integrates the benefits of enhanced membrane performance with regional citrate anticoagulation (RCA):

Ultraflux EMiC 2 with citrate anticoagulated CVVHD has shown effective middle molecule clearance throughout the CKRT for up to 72 h⁻¹ and statistically significantly improved middle molecule clearance for:

- β_2 microglobulin^{1,2}
- myoglobin¹⁻³
- IL-6 and IL-10⁴



What are the advantages of RCA on multiFiltrate and multiFiltratePRO?

- RCA enables patient treatment with less bleeding complications and less filter clotting compared to heparin CKRT^{9,10}
- Ci-Ca therapy is an effective and reliable RCA option¹¹⁻¹⁶
- Integrated citrate and calcium management¹⁷
- ICU staff can focus more on the patient and less on handling issues^{12,16}

Benefits of CVVHD in CKRT:

- Longer filter patency^{18,19}
- Compared to modalities requiring predilution, CKRT fluid is applied with full efficiency²⁰
- Less demanding regarding blood flow than convective modalities^{2,3,13,21}

Ultraflux EMiC 2

in Continuous Kidney Replacement Therapy (CKRT)

Performance data²²

Sieving coefficient*		Clearance*	
Inulin	1	$Q_B=100$ ml/min; $Q_D=30$ ml/min	$Q_B=125$ ml/min; $Q_D=125$ ml/min
$\beta 2$ microglobulin	0.9	Urea	30 ml/min
Myoglobin	0.8	Creatinin	30 ml/min
Albumin	0.01	Vitamin B12	29 ml/min
		Inulin	28 ml/min
			60 ml/min

Technical data²²

Effective surface area	1.8 m ²
Membrane material/Wall thickness/Inner lumen	Fresenius Polysulfone®/35 µm/220 µm
Blood priming volume	130 ml
Sterilization method	INLINE steam
Blood flow range	100–350 ml/min
Recommended period of use (max.)	72 hours
Housing/Potting material	Polycarbonate/Polyurethane
Blood/Dialysate connectors	According to ISO 8637-1

**In vitro data are likely to differ from in vivo data due to the patient's blood composition and clinical settings*

References:

- Siebeck M et al. Ther Apher Dial 2018, 22(4): 355-364
- Weidhase L et al. PLoS ONE 2019, 14(4): e0215823
- Weidhase L et al. Crit Care 2020, 24: 644
- Eichhorn T et al. Blood Purif 2017, 44(4): 260-266
- Schmidt JJ et al. Blood Purif 2012, 34(3-4): 246-252
- Chatzizisis YS et al. Eur J Intern Med 2008, 19(8): 568-574
- Bellomo R et al. Intensive Care Med. 2017, 43(6): 816-828
- Sancharawala V. Clin J Am Soc Nephrol. 2006, 1: 1331-1341
- Tsujimoto H et al. Cochrane Database Syst Rev. 2020, 12(12): CD012467
- Bai M et al. Intensive Care Med 2015, 41: 2098-2110
- Bianchi NA et al. Blood Purif 2020, 49: 567-575
- Kalb R et al. Ther Apher Dial 2013, 17: 202-212
- Morgera et al. Crit Care Med 2009, 37: 2018-2024
- Slowinski T et al. Crit Care 2015, 19: 349
- Huguet M et al. Int J Artif Organs 2017, 40: 676-682
- Houllé-Veyssièrre et al. Intensive Crit Care Nurs 2016, 36:35-41
- multiFiltratePRO Instructions for Use. Software version: 6.0
Edition: 14A-2022 Date of issue: 2022-09
- Friedrich JO et al. Crit Care 2012, 16(4): R146
- Zarbock A et al. JAMA 2020, 324(16): 1629-1639
- Neri M et al. Crit Care 2016; 20: 318
- Joannidis M. Crit Care Med 2009, 37: 2128-2129
- Ultraflux EMiC 2 Instructions for Use, 10/2023