

Theranova

DESIGNED FOR:
HDx

MEMBRANE:
MCO (PAES/PVP, BPA-free)

HDx THERAPY ENABLED BY THERANOVA*

HDx therapy (expanded HD) is the next evolution in hemodialysis, as it targets the efficient removal of large middle molecules (25 kDa to < 60 kDa).¹ Indeed, many of them are linked to the development of inflammation, cardiovascular disease, and other co-morbidities in dialysis patients.² With HDx therapy, **Theranova** provides superior removal of large middle molecules compared with HD and HDF modalities and it does so using regular HD workflow and infrastructure.³

HDx therapy is enabled by the **Theranova** dialyzer series, which features an innovative membrane design that combines a permeability higher than that of regular high-flux dialyzers with effective selectivity for large proteins.^{4,5}

PROVIDE EXPANDED HD, RETAIN HD SIMPLICITY

- > Markedly greater clearances and intradialytic reduction ratios for middle molecules than regular HD – at ordinary blood flow rates³
- > Superior removal of large middle molecules compared to HD and HDF modalities³
- > Limited albumin removal of between 1 and 4 grams per session³
- > Compatible with any HD monitor^{6,7} and with standard dialysis

WITH VANTIVE'S LATEST DIALYZER INNOVATION, COMING CLOSER TO THE NATURAL KIDNEY^{4,5}

- > High permeability to large middle molecules
- > Effective selectivity by size exclusion
- > Augmented internal filtration
- > Similar retention of endotoxins to other dialysis membranes of the same material⁸

CLINICAL EFFICIENCY AND PATIENT REPORTED OUTCOMES

- > Pre-dialysis levels of β_2 -microglobulin and kappa and lambda free light chains were reduced at 3 months and this reduction was maintained up to 6 months evaluation period of HDx therapy in a multi-center observational study of 41 HD patients^{9,†}
- > Based on 2 large, long-term registry studies in prevalent HD patients there was an approximate 50% reduction in the number of patients meeting Restless Leg Syndrome (RLS) criteria after 6 months of HDx therapy^{11,12} and an over 50% reduction in the number of patients meeting RLS criteria at 12 months.¹² A smaller before-after study found no difference in patient-reported symptom burden¹⁰

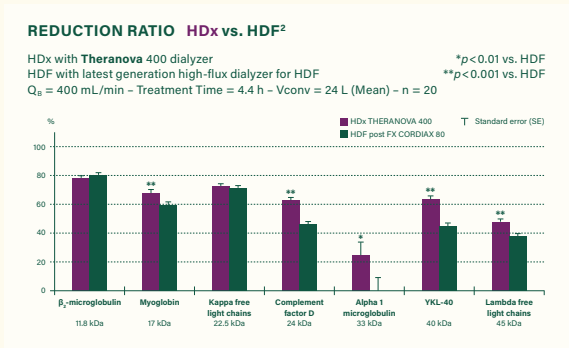
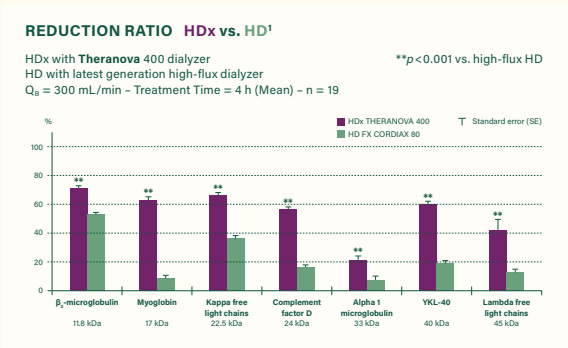
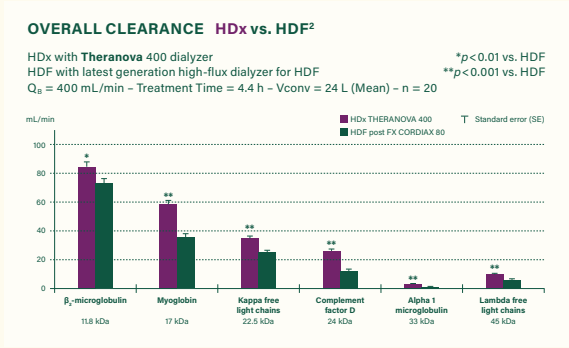
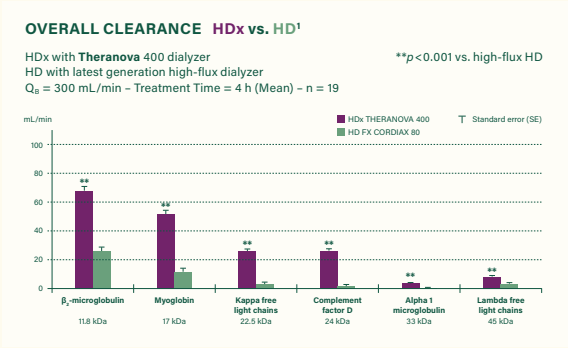
***Do not use THERANOVA dialyzers in HDF or HF mode**

[†]Based on data presented in a congress abstract – see reference for details.

[‡]Based on data presented in a congress abstract – see reference for details.
Restless leg syndrome was only one of several secondary endpoints.



CLINICAL PERFORMANCE³



IN VITRO CLEARANCES

IN VITRO CLEARANCES ARE INDICATED IN (mL/min) ± 10%

THERANOVA 400

UREA
60 Da



THERANOVA 500

UREA
60 Da



PHOSPHATE
95 Da

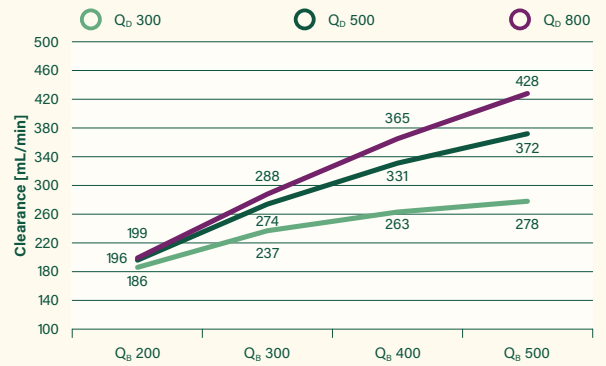
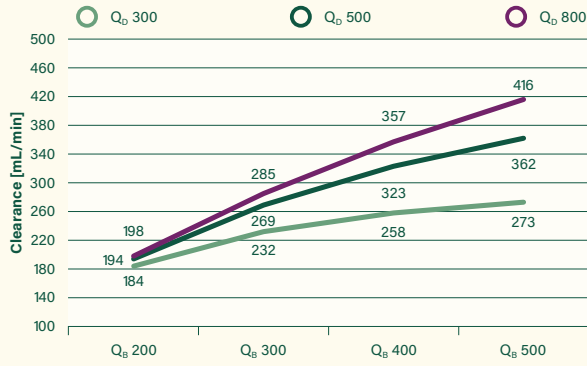


THERANOVA 400

THERANOVA 500

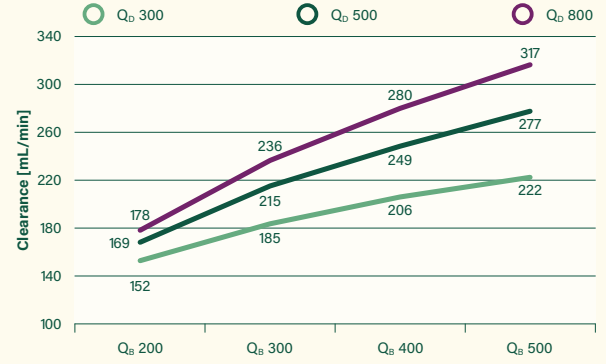
CREATININE

113 Da



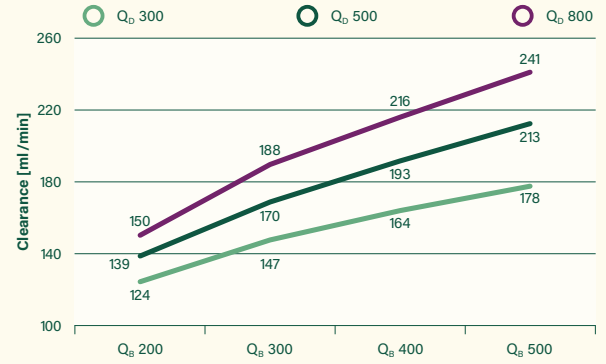
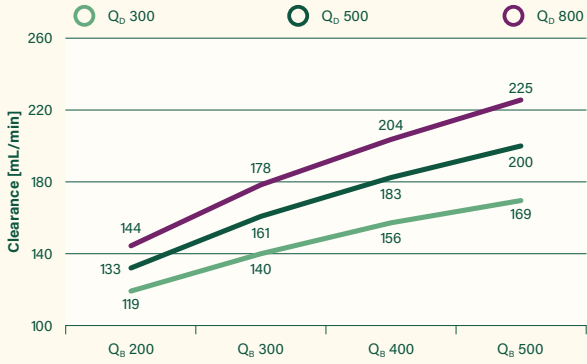
VITAMIN B12

1.4 kDa



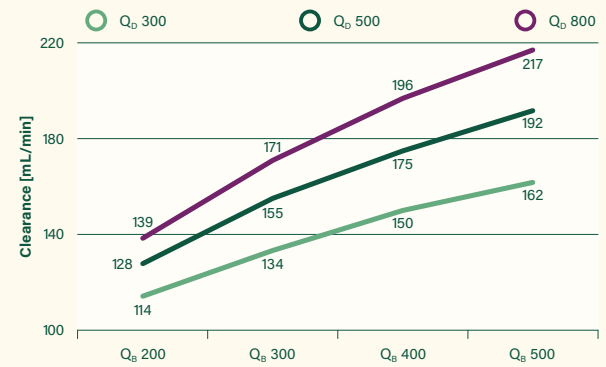
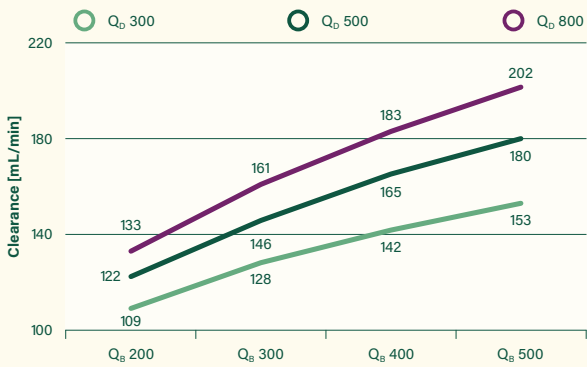
INULIN

5.2 kDa



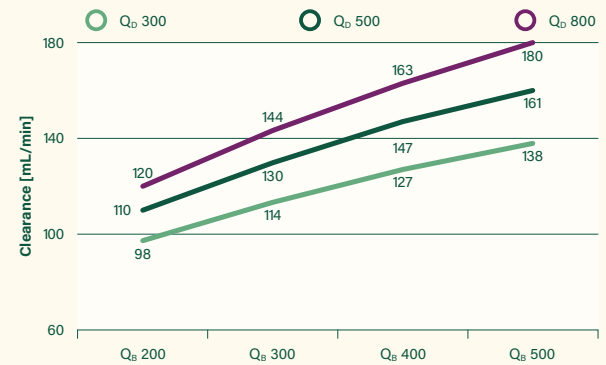
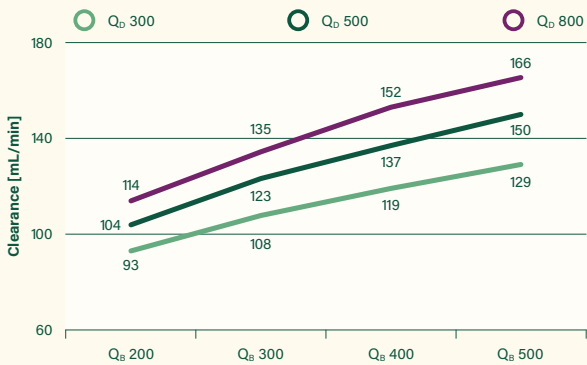
CYTOCHROME C

12 kDa



MYOGLOBIN

17 kDa



Theranova Specifications

MATERIALS	THERANOVA 400	THERANOVA 500
Membrane	Medium Cut Off Polyarylethersulfone and Polyvinylpyrrolidone blend BPA-free	
Potting	Polyurethane (PUR)	
Housing	Polycarbonate (PC)	
Gaskets	Silicone rubber (SIR)	
Protection caps	Polypropylene (PP)	
Sterilization	Steam (inside-out)	
Sterile barrier	Tyvek	

SPECIFICATIONS

UF-Coefficient (mL/(h*mmHg))*	48	59
KoA urea*	1482	1630
Blood Compartment volume (mL)	91	105
Minimum recommended priming volume (mL)	300	
Maximum TMP (mmHg)	600	
Recommended Q _B (mL/min)	200–600	250–600
Storage conditions	< 30°C (or < 86°F)	
Units per box	24	
Gross/net weight (g)	229/170	246/190

MEMBRANE

Effective Membrane Area (m²)	1.7	2.0
Fiber inner diameter (µm)	180	
Fiber wall thickness (µm)	35	

Sieving profile - before blood exposure*

MWCO (cut-off) [kDa]	56 +/- 3
MWRO (rentation onset) [kDa]	9.4 +/- 0.2

SIEVING COEFFICIENTS*

Vitamin B12 (1.4 kDa)	1.0
Inulin (5.2 kDa)	1.0
β ₂ -microglobulin (11.8 kDa)	1.0
Myoglobin (17 kDa)	0.9
Albumin (66.4 kDa)	0.008

*According to EN 1283/ISO 8637:
> UF-Coefficient: measured with bovine blood, Hct 32%, Pct 60 g/L, 37°C
> KoA urea: calculated at Q_B = 300 mL/min, Q_D = 500 mL/min, UF = 0 mL/min
> Sieving coefficients: measured with human plasma, Q_B = 300 mL/min, UF = 60 mL/min
> Clearances In-Vitro: measured at UF = 0 mL/min, ± 10% (± 20% Cyt. C, ± 30% Myo.)

1. Ronco C, et al. The rise of Expanded Hemodialysis. *Blood Purif.* 2017;44:1–VIII.
2. Hutchison CA, et al. The Rationale for Expanded Hemodialysis Therapy (HDx). *Contrib Nephrol.* 2017;191:142–52.
3. Kirsch AH, et al. Performance of hemodialysis with novel medium cut-off dialyzers. *Nephrol Dial Transpl.* 2017;32(1):165–72.
4. Boschetti-de-Fierro A, et al. MCO membranes: Enhanced Selectivity in High-Flux Class. *Scientific Reports* 2015;5:18448.
5. Zweigart C, et al. Medium cut-off membranes – closer to the natural kidney removal function. *Int J Artif Organs.* 2017;40(7):328–334.
6. Baxter. Data on file. Theranova Limited Controlled Distribution Report. 2016.
7. Baxter. Theranova 400/500 Instructions For Use. N50 648 rev 003, 2017-05-29.
8. Schepers E, Glorieux G, Eloot S, et al. Assessment of the association between increasing membrane pore size and endotoxin permeability using a novel experimental dialysis simulation set-up. *BMC Nephrology.* 2018;19:1.
9. Cantaluppi V, et al. Removal of large-middle molecules on expanded hemodialysis (HDx): a multicentric observational study of 6 months follow-up. ASN 2018 Kidney Week Abstract TH-PO357.
10. Krishnasamy R, et al. Trial evaluating mid cut-off value membrane clearance of albumin and light chains in hemodialysis patients (REMOVAL-HD): a safety and efficacy study. ASN 2018 Kidney Week Abstract TH-PO353.
11. Sanabria M, et al. Quality of life reported by patients with expanded hemodialysis by the Theranova dialyzer in RTS Colombia. ASN 2018 Kidney Week Abstract TH-PO296.
12. Sanabria M, et al. Patient-Reported Outcome Measures (PROMs) and Expanded Hemodialysis (HDx) with Medium Cut-Off Dialyzers in a Large Cohort of Patients in Colombia: The COREXH Study. ASN 2018 Kidney Week Abstract FR-PO493.

For safe and proper use of the device,
please refer to the Instructions for Use.

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CLEARANCES IN VITRO (mL/min)*	THERANOVA 400	THERANOVA 500
Urea (60 Da) (Q _B -Q _D , mL/min)		
200/500	198	199
300/500	282	285
400/500	344	351
400/800	376	381
500/800	445	454
Phosphate (95 Da)		
200/500	192	194
300/500	261	267
400/500	311	320
400/800	345	354
500/800	400	413
Creatinine (113 Da)		
200/500	194	196
300/500	269	274
400/500	323	331
400/800	357	365
500/800	416	428
Vitamin B12 (1.4 kDa)		
200/500	164	169
300/500	207	215
400/500	239	249
400/800	267	280
500/800	301	317
Inulin (5.2 kDa)		
200/500	133	139
300/500	161	170
400/500	183	193
400/800	204	216
500/800	225	241
Cytochrome C (12 kDa)		
200/500	122	128
300/500	146	155
400/500	165	175
400/800	183	196
500/800	202	217
Myoglobin (17 Da)		
200/500	104	110
300/500	123	130
400/500	137	147
400/800	152	163
500/800	166	180

Vantive ULC
6675 Millcreek Drive, Unit 2
Mississauga ON L5N 5M4
Canada
www.vantive.com