

Medtronic

Sustainable performance

Phylther™ UP dialyzers

Polyphenylene™ membrane, made of Polyethersulfone



Blood purification goals

For patients with end stage renal disease (ESRD) or acute conditions, blood purification in extracorporeal treatment is critical. Different molecules with different molecular weights have significant clinical impact as illustrated in Table 1.¹⁻⁴

Dialyzers play a pivotal role in the blood purification process. Our Phylther™ UP dialyzers are designed and manufactured using specific materials that help ensure adequate performance for every patient.

| Molecular weight | Molecules | Family class | Toxicity |
|------------------|------------------|-------------------|--|
| 1 kDA | Urea | Small molecules | General toxicity |
| | Creatinine | | |
| | β lipotropin | | |
| 15 kDA | β ₂ M | Middle molecules | Amyloidosis |
| | Leptin | | Malnutrition |
| 60 kDA | Myoglobin | Large molecules | Ox. stress and mitochondrial dysfunction |
| | κ-FLC | | Multiple toxicity |
| | Interleukin 6 | | Inflammation |
| | Hepcidin | | Anemia |
| | Pentaxin-3 | | Acute phase protein |
| | λ-FLC | | CV complication and inflammation |
| | TNF α | | Sepsis inflammation |
| | Albumin | Essential protein | Toxin binding |

Table 1

Dialyzers are designed to provide:

- **High tolerability:** to limit the impact of extracorporeal blood treatment
- **High diffusion exchanges:** to optimize electrolyte balance and removal of small toxins
- **High hydraulic permeability:** to enhance removal of toxins with medium-large molecular weight





Technology in practice

Phylther™ UP dialyzer fiber bundles are equipped with performance enhancing technology (P.E.T.). This uses spacer yarns inserted between the fibers to help ensure homogeneous dialysis solution distribution between capillaries and consistent diffusion exchange.

Sieving Enhancing Technology (S.E.T.) enables optimal pore distribution and homogeneous large pore diameter (Figure 1). S.E.T. also minimizes protein adhesion, ensuring consistent performance throughout the treatment.¹⁴

Phylther™ UP dialyzers are steam sterilized which increases fiber permeability. This helps ensure greater selective clearance of solutes with medium and high molecular weight.

Membrane and housing materials used in the production of Phylther™ UP dialyzers are completely Bisphenol A (BPA) free. This helps ensure BPA is not released in the blood stream during treatment.

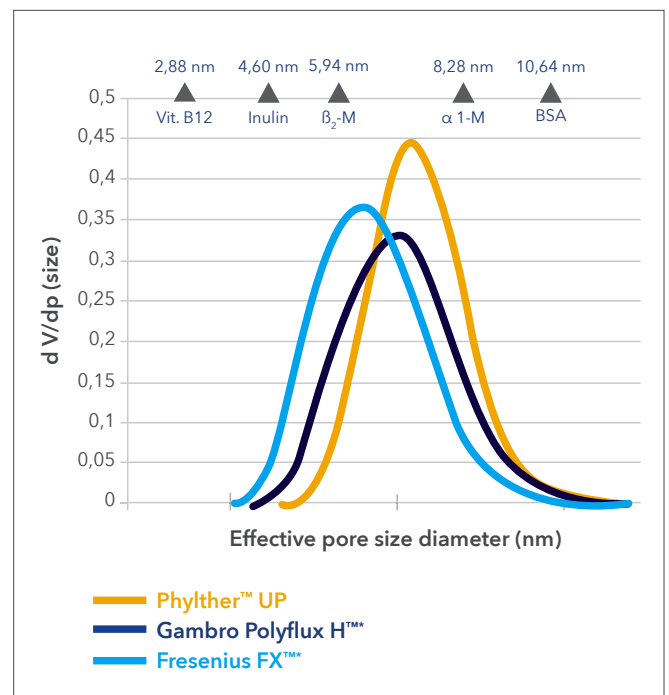
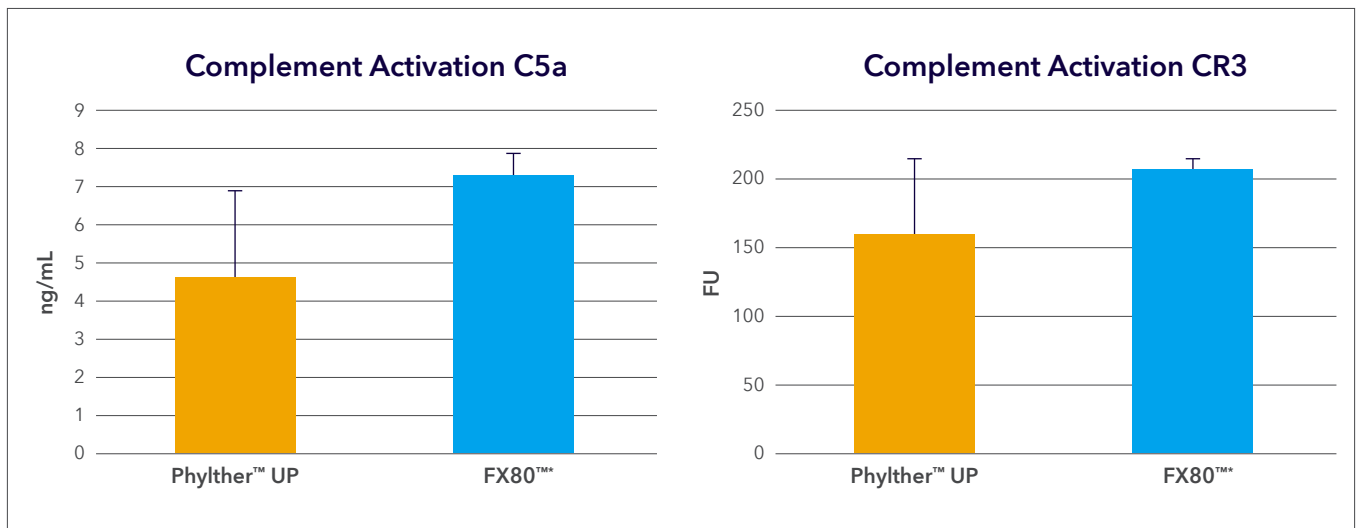
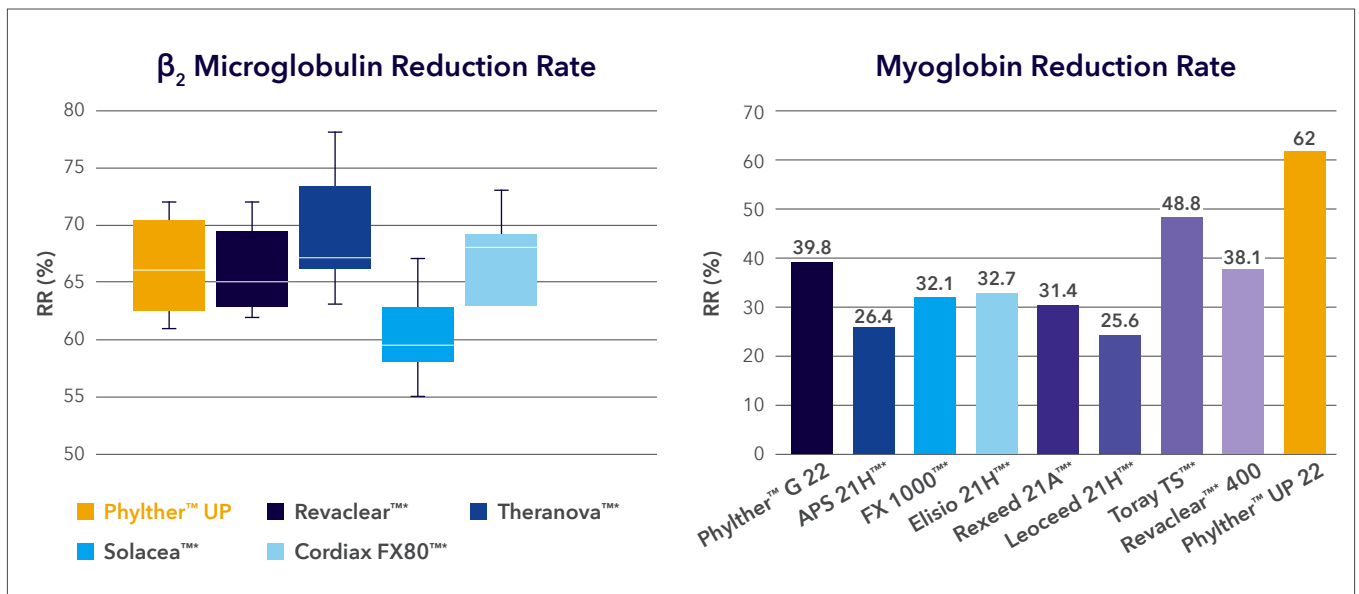


Figure 1. Membrane pore size distribution.⁵

Clinical outcomes



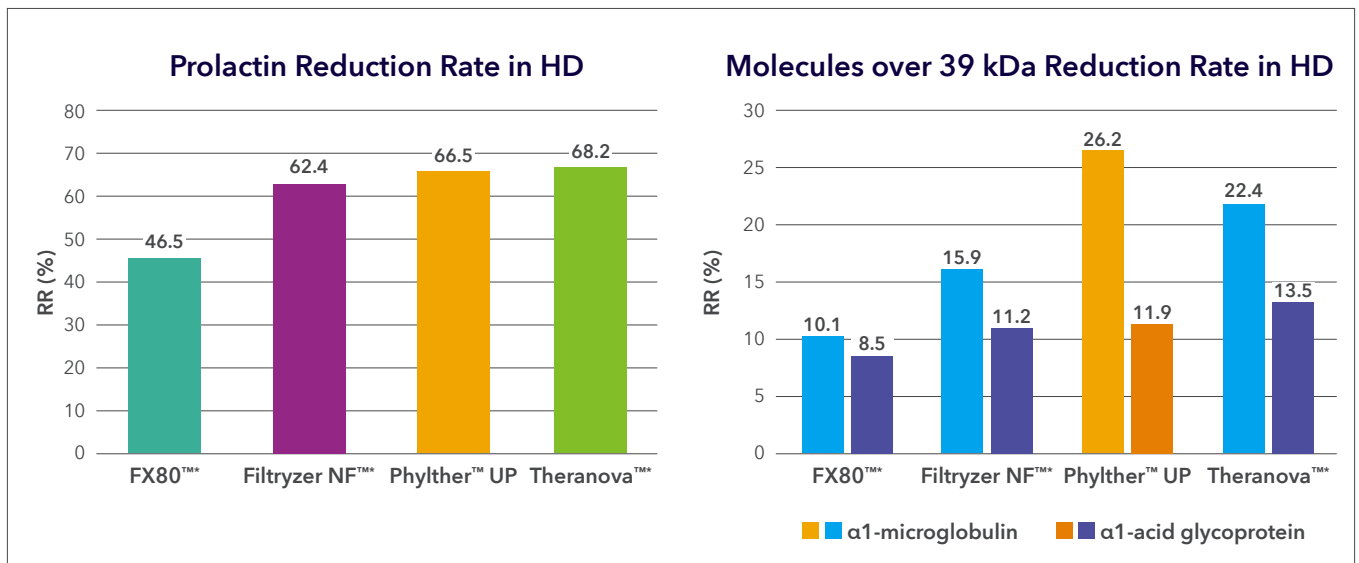
Phylther™ UP[†] dialyzers led to significantly lower complement C5a generation, and CR3 up-regulation, when compared with Helixone™ (FX80).⁶



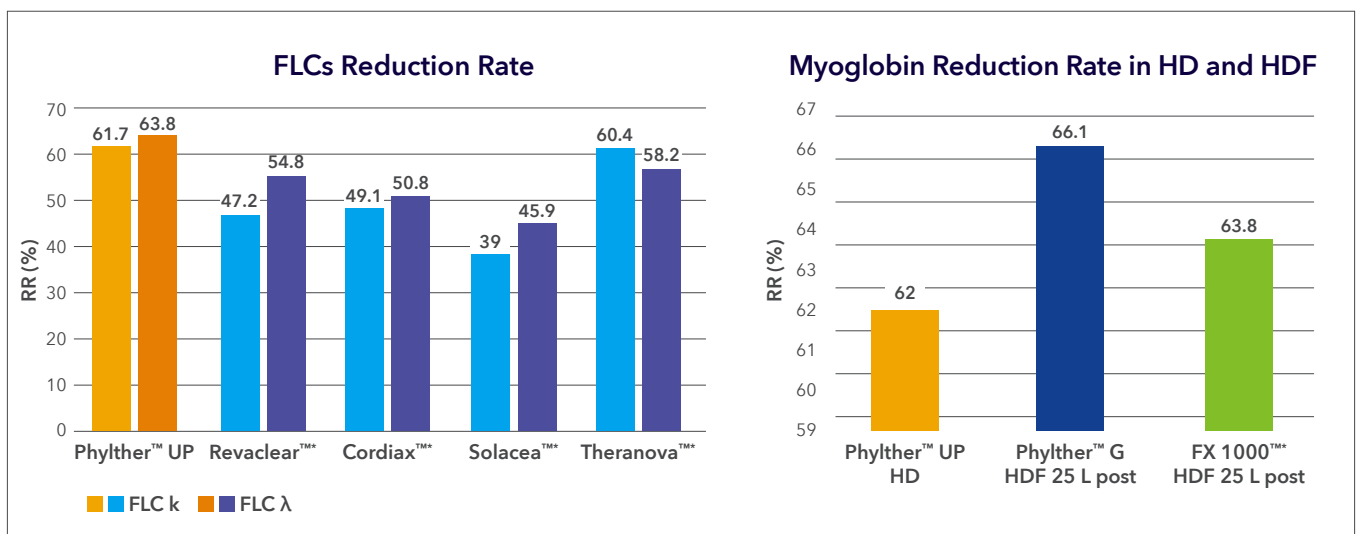
There is a strong correlation between high Reduction Rate (RR) of β₂-microglobulin⁷, efficiently removed by Phylther™ UP dialyzers, and its high concentration in plasma prior to dialysis, and mortality of hemodialysis patients.⁸

Molecules with weights above 12 kDa, i.e., myoglobin, are optimally reduced by Phylther™ UP dialyzers.⁹

[†]The Purema™ membrane used in this study is the same of Phylther™ UP dialyzer.



As compared with other high flux and MCO dialyzers,¹⁰ Phylther™ UP dialyzers demonstrated a high Reduction Rate (RR) of middle molecules in the range (23-41 kDa): prolactin (23 kDa), α1-microglobulin (33 kDa) and α1-acid glycoprotein (41 kDa).



Phylther™ UP dialyzers demonstrated very high removal rate for middle molecular weight toxins like FLC, as compared with other dialyzers.⁷

HD with Phylther™ UP didn't show statistical difference in RR of myoglobin compared to HDF.

For patients and the environment

BPA is a known endocrine disruptor. It bonds with certain hormones (i.e., oestrogens) and generates some very critical hormone-like effects such as increased risk of diabetes, obesity and cardiovascular diseases.¹¹ Also, BPA is excreted primarily through the kidneys.

This could place dialysis patients at high risk of exposure to comorbidities linked to BPA, especially if devices used in dialysis contain and release BPA.¹²

Membrane and housing of Phylther™ UP dialyzers are BPA-free. This is an important safety feature which can have an impact on the patient.

Phylther™ UP dialyzers are manufactured with a polypropylene housing. This housing is lighter than those made of polycarbonate and polystyrene. Polypropylene has a lower carbon footprint than other polymers used in dialyzers production.¹³

Phylther™ UP dialyzers – technology that helps improve patient care, and the environment.





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