At Fresenius Medical Care, we work continuously to improve peritoneal dialysis treatment and therapy. Our work has been validated by numerous studies demonstrating the benefits and advantages of our products, devices and software. The P3 programme allows you to provide your patients with a therapy that Protects, Preserves and Prolongs their time on PD.

To learn more about the P3 categories Protect and Prolong please contact your local sales representative.

The P3 programme is available only from Fresenius Medical Care.
P³ – A new approach to Peritoneal Dialysis

P³ is a comprehensive PD programme specifically designed to improve your patients’ quality of life whilst extending their time on PD.

P³ allows you to prescribe individual therapy programmes, monitor patient conditions, and precisely adjust therapy when needed – in an efficient and optimised way.

P³ features three integrated categories:

- **Protect**: unique and easy-to-understand PD systems
- **Preserve**: ultra-low GDP fluids with neutral pH
- **Prolong**: individual state-of-the-art therapies for fluid balance control and guided prescription modelling

Preserve

With *balance*, Fresenius Medical Care offers a biocompatible dialysis solution with ultra-low glucose degradation product (GDP) content and a neutral pH. Compared with conventional fluids, this powerful combination aims at improving survival by reducing complications in PD.¹ ²

Preserve is designed to:

- Preserve the peritoneal membrane function
- Reduce the incidence of infection and prevalence of inflammation
- Preserve residual renal function (RRF)
- Improve patient survival
GDPs and AGEs exhibit adverse local and systemic effects

GDPs are considered to play a major role in the bioincompatibility of peritoneal dialysis fluids. Glucose degradation, forming GDPs, takes place during sterilisation and storage of PD fluids. In addition to their direct toxicity, GDPs promote the formation of advanced glycation end products (AGEs), in particular 3-deoxyglucosone (3-DG). Both GDPs and AGEs have negative local and systemic effects:

- by affecting cell viability and function
- by inducing inflammation, fibrosis and neo-angiogenesis

Local effects of GDPs and AGEs
- Inflow associated pain
- Increased inflammation/infection
- Damage to the peritoneal membrane
- Loss of ultrafiltration

Systemic effects of GDPs and AGEs
- Reduction of residual renal function
- Cardiovascular toxicity
- Increased inflammation
- Reduced appetite

Preserving systemic homeostasis

Systemic effects of GDPs and AGEs
- Reduction of residual renal function
- Cardiovascular toxicity
- Increased inflammation
- Reduced appetite

Preserving residual renal function contributes to survival and the quality of life of PD patients. RRF eliminates middle molecules, increases hemoglobin, improves acid base balance and nutritional status, as well as fluid balance.
Smart technology dramatically reduces GDPs

**balance** contains ultra-low GDP concentrations by utilising a double-chamber bag system. The formation of GDPs is drastically reduced by separating the glucose from the buffer which allows sterilization and storage of glucose at a low pH. Immediately before infusion both chambers are mixed, which results in a unique biocompatible solution with neutral pH and ultra-low GDP content. This greatly reduces the unfavourable effects associated with GDPs and AGEs.

- Ultra-low GDP fluid with neutral pH
- Lactate-buffered solution

**balance** is the only PD fluid with ultra-low GDPs

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**PD Fluids**

- * 3-deoxyglucosone; ♣ 2.3% glucose, ♦ 2.27% glucose

Chart based on Erixon et al. 17
Preserving the peritoneal membrane function

Preservation of the peritoneal membrane function is central to the effective treatment of PD patients.\textsuperscript{21}

\textit{balance}
- reduces the risk of damage to the peritoneal membrane\textsuperscript{13}
- improves mesothelial cell mass/function as indicated by increased CA-125\textsuperscript{13}
- reduces peritoneal inflammation and damage as indicated by decreased hyaluronan\textsuperscript{13}
- has shown excellent reduction in infection rates\textsuperscript{2, 23}

Conventional PD fluids can alter the peritoneal membrane over time and might lead to functional problems. This process shall be delayed with more biocompatible PD fluids.

Profile of the parietal peritoneal membrane at (left) therapy initiation and (right) > 5 years therapy (The Peritoneal Biopsy Registry\textsuperscript{9})

Profile: 200 µm

\textit{Improved mesothelial cell mass/function}

\textit{Reduced peritoneal inflammation}

CA125 values were significantly higher in patients on \textit{balance}, suggesting better preserved mesothelial cell mass/function with \textit{balance}.\textsuperscript{13}

Hyaluronan was significantly decreased in patients treated with \textit{balance} indicating reduced peritoneal inflammation.\textsuperscript{13}
In addition to local toxic effects, GDPs and AGEs cause systemic toxicity which has been shown to be associated with a decline in RRF\textsuperscript{13, 14} and cardiovascular damage.\textsuperscript{15}

\textit{balance}
- reduces systemic AGE formation\textsuperscript{13, 24}
- decreases systemic inflammation\textsuperscript{9}
- preserves residual renal function\textsuperscript{13, 25}

Preserving residual renal function contributes to survival and the quality of life of PD patients.\textsuperscript{1, 2} RRF eliminates middle molecules, increases hemoglobin, improves acid base balance and nutritional status, as well as fluid balance.

\textbf{The challenge in PD is to improve technique and patient survival. Thanks to the beneficial effects of balance, we have the potential to contribute to this goal.}

\textbf{balance preserves the RRF}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{balance_preserves_the_RRF.png}
\caption{Positive effect of \textit{balance} on the RRF in patients with a glomerular filtration rate (GFR) of \geq 2 \text{ mL/min/1.73 m}^2.\textsuperscript{25} Chart adapted from Kim et al.\textsuperscript{25}}
\end{figure}

\textbf{Lower systemic inflammation with balance}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{lower_systemic_inflammation_with_balance.png}
\caption{Positive effect of \textit{balance} on the C-reactive protein (CRP) serum levels.\textsuperscript{9}}
\end{figure}