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Clinical Update on Dialyzer Membranes

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Modern methods in analytical biochemistry have established that uraemia is associated with the retention of proteins, both in their native state and post-translationally modified, over a wide range of molecular weights up to 60 kDa. Evidence is accumulating that these higher molecular weight retention solutes are important uraemic toxins, and therapies such as online haemodiafiltration (HDF), which enhance their removal, are associated with improved outcomes. However, HDF has limitations regarding cost, clinical implementation and the need for an external source of sterile substitution solution to maintain fluid balance. New membranes that have a solute removal profile more closely approaching that of the glomerular filtration barrier when used for conventional haemodialysis, while at the time not allowing the passage of clinically significant amounts of beneficial proteins, are needed to address these limitations. Tighter control of the molecular characteristics of the polymers used for membrane fabrication, along with the introduction of additives and improvements in the manufacturing process, has led to membranes with a tighter pore size distribution that allows the use of an increased absolute pore size without leaking substantial amounts of albumin. At the same time, the wall thickness and internal diameter of membrane fibers have been decreased, enhancing convective transport within the dialyser without the need for an external source of substitution solution. These new expanded range membranes provide a solute removal profile more like that of the native kidney than currently available membranes when used in conventional haemodialysis.