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Preservation and modulation of peritoneal function. A potential role of pyruvate and betaine.

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AIMS: To review interventions aimed at protecting the peritoneal membrane from the detrimental effects of dialysis solutions, and to analyze proposed pharmacological interventions aiming to modulate peritoneal permeability. **Main REMARKS:** Sustained oxidative stress appears as the most relevant factor bringing about substantial damage to all the components of the peritoneal membrane. In vivo and in vitro studies suggest that pyruvate, a natural radical scavenger, may well neutralize or substantially reduce the oxidative insult. Additional research suggest that trimetazidine and the glutathione precursor L-2-oxothiazolidine-4-carboxylic (OTZ), both showing antioxidant capabilities, are also promising agents that deserve to be further explored. Acute osmotic stress provokes different modes of cell death. In the long-term mesothelial cells adapt to the hypertonic environment, at least from a morphological point of view, by accumulating compatible osmolytes like betaine, launching the mechanism of regulatory volume increase. Addition of betaine to PD formulation is proposed in order to attenuate cells shrinkage and facilitate adjustment to a new, non physiological environment. Modulation of peritoneal function as a reusable dialyzing, biological membrane has been investigated using a variety of drugs in different experimental set ups: heparin, sulodexide, chondroitin sulphate, phosphatidylcholine, indomethacin, and vasoactive drugs like verapamil, captopril, nicardipine, diltiazem, enalapril, valsartan and lisinopril, offering at times conflicting results. **CONCLUSIONS:** Efforts focused in improving the dialyzing capabilities of the peritoneal membrane by means of pharmacological manipulation, have not yet offered clinically relevant innovations. Conversely, interventions designed to preserve the peritoneum as a reusable dialyzing living membrane are more promising, especially those aimed at neutralizing oxidative and osmotic injury.

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