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Theme : Basic Research on Biocompatibility, Immunology, Inflammation and Fibrosis

Effects of overexpression Smad7 on the expression of AQP-1,3 in a rat peritoneal fibrosis model

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Objectives: To investigate the effects of overexpression Smad7 on the expression of peritoneal AQP-1, 3 in a rat peritoneal fibrosis model. **Methods:** Peritoneal fibrosis rat was established by daily intraperitoneal injection of 4.25% peritoneal dialysis solution for four weeks and intraperitoneal injection of LPS on days 1,3,5,7. 40 male Sprague-Dawley rats were randomly divided into four groups: Group N: normal control; Group M: Peritoneal fibrosis rat and received no treatment; Group V: Peritoneal fibrosis rat and received twice intraperitoneal injection of control empty vectors at day 0 and 14; Group T: Peritoneal fibrosis rat and received twice intraperitoneal injection of the pTRE-m2Smad7/Tet-on plasmids/Optison using an ultrasound at day 0 and 14. Doxycycline was added in the daily drinking water to inducing the transgene expression of Smad7. The expression of AQP-1 and AQP-3 were examined by immunofluorescence, western-blot and RT-PCR. **Results:** The Smad7 transgene expression, peritoneal function (UF and MGT) were measured, and peritoneal AQP-1, AQP-3 mRNA and protein expression were also detected. The ultrasound treatment with Optison largely increased the transfection rate of Smad7 transgene expression, and this was mainly found in peritoneal mesothelium cells. Compared with normal rats, the phosphorylation of smad2/3 protein was upregulated 3.5 fold by LPS and PDS. However, treatment with inducible Smad7 resulted in a 54% decreased smad2/3 phosphorylation. Compared with normal rats, Ultrafiltration was reduced significantly by LPS and PDS, In contrast, Smad7 treatment resulted in increase of UF. However, compared with peritoneal fibrosis rats, Smad7 treatment has no effects on the expression of AQP-1 and AQP-3. **Conclusions:** Overexpression of Smad7 significantly reduced the phosphorylation of Smad2/3. Blockade of TGF- β /Smad signaling by overexpression Smad7 increased UF, improved peritoneal function. However, Smad7 treatment has no effects on the expression of AQP-1 and AQP-3 in peritoneum.