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Fabrication, Characterization and Anti-fibrotic effect of surface engineered nano-formulation of Revesterol against peritoneal fibrosis via alteration of TGF- β 1

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Objectives: We fabricate the nano-formulation of Revesterol (RT-PLGA-NP) and scrutinized against the peritoneal fibrosis in rats and explore the underlying mechanism.

Methods: The RT-loaded PLGA nanoparticles (RT-PLGA-NP) were prepared using the emulsion solvent technique and were developed for an economical dosing system. The potential of the CT-PLGA-NP to decrease TGF- β signaling was evaluated through docking analysis. Intraperitoneal administration of 0.1% Chlorhexidine gluconate was used to induce peritoneal fibrosis (PF) in rats. Both inflammatory and biochemical parameters were evaluated. The quantitative RT-PCR was carried out to estimate the levels of inflammation and fibrosis-associated factors. We also detected the Transforming growth factor beta 1 (TGF- β 1) in peritoneal fluid by ELISA.

Results: The RT-PLGA-NP exhibited the desired properties of nanoparticles, featuring a spherical, smooth appearance and a narrow size distribution. RT-PLGA-NP showed the remarkably reduction the thickness of peritoneal membrane and also myofibroblasts expression with avoidance of loss filtration of peritoneal membrane. RT-PLGA-NP showed the alteration in the antioxidant parameters such as malonaldehyde (38.6%), superoxide dismutase (42.4%), glutathione (36.7%), catalase (52.3%); inflammatory cytokines viz., tumor necrosis factor- α (46.5%), interleukin-1 β (45.6%), interleukin-6 (34.5%). RT-PLGA-NP also suppressed the level of TGF- β 1 in the peritoneal fluid.

Conclusions: The result suggest that the RT-PLGA-NP exhibited the renal protective effect against the peritoneal fibrosis via alteration of TGF β 1.