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Probiotics attenuate chronic kidney disease progression in mice

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Background: Emerging evidence showed the important role of kidney-gut crosstalk in diverse pathological processes and alterations in intestinal barrier or dysbiotic gut microbiota have been demonstrated in chronic kidney disease (CKD). Regulatory T cells (Tregs) are known to be important in maintaining immune homeostasis in various inflammatory diseases and recent several in-vitro experiments demonstrated that probiotics could induce an expansion of Tregs. The purpose of this study was to investigate the effect of probiotic treatment on the CKD.

Methods: CKD was induced in 6 week old C56BL/6 mouse by 5/6 nephrectomy. *Lactobacillus Rhamnosus* R0011 and *Lactobacillus Acidophilus* R0052 and proton pump inhibitor mixture were administered via oral gavage starting 1 day after the operation and continued for 8 weeks following intestinal decontamination. Biochemical, histological analyses as well as immunological analyses were performed at 4 weeks after 5/6 nephrectomy.

Results: At 8 weeks, serum creatinine decreased in probiotics treated group compared to CKD group and sham operated mice ($p=0.03$). Probiotics group shows decreased fibrosis in MT stain semi quantification ($p=0.05$). Urine protein creatinine ratio showed no statistical significance but we confirmed the declining trend in probiotics group ($p=0.13$). This beneficial effect was associated with significant increased percentage of colonic FoxP3 ($p=0.03$). Serum IL-6 concentration was remarkably lower in probiotics group ($p=0.02$). Kidney TNF- α and MCP-1 concentration was higher in CKD group ($p<0.01$). Probiotics conjugate intestinal condition which is responsible for anti-fibrotic mechanism.

Conclusion: Probiotics have renoprotective effect by reducing renal fibrosis through kidney-gut crosstalk and inhibit CKD progression.

Keywords: renal failure: chronic, progression of renal disease, treatment