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Effect of Probiotics Supplementation on Inflammatory Monocytes and Regulatory T Cells in Hemodialysis Patients

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Objectives: Chronic inflammation is often found in hemodialysis (HD) patients and related to cardiovascular disease and mortality. Intestinal dysbiosis may be a contributing factor to systemic inflammation. Probiotic supplementation may correct dysbiosis and related systemic inflmmation. The objective of this study was to evaluate the effects of probiotics supplementation on various inflammatory parameters in HD patients

Methods: This was a single center, crossover study including 21 patients. (IRB No. 2018AN0346) HD patients were treated twice per day with probiotics (*Bifidobacterium bifidum*, *Bifidobacterium longum*, *Lactobacillus acidophilus*, *Enterococcus facium*). The percentage of CD14+ CD16+ monocytes and CD4+ CD25+ regulatory T cells (Treg), and cytokine response upon lipopolysaccharide (LPS) challenge as well as various clinical parameters were compared before and after probiotics supplementation.

Results: The proportion of regulatory T cells was significantly increased after a month of probiotics trial compared to baseline. (3.6% vs 7.7%, $P<0.05$). In age group over 70 years old, the percentage increase of regulatory T cell was more prominent. (196% vs 62%, $P<0.05$) The change of CD14+ CD16+ inflammatory monocyte was not significant. (13.9% vs 16.5%, $p>0.05$) White blood cell count and C-reactive protein levels did not show significant change. Calprotectin and zonulin levels, indicators for gut wall penetration, were not significantly decreased. However, tumor necrosis factor-α, IL-1β and IL-8 response after lipopolysaccharide challenge diminished significantly. ($p<0.05$)

Conclusions: These preliminary data suggest that probiotics may modulate systemic immune response via regulatory T cells and suppression of proinflammatory cytokines. Targeting gut dysbiosis might be a new therapeutic strategy in chronic kidney disease patients undergoing maintenance HD.