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Benefits of Probiotic Consumption on Chronic Kidney Disease

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ACCORDING TO THE Office of Disease Prevention and Health Promotion, Medicare spends approximately 25% of its money on treatment for patients with chronic kidney disease (CKD) and end-stage renal disease.[1] This disease impacts nearly 30 million American adults, with many more at risk of developing the disease.[2] Treatment for these patients includes diet modification, lifestyle changes, renal replacement therapy, and kidney transplantation.

CKD can lead to many complications in patients including gut microbiota alterations. Constipation, common in 29% of patients on peritoneal dialysis and 63% of patients on hemodialysis, is one factor that can contribute to this altered state. Constipation may be caused by many factors including low fiber intake, low fluid consumption, lack of activity, and other comorbidities that the patient may have.[3] The slowed transit time through the gastrointestinal (GI) tract associated with constipation may contribute to dysbiosis due to bacterial overgrowth in the stool.[4]

In CKD, concentrations of both urea and ammonium increase in the GI tract, raising the pH level and promoting aerobic bacteria growth. In turn, these aerobic bacteria produce uremic toxins such as p-Cresol, indoxyl sulfate, and trimethylamine N-oxide which decrease the number of healthy anaerobic bacteria in the gut.[5] High concentrations of these toxins have also been associated with the progression of CKD. Bifidobacteria and Lactobacillus are two types of healthy anaerobic bacteria, commonly used in probiotic supplements, that are found decreased in the presence of uremic toxins. These probiotic bacteria have shown to have beneficial functions in the gut by assisting in digestion, supporting immune function, promoting vitamin synthesis, and blocking the prevalence and growth other harmful bacteria.[6]

Early research shows the effect of probiotic supplementation on CKD progression. The journal, *Minerva Urologica E Nefrologica* published a study in 2016 which evaluated the impact of prebiotic and probiotic supplementation on how CKD progressed. This particular study assigned 24 patients with CKD to 1 of 2 groups: the experimental group which consumed a low-protein diet with prebiotic and probiotic supplements or the control group which received only a low-protein diet. The duration of the study lasted for 6 months. At the end of the study, results showed that the declining glomerular filtration rate improved significantly in participants who were on the low-protein diet combined with prebiotics and probiotics.[7]

A similar study examined 37 patients with CKD stage 4-5 who were not on dialysis. These patients participating in a 6 week study were given treatment with prebiotics and probiotics or a placebo. Appropriate protein and fiber intake were encouraged with each participant in the study. Patients who consumed *Lactobacillus*, *Bifidobacteria*, and *Streptococcus* along with prebiotics showed positive changes to the stool microbiome by increasing *Bifidobacterium*. In addition, these patients had a decrease in the level of hazardous compounds p-cresol and indoxyl sulfate in their GI tract.[6]

These studies show that the regular consumption of probiotics has the potential to improve the quality of life in patients with CKD. The patient handout attached provides the results of these studies in a simplified explanation of how gut health and the use of probiotics relate to CKD. This handout also presents a list of foods for patients' reference that are known to provide considerable amounts of probiotics. The goal of creating this handout was to provide patients with easily understandable, updated information about a trending topic that is still being researched.

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Probiotics and Chronic Kidney Disease

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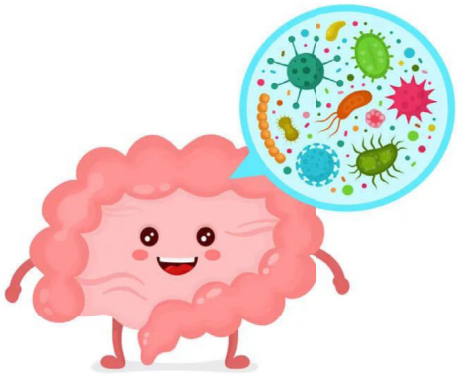
Probiotics are living bacteria which are healthy for your gut. Studies show that these types of bacteria may have the potential to improve gastrointestinal (GI) function and restore a healthy balance of the gut in people with chronic kidney disease (CKD).



Constipation and altered gut microbiota are common symptoms in CKD. The slow movement of stool and the increase in gut pH level cause the microbiome in the gut to be disrupted. This leads to the build-up of protein metabolism end-products or toxins. Some studies show high amounts of these toxins may be linked to CKD progression.

Potential Effects:

- Improved gut motility
- Possible reduction in toxins that may cause CKD progression
- Improved GI tract pH/balance
- Immune system support

Sources of Probiotics

Add these foods to your next grocery trip to begin improving your health. Keep in mind some of these foods may contain potassium or phosphorus. It is important to work with a Registered Dietitian for foods you can incorporate as part of your diet.

Yogurt

Kimchi

Kombucha

Tempeh

Kefir

Sauerkraut

Miso