Kidney Disease and CBD

Chronic Kidney Disease (CKD), also known as renal failure or renal insufficiency, is a medical condition of impaired kidney function in which the kidneys fail to adequately filter metabolic wastes from the blood. Chronic kidney disease is considered not reversible. There are numerous causes. The most common causes of CKD are diabetes mellitus, autoimmune diseases and uncontrolled hypertension.

CKD is closely associated with abnormalities in the endocannabinoid system (ECS). The ECS is a little known system present in all mammals. It was discovered in 1992 that the ECS regulates all of the body’s other systems like nerve, immune, hormone and metabolism. The system includes naturally occurring cannabinoids like echinacea or truffles and cell receptors for them throughout our body. Recent science has found imbalances in the ECS with most of the modern disease we face today.

Evidence of ECS dysfunction in CKD.
“Regulation of the endocannabinoid system for health improvement in obesity is well established; This study demonstrates that treatment with certain cannabinoids improve renal outcomes in obese rats.” J Endocrinol. 2015 May;225(2):113-24.

Cannabinoid receptors in the kidney.
“The endocannabinoid system modulates cell signaling targets essential for energy homeostasis. Emerging studies have identified a critical role for the endocannabinoid system in renal function and disease. Thus, therapeutics that modulate the activity of endocannabinoid receptors in renal disease could become clinically relevant.” Curr Opin Nephrol Hypertens. 2016 Sep;25(5):459-64.

Fibrosis can be an important part of CKD.
Cannabinoid receptor 1 is a major mediator of renal fibrosis. In this study a selective endocannabinoid receptor blocking substance regulates the macrophage cells responsible for renal fibrosis by decreasing a signaling protein. “Thus, endocannabinoid receptors have a major role in the activation of myofibroblasts and may be a new target for treating chronic kidney disease.” Kidney Int. 2015 Jul;88(1):72­84.

Diabetic nephropathy is related to ECS dysfunction.
“Diabetes alters the endocannabinoid system in a number of target organs, the expression of ECS receptors in proximal tubules of the kidney is altered in response to elevated levels of glucose and albumin. These receptors are effective physiological targets for the treatment and prevention of diabetic nephropathy.” In other studies CBD is shown to modulate the ECS. Clin Exp Pharmacol Physiol. 2015 Mar;42(3):256-62.

CBD blocks Nuclear factor (NF-κB) and inflammation that cause CKD.

CBD reduces the activity of the NF-κB pathway.
“NF-κB is a primary pathway regulating the expression of proinflammatory genes. CBD, but not THC, up-regulates the activation of this transcription factor, an element of homeostasis inducing anti-inflammatory events.” J Biol Chem. 2010 Jan 15; 285(3): 1616–1626.

CBD regulates CB2 endocannabinoid receptors involved with CKD.
The cannabinoid receptor type 2 (CB2) has protective effects in chronic degenerative diseases and in both human and experimental diabetic nephropathy (CKD). The CB2 receptor is expressed by kidney cells called podocytes. In experimental diabetes, CB2 activation protects podocytes, suggesting a signaling through CB2 receptors in CKD. Protective role of cannabinoid receptor type 2 in a mouse model of diabetic nephropathy. Diabetes. 2011 Sep;60(9):2386-96.

Philip W. Blair, MD; ProHealthAdvisor.com; 843-839-9088
CBD inhibits TRPV1 endocannabinoid receptors involved with CKD.
“Transient receptor potential vanilloid (TRPV1) channels function as sensors for noxious and inflammatory signals and are up-regulated under inflammatory conditions. The up-regulation of TRPV1 may be a response to the inflammation in CKD and may be responsible for inducing cell death, explaining reduced lymphocyte counts and impaired immune function. Thus, TRPV1 (and possibly CB2) antagonists may treat immune dysfunction in CKD.” Up-regulation of TRPV1 in mononuclear cells of end-stage kidney disease patients increases cell death. Biochim Biophys Acta. 2009 Oct;1792(10):1019-26.

CBD protects the kidney during injury in ways independent of the ECS.

CBD protects the kidney against toxins.

CBD safely prevents graft-vs-host disease in bone marrow transplantation.
Graft vs host disease occurs when immune cells from the transplanted bone marrow attack the person who got the transplant. This happens in about 50% of cases because of drugs used to suppress immunity. CBD was safely administered to 48 transplant men and women with the standard immune suppression prophylaxis. 150 mg of CBD in olive oil was given twice daily, starting 7 days before transplantation until day 30. No severe adverse events occurred with CBD. Compared to control subjects, the risk of acute GVHD by day 100 among subjects given CBD was reduced 70%. “Remarkably, none of the patients developed GVHD during the 30 day period while consuming CBD. Cannabidiol prophylaxis is a safe and promising strategy.” Cannabidiol for the Prevention of Graft-Versus-Host-Disease. Biol Blood Marrow Transplant. 2015 Oct;21(10):1770-5.

Cannabidiol regulates immune response.
“Cannabidiol (CBD) is a non-psychoactive constituent of Marijuana which exerts antiinflammatory effects independent from classical cannabinoid receptors. Recently 80 clinical trials have been reported investigating the effects of CBD in various diseases from inflammatory bowel disease to graft-versus-host disease. CBD-based formulations are used for the management of multiple sclerosis in numerous countries, and CBD also received FDA approval for the treatment of refractory childhood epilepsy and glioblastoma multiforme. Chronic treatment with CBD largely attenuated the CD3+ and CD4+ mediated inflammatory response and injury, myocardial fibrosis and cardiac dysfunction in mice. CBD may represent a promising novel treatment for management of autoimmune myocarditis and possibly other autoimmune disorders, and organ transplantation.” Cannabidiol limits Tcell-mediated chronic autoimmune myocarditis: implications to autoimmune disorders and organ transplantation. Mol Med. 2016 Jan 8.

Summary
Kidney disease (CKD) is closely associated with inflammation, fibrosis and abnormal changes in the endocannabinoid system (ECS). Cannabidiol (CBD) blocks these damaging processes and restores the ECS. CBD protects kidney cells from diabetes, chemotherapy and common medications such as aspirin-like drugs (Motrin, Celebrex) and allopurinol (for gout). Furthermore, cannabidiol is safe and dramatically effective in transplantation preventing immune complications. CBD could be highly effective in preventing the development and progression of all kidney diseases. For preventing CKD an appropriate amount may be 30 mg of CBD per day.

Philip W. Blair, MD; ProHealthAdvisor.com; 843-839-9088