

Synthetic Vitamin D Protects Bone Strength in Kidney Failure Patients

University of Wisconsin-Madison

A serious side effect from kidney failure is the depletion of vitamin D hormone, which is manufactured by the kidneys and regulates calcium absorption from the intestines. Without adequate levels of vitamin D hormone in the bloodstream, the body cannot process enough calcium from digested food and instead must draw calcium into the blood from the skeleton. Over time this leads to weakened, brittle bones that break easily. To fight this condition, in the early 1990s, scientists at the University of Wisconsin-Madison invented paricalcitol, a synthetic form of vitamin D hormone that regulates calcium in the bloodstream.

Biochemistry professor Hector DeLuca, Ph.D., led the research team that discovered paricalcitol (now sold commercially as Zemplar™). Initial

funding for the research was provided by the National Institutes of Health.

When calcium levels in the blood are low, the parathyroid gland produces parathyroid hormones that trigger calcium release from the bones. During kidney failure the parathyroid gland is in a state of over-production known as secondary hyperparathyroidism. Paricalcitol suppresses the activity of the parathyroid gland and the over-production of parathyroid hormone by increasing calcium levels in the blood. Paricalcitol is also safer than other vitamin D hormone therapies because it has lower risk for elevating blood calcium to dangerous levels.

The use of vitamin D hormone therapy in chronic kidney disease patients has increased since paricalcitol was commercialized as Zemplar. Nearly 80 percent of patients on kidney dialysis now receive vitamin D hormone compared to approximately 60 percent in 1999. Paricalcitol generates more than \$30 million each year in royalties for the University of Wisconsin, where research continues for clinical applications of vitamin D in psoriasis, osteoporosis, cancer and a variety of autoimmune/inflammatory diseases.