

## Vitamin K2 – Hope and Help for CKD Patients



**Chronic kidney disease (CKD) is a worldwide, very often “under-treated,” public health problem.\* New advances in understanding the course of progressive kidney disease and its complications should bring about the development of routine interventions that can slow the progression and ameliorate the complications of CKD.**

### Why Vitamin K2 is Important

Most patients with CKD suffer from extensive vascular calcifications. The presence of vascular calcifications is an independent risk factor for the increased cardiovascular mortality in this population. Matrix Gla Protein (MGP) is a powerful vascular wall-based inhibitor of vascular calcifications. It is produced by vascular smooth muscle cells, but it requires vitamin K-dependent post-translational modification to be fully active. Patients with end stage renal disease (ESRD) exhibit reduced vitamin K intake, and uraemia also interferes with vitamin K recycling. Levels of inactive MGP tend to increase with CKD stage, and this inversely correlates with all-cause and cardiovascular mortality in end-stage kidney disease. Taken together, indirect evidence suggests that vitamin K2 supplementation may attenuate the progression of vascular calcifications in patients with renal failure and beneficially affect mortality in these patients.

### Why Vitamin K2 in the form of MK-7?

Vitamin K is absorbed along with dietary fat from the small intestine and transported by chylomicrons in the circulation. Most of vitamin K1 is carried by triacylglycerol-rich lipoproteins (TRL) and rapidly cleared by the liver; only a small amount is released into the circulation and carried by LDL and HDL. MK-4 is carried by the same lipoproteins (TRL, LDL, and HDL) and cleared fast as well.

The long-chain menaquinones are absorbed in the same way as vitamin K1 and MK-4, but are efficiently redistributed by the liver in predominantly LDL (VLDL). Since LDL has a long half-life in the circulation, these menaquinones can circulate for extended times resulting in higher bioavailability for extra-hepatic tissues as compared to vitamin K1 and MK-4.

Recently published study by Sato et al. proved the concept that Vitamin K2 as menaquinone-7 (MK-7) should be more bioavailable in humans. MK-7 significantly increased serum MK-7 levels in comparison to MK-4, and therefore may be of particular importance for extrahepatic tissues such as blood vessels.<sup>1</sup>

*\* With this article, we do not aim at treating CKD, but at preventing some of its many complications, such as vascular calcification and bone problems.*

**Reference:** 1 Sato et al. 2012

