

# Relation between plasma vitamin K and bone and cartilage markers in osteoarthritic dogs

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## Abstract

**Vitamin K is a cofactor in the activation of some proteins related to bone and cartilage homeostasis:** osteocalcin (OC) is involved in bone formation, while matrix Gla protein (MGP) inhibits endothelium and cartilage calcification. Thirty three osteoarthritic dogs (OA) and 30 healthy dogs (C) were blood sampled to analyze vitamin K forms (K<sub>1</sub>, K<sub>2</sub>: MK4, MK6, MK7) and markers of bone and cartilage metabolism (OC, NTX, BAP, carboxylated MGP (cMGP), uncarboxylated MGP (ucMGP), CPII). Data was divided into 2 populations: high plasma vitamin K (HK>1 ng/ml, N=34), low plasma vitamin K (LK<1 ng/ml, N=29). Total OC levels in OA dogs were higher than in C dogs (C:1.6±0.3 vs OA:2.3±0.3). This difference was also observed in HK dogs, but not in LK dogs. There was a trend to higher BAP levels in HK vs LK dogs (HK:22.6±4.4 vs LK:15.2±1.4), while LK dogs tended to have higher levels of ucMGP than HK (HK:9.1±3.3 vs LK:21.5±5.2). In LK dogs, total K and K<sub>2</sub> levels were correlated with the ratio ucMGP/cMGP (UCR) (K<sub>2</sub>-UCR: r=-0.359; total K-UCR: r=-0.416). In HK this correlation was not present, although in the global population, correlation was still trendy for K<sub>2</sub> (UCR: r=-0.213). High levels of plasma vitamin K could help maintain higher remodeling bone activity in dogs with altered joint metabolism, which has been associated with a reduced cartilage loss. Increasing plasma vitamin K levels could contribute to the activation of inhibitory calcification proteins (MGP), which may be helpful in osteoarthritis. Source of research support: Affinity Petcare.