

# K2 Supreme

Supports bone and cardiovascular health



  
1 Vegetarian  
Hard Capsule

## OVERVIEW

- > Provides 180 micrograms MenaQ7® (menaquinone 7) per capsule
- > Supports cardiovascular system health
- > Supports arterial health
- > Supports bone mineralisation
- > Supports bone mass and enhances arterial health in postmenopausal women

### Active Ingredients

Menaquinone 7 (from MenaQ7®)	180 micrograms
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### Directions for Use

Adults: Take one capsule daily with a meal, or as directed by your health professional.

### Allergen Information

Does not contain: gluten, dairy, lactose or nuts.

Pack Size	60
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Serving Per Pack	60
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### Excipients

Medium chain triglycerides  
Microcrystalline cellulose  
Magnesium stearate  
Colloidal anhydrous silica  
Calcium hydrogen phosphate anhydrous



No Added  
Gluten



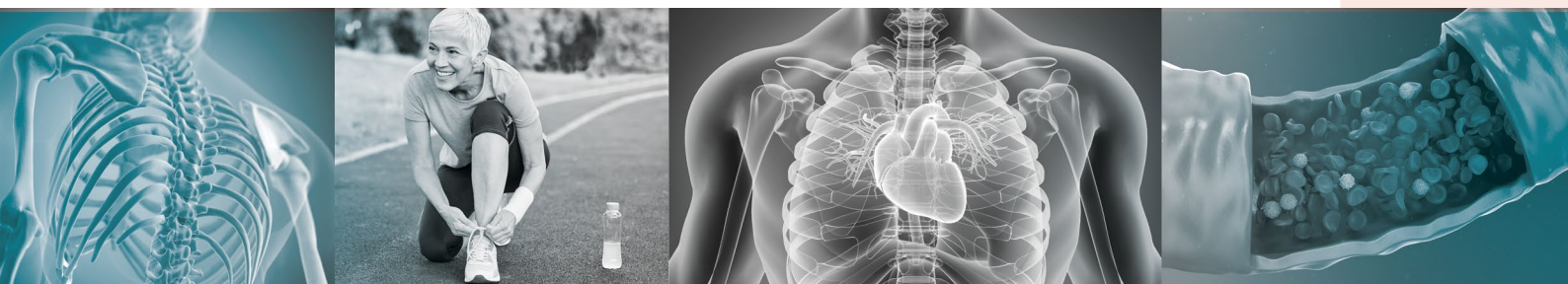
No Added  
Dairy



No Added  
Nuts



No Added  
Soy





## EDUCATION:

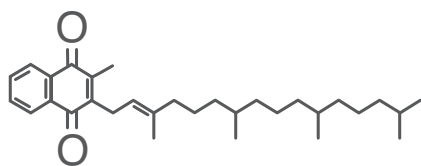
Vitamin K2 otherwise known as menaquinone, is part of a group of K vitamers and functions mainly as a cofactor for the post-translational enzyme  $\gamma$ -glutamate carboxylase (GGCX).<sup>2,3,4,9,11,12,14</sup> GGCX is found in the endoplasmic reticulum of a range of mammalian cells, and is responsible for the  $\gamma$ -carboxylation of the glutamate residues inherent in around 17 known biological proteins known as Vitamin K Dependent Proteins (VKDPs).<sup>7,9,11</sup> Without  $\gamma$ -carboxylation facilitated by K2, these proteins remain inactive and therefore non-functional.

The most heavily researched of the VKDPs affect bone and cardiovascular health. Two of the more well-known of the VKDPs are osteocalcin (OC) which is involved in the bone building process, and promotes calcification in osseous tissues, and matrix Gla protein (MGP) which acts as a calcium transport molecule in vascular tissues, and inhibits vascular mineralisation.<sup>1,4</sup> Carboxylation of glutamic acid portions on these VKDPs results in the formation of  $\gamma$ -carboxyglutamic acid (Gla) which has an enhanced capacity for the binding of  $\text{Ca}^{2+}$  ions. The direct result is optimal calcium mobilisation, storage and metabolism.<sup>3,4,7,8,9,12</sup>

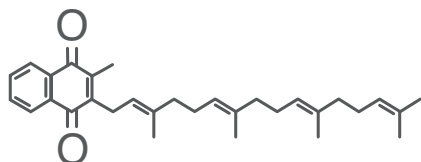
K2 can therefore maintain bone health by maintaining optimal mineralisation, and support and protect the health of arterial tissues by directing calcium away from the vascular tissues to the bone.

### Chemistry

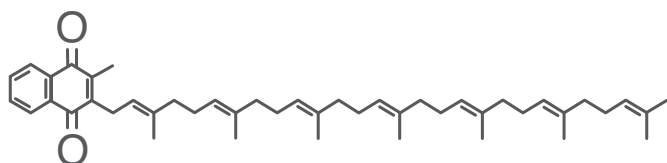
Chemically, the menaquinones have a common methylated naphthoquinone ring structure with a variable aliphatic side chain made up of an assorted number of isoprenoid residues. Menaquinones are named numerically (MK-*n*) depending upon the length of their isoprenyl side chain which can contain from 1-14 units. For example, Menaquinone 4 (MK-4), contains 4 isoprenoid units, Menaquinone 7 (MK-7) contains 7 and so on.<sup>2,7,11</sup>



Phylloquinone (K<sub>1</sub>)



MK-4 (K<sub>2</sub>)



MK-7 (K<sub>2</sub>)

MK-7 has been found to be the most bioavailable and have the longest half-life of all of the K vitamers.<sup>1,2,3,15</sup>

### Bone Health

Osteocalcin (OC) contains three glutamic acid portions that require K2-dependent carboxylation in order to function. Once carboxylated and activated, OC is able to bind  $\text{Ca}^{2+}$  ions and directly incorporate them into hydroxyapatite crystals in the bone matrix.<sup>12</sup>

In a study of 244 postmenopausal women, it was found that over a three-year period, supplementation with 180mcg of Vitamin K2 in the form of MK-7 preserved bone mineral content and reduced age-related losses of bone strength and bone mass.<sup>5</sup>

### Artery and Cardiovascular Health

Matrix GLA protein (MGP) is secreted from both chondrocytes and in the tunica media of vascular smooth muscle cells.<sup>2,10,12,13</sup> Its general function is to move calcium from soft tissues, and promote ossification of bone.<sup>6,10,11,12</sup> Its activity is upregulated in the presence of calcium. MGP contains 5 glutamic acid residues which each need to undergo glutamate carboxylation and serine phosphorylation in order to become functional. Once activated, MGP is the primary transport mechanism that directs calcium away from vascular tissues and into skeletal tissues.<sup>12,13,14</sup>

MK-7 also bears influence over the genetic expression of various proinflammatory biomarkers, which may also influence the health of the CVS. Low levels of circulating MK-7 have been associated with high levels of proinflammatory metabolites such as C-Reactive Protein, Interleukins 6 and 8, serum alkaloid-A and tumour necrosis factor which have all been found in stressed arteries. These metabolites can stimulate vascular smooth cell proliferation and promote leukocyte influx causing remodelling of the vascular tissues.<sup>6</sup>

MK-7 has been shown to improve the health and elasticity of arterial tissues in a group of postmenopausal women supplemented with 180mcg K2 daily for three years.<sup>6</sup>

*References supplied on request.*