



Available in 60 vegetarian capsules

- Helps to relieve joint pain associated with osteoarthritis

## Discussion

It is known that tendons and ligaments have a slower and more limited ability to self-repair than other tissues. However, healthy tendons and ligaments do indeed have an intrinsic capacity for repair, which is controlled by resident fibroblasts and their surrounding extracellular matrix (ECM).<sup>[1]</sup> Fibroblasts (e.g., tenocytes) are responsible for producing the ECM and therefore the proteoglycans (protein/mucopolysaccharide complex) and collagen needed for tissue repair. The key is to stimulate this process. In vitro and in vivo research suggests SynovX Tendon & Ligament does just that. This proprietary blend of type I collagen and mucopolysaccharides combined with vitamin C supports the structural and functional needs of tendons and ligaments.\*

**Type I Collagen and Mucopolysaccharides** Adult tendons are comprised mainly of type-I collagen molecules that are hierarchically organized into structural units. The molecular structure and organization of tendon and ligament collagen fibrils are key determinants in the ability of these tissues to endure mechanical force and fuel self-repair.<sup>[1]</sup> While collagen provides much of tendon/ligament structure and strength, mucopolysaccharides are said to provide the “glue” that holds them together and allows them to stretch, flex, bend, and maintain their resilience. Mucopolysaccharides—also known as glycosaminoglycans or GAGs—are a critical component of ECM and are important in maintaining structural integrity, lubrication, and spacing of collagen fibers. Furthermore, mucopolysaccharides have been shown to increase collagen and non-collagenous protein synthesis in cultures of bovine tenocytes and ligament cells.\*<sup>[2]</sup>

**Vitamin C** This vitamin helps maintain tendon/ligament structure and biomechanical properties by stimulating collagen biosynthesis.\*<sup>[3-5]</sup>

**In Vitro** IL-1beta (interleukin-1beta) is a cytokine associated with adverse tendon/ligament changes. The effect of SynovX Tendon & Ligament in the presence of IL-1beta was studied in primary human tenocytes. Tenocyte cultures treated with 250, 500, and 1000 µg/ml of SynovX Tendon & Ligament showed no signs of cytotoxicity or other negative effects on the viability of cells. The major findings were that this formula counteracted the negative effects of IL-1beta by: (1) protecting tenocytes from degenerative morphological changes, cellular degeneration, and apoptosis, (2) reversing the downregulation of collagen type I and beta 1-integrin receptor expression, (3) increasing tenomodulin production, and (4) causing a significant dose- and

time-dependent increase in proliferation and viability of tenocytes. These results demonstrated that SynovX Tendon & Ligament supports tenocyte viability and proliferation and type I collagen synthesis.<sup>[1]</sup> Furthermore, the treated cells appeared healthy; displayed an abundant and well-organized ECM; and exhibited high levels of euchromatin, indicating that the cells were very active and had a high rate of protein (i.e., collagen) biosynthesis. <sup>[1]</sup> In another in vitro test, human tenocytes incubated with SynovX Tendon & Ligament for 10 days showed a strong stimulatory effect on cell proliferation that exceeded the proliferation seen in cells incubated with (IGF-1) insulin-like growth factor 1 (positive control).<sup>[6]</sup> In addition, cells remained viable and showed large amounts of endoplasmic reticulum, which is needed for synthesis of ECM.\*

**In Vivo** A prospective observational study performed by Nadal et al demonstrated the effects of SynovX Tendon & Ligament on the health of epicondyles, plantar fascia, Achilles tendons, or supraspinatus tendons. Patients were selected on the basis of clinical assessment and ultrasound results. For three months, all of the patients received 20 to 30 physical therapy sessions and the study group received two caps/d of SynovX Tendon & Ligament.<sup>[7]</sup> Comfort, quality of life (SF-36), and physiotherapist assessments were performed before intervention began and also at 30-, 60-, and 90-day intervals during intervention. In every assessment, patients given SynovX Tendon & Ligament showed numerical or statistically significant improvements after two to three months of supplementation compared to controls.<sup>[7]</sup> Researchers concluded that supplementing with SynovX Tendon & Ligament improved comfort level and biomechanical properties without adverse effects.\*

## SynovX® T & L

### Medicinal Ingredients (per vegetarian capsule)

TENDOACTIVE® Chondroitin sulfate (chondroitin sulfate sodium from bovine cartilage).....	220 mg
TENDOACTIVE® Hydrolyzed collagen ( <i>Bos taurus</i> ).....	40 mg
Vitamin C (ascorbic acid).....	30 mg

### Non-Medicinal Ingredients

Hypromellose (capsule), microcrystalline cellulose, ascorbyl palmitate, silica, medium-chain triglycerides.

### Recommended Dose

*Adults:* Take two capsules twice daily, or as directed by your healthcare professional. Use for a minimum of 3 months to see beneficial effects.

Consult your healthcare practitioner prior to use if you are pregnant or breastfeeding. Consult a healthcare practitioner if symptoms worsen. Some people may experience mild gastrointestinal disturbances such as diarrhoea, abdominal pain, heartburn, nausea and vomiting; in which case, discontinue use.

## TENDOACTIVE®

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## References

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7. Nadal F, Bové T, Sanchís D, et al. Effectiveness of treatment of tendinitis and plantar fasciitis by Tendoactive™. [OARS abstract 473]. *Osteoarthritis Cartilage.* 2009 Sept; 17(suppl 1):S253.

Additional references available upon request

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