

Juvecol® Clinical Evidence

Medical Consultation and New Remedies

Najima M., et al. "Usefulness of the Supplement Containing Proteoglycan for Japanese Healthy People Feeling Knee's Discomfort." 2016; 53(3):64-71.

Topic	What effect does a supplement containing proteoglycan have in improving knee discomfort in healthy people?	Results	In terms of knee pain, VAS results showed significant differences from the base line of the proteoglycan group after 12 weeks of ingestion. The difference in VAS from climbing up and down stairs between the proteoglycan group and the placebo group was recorded to be statistically significant ($p = 0.041$).
Background	Proteoglycans (PGs) can be found in connective tissues such as skin, bone, and cartilage, where they form a complex with collagen, fibronectin, laminin, hyaluronic acid, and other glycoproteins. The basic chemical structure of PGs is a complex glycohydate composed of a core protein covalently bonded with one or more glycosaminoglycan side chains. Human articulation consists of cartilage cells, cartilage matrix, subchondral bone, tendons, and ligaments around the articulation and muscles. These components undergo various changes as our bodies age. Among these changes, the change of cartilage matrix is the key factor for developing osteoarthritis, which causes knee discomfort, especially in the elder population.		In terms of knee extension and flexion, both right and left knee extension changed significantly from the base line in the proteoglycan group after 4, 8, and 12 weeks of ingestion. For right knee extension, significant differences between the two groups in changes from base line were observed after 4, 8, and 12 weeks of ingestion. For left knee extension, significant differences were observed after 4 and 12 weeks of ingestion.
Study Type	Randomized, double-blind, placebo-controlled human clinical study		In terms of knee flexion, a significant difference between the two groups in changes from base line for both knees was observed after 12 weeks of ingestion.
Study Design	The total period of the study was 12 weeks. All qualified subjects were sequentially assigned at random to group P (placebo: $n = 16$) and group T (test: $n = 15$). Subjects consumed 3 tablets of the supplement every day for 12 weeks while maintaining their usual lifestyle and habits. However, subjects were asked to avoid excessive amounts of food, drink, or alcohol and to maintain a daily record of lifestyle factors. To evaluate the effect in relieving knee joint pain, visual analog scale (VAS) for knee pain, the knee range of motion measurements, and the modified J-KOOS (Japan-Knee injury and Osteoarthritis Outcome Score) were conducted as the primary outcomes. To evaluate the safety of the test foods, adverse events were collected by a written questionnaire.		Modified J-KOOS results showed that a change of the aggregate scores was significantly improved at weeks 4 and 12 in the proteoglycan group compared with the placebo group.
Subjects	31 healthy people between 40 and 69 years old		Based on blood and urine tests, the researchers observed no harmful influence against biochemical and/or physiological markers, which indicated the safety of ingesting proteoglycan.
Dosage	3 tablets daily (containing salmon-derived proteoglycan over 10 mg) for 12 weeks	Conclusion	Ingestion of a supplement containing proteoglycan could be a safe way to contribute to relieving knee pain and discomfort as well as improving overall joint support.

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Immunology, Endocrine & Metabolic Agents in Medicinal Chemistry
 Takahashi T., et al. "Ingestion of Salmon Nasal Cartilage-Derived
 Proteoglycan Improves Skin Condition: A Randomized, Double-Blind,
 Controlled Study." 2015; 15:160-167.

Topic	Can ingestion of salmon nasal cartilage-derived proteoglycan improve skin condition?
Background	Skin is the largest organ of the human body, and it plays many important roles in regulating body temperature, water & lipid stores, and mitigation of environmental stresses including UV exposure, heat, injury, and infections. Reduced skin function has been observed in aged skin; including some chronic skin diseases that may be caused by decreasing collagen and lipid content, loss of fibroblasts, change of hormone levels, less supplementation of nutrition, and various other factors. Proteoglycans (PGs) can be found in connective tissues such as skin, bone, and cartilage, where they form a complex with collagen, fibronectin, laminin, hyaluronic acid, and other glycoproteins. The basic chemical structure of PGs is a complex glycohydate composed of a core protein covalently bonded with one or more glycosaminoglycan side chains. PG from salmon nasal cartilage is commonly ingested as a traditional food in Japan. The PG in salmon nasal cartilage is considered to be an excellent source of nutrition.
Study Type	A randomized, double-blind, placebo-controlled human clinical study
Study Design	Subjects were randomly assigned into a placebo group (n = 9, 26 - 58 years, mean age, 39.6 years) and a PG group (n = 10, 27 - 53 years, mean age, 39.1 years). During the study period, use of other dietary supplements was prohibited. Before measurements, all subjects washed their faces and remained in the testing room, which was maintained at 19.7°C ± 0.1°C and 46.8% ± 1.5% humidity, for 20 minutes for acclimation. Skin conditions were evaluated by skin elasticity measurements, wrinkles, pore condition, and blotch measurements, corneum microgram and analysis, and skin moisture.
Subjects	19 healthy volunteers based on the exclusion criteria of the guidelines for evaluation of cosmetic functions (Japanese Cosmetic Science Society)
Dosage	Ingestion of a capsule containing 5 mg of salmon PG daily for 2 weeks
Results	Skin viscoelasticity was significantly improved in the salmon PG group after ingestion compared with the placebo group (p = 0.014). Ingestion of salmon PG also significantly decreased the value of recovery after deformation (p = 0.024). The number of wrinkles underneath the eye was also significantly reduced in the salmon PG group after ingestion compared with the placebo group (p = 0.041). The number of conspicuous pores and darkened pores was also significantly reduced from base line after salmon PG ingestion (p = 0.045 and p = 0.035, respectively). The number of blotches was significantly decreased from base line after salmon PG ingestion (p = 0.045), while no significant change from base line was observed after ingestion in the placebo group.
Conclusion	These results suggest that the potential of salmon proteoglycan ingestion as a nutritional ingredient could help improve human skin condition.