



Sea Cucumber (Holothurian Species): Scientific Perspectives on Marine Collagen, Joint Health, Skin Wellness, and Healthy Aging

Introduction

Sea cucumbers are marine invertebrates belonging to the class Holothuroidea and have been consumed for centuries in various coastal cultures as both a food and a traditional wellness ingredient. Modern scientific research has generated interest in sea cucumber powders and extracts because they contain a unique combination of naturally occurring compounds, including marine collagen, glycosaminoglycans (GAGs), sulfated polysaccharides, peptides, minerals, and omega-rich lipids.

Researchers have investigated sea cucumber-derived ingredients for their potential role in supporting joint health, connective tissue function, skin wellness, mobility, healthy aging, and general well-being.

Sea cucumber powder is included as an ingredient in **IRx-ZEUS®** for humans and **ActivPower ATLAS®** for dogs as part of comprehensive nutritional formulations designed to support mobility, connective tissue wellness, and active lifestyles.

Sea Cucumber as a Source of Marine Collagen and Connective Tissue Nutrients

One of the primary reasons sea cucumber has attracted scientific interest is its naturally occurring content of:

- Marine collagen
- Sulfated glycosaminoglycans
- Chondroitin sulfate-like compounds
- Fucosylated chondroitin sulfate
- Structural proteins and peptides

These compounds are naturally found in connective tissues throughout the body and contribute to the structure and function of joints, skin, tendons, ligaments, and extracellular matrix tissues (Bordbar et al., 2011; Khotimchenko, 2018).

Researchers have proposed that marine-derived collagen and glycosaminoglycans from sea cucumbers may help support normal connective tissue integrity and tissue resilience.

Joint Health and Mobility

The strongest scientific rationale for sea cucumber supplementation relates to connective tissue support and musculoskeletal wellness.

Sea cucumber contains naturally occurring sulfated polysaccharides and glycosaminoglycans that have structural similarities to compounds found within cartilage and connective tissues (Khotimchenko, 2018).

Preclinical studies have demonstrated biological activities involving:

- Connective tissue metabolism
- Cartilage-supportive pathways

- Joint tissue structure
- Normal inflammatory balance

Several animal and laboratory studies have reported improvements in markers associated with joint tissue integrity and musculoskeletal function (Bordbar et al., 2011).

Sea cucumber has been studied for its role in supporting mobility, joint comfort, and connective tissue wellness. However, compared with ingredients such as glucosamine or Boswellia, large-scale human clinical studies remain limited.

Supporting the Body's Normal Inflammatory Response

Sea cucumber contains several bioactive compounds that have been studied for their interaction with pathways involved in normal inflammatory regulation.

These include:

- Fucosylated chondroitin sulfates
- Sulfated polysaccharides
- Marine peptides
- Triterpene glycosides

Scientific studies have explored sea cucumber compounds for their role in supporting normal inflammatory balance and healthy tissue function.

Laboratory studies suggest these compounds may interact with cytokine signaling pathways, oxidative stress pathways, and other biological systems involved in maintaining normal tissue homeostasis (Bordbar et al., 2011; Khotimchenko, 2018).

Skin Health and Appearance

Marine collagen has become a major area of scientific interest for skin wellness.

Sea cucumber naturally contains collagen-rich structural proteins that contribute to the integrity of its own connective tissues.

Researchers have proposed that marine collagen and associated peptides may support:

- Skin hydration
- Skin elasticity
- Connective tissue integrity
- Healthy skin appearance

In addition, sulfated glycosaminoglycans found in sea cucumber may contribute to extracellular matrix structure and hydration.

Although direct clinical studies using sea cucumber powder remain limited, these findings support ongoing scientific interest in marine-derived ingredients for skin wellness.

Sea cucumber provides marine-derived structural compounds that support healthy skin and connective tissue wellness.

Allergy-Related Wellness

Some marine polysaccharides have been investigated for their influence on immune-system signaling and maintenance of healthy tissue responses.

However, evidence supporting sea cucumber supplementation for allergy-related outcomes remains preliminary.

Researchers continue to investigate marine-derived polysaccharides for their role in supporting normal immune and tissue function.

Tissue Health and Wound-Healing Research

Sea cucumbers possess remarkable regenerative abilities in nature, which has inspired considerable scientific investigation.

Researchers have studied sea cucumber-derived compounds in relation to:

- Tissue remodeling
- Extracellular matrix formation
- Collagen metabolism
- Cellular migration
- Connective tissue regeneration

Laboratory and animal studies have reported findings suggesting biological activity relevant to tissue repair processes (Bordbar et al., 2011).

Sea cucumber contains structural compounds that have been studied for their role in supporting connective tissue health and normal tissue-repair processes. However, there is currently insufficient human evidence to conclude that oral sea cucumber supplementation accelerates wound healing.

Healthy Aging and Longevity

Sea cucumber has attracted interest within healthy-aging research because many of its naturally occurring compounds are involved in:

- Connective tissue integrity
- Mobility
- Skin wellness
- Antioxidant defenses
- Cellular resilience

Researchers have proposed that supporting these physiological systems may contribute to healthy aging and quality of life.

However, there is currently no clinical evidence demonstrating that sea cucumber supplementation extends lifespan or directly promotes longevity.

The strongest healthy-aging rationale remains support of:

- Mobility
- Physical function
- Connective tissue wellness
- Skin health
- Active lifestyles

A balanced statement is:

Sea cucumber may contribute to healthy aging by supporting mobility, connective tissue integrity, and overall wellness.

Use in Companion Animals

Sea cucumber-derived ingredients have become increasingly common in companion animal nutritional formulations designed to support mobility and quality of life.

Within the ActivPower product portfolio, sea cucumber powder is included in **ActivPower ATLAS®** for dogs as part of a broader nutritional strategy supporting mobility, connective tissue wellness, and healthy activity.

As with all nutritional ingredients, sea cucumber should be viewed as one component of a comprehensive wellness program that includes nutrition, exercise, veterinary care, and lifestyle management.

Safety Profile

Sea cucumber has a long history of dietary consumption in many regions of the world.

Published research generally reports good tolerability when consumed appropriately.

Individuals with seafood allergies, medical conditions, or those taking medications should consult qualified healthcare professionals before introducing new supplements. Pet owners should consult their veterinarian before adding new nutritional ingredients to an animal's wellness routine.

ActivPower Perspective

Sea cucumber represents a unique marine source of collagen, glycosaminoglycans, sulfated polysaccharides, and structural peptides that continue to attract scientific interest for their role in supporting mobility, connective tissue wellness, skin health, and healthy aging.

For this reason, ActivPower includes sea cucumber powder in:

- **IRx-ZEUS®** for humans
- **ActivPower ATLAS®** for dogs

as part of comprehensive nutritional formulations intended to support mobility, connective tissue function, skin wellness, and overall quality of life.

Current scientific literature supports continued interest in sea cucumber as a nutritional ingredient that may contribute to healthy movement, structural wellness, and active living.

Selected Scientific References

Bordbar S, Anwar F, Saari N. (2011). High-value components and bioactives from sea cucumbers for functional foods—A review. *Marine Drugs*. 9(10):1761–1805.

Khotimchenko Y. (2018). Pharmacological potential of sea cucumbers. *International Journal of Molecular Sciences*. 19(5):1342.

Pangestuti R, Arifin Z. (2018). Medicinal and health benefit effects of functional sea cucumbers. *Journal of Traditional and Complementary Medicine*. 8(3):341–351.

Ru X, Wang Y, Li L, et al. (2022). Bioactive compounds from sea cucumbers and their potential health benefits: A review. *Marine Drugs*. 20(8):489.

Zhong Y, Khan MA, Shahidi F. (2007). Compositional characteristics and antioxidant properties of sea cucumber processing byproducts. *Journal of Agricultural and Food Chemistry*. 55(4):1188–1194.

Educational Literature Disclaimer

This article is provided solely for educational and informational purposes and summarizes selected scientific literature concerning sea cucumber (Holothurian species) and its use as a nutritional ingredient in humans and animals.

References to mobility, joint health, connective tissue support, skin wellness, tissue health, healthy aging, inflammatory balance, wound-healing research, allergy-related wellness, or scientific studies are presented for educational discussion only.

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