EndoFlow360°

CARDIOVASCULAR HEALTH

CLINICAL APPLICATIONS

- *Helps to Preserve, Protect, and Regenerate the Endothelial Glycocalyx*
- *Supports Optimal Circulation and Blood Flow*
- *Helps Maintain Healthy Vascular Permeability*
- *Promotes the Synthesis of Nitric Oxide*

EndoFlow360° is formulated to strengthen the endothelial glycocalyx by providing the foundational building blocks that make up this delicate defensive barrier. Using a combination of chondroitin sulfate, hyaluronic acid, and a certified organic complex of fucoidan and marine polyphenols, EndoFlow360° delivers full-spectrum support to strengthen and protect the artery wall's microscopic, gel-like barrier.

Overview

The endothelial glycocalyx (eGCX) is a dense, gel-like meshwork that covers the endothelial cell layer. It makes up an important physical barrier in the vasculature that prevents lipids and other particles from adhering to and entering the endothelium. This special network of membrane-bound proteoglycans and glycoproteins has a profound influence at the vascular wall on the transmission of shear stress and pressure, the maintenance of selective permeability, and controlling adhesion of blood leukocytes and platelets.1 Besides protecting endothelial barrier integrity, the dynamic microstructure of the eGCX confers remarkable functions, including mechanotransduction, control of vascular tone, and modulating vascular homeostasis.2 Major constituents of the glycocalyx include syndecans, heparan sulfates, and hyaluronan, which are shed from the endothelial surface as an expected part of the aging process3-5 and under various stressors.1 EndoFlow360° provides a blend of the major constituents of the eGCX, including glycosaminoglycans, hyaluronan, fucoidan, and marine polyphenols, which are designed to protect and regenerate the endothelial glycocalyx.

Mobilee® Hyaluronic Acid Matrix

Mobilee® is a hyaluronic acid matrix ingredient extracted from rooster comb that contains a high concentration of hyaluronic acid (60-75%) and other components, including polysaccharides (>10%) and collagen (>5%). Hyaluronic acid is a substance naturally produced by the body and present in our joints, skin, and other organs. It is present in the endothelial glycocalyx and plays a central role in numerous functions of the endothelial surface layer, such as protecting the endothelial cells, regulating barrier permeability, and ensuring mechanosensing, which is essential to nitric oxide production and flow-induced vasodilation.6

According to research, the shedding of syndecan-1, heparan sulfate, and hyaluronic acid has been claimed to represent the endothelial glycocalyx state of health.7

The quality and quantity of hyaluronic acid the body produces decreases with age. Tested in 11 clinical and pre-clinical studies, Mobilee® has been shown to provide a tenfold increase in the endogenous synthesis of hyaluronic acid by synoviocytes.8

Chondroitin Sulfate

Chondroitin sulfate is the second most abundant component of the eGCX.9 In addition to functioning as a vital component of the eGCX, chondroitin sulfate stimulates the synthesis of other glycosaminoglycans (GAGs) of the eGCX, like heparan sulfate and hyaluronan.6-10

Compared to glucosamine sulfate, chondroitin sulfate provides superior eGCX support due to its role as a precursor and source component of the eGCX, which is one of several mechanisms of action hypothesized for chondroitin sulfate's cardioprotective benefits.11 The conversion of glucosamine sulfate to other GAGs can also be inhibited by non-steroidal anti-inflammatory drugs.12

Chondroitin sulfate has inhibitory effects on catabolic enzymes like elastase, collagenase, and proteoglycanase, structures that are rich in all layers of blood vessels.12 Another proposed cardioprotective mechanism is the ability of chondroitin sulfate to maintain normal inflammatory balance because it decreases the expression of TNF-α, IL-1β, IL-6, and COX-2.9,13

In an NHANES study sample, 658 participants had been taking glucosamine and chondroitin for one year or longer. Respondents taking glucosamine and chondroitin had better cardiovascular health and wellness than controls. After controlling for age, this combination was associated with a 65% reduction in cardiovascular challenges.14,15 Finally, a case-control study that investigated the cardiovascular health and wellness of 140,990 adults from 2002-2015 found that those who supplemented with chondroitin sulfate had a lower likelihood of cardiovascular challenges.16

† These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

Maritech® Synergy

EndoFlow360° contains Maritech® Synergy, a proprietary, multifunctional, certified organic complex that combines the synergistic effects of specialized polyphenols and fucoidan sourced from the wild brown seaweed known as Fucus vesiculosus. In fact, of the three groups of seaweed, brown seaweed is known to contain more bioactive components than either red or green seaweed. Among the different brown seaweed species, Ascophyllum nodosum and Fucus vesiculosus have the highest antioxidant values and highest total phenolic content.17 Therefore, fucoidan from brown seaweed is a powerful glycocalyx regenerating compound and has been reported to possess many cardiovascular health benefits. For example, fucoidan potently inhibits selectin-mediated adhesion of leukocytes to vascular endothelium.18

In addition to fucoidan, phlorotannins are a heterogeneous group of unique polyphenolic compounds differing in structure and degree of polymerization and are found only in brown seaweed, with the largest amount accumulating in Fucus brown seaweed.19 Phlorotannins have very strong antioxidant properties since phenolic rings act as electron traps for free radicals. These bioactive compounds have been shown to help maintain normal inflammatory balance, modulate immune cell signaling, and even maintain blood sugar levels already within the normal range.20-24

One study showed the administration of Fucus vesiculosus is effective in reducing microvascular fat retention and improving glycemic control, thereby lowering the risk of health challenges related to the consumption of fat- and sugar-enriched diets.25 The fucoidan sulfate in EndoFlow360° has an analogous chemical structure to heparan sulfate, which is found amply in the endothelial glycocalyx. In vitro studies by Marinval, et al. demonstrated that fucoidan can directly connect with the glycocalyx, prevent its degradation, and help to restore its structure and function.26 Glycocalyx restoration and other beneficial mechanisms of action support the therapeutic use of fucoidan and phlorotannins from Fucus vesiculosus for cardiovascular wellness.

Directions

2 capsules per day or as recommended by your health care professional.

Does Not Contain

Gluten, corn, yeast, artificial colors or flavors.

Cautions

Do not consume this product if you are pregnant or nursing. Consult your physician for further information.

Supplement Facts V3

Serving Size 2 Capsules
Servings Per Container 30

	Amount Per Serving	% Daily Value
Calories	5	
Total Carbohydrate	1 g	<1%*
Sodium	60 mg	3%
Proprietary Blend	1.38 g	
Fucus vesiculosus Seaweed Extract (Whole Plant) (Maritech® Synergy) (Contains Fucoidan and Polyphenols)		**
Chondroitin Sulfate Sodium		**
Chicken Comb Extract (MOBILEE®) (Standardized to contain 40 mg Hyaluronic Acid)		**

* Percent Daily Values are based on a 2,000 calorie diet.
** Daily Value not established.

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Other Ingredients: Hypromellose (Natural Vegetable Capsules), Microcrystalline Cellulose, Magnesium Stearate and Silicon Dioxide. **Contains: Crustacean Shellfish (Shrimp) and Fish (Cod).**

ID# 161060 60 Capsules

References

1. *Becker BF, Jacob M, Leipert S, Salmon AH, Chappell D. Degradation of the endothelial glycocalyx in clinical settings: searching for the sheddases. Br J Clin Pharmacol. 2015;80(3):389-402.*
2. *Villalba N, Baby S, Yuan SY. The Endothelial Glycocalyx as a Double-Edged Sword in Microvascular Homeostasis and Pathogenesis. Front Cell Dev Biol. 2021;9:711003.*
3. *Machin DR, Bloom SI, Campbell RA, et al. Advanced age results in a diminished endothelial glycocalyx. Am J Physiol Heart Circ Physiol. 2018;315(3):H531-H539.*
4. *Qi F, Zhou H, Gu P, et al. Endothelial glycocalyx degradation is associated with early organ impairment in polytrauma patients. BMC Emerg Med. 2021;21(1):52.*
5. *Barber BE, Grigg MJ, Piera KA, et al. Endothelial glycocalyx degradation and disease severity in Plasmodium vivax and Plasmodium knowlesi malaria. Sci Rep. 2021;11(1):9741.*
6. *Dogné S, Flamion B. Endothelial Glycocalyx Impairment in Disease: Focus on Hyaluronan Shedding. Am J Pathol. 2020;190(4):768-780.*
7. *Dogné S, Flamion B, Caron N. Endothelial Glycocalyx as a Shield Against Diabetic Vascular Complications: Involvement of Hyaluronan and Hyaluronidases. Arterioscler Thromb Vasc Biol. 2018;38(7):1427-1439.*
8. *Bioiberica. Mobilee. 2022. Available at: Derosa G, D'Angelo A, Bonaventura A, Bianchi L, Romano D, and Maffioli P. Effects of berberine on lipid profile in subjects with low cardiovascular risk. Expert Opinion on Biological Therapy. 2013;13:475-482..*
9. *Martel-Pelletier J, Farran A, Montell E, Vergés J, Pelletier JP. Discrepancies in composition and biological effects of different formulations of chondroitin sulfate. Molecules. 2015;20(3):4277-4289. Published 2015 Mar 6.*
10. *Villalba N, Baby S, Yuan SY. The Endothelial Glycocalyx as a Double-Edged Sword in Microvascular Homeostasis and Pathogenesis. Front Cell Dev Biol. 2021;9:711003. Published 2021 Jul 14.*
11. *Chondroitin sulfates. Monograph. Altern Med Rev. 2006;11(4):338-343.*
12. *Guilliams TG. Osteoarthritis–Evidence for a Non-Pharmacological Approach. Point Institute; 2022. The Standard Monograph Series 18.*
13. *King DE, Xiang J. Glucosamine/Chondroitin and Mortality in a US NHANES Cohort. J Am Board Fam Med. 2020;33(6):842-847.*
14. *Martínez-Calatrava MJ, Largo R, Herrero-Beaumont G. Improvement of experimental accelerated atherosclerosis by chondroitin sulphate. Osteoarthritis Cartilage. 2010;18 Suppl 1:S12-S16.*

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15. *Ma H, Li X, Sun D, et al. Association of habitual glucosamine use with risk of cardiovascular disease: prospective study in UK Biobank. BMJ. 2019;365:l1628.*

16. *Mazzucchelli R, Rodríguez-Martín S, García-Vadillo A, et al. Risk of acute myocardial infarction among new users of chondroitin sulfate: A nested case-control study. PLoS One. 2021;16(7):e0253932. Published 2021 Jul 12.*

17. *Keleszade E, Patterson M, Trangmar S, Guinan KJ, Costabile A. Clinical Efficacy of Brown Seaweeds Ascophyllum nodosum and Fucus vesiculosus in the Prevention or Delay Progression of the Metabolic Syndrome: A Review of Clinical Trials. Molecules. 2021;26(3):714.*

18. *Patankar MS, Oehninger S, Barnett T, Williams RL, Clark GF. A revised structure for fucoidan may explain some of its biological activities. J Biol Chem. 1993;268(29):21770-21776.*

19. *Besednova NN, Andryukov BG, Zaporozhets TS, et al. Antiviral Effects of Polyphenols from Marine Algae. Biomedicines. 2021;9(2):200.*

20. *Kim AR, Shin TS, Lee MS, et al. Isolation and identification of phlorotannins from Ecklonia stolonifera with antioxidant and anti-inflammatory properties. J Agric Food Chem. 2009;57(9):3483-3489.*

21. *Li Y, Lee SH, Le QT, Kim MM, Kim SK. Anti-allergic effects of phlorotannins on histamine release via binding inhibition between IgE and Fc epsilonRI. J Agric Food Chem. 2008;56(24):12073-12080.*

22. *Ahn MJ, Yoon KD, Min SY, et al. Inhibition of HIV-1 reverse transcriptase and protease by phlorotannins from the brown alga Ecklonia cava. Biol Pharm Bull. 2004;27(4):544-547.*

23. *Catarino MD, Silva AMS, Cardoso SM. Fucaceae: A Source of Bioactive Phlorotannins. Int J Mol Sci. 2017;18(6):1327.*

24. *Lee SH, Jeon YJ. Anti-diabetic effects of brown algae derived phlorotannins, marine polyphenols through diverse mechanisms. Fitoterapia. 2013;86:129-136.*

25. *Gabbia D, Saponaro M, Sarcognato S, et al. Fucus vesiculosus and Ascophyllum nodosum Ameliorate Liver Function by Reducing Diet-Induced Steatosis in Rats. Mar Drugs. 2020;18(1):62.*

26. *Marinval N, Sabboural P, Haddad O, et al. Identification of a Pro-Angiogenic Potential and Cellular Uptake Mechanism of a LMW Highly Sulfated Fraction of Fucoidan from Ascophyllum nodosum. Mar Drugs. 2016;14(10):185. Published 2016 Oct 17.*

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