MARINE-DERIVED THERAPEUTICS | MUSCULOSKELETAL HEALTH

Oceanicare SC-23P

Bioactive Profile: Joint Health & Inflammatory Support

Marine-Derived Therapeutics for Musculoskeletal Health

Clinical Overview

Oceanicare™ SC-23P represents a marine-derived source of structurally unique bioactive compounds with clinically relevant anti-inflammatory, chondroprotective, and immunomodulatory properties. These compounds act on well-characterized molecular pathways central to joint degeneration and chronic inflammatory conditions.

Its multi-compound profile differentiates it from single-mechanism interventions, providing simultaneous support across the inflammatory cascade, cartilage matrix, and immune regulation axis.

Inflammatory Pathway Support

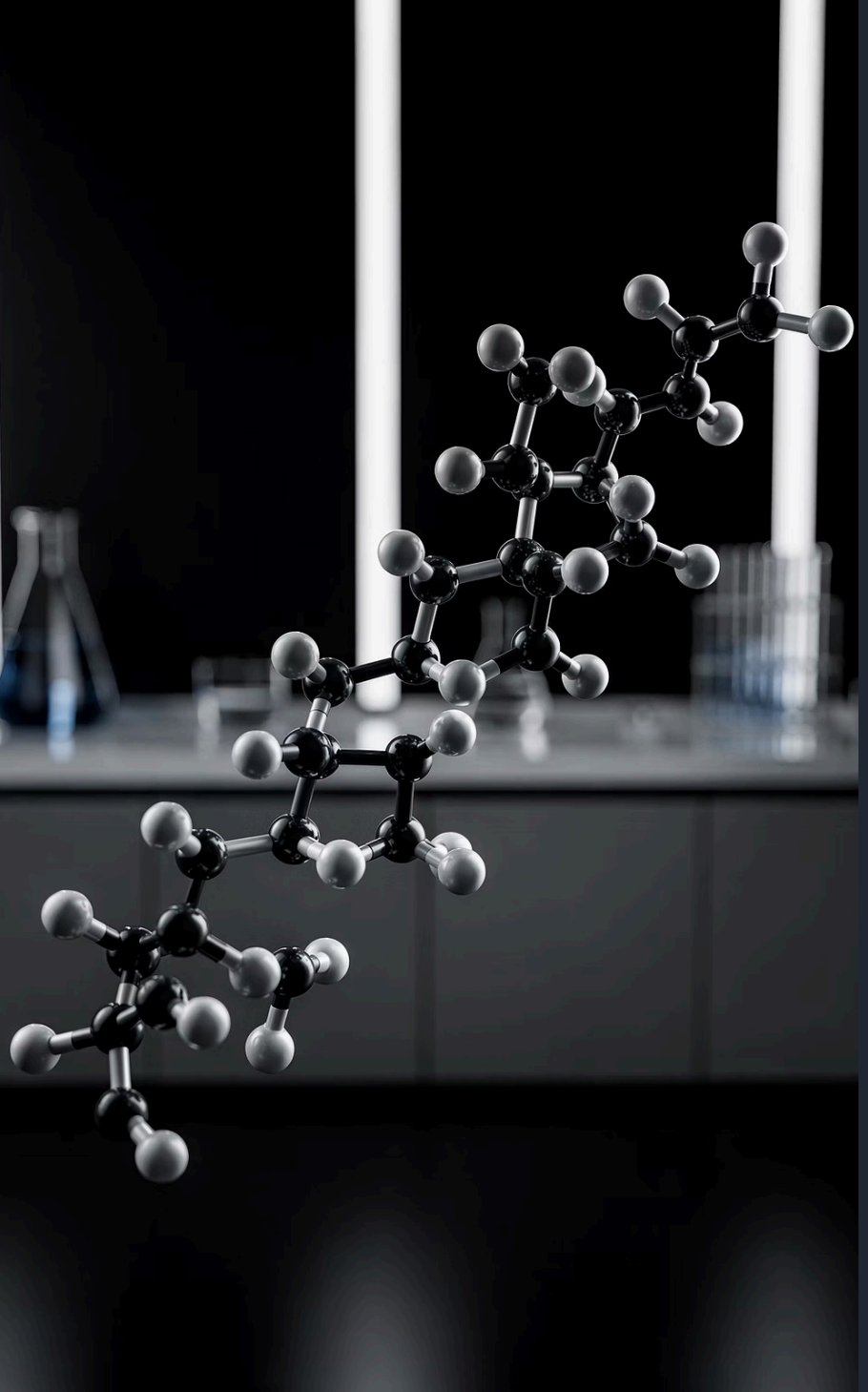
Modulates pro-inflammatory cytokine expression and NF-κB signaling

Chondroprotection

Protects cartilage integrity and reduces MMP-driven degradation

Joint Comfort & Mobility

Supports synovial lubrication and long-term functional joint health



BIOACTIVE FRACTION 1

Fucosylated Chondroitin Sulfate (FCS)

Mechanisms of Action

- **Cytokine Downregulation:** Suppresses TNF-α, IL-1β, and IL-6 — key drivers of synovial inflammation and cartilage catabolism
- **NF-κB Inhibition:** Attenuates the master regulator of inflammatory gene expression
- **MMP Reduction:** Limits enzymatic degradation of collagen and proteoglycans in articular cartilage

Clinical Relevance

- **Cartilage Preservation:** Maintains extracellular matrix composition under chronic inflammatory load
- **Joint Lubrication:** Enhances synovial fluid viscosity and articular surface integrity

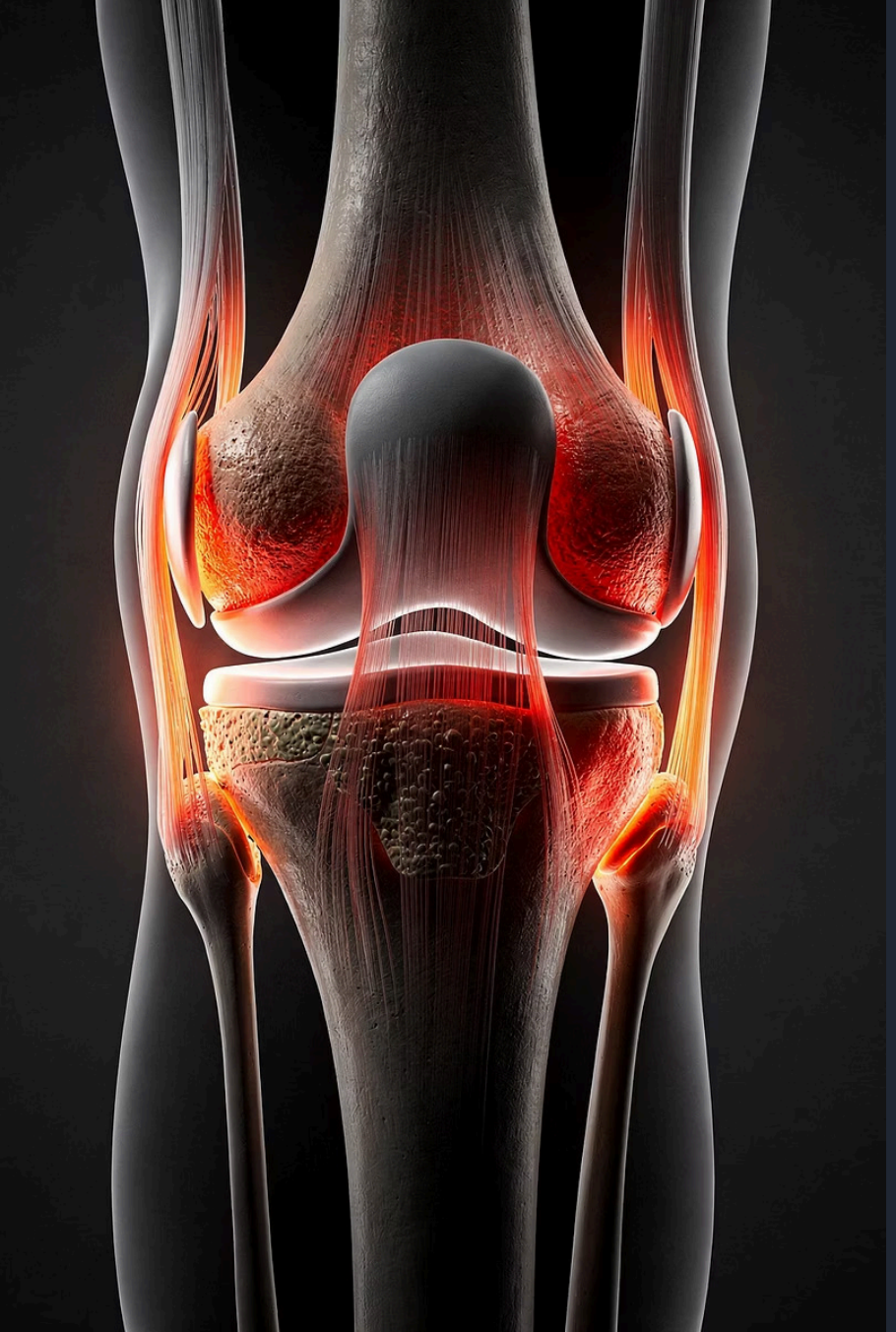
Marine-derived FCS may demonstrate **enhanced biological activity** compared to conventional terrestrial chondroitin sulfate.

BIOACTIVE FRACTION 2

Triterpene Glycosides – Frondoside A

Frondoside A demonstrates particular utility in **autoimmune-driven joint conditions**, where dysregulated immune activation perpetuates synovial inflammation. By modulating rather than suppressing immune function, it supports a controlled, balanced immune response — especially relevant in rheumatoid arthritis and ankylosing spondylitis.

1	2	3
NF-κB & MAPK Modulation Simultaneously attenuates two major inflammatory signaling cascades, providing broad-spectrum pathway coverage	Immune System Balance Supports homeostatic immune regulation without inducing global immunosuppression	Inflammatory Cell Activation Reduces activation and recruitment of pro-inflammatory immune effector cells at sites of joint pathology



BIOACTIVE FRACTION 3

Sulfated Polysaccharides

Mechanisms of Action

- **NO & Prostaglandin Suppression:** Reduces nitric oxide and prostaglandin biosynthesis — principal mediators of inflammatory pain signaling and vasodilation in synovial tissue
- **Macrophage Modulation:** Suppresses macrophage-driven inflammatory amplification, central to both acute flares and chronic low-grade joint inflammation

Clinical Relevance

- **Joint Inflammation Reduction:** Contributes to measurable reductions in periarticular inflammation, supporting improved joint comfort and reduced stiffness
- **Inflammatory Balance:** Supports systemic inflammatory homeostasis, complementing the localized effects of other bioactive fractions

BIOACTIVE FRACTION 4

Marine Lipids

The marine lipid fraction provides **dual-pathway coverage** of the arachidonic acid cascade, analogous to combined COX/LOX inhibition strategies.

Mechanisms of Action

- **COX/LOX Pathway Inhibition:** Inhibits both cyclooxygenase and lipoxygenase enzymes, targeting multiple arms of the eicosanoid inflammatory cascade
- **PGE2 Reduction:** Reduces prostaglandin E2 — a key mediator of inflammatory hyperalgesia and synovial sensitization

Clinical Outcomes

- Reduction in inflammatory pain signaling at the synovial and periarticular level
- Support for **active resolution** of inflammation, rather than passive suppression alone
- Complementary activity alongside FCS-mediated cytokine modulation

BIOACTIVE FRACTION 5

Collagen, Peptides & Glycosaminoglycans

Structural Cartilage Components

Provides native collagen and bioavailable peptides as direct precursors for articular cartilage repair and synthesis, reducing reliance on endogenous precursor availability

ECM Support

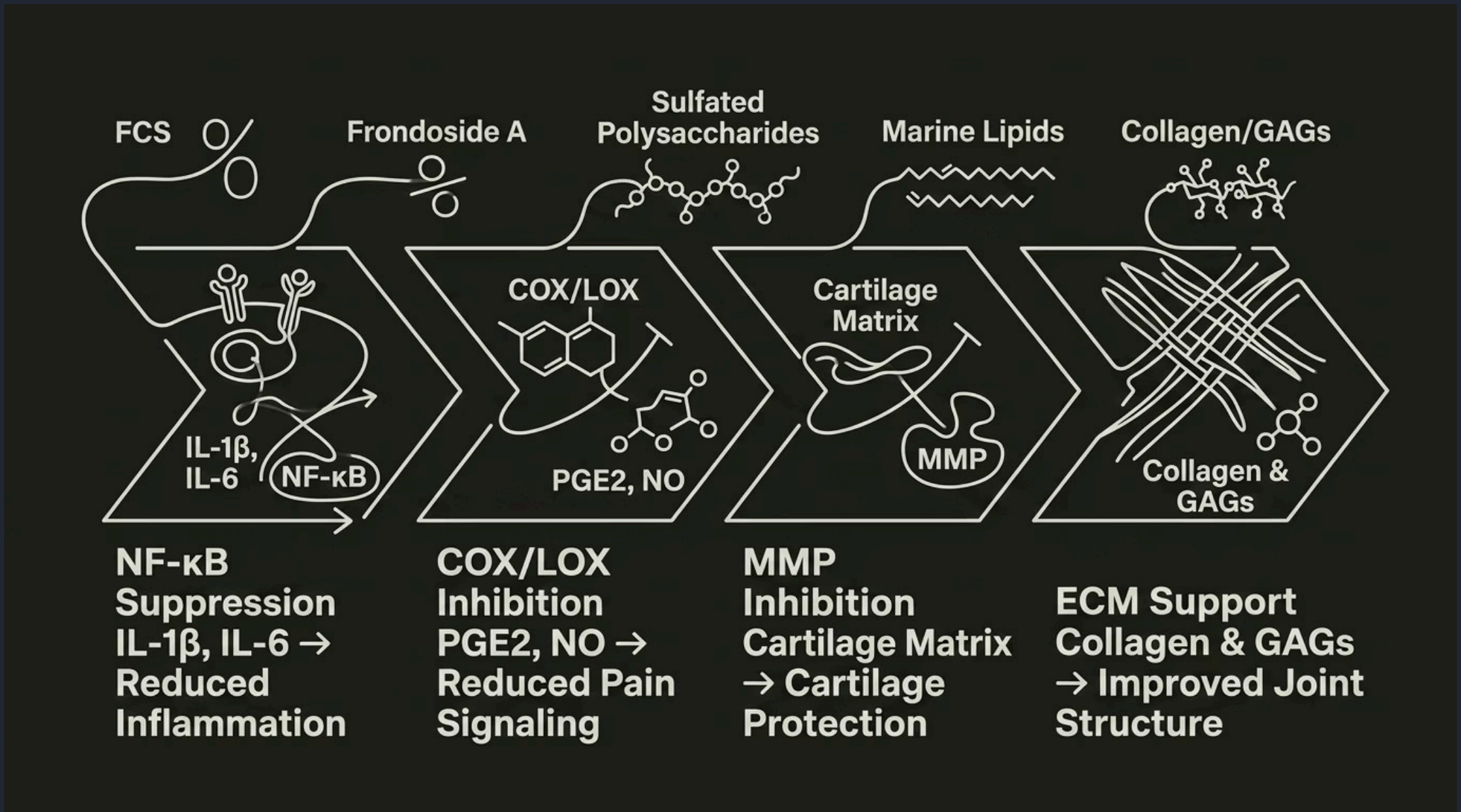
Glycosaminoglycans reinforce extracellular matrix architecture, maintaining tissue hydration, compressive resilience, and biomechanical load distribution across articular surfaces

Long-Term Joint Function

Promotes joint cushioning and resilience under mechanical stress, supporting functional mobility and reducing wear-related cartilage loss over time

Integrated Mechanism of Action

The five bioactive fractions of *Cucumaria frondosa* act convergently across distinct but interconnected molecular targets, producing coordinated clinical outcomes across inflammation, pain signaling, and structural joint health.



This multi-targeted profile distinguishes *C. frondosa* from single-mechanism interventions (e.g., isolated chondroitin or omega-3 supplementation), offering simultaneous coverage across inflammatory, catabolic, and structural joint pathways.

Clinical Applications

Clinical Applications Suggested by Research Science

1

Osteoarthritis

MMP inhibition, ECM support, and cartilage precursor provision directly address degenerative and inflammatory OA pathophysiology

2

Rheumatoid Arthritis

NF-κB and MAPK modulation supports immune regulation in autoimmune-driven synovial inflammation; FCS reduces cytokine burden

3

Ankylosing Spondylitis

Immune balancing and anti-inflammatory mechanisms may attenuate chronic axial inflammation characteristic of spondyloarthropathies

4

Chronic Joint Inflammation

Sulfated polysaccharide and marine lipid fractions address macrophage-driven and prostaglandin-mediated contributors to persistent inflammation and morning stiffness

Clinical Summary: A Differentiated Multi-Target Strategy

Cucumaria frondosa provides a uniquely comprehensive approach to joint health — addressing inflammation at multiple pathway levels, protecting articular cartilage from enzymatic and cytokine-mediated degradation, and directly supporting structural integrity through native marine ECM components.

5	4	4
Bioactive Fractions	Pathway Categories	Clinical Indications
Acting across complementary molecular targets	NF-κB, COX/LOX, MMP, ECM — simultaneously addressed	OA, RA, AS, and chronic joint inflammation

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

Bibliography

L. Ghelani et al. (2022)
Marine Drugs
EPA-rich phospholipids from *Cucumaria frondosa* reduce TNF-α, IL-6 and inhibit NF-κB signaling.

Ghelani et al. (Frondanol studies)
Demonstrated reduction in inflammation in **adjuvant-induced arthritis models** via LOX inhibition.

Saeid et al. (2025)
Food & Function
Fucosylated chondroitin sulfate suppresses **IKKβ, JNK, and NF-κB activation**.

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Sulfated polysaccharides reduce **inflammatory edema** in preclinical models.

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Comprehensive review of *Cucumaria frondosa* bioactives and anti-inflammatory activity.

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