

**Supplementary Table S1.** Anti-inflammatory bioactive marine compounds: *in vitro* studies.

Authors [ref.]	Publication date	Source Organism(s)	Bioactive compound	Study design	Results
[42]	2007	<i>P. canaliculus</i> and <i>Mytilus edulis</i>	Lyprinol and Lyprinol lipid classes	<i>In vitro</i>	The Lyprinol free fatty acid fraction inhibitions the COX isoforms.
[141]	2008	<i>Aegiceras corniculatum</i>	The n-hexane, ethyl acetate and methanol extracts from <i>aegiceras corniculatum</i> stems	<i>In vitro</i>	Antioxidant and anti-inflammatory effects
[88]	2010	<i>Tetraselmis suecica</i>	<i>Tetraselmis suecica</i> extract	Murine macrophages	Reduces the production of NO, TNF- $\alpha$ and IL-6
[60]	2013	<i>Eisenia bicyclis</i>	Fucosterol and phlorotannins	LPS-stimulated murine macrophages	suppressed the expression of iNOS and COX-2
[142]	2015	<i>Excoecaria agallocha</i>	<i>Excoecaria agallocha</i> extract	<i>In vitro</i>	Antioxidant, anti-inflammatory and anti-proliferative effects
[137]	2015	<i>P. palmata</i> , <i>P. dioica</i> , and <i>C. crispus</i>	omega-3 fatty acids	LPS-stimulated human macrophages	Reduction of IL-6 and TNF- $\alpha$ production
[34]	2017	<i>Paphia malabarica</i>	23-gem-dimethyl-3 $\beta$ -hydroxy- $\Delta$ 5-cholestane nucleus and C-30 dihomosterol	<i>In vitro</i>	antioxidant and anti-inflammatory activities.
[56]	2018	<i>Aspergillus flocculosus</i> 16D-1 from the marine sponge <i>Phakellia</i>	Preussins C-K	THP-1	Down-regulation of IL-6
[131]	2019	<i>Phaeodactylum tricornutum</i>	Fucoanthin	Human peripheral blood leukocytes and mononuclear cells	Antiproliferative and antioxidant activities
[143]	2020	<i>Excoecaria agallocha</i>	Agallolides A-M	<i>In vitro</i>	Inhibits NF- $\kappa$ B
[62]	2020	<i>Posidonia oceanica</i>	<i>Posidonia oceanica</i> phytocomplex	Murine macrophage cells	Downregulation of iNOS and COX-2 levels  Modulation of NF- $\kappa$ B signaling inhibiting ERK1/2 and Akt intracellular cascades.
[52]	2021	Marine sponge <i>Cliona celata</i>	organic extracts (C1-C5)	LPS-stimulated murine macrophages	<i>Cliona celata</i> extracts showed high anti-inflammatory capacity in the studied cellular inflammatory model
[134]	2021	<i>Phaeodactylum tricornutum</i>	Fucoanthin	Human bone marrow-derived immune cells	Anti-inflammatory effect by regulating both NF- $\kappa$ B and NLRP3 inflammasome activation.
[133]	2022	<i>Tetraselmis chuii</i>	<i>Tetraselmis chuii</i> extract	<i>In vitro</i>	Inhibits COX-2
[58]	2023	Brown seaweed	Fucoanthin	Human placenta-derived mesenchymal stem cells	Fucoanthin reduces oxidative stress damage through the PI3K/Akt/Nrf-2 pathway
[57]	2024	<i>Talaromyces aurantiacus</i>	Talaroterpenoids A-F	LPS-induced BV-2 cells	Inhibition of NO release in inflammatory <i>in vitro</i> model
[63]	2024	<i>Halimeda tuna</i>	Crude polysaccharide extracted	Murine macrophage cells	Antioxidant activity and inhibition of NO

COX: cyclooxygenase; COX-2: cyclooxygenase-2; iNOS: inducible nitric oxide synthase; NO: nitric oxide; NF- $\kappa$ B: nuclear factor kappa-light-chain-enhancer of activated B cells; TNF- $\alpha$ : tumour necrosis factor-alpha (TNF- $\alpha$ ); IL-1 $\beta$ : interleukin-1 beta; IL-6: interleukin-6; IL-12: interleukin-12; IL-17: interleukin-17; THP-1: human monocytic cell line; LPS: lipopolysaccharide; ERK1/2: extracellular signal-regulated kinase 1/2; Akt: protein Kinase B; NLRP3: LRR- and pyrin domain-containing protein 3; MAPK: mitogen-activated protein kinase; PI3K/Akt/Nrf-2: phosphatidylinositol 3-kinase/protein kinase B/nuclear factor erythroid 2-related factor 2; BV-2 cells: mouse microglial cell line (BV-2 cells).

**Supplementary Table S2.** Anti-inflammatory bioactive marine compounds: *in vivo* animal models.

Authors [ref.]	Publication date	Source Organism(s)	Bioactive compound	Study design	Results
[36]	1997	Perna canaliculus	Lysinopril	Arthritis murine model	anti-inflammatory effect
[87]	2013	Chlorella marina	Lycopene	Arthritis murine model	Reduction of serum inflammatory biomarkers
[51]	2014	Theonella swinhoei	solomonsterol A	RA mouse model	Reduces pro-inflammatory $\gamma$ cytokines expression (TNF- $\alpha$ , IFN- $\gamma$ and IL-17) preventing arthritis development
[49]	2014	Mytilus coruscus	Lipid extract	RA mouse model	Suppresses pro-inflammatory cytokines (TNF- $\alpha$ , IL-1 $\beta$ , and IL-6), and the NF- $\kappa$ B signaling path- way.  Enhances the production of anti-inflammatory cytokine (IL-10)
[51]	2016	Theonella swinhoei	Solomonsterol A	Arthritis murine model	Reduces the expression of inflammatory markers (TNF- $\alpha$ , IFN- $\gamma$ and IL-17 and chemokines)
[54]	2018	Pestalotiopsis sp	4-(hydroxymethyl) catecholextractedfrom fungi	RA mouse model and human RA synovial fibroblasts	modulates the PI3K/Akt/NF- $\kappa$ B pathway, suppressing Th1/Th17 CD4+ lymphocytes response in human RA synovial fibroblasts and reduces pro-inflammatory cytokines production in both <i>in vivo</i> and <i>in vitro</i> studies.
[92]	2023	Tetraselmis Species	Lutein-Enriched Extract	LPS-stimulated murine macrophages and zebrafish model	Antioxidant and anti-inflammatory activity. Inhibits COX-2, iNOS and NF- $\kappa$ B pathway

RA: rheumatoid arthritis; TNF- $\alpha$ : tumour necrosis factor-alpha; IFN- $\gamma$ : interferon-gamma; IL-1 $\beta$ : interleukin-1 beta; IL-6: interleukin-6; IL-10: interleukin-10; IL-17: interleukin-17; NF- $\kappa$ B: nuclear factor kappa B; PI3K: phosphatidylinositol 3-kinase; Akt: protein kinase B; CXCL1: C-X-C motif chemokine ligand 1; CXCL2: C-X-C motif chemokine ligand 2; Th1: T helper 1; Th17: T helper 17; CD4: cluster of differentiation 4; iNOS: inducible nitric oxide synthase (iNOS); COX-2: cyclooxygenase-2.

**Supplementary Table S3.** Anti-inflammatory bioactive marine compounds: *in vivo* studies on human subjects.

Authors [ref.]	Publication date	Source Organism(s)	Bioactive compound	Study design	Results
[41]	2003	Lyprinol	Perna Canaliculus	Osteoarthritis patients	Improvement of pain and joint function
[47]	2004	Lyprinol	Perna Canaliculus	Patients with knee osteoarthritis	Reduction of knee pain
[44]	2013	PCSO-524™	Perna Canaliculus	Osteoarthritis patients	Efficacy of Seatnew in alleviating pain associated with osteoarthritis compared to fish oil
[46]	2017	BioLex® -GLM extract	Perna Canaliculus	Patients with hip or knee osteoarthritis	Reduction of joint stiffness and NAID <sub>s</sub> use in the post-intervention period when compared to control group
[139]	2018	omega-3 fatty acids	Schizochytrium	RA patients	Reduction of inflamed joints in RA patients
[31]	2024	omega-3	Krill oil	SLE patients	Reduction of disease activity in patients with active disease
[30]	2024	omega-3, astaxanthin and lower molecular weight hyaluronic acid (FlexPro MD®)	Krill oil	Knee or hip osteoarthritis	Reduces pain with a good safety profile

NSAIDs: nonsteroidal anti-inflammatory drugs (NSAIDs); RA: rheumatoid arthritis; SLE: systemic lupus erythematosus.