

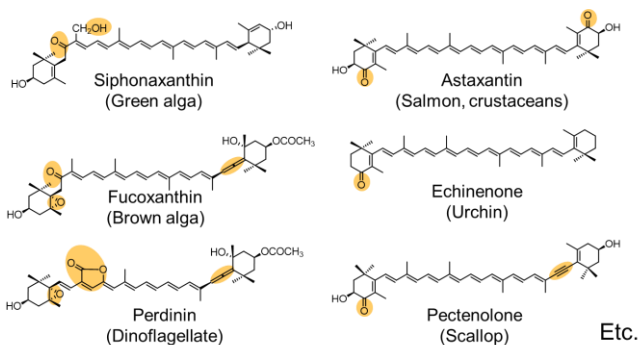
# High Technology of Marine Bioresources

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Oceanic life has adapted itself to the specific environment different from life on land. For this adaptation, diverse bioactive substances must be incorporated into or biosynthesized in the body. For high performance utilization of marine bioproducts, we are analyzing hitherto unrecognized functions in marine life, and developing bioactive components that will contribute to our healthy life style. We are also analyzing their action mechanisms using human cell lines or experimental animals on the biomolecular level.

## Power of marine carotenoids

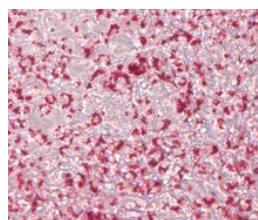
Marine organisms contain various carotenoids, among about 750 structurally defined carotenoids around 250 are of marine origin. Marine algae and animals have particularly unique structures such as allenic and acetylenic carotenoids. We are studying about unique carotenoids from marine organisms concerning the perspective of their absorption, metabolism through intestinal tract, and bio-activities of the metabolites using various cell lines and animal models.



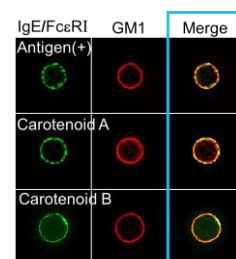
Structures of unique carotenoids in marine organisms



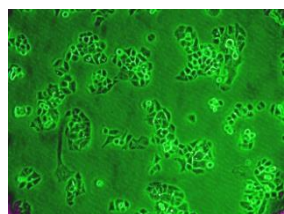
Animal models



Cultured cells



## Novel functions of marine bioproducts



Human hepatoma cells

We are screening novel bio-active components from oceanic life and elucidating their functions for preventing life-style related diseases. Especially, we focus on the effect of marine compounds on the lipid metabolism through nuclear receptors for prevention of obesity and cardiovascular diseases.

## Absorption mechanism of functional components

Intestinal absorption and metabolic pathways of functional components have not been well clarified. We investigate the absorption mechanism of the biomodulating substances derived from marine bio-products such as sphingolipids and carotenoids. We hope that the clarification lead to more efficient utilization of the components to functional foods, cosmetics, medicines, etc.

## Key words

***Functional component, Marine food, Utilization of Marine bio-product, Lifestyle-related disease, Carotenoids, Sphingolipids, Inflammation, Polyunsaturated fatty acids, Lipid metabolism, Nuclear transcription factor, Skin barrier, Keratinocytes, Intestinal absorption***

## Recent research papers

### **Milk fermented by lactic acid bacteria enhances the absorption of dietary sphingomyelin in rats**

Morifuji, M., Kitade, M., Oba, C., Fukasawa, T., Kawahata, K., Yamaji, T., Manabe, Y., Sugawara, T., *Lipids*, 52, 423-431 (2017)

### **Digestion of ceramide 2-aminoethylphosphonate, a marine sphingolipid from the jumbo flying squid *Dosidicus gigas* in mice**

Tomonaga, N., Manabe, Y., Sugawara, T., *Lipids*, 52, 353-362 (2017)

### **Selective absorption of dietary sphingoid bases from the intestine via efflux by P-glycoprotein in rats**

Fujii, A., Manabe, Y., Aida, K., Tsuduki, T., Hirata T., Sugawara, T., *Journal of Nutritional Science and Vitaminology*, 63, 44-50 (2017)

### **Preventive effect of dietary astaxanthin on UVA-induced skin photoaging in hairless mice**

Komatsu, T., Sasaki, S., Manabe, Y., Hirata, T., Sugawara, T., *PLoS One*, 12(2), e0171178 (2017)

### **Effect of dietary low-molecular-weight hyaluronic acid on ear swelling in 2,4-dinitro-1-fluorobenzene-treated BALB/c mice**

Shu, K., Hatori, Y., Manabe, Y., Sugawara, T., *Trace Nutrients Research*, 33, 100-105 (2016)

### **Dietary cerebroside from sea cucumber (*Stichopus japonicus*): absorption and effects on skin barrier and cecal short-chain fatty acids**

Duan, J., Ishida, M., Aida, K., Tsuduki T., Zhang, J., Manabe Y., Hirata, T., Sugawara, T., *Journal Agricultural and Food Chemistry*, 64, 7014-7021 (2016)

### **Imaginal feeding for progression of diapause phenotype in the two-spotted spider mite (*Acari: Tetranychidae*)**

Kawaguchi, S., Manabe, Y., Sugawara, T., Osakabe, M., *Environmental Entomology*, 45, 1568-1573 (2016)

### **Structural properties of films and rheology of film-forming solutions of chitosan gallate for food packaging**

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### **Effect of the molecular architecture on the antioxidant properties of chitosan gallate**

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**10-Oxo-trans-11-octadecenoic acid generated from linoleic acid by a gut lactic acid bacterium *Lactobacillus plantarum* is cytoprotective against oxidative stress**

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Oba, C., Morifuji, M., Ichikawa, S., Ito, K., Kawahata, K., Itou, H., Sugawara, T., *PLoS One*, 10, e0136377 (2015)

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Hossain, Z., Sugawara, T., Hirata, T., Oncology Report, 29, 1201-1207 (2013)