

**VIVO<sup>TM</sup>  
MEGA**

**IMMUNE  
HEALTH**

### INFECTION & DISEASE

The immune system protects the body against infection and disease. EPA and DHA are essentially important for the immune system development

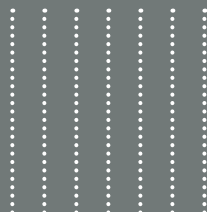
### ANTI-INFLAMMATORY & INFLAMMATION RESOLVING

New research has discovered that EPA and DHA give rise to specialized pro-resolving mediators (SPM's) which are both anti-inflammatory and inflammation resolving

### OIL RICH IN DHA & EPA

may in particular enhance the function of white blood cells known as immune B cells

**OMEGA-3 SUPPLEMENTATION  
MAY AID THE IMMUNE SYSTEM  
BY LOWERING INFLAMMATION  
& ENHANCING THE FUNCTION  
OF IMMUNE CELLS**



# IMMUNE HEALTH continued

## OUR IMMUNE SYSTEM

The immune system protects the body against infection and disease. It is a complex system of organs, tissues, and white blood cells located throughout the body. The immune system recognizes foreign invaders (e.g. bacteria, viruses, fungi) and abnormal cells and distinguish them from the body's healthy cells. Autoimmune diseases happens when the body mounts an immune response against its own tissues instead of a foreign invader. Allergies occur when an individual's immune system reacts to substances in the environment that are not harmful and tolerated by most people.

Illustration modified from Linus Pauling Institute "Micronutrient Information Center". <https://lpi.oregonstate.edu/mic/health-disease/immunity-in-brief>

Many factors impact our immune system (e.g. sleep, lifestyle, genes, age, diet), and especially getting the right nutrients are important for our immune system to stay healthy. A large body of scientific evidence indicates that EPA and DHA, the Omega-3 fatty acids in fish oil, helps to support the immune response and regulate the internal repair systems that operate in response to inflammation, which is a key component of our immune system. Prolonged inflammation may cause chronic inflammation and illness, and supplementation of marine based Omega-3s or intake of fish (a rich source of EPA and DHA) has through clinical research been shown to promote and restore the body's imbalance of molecules with action to resolve the inflammatory processes. Because in our body EPA and DHA are enzymatically converted into anti-inflammatory and pro-resolving molecules that favorably regulate the inflammation.

## RDI

EPA and DHA are under consumed in the Western World and there is a growing evidence that increasing the consumption of these fatty acids to decrease the Omega-6 to Omega-3 fatty acid ratio has potential health benefits for a range of inflammatory and autoimmune diseases. Health authorities recommend intakes for EPA + DHA ranging from 250 to 1000 mg/day for adults and from 100 to 250 mg/day for infants older than six months and for children and adolescents. Omega-3 fatty acids are considered safe up to 3 and 5 gram per day by FDA and EFSA respectively.

### References:

- Calder P. C. 2010. Omega-3 fatty acids and inflammatory processes. *Nutrients*, 2:355-374.  
 Calder P. C. 2013. n-3 Fatty acids, inflammation and immunity: new mechanisms to explain old actions. *Proceedings of the Nutrition Society*, 72, 326-336.  
 Calder P. C. et al. 2018. Very long-chain n-3 fatty acids and human health: fact, fiction and the future. *Proceedings of the Nutrition Society*, 77, 52-72.  
 Calder P. C. et al. 2020. Optimal nutritional status for a well-functioning immune system is an important factor to protect against viral infections. *Nutrients*, 12, 1181.  
 Gangal, S. 2016. Modulation of Immune Response by Omega-3 in Health and Disease Chapter 26 from book "Omega-3 fatty acids: Keys to nutritional health (pp.307-320)". *Chemical Society Reviews* 47(suppl 3), June 2018  
 Guesdon W. et al. 2018. Effects of fish oils on ex vivo B cell responses of obese subjects upon BCR/TLR stimulation: A pilot study. *Nutr Biochem*. 53: 72-80.  
 Gutiérrez, S. et al. 2019. Effects of omega-3 fatty acids on immune cells. *Int. J. Mol. Sci.*, 20, 5028.  
 Kohli P. and Levy B. D. 2009. Resolvins and protectins: mediating solutions to Inflammation. *Br J Pharmacol*. 158(4):960-71.  
 Serhan C. H. et al. 2015. Lipid Mediators in the Resolution of Inflammation. *Cold Spring Harb Perspect Biol.*, 7(2): a016311.  
 Shaikh S. R. et al. 2015. The effects of diet-induced obesity on B cell function. *British Society for Immunology, Clinical and Experimental Immunology*, 179: 90-99.  
 Simopoulos A. P. 2002. Omega-3 fatty acids in inflammation and autoimmune diseases. *J Am Coll Nutr*. 21 (6): 495-505.  
 Warstedt K. et al. 2016. High levels of omega-3 fatty acids in milk from omega-3 fatty acid-supplemented mothers are related to less immunoglobulin E-associated disease in infancy. *Acta Paediatrica*, 105:1337-1347.

## SUGGESTED PRODUCTS

	EPA mg/g	DHA mg/g	TOTAL n3
<b>VIVOMEGA PLATINUM*</b>			
4535 TG Premium	450	350	850
<b>VIVOMEGA ULTRA*</b>			
4030 TG Premium	400	300	750
<b>VIVOMEGA CORE*</b>			
3624 TG 60	360	240	620

\* NORWEGIAN SUPERIOR QUALITY OMEGA-3 FISH OIL CONCENTRATES  
 ALL PRODUCTS ALSO AVAILABLE IN EE FORMAT



### Disclaimer:

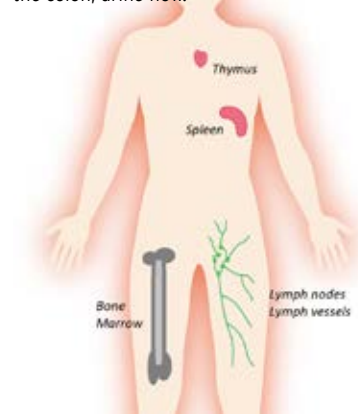
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## 3 LINES OF DEFENCE

1/.

### BARRIERS - PREVENT ENTRY

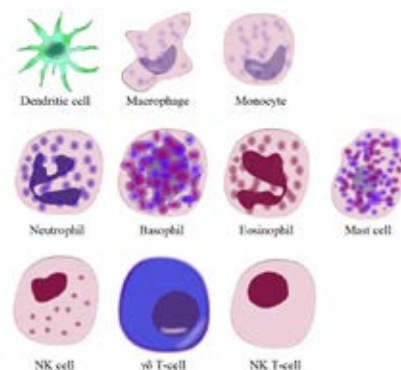
Skin and mucus membranes, stomach acid and digestive enzymes, beneficial bacteria that live in the colon, urine flow.



2 //.

### INNATE IMMUNITY - GENERAL DEFENCE

WBCs called neutrophils and macrophages engulf and destroy foreign invaders and damaged cells.



3 ///.

### ADAPTIVE IMMUNITY - SPECIFIC DEFENCE

WBCs called T-lymphocytes (T-cells) target and destroy infected cells; WBCs called lymphocytes (B-cells) and plasma cells produce antibodies that target and destroy infected cells.



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