OMEGA-3 PHOSPHOLIPIDS HELP MAINTAIN BONE AND JOINT HEALTH

BONE AND JOINT DISEASE AND DISORDERS

Bone and joint disease and disorders cause considerable discomfort, pain, and functional impairment among populations in today's industrialized societies. The harmful mechanisms are generally abnormal bone metabolism, accompanied by altered bone resorption and formation, or inflammatory processes in joints.

Omega-3 in phospholipid form is suggested as a significant nutritional factor associated with alleviating symptoms and lessening discomfort due to bone and joint disease and disorders.

OSTEOPOROSIS

Osteoporosis, a disease reported as common worldwide, results in considerable pain and immobility among its sufferers, who are often post-menopausal women. Characteristic symptoms are loss of bone mass and increased risk of bone fractures. Genetic factors are considered responsible for 70% of the interindividual variance in bone mass. Consequently, the most significant causative factors are not modifiable. Lifestyle and diet, the two most important non-hereditary factors determining interindividual bone mass variance, are indeed highly modifiable. Appropriate nutrition and lifestyle factors in childhood and adolescence are credited with reducing the risk of osteoporosis later in life.

MECHANISMS BY WHICH OMEGA-3 PHOSPHOLIPIDS MAINTAIN BONE AND JOINT HEALTH

Omega-3 benefits bone health via several proposed mechanisms which affect bone metabolism, inflammatory reactions in bone and joints, cartilage degradation, and local inflammation. Most skeletal growth and bone formation occur in childhood and adolescence; peak bone mass is reached in early adulthood. Bone resorption and formation, called the bone remodeling cycle, continue throughout adult life. Omega-3 is indicated as having beneficial effects on skeletal growth in childhood and adolescence, and the bone remodeling cycle. Omega-3 is thus considered to help maintain bone health in all age categories. Omega-3 is also thought to play a role in delaying the degradation of articular cartilage and, hence, supplementation may lessen arthritis symptoms. Further, omega-3 in diet can modulate inflammatory reactions in joints. Various inflammatory cells are produced when an inflammatory reaction is launched. Presence of omega-3 in cell membrane phospholipids results in less vigorous inflammatory reactions — and production of inflammatory cells that are less harmful to cells and tissues. Less vigorous inflammatory processes in joints, fewer symptoms, and diminished severity of RA bone disease and disorders are attributed to appropriate omega-3 status.

REFERENCES:


For further details, please contact Aker BioMarine ASA at superba@akerbiomarine.com
OMEGA-3 PHOSPHOLIPIDS AND THE PREVENTION OF CARDIOVASCULAR DISEASE

CARDIOVASCULAR DISEASE

Globally, cardiovascular disease (CVD) is the main cause of morbidity and death. A number of well-publicized CVD risk factors — and ways to prevent CVD — are associated with dietary components.

OMEGA-3 PHOSPHOLIPIDS’ ROLE IN PREVENTING CARDIOVASCULAR DISEASE

Patients diagnosed with CVD have shown significantly lower concentrations of omega-3 in tissues, blood, and red blood cells.

Omega-3 provides recognized beneficial effects in preventing CVD, and the evidence supporting greater omega-3 dietary intake is increasing.

MECHANISMS BY WHICH OMEGA-3 PHOSPHOLIPIDS PREVENT CARDIOVASCULAR DISEASE

The benefits of omega-3 phospholipids in the prevention of CVD result from modulation of risk factors via a number of mechanisms proposed by scientists. On the subcellular level, risk factor modulation results from incorporation of omega-3 phospholipids in cell membranes, alteration of membrane properties, altering inflammatory responses, inclusion in modulating enzymes involved in cell signaling pathways, and altering gene expression.

OMEGA-3 MODULATES CARDIOVASCULAR RISK FACTORS

Omega-3 helps prevent heart disease by beneficially affecting several CVD risk factors. Omega-3 has been observed to lower blood pressure and appears to help prevent arrhythmia. A lower risk of CV blood clot formation may be the result of omega-3’s alteration of blood clotting processes. Omega-3 has beneficial effects on blood cholesterol levels by decreasing the level of so-called “bad” cholesterol (LDL) and increasing the level of “good” cholesterol (HDL). Omega-3 is also thought to help deter atherosclerosis processes. Modulation of the aforementioned risk factors is suggested as primary components of the beneficial effects of omega-3 in the prevention of cardiovascular disease.

SUPERBA™ KRILL OIL PROVIDES CARDIO-PROTECTIVE OMEGA-3 PHOSPHOLIPIDS

Superba™ Krill Oil provides omega-3 in phospholipid form, mainly as phosphatidylcholine. Omega-3 availability is increased when delivered by phospholipids compared with other sources, due to more efficient absorption of omega-3 phospholipids in the small intestine. After absorption, phosphatidylcholine is incorporated into cell membranes and participates in fatty acid transport in blood and across membranes. Lysophosphatidylcholine is thought to impact the distribution of fatty acids to the body’s organs and tissues because of its role in lipoprotein assemblages, which serve as vehicles that transport fatty acids via blood serum. In certain animal models, after removing phosphatidylcholine from the diet, a significant reduction in the transport of fatty acids to tissues, accompanied by accumulation of fat in the liver, have been observed. As a consequence of the enhanced availability of omega-3 when delivered by phospholipids in humans, it is proposed that Superba™ Krill Oil is a superior source of omega-3 for preventing CVD.

OMEGA-3 INDEX REFLECTS EFFECT OF INDIVIDUAL’S OMEGA-3 SUPPLEMENTS

Due to the role of omega-3 in reducing the risk of CVD, greater dietary intake of omega-3 is recommended. The Omega-3 Index, a diagnostic tool, can provide feedback on an individual’s omega-3 supplement dosage. The Index was developed to provide a routine clinical assessment of the risk of dying from a cardiovascular event. By recording the percentage concentration of omega-3 in red blood cells, the Omega-3 Index provides a useful indication of a person’s long-term ingestion of omega-3. Because the Omega-3 Index reflects the incorporation of omega-3 in cell membranes, which provides beneficial CVD effects, the Index is suggested to correlate with both CVD risk and the body’s omega-3 status.

A subject’s Omega-3 Index is determined from a blood droplet drawn from a fingertip. Test results falling within the green range (>8%) of the Omega-3 Index are desirable. (See chart.) Use of supplements rich in omega-3 phospholipids can shift an individual’s Omega-3 Index towards the right (the green, healthier scale range), which indicates the lowering of risk.

REFERENCES:


OMEGA-3 PHOSPHOLIPIDS IN THE BRAIN

OMEGA-3 IS A CRITICAL PART OF OUR CENTRAL NERVOUS SYSTEM

Only adipose tissue contains more fatty acids than the body's central nervous system, including the brain. The omega-3 fatty acid, DHA, which is the most common fatty acid in the human brain, constitutes 15% of all brain fatty acids.

Omega-3 phospholipids play key roles in the structure and function of brain cell membranes and cell signaling. An omega-3 deficiency in brain tissue can result in functional disturbances and delayed development.

OMEGA-3 PHOSPHOLIPIDS HAVE BEEN SHOWN TO BE PREFERENTIALLY TRANSPORTED TO BRAIN TISSUE

OMEGA-3 phospholipids have been suggested as a superior source of omega-3 for brain tissue. Omega-3 intake is reported to be valuable in maintaining memory and cognitive functions, which can become impaired in adults who have attained middle age. Cognitive decline is common among the elderly, although the presence and extent of any age-related decline is specific to the individual. Sufficiently high intake of omega-3 has been found to be associated with prevention, delay, or amelioration of cognitive impairment among the elderly. An association has been suggested between intake of omega-3 and the amount of omega-3 in the brain, and the risk of developing dementia. Patients with dementia have shown decreased levels of DHA in brain tissue. Adequate consumption of omega-3 is recommended to maintain memory performance and reduce the risk of developing severe dementia.

OMEGA-3 PHOSPHOLIPIDS IN EARLY BRAIN DEVELOPMENT

The developing brain undergoes particularly rapid growth during the third trimester of fetal life and the first two years of childhood.

Insufficiency of certain nutrients can disrupt the complex process of brain development. Omega-3 is an important nutrient for optimal growth and development of the human brain, and an adequate supply is needed from early fetal life.

An association between infants' omega-3 status and developmental outcome has been observed. Mothers' milk provides most of its omega-3 content in phospholipid form, suggesting that omega-3 phospholipids are the preferred form for delivery of omega-3 to the human brain.

OMEGA-3 PHOSPHOLIPIDS AND MAINTAINING BRAIN HEALTH

OMEGA-3 intake is reported to be valuable in maintaining memory and cognitive functions, which can become impaired in adults who have attained middle age. Cognitive decline is common among the elderly, although the presence and extent of any age-related decline is specific to the individual. Sufficiently high intake of omega-3 has been found to be associated with prevention, delay, or amelioration of cognitive impairment among the elderly. An association has been suggested between intake of omega-3 and the amount of omega-3 in the brain, and the risk of developing dementia. Patients with dementia have shown decreased levels of DHA in brain tissue. Adequate consumption of omega-3 is recommended to maintain memory performance and reduce the risk of developing severe dementia.

OMEGA-3 PHOSPHOLIPIDS AND MOOD DISORDERS

OMEGA-3 status has been shown to play a potentially important role in controlling mood disorders. Omega-3 and its association with depression is currently an area of great interest to researchers. Research suggests that an omega-3 deficit may contribute to the onset of depression and that omega-3 can play a role in future treatment strategies for depression and mood swings.

OMEGA-3 PHOSPHOLIPIDS AND ADHD

Attention Deficit Hyperactivity Disorder (ADHD) is claimed to be the most common neurological disorder among children, affecting 8% to 12% of children worldwide. ADHD, classified as attention deficit, impulsivity, and hyperactivity, symptoms are inattention and hyperactivity. Both environmental and genetic factors can contribute to the development of ADHD. Omega-3 is a dietary factor suggested to ameliorate ADHD.

Low levels of omega-3 in blood and an altered pattern of omega-3 in the brain are observed in children and adolescents with ADHD. Dietary intervention that includes high doses of omega-3 has been reported to be nearly as effective as drug therapy for treatment of ADHD.

MECHANISMS OF OMEGA-3 PHOSPHOLIPIDS AFFECTING BRAIN HEALTH

Several mechanisms have been proposed for omega-3's beneficial effects on the brain. Omega-3 phospholipids have been shown to be more efficiently taken up by brain tissue, compared with omega-3 triglycerides; observations also suggest greater availability and more beneficial effects on brain functions when omega-3 phospholipids are provided. Another beneficial effect of omega-3 on brain tissue is altered production of mediators of inflammatory processes, as follows: Increased incorporation of omega-3 into cell membranes results in increased production of omega-3-derived inflammatory mediators.
Elevated levels of inflammatory mediators derived from omega-3 result in weaker inflammatory reactions, which cause less injury to surrounding tissue. Omega-3 also appears to impart beneficial effects regarding various brain cell functions and cell signaling when incorporated into membranes.

**SUPERBA™ KRILL OIL PROVIDING OMEGA-3 PHOSPHOLIPIDS TO THE BRAIN**

Superba™ Krill Oil is a rich source of omega-3 phospholipids, mainly phosphatidylcholine. Omega-3 bioavailability increases when delivered as omega-3 phospholipids, compared with other sources, as a result of better fatty acid absorption and distribution to organs and tissues.

Omega-3 delivered in the phospholipid form has been shown to be preferentially transported into the brain, compared with omega-3 delivered in triglyceride form. Such evidence suggests that Superba™ Krill Oil is a superior source of omega-3 for delivery to the brain because of increased omega-3 availability and the benefits associated with omega-3 phospholipids on brain function and structure.

**REFERENCES:**


