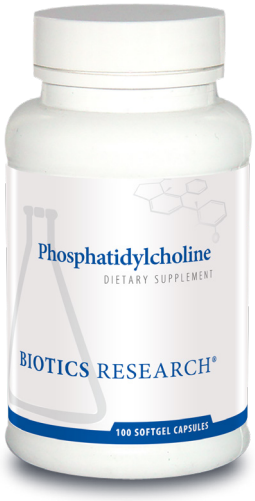
Phosphatidylcholine

Support for Healthy Membrane & Liver Function



Phosphatidylcholine
available in a
100 capsule
bottle (#1410)

Dietary choline, an essential cellular nutrient, is ingested in the diet primarily in the form of **phosphatidylcholine**. **Phosphatidylcholine** is the principal circulating phospholipid in plasma, where it is an integral component of the lipoproteins, especially HDL. It plays an important role in both the structure and function of mammalian organ membranes,[1,2] and is the prime phospholipid in the mammalian heart, accounting for ~40% of the total membrane phospholipids.[3] It is estimated that greater than 98% of the blood and tissue choline is sequestered in phosphatidylcholine.

Phosphatidylcholine, a glycerophospholipid, is the key building block of membrane bilayers, and makes up a very high proportion of the outer leaflet of the plasma membrane. Following ingestion, most of the **phosphatidylcholine** is broken down and subsequently incorporated into cellular membranes. **Phosphatidylcholine** serves as an excellent source of methyl groups for various chemical reactions, as it can supply up to three methyl groups per molecule, thus plays an important role in metabolic regulation. Additionally, it is present in a variety of molecular species in human tissues, primarily due to the variability of the fatty acid tails.

Choline plays a fundamental role in the synthesis of membrane phospholipid components of the cell membrane. Although choline may be synthesized in vivo, from either methionine or serine, it is considered an essential nutrient.[4] The composition of essential fatty acids in **phosphatidylcholine** determines its value in promoting health. Lowered blood choline is frequently displayed as liver steatosis (fatty liver) and related dysfunctions, and a deficiency in choline has been correlated with deleterious affects on the expression of a variety of genes, including those involved in cell proliferation, cell differentiation and apoptosis. Choline deficiency has also been associated with liver dysfunction and neoplastic diseases, as well as with neurodegenerative disorders, including Alzheimer's and Parkinson's disease.[5] A source of choline contributes to the biosynthesis of the neurotransmitter acetylcholine, a neurotransmitter which has many functions in the body, including its involvement in muscle control and memory. **Phosphatidylcholine** has been implicated as the preferred source of choline for this action.[6]

Hepatic **phosphatidylcholine** is considered an important component in liver function as well as in metabolic regulation.[7] A decrease in hepatic **phosphatidylcholine** has been associated with an accumulation of triglycerides in the liver, along with a reduced level of plasma lipids and plasma lipoprotein.[8] In animal studies choline intake was correlated to a hepatoprotective effect. Consequently **phosphatidylcholine** supplementation in persons with liver impediments is particularly important.

Biotics Research Corporation's **Phosphatidylcholine** is supplied as a highly bioavailable form, which is well tolerated, odor free, readily absorbed and most importantly tested to ensure quality and purity.

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Phosphatidylserine

Support for Healthy Brain Function

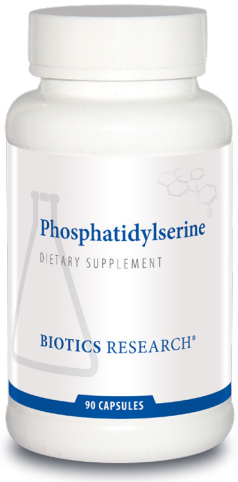
Phosphatidylserine, a naturally occurring phospholipid nutrient, is a component of cell membranes. As such it serves as an essential constituent to the functioning of all cells in the body. In addition to its primary role as a structural component of cell membranes, it also plays a significant role in the biological processes of apoptosis and cell signaling.[1] In most cells **Phosphatidylserine** is restricted to the inner leaflet of the plasma membrane; however it appears on the surface of apoptotic lymphocytes at the initiation of phagocytosis by activated macrophages,[2] and is believed to be a recognition signal for the phagocytic removal of apoptotic cells.[3,4] The cell surface exposure of **Phosphatidylserine** also occurs in coordination with other cellular functions, for example in platelet initiation of the blood clotting cascade,[4,5,6,7] as well as in sperm maturation.[8,9]

Phosphatidylserine comprises only a small percentage of the total phospholipids, accounting for less than 10% of the phospholipid total. However, as a component of myelin it makes up a major part of the phospholipid concentration of the brain, and as such may offer a supportive aspect in regard to brain function. It is also present in high concentrations in the retina,[10] and is thought to play an important role in both vision and the nervous system.[11]

Functionally, **Phosphatidylserine** serves as an essential cofactor for the binding and activation of protein kinase C,[12,13] a key enzyme in signal transduction, as well as a required component for the activity of other essential enzymes, including Na^+/K^+ ATPase and neutral sphingomyelinase.[15] In blood coagulation, it is transported to the membrane surface, where it serves to enhance the activation of prothrombin to thrombin.[16] Its importance in apoptosis is demonstrated by the fact that in its absence, the ingestion and clearing of apoptotic cells does not occur.[17] Additionally, Bleijerveld OB, ***et al.*** have hypothesized its essentiality in mitochondrial functioning as a component in the **Phosphatidylserine** decarboxylation pathway.[18]

Due to the ability of **Phosphatidylserine** to be converted into key lipid secondary messengers, it participates in important cellular regulatory mechanisms.[19,20] In platelets, the translocation of **Phosphatidylserine** from the inner to the outer leaflet of the plasma membrane marks the initiation of the blood-clotting cascade, thus implicating its importance in this function.[21] The exposure of **Phosphatidylserine** on the cell surface, a characteristic of dying cells, allows for the safe clearance of apoptotic waste without induction of the inflammatory cascade. A defect in this clearance mechanism has been associated with autoimmune pathologies.[22] Cumulatively, **Phosphatidylserine** plays a key role in many biochemical and physiological processes in mammalian cells, including immunity.

Biotics Research Corporation's **Phosphatidylserine** is supplied in 100 mg softgel caplets. As with all products from Biotics Research Corporation, the product it tested to ensure quality and purity.



Phosphatidylserine
available in a
90 capsule
bottle (#1430)

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