

NANOFORMULATED

PURE PC®



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Pure PC® delivers highly bioavailable phosphatidylcholine in a liposomal format for easy absorption into the bloodstream, rapidly replenishing cell membranes and supporting whole-body health.*

EDUCATION

PHOSPHATIDYLCHOLINE DELIVERS THE ESSENTIAL NUTRIENT CHOLINE

Choline, a water-soluble compound with structural similarities to B vitamins, comprises approximately 13 percent of the weight of a phosphatidylcholine molecule. Although small amounts of choline can be synthesized in the body via the hepatic phosphatidylethanolamine N-methyltransferase (PEMT) pathway, this pathway can be seen as a biochemical "last resort;" as it does not produce enough choline to support optimal health.¹ Therefore, choline must be consumed through diet or supplements.



Supplement Facts

Serving Size: 5 mL (1 tsp)
Servings Per Container: 24

	Amount Per Serving	% Daily Value
Phosphatidylcholine (from purified soybean lecithin)	650mg	**

**Daily Value not established

Other Ingredients: Water, glycerin, ethanol, tocopherol

Phosphatidylcholine (PC) is a class of phospholipid that incorporates choline as a headgroup in its molecular structure. Phospholipids also contain fatty acids, glycerol, and phosphorous. Lecithin, the phosphorous aspect of phospholipids, are made up of PC, thus phosphatidylcholine and lecithin are terms that are used interchangeably, although they are different, and grades of phosphatidylcholine vary. PC is the predominant lipid building block of cellular membranes, both internal and external. PC also supports cognition and liver function, facilitates detoxification, supports methylation, and is an integral part of healthy cholesterol and fat metabolism.^{2,3,4,5,6}

While adequate intakes for choline have been estimated, these numbers are based merely on the dietary choline intake required to prevent overt liver damage; they do not reflect choline intakes conducive to optimal health. An insufficient intake of choline, in turn, can contribute to a wide range of health concerns, including fatty liver, muscle damage, and cognitive dysfunction.^{1,7}

Furthermore, the increasing popularity of plant-based diets may further decrease choline intake because animal proteins, such as dark meat and eggs, are the most abundant sources of choline in the human diet.^{8,9} The low (or even absent) consumption of animal products in vegan and vegetarian diets puts individuals at an increased risk of choline deficiency. Postmenopausal women are also at an increased risk due to reduced estrogen levels, as estrogen production naturally increases choline production.⁵ Finally, genetic polymorphisms in PEMT are common, and further increase the risk of choline deficiency by hindering the conversion of phosphatidylethanolamine into phosphatidylcholine.¹⁰

Inadequate intake of choline has a host of adverse health effects, and a large portion of the population is at risk for deficiency. Supplemental phosphatidylcholine¹¹ provides a rich source of readily available choline, and may help replenish levels of this vital nutrient.

PC SUPPORTS HEALTHY CELL MEMBRANES

Phospholipids are the fundamental building blocks of all cell membranes in the human body. Human cells contain four main phospholipids – phosphatidylserine, phosphatidylethanolamine, sphingomyelin, and phosphatidylcholine.¹¹ Of these phospholipids, phosphatidylcholine comprises the lion's share of the membrane.

Phosphatidylcholine has a hydrophilic ("water-loving") phosphate-containing head and two hydrophobic ("water-fearing") fatty acid tails. The amphiphilic properties of phosphatidylcholine enable it to spontaneously form bilayers in aqueous solutions, including the aqueous internal environment of the human body. Phosphatidylcholine comprises the cell membranes of all cells in the body, creating a protective interface between the interior of the cell and its exterior environment, while also providing an anchoring point for membrane proteins. These membrane proteins participate in a variety of vital functions, including intercepting external signals from hormones and neurotransmitters and relaying these messages to the cell's genome, and selectively transporting nutrients and other molecules into the cell.¹²

A variety of lifestyle factors, including oxidative stress, infections, and the consumption of rancid dietary fats, cause a loss of host cell membrane integrity.^{13,14,15} Without healthy cell membranes, these vital functions cannot be performed, and one's health may suffer.

PC SUPPORTS COGNITIVE FUNCTION

Choline is a precursor for the synthesis of acetylcholine, an essential neurotransmitter in the brain, and at neuromuscular junctions. Phosphatidylcholine is a critical component of cell membranes, including the membranes of neuronal cells that facilitate neurotransmission and cognition.

Acetylcholine has been observed to decline in cognitive disorders such as Alzheimer's disease; in parallel, phosphatidylcholine levels are also diminished.^{16,17} Supplemental phosphatidylcholine may support healthy acetylcholine levels and maintain neuronal membrane integrity, preserving healthy neurotransmission. Higher intakes of phosphatidylcholine are associated with better cognitive performance in adulthood.¹⁸

PC SUPPORTS LIVER FUNCTION AND DETOXIFICATION

Phosphatidylcholine is critical for liver function. It comprises hepatic cell membranes, which must continually be renewed to successfully facilitate detoxification reactions. The liver also requires PC for packaging and eliminating lipids, triglycerides, and cholesterol to prevent harmful hepatic lipid accumulation. When PC is in short supply, hepatic cell membranes suffer damage from the free radicals generated during detoxification; lipids also accumulate in the liver, hindering detox and promoting inflammation.

Research suggests that high-dose phosphatidylcholine is a beneficial adjunct intervention for non-alcoholic fatty liver disease (NAFLD), normalizing the liver enzymes AST, ALT, and GGT, and improving ultrasonographic features of the disease.^{19,20} PC appears to alleviate fatty liver by replacing damaged phospholipids in hepatic cell membranes and by exerting antioxidant and anti-fibrotic effects on the liver.

Phosphatidylcholine has been shown to protect the liver against a variety of xenobiotics, including heavy metals and pharmaceuticals.^{21,22} PC deficiency may be a critical step in the pathogenesis of mycotoxin-induced liver damage, suggesting that PC administration may be crucial for supporting the recovery of individuals who have been exposed to environmental mycotoxins.²³

Phosphatidylcholine is also a critical element of bile, a fluid made in the liver and secreted by the gallbladder that is essential for fat digestion and detoxification. PC insufficiency reduces bile flow, and may, therefore, slow down the elimination of mobilized toxins.²⁴

PC SUPPORTS METHYLATION

Methylation is a biochemical process by which a methyl group (-CH₃) is added to a substrate, transforming it into a new compound. Essentially, methylation serves as a cellular "switch," turning off and on a variety of vital biochemical processes, including neurotransmitter production, immune function, and detoxification. A variety of micronutrients are needed to keep methylation running smoothly, including folate, B12, and choline²⁵. Choline deficiency significantly impairs DNA methylation with downstream adverse effects throughout the body. Conversely, supplying the body with sufficient choline supports methylation and healthy gene expression.

Phosphatidylcholine supplementation supports the reduction of homocysteine, a metabolite that can become elevated when methylation is impaired.²⁶ It may reduce homocysteine by downregulating PEMT expression, which is turned on when dietary choline is lacking.

PC ENHANCES CHOLESTEROL AND FAT METABOLISM

The amphiphilic properties of phosphatidylcholine are important not only for maintaining the structure of cell membranes, but they are also crucial for packaging lipids into very-low-density lipoproteins (VLDLs), and for transporting these lipoproteins throughout the body. When choline and phosphatidylcholine levels are low, lipids can accumulate in the liver, causing liver damage. Blood lipids can also become elevated, increasing the risk of cardiovascular disease. Phosphatidylcholine “greases the machinery” used in the processing, packaging, and distribution of cholesterol, supporting healthy cholesterol metabolism.^{27,28}

Quicksilver Delivery Systems[®] improve upon liposomal and emulsification technology with smaller, more stable particles made from the highest-grade ingredients available. In addition to exceptional absorption rates, these tiny liposomal and nanoemulsified particles increase diffusion across mucus membranes, enhance lymphatic circulation of nutrients and support cellular delivery.*

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References available at quicksilverscientific.com/purepreferences/

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