

Nutritional Therapeutics, Inc.  
Hauppauge, New York  
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## **NT Factor™; Phosphoglycolipids from Soy**

### **The Soybean's Polyunsaturated Phosphatidyl Choline: The Pivotal Substance for Optimal Cellular Function**

Monica Harris  
Operations Manager  
Livron Vitamin Co, Allendale NJ

#### **INTRODUCTION**

Polyunsaturated phosphatidyl choline (PPC) found in soy lecithin is an essential member of the phospholipid family. Similar in structure to a triglyceride, one fatty acid ester in PPC is replaced with phosphoric acid and choline. PPC is a dipolar molecule having a positive charge on the choline amide group and a negative charge on the phosphate group. Two fatty acids as a diglyceride ester complete the molecule. PPC hence has the ability to permeate both the hydrophilic and hydrophobic regions of the body as well as the negatively or positively charged zones. The diverse characteristics of this molecule make PPC the ultimate biochemical delivery system as well as giving it superior functionality as a structural molecule.

Research in molecular and cellular biology, neuroscience, and nutrition reveals much about PPC and the role it plays in health and disease. Contained within cell membranes, PPC together with other phospholipids and glycolipids serve as messengers in cell signaling, the process by which hormones and other substances transmit signals from the exterior of a cell to the interior. PPC plays a decisive role for the activity of numerous membrane-located enzymes, such as sodium-potassium-ATPase and lipoprotein lipase. The polyunsaturated fatty acids contained in PPC, such as linoleic acid, are precursors of the cytoprotective prostaglandins and other eicosanoids. As choline and fatty acid donors, PPC has an

influence in certain neurological processes. Without the essential phospholipid PPC, cells could not properly grow, replicate, or absorb and use nutrients for energy.

Countless studies done with PPC have clearly identified it as pertinent to one's health because of its contribution to reproduction and development, liver health, heart health, memory improvement, and physical performance. Human cell lines grown in laboratory culture require choline. Healthy human subjects maintained on choline-deficient diets, frequently developed fatty liver and liver cell damage within a few weeks. In addition, choline deficiencies can be found to contribute to abnormal kidney function, infertility, growth impairment, bone abnormalities, decreased hematopoiesis, and hypertension. PPC found in soybeans may lower the incidence of two leading causes of death in America, cardiovascular disease (CVD) and cancer.

The Food and Nutrition Board recognizes that there are a number of nutrients important to health with no established RDAs and choline happens to be one of them. Proposals have been made to the Food and Nutrition Board for designating a recommended dietary intake for choline. It is estimated that adults need to consume about 6g per day of lecithin containing PPC and 0.6 to 1.0 g per day of choline. US infant formulas approved by the FDA are required to contain at least 7 mg of choline

per 100 kcal (based on the choline content in human milk).

Americans have cut their fat intake over the last twenty years by 15%. By limiting PPC rich foods such as eggs, organ and red meats has done this. This dietary PPC loss has not been offset by increased consumption of soy, the PPC rich plant

source. Unfortunately, many of the current advocates of soy are myopic in their view as they are solely promoting soy protein and isoflavones, grossly underestimating the powerful, nutritional health benefits found in the lipid fraction of the soybean.