



The Leader in Soy-Derived Phospholipid Nutraceuticals

"Life Happens on the Membrane"

Purified Phosphatidylcholine

The Nutritive Benefits

Topics of discussion

- ❑ What is lecithin?
- ❑ What is phosphatidylcholine?
- ❑ Why its so unique
- ❑ How it functions in the body
- ❑ On going clinical studies

Origins of Lecithin

- ❑ The word Lecithin is derived from the Greek word **“Lekithos”** meaning Egg Yolk
- ❑ The majority of all lecithin produced today is derived as a by product of soy oil production
- ❑ Mammalian sources of lecithin are primarily the brain and liver
- ❑ Commercial quantities are derived from seed oils such as soybean, corn, cottonseed, sunflower and rapeseed

What is Lecithin?

- Lecithin is mainly a complex mixture of phospholipids, glycolipids and triglycerides
- The “**active components**” of lecithin are the phospholipids, primarily
 - Phosphatidylcholine 12%
 - Phosphatidylethanolamine 10%
 - Phosphatidylinositol 7%

Simple chemistry

- ❑ The phospholipid components in lecithin have a head group that likes water and two fatty acids that like oil
- ❑ This chemical structure allows lecithin to immerse two immiscible fluids, i.e. to mix oil and water
- ❑ Lecithin is a “natural emulsifier”

Enhancing lecithins nutritive value

- ❑ The intent is to increase the amount of PC in the finished product
- ❑ Utilizing either acetone extraction or column chromatography you go from 15% to 100% PC
- ❑ Improved quality = higher price
- ❑ ***You get what you pay for!***

What is Phosphatidylcholine?

- ❑ Phosphatidylcholine (PC) is basically characterized as a fat.
- ❑ It differs from a triglyceride in that one fatty acid has been replaced with a phosphorous group containing choline
- ❑ It normally contains Linoleic Acid an unsaturated fat or “the good fat”
- ❑ Depending upon the source of the PC its fatty acid or “good fat” profile will vary

PC Background

- ❑ Purified PC has been an approved drug in Europe (Approved by the Bfarm) since the 1950's and has been used as a nutritional supplement throughout Asia for decades
 - Essentiale - Liver Protectant
 - Lipostabil - Cardiovascular Health
- ❑ Administration has been primarily orally or intravenously
- ❑ PhosChol was developed in the mid 1980's
 - Primarily an oral supplement
- ❑ There are over several hundred use patents on Purified PC in both pharmaceutical and nutraceutical applications

Differentiating Lecithin from Phosphatidylcholine

- ❑ In scientific research lecithin and phosphatidylcholine are used synonymously, meaning ***purified phosphatidylcholine***
- ❑ Due to our background and relationship to drug manufacturers, Nutrasal's commitment is ***to developing highly purified, efficacious, nutraceuticals based on solid drug research.***

Types of Lecithin products on the market

- ❑ Standard lecithin capsules - 12%
- ❑ De-oiled lecithin - 23%
- ❑ PC 55 - 55%
- ❑ Triple strength capsules - 35%
- ❑ **PhosChol - pure PC 100%**
- ❑ All of the above products are “soy derived”

Phosphatidylcholine's role in nutrition

- ❑ It is a major component of cell membranes
- ❑ It alters the lipid composition of certain immune cells, resulting in enhanced host defenses (phagocytosis and NK cell activity)
- ❑ It is an essential precursor for acetylcholine, a neurotransmitter
- ❑ It is a major component of the gastric mucosal lining of the stomach
- ❑ It is effective in treating circulatory disorders

Mammalian Membranes

- Major components consist of:
 - Phospholipids
 - Proteins
 - Glycolipids
 - Cholesterol

Membrane Phospholipids

Cellular Functions

- ❑ Influence carrier mediated transport
- ❑ Effect membrane-bound enzymes
- ❑ Bind receptors of biologically active substances
- ❑ Induce endo, exo and phagocytosis
- ❑ Precursors for prostaglandin and acetylcholine production
- ❑ Effect cell differentiation

Patent Samples

- ❑ **The key patents are:**
- ❑ PREVENTION AND TREATMENT OF MICROBIAL INFECTION BY PHOSPHOGLYCERIDES Vitale, Inventor
- ❑ PROCESS AND COMPOSITION FOR TREATING DISORDERS BY ADMINISTERING LECITHIN - Growdon & Wurtman, inventors
- ❑ PROCESS FOR UTILIZING CHOLINE TO SUSTAIN MUSCULAR PERFORMANCE - Wurtman, Conaly, Blusztajn, inventors

Patent Samples

□ The key patents are:

- USE OF LECITHIN TO RESTORE OLFACTION AND TASTE - Hirsch, inventor
- METHOD AND COMPOSITIONS EMPLOYING UNIQUE MIXTURES OF POLAR AND NEUTRAL LIPIDS FOR PROTECTING THE GASTROINTESTINAL TRACT – Lichtenberger, inventor

PC and the Brain

- ❑ **Fact:** as you age your body's ability to allow choline to pass through the blood brain barrier decreases
- ❑ **Fact:** people are consuming less foods containing PC because they are derived from foods high in cholesterol
- ❑ **Fact:** that your brain will cannibalize its own cells to obtain PC for proper neurotransmission

PC and the Brain

- ❑ Daily supplementation with PhosChol is proven to increase blood choline levels necessary for proper brain function
- ❑ It may help to reduce age related memory decline by increasing the amount of PC in your daily diet. PC is a precursor to acetylcholine – the primary neurotransmitter in the brain

PC and Muscle Recovery

- ❑ Major exercise causes a pronounced decrease of choline levels in the blood
- ❑ The claim is for reducing fatigue for athletes participating in rigorous exercise by increasing blood choline levels

PC and Anti Bacterial Viral Agents

- ❑ Discovery - Phosphoglycerides in the form of highly purified phosphatidylcholine, could act to augment the immune system rather than suppress it
- ❑ Numerous claims were allowed including treatment and prophylaxis of bacterial, protozoal, fungal, and viral infections. In addition, field of use stipulating treatment of persons with AIDS were allowed

PC and Cardiovascular Health

- PhosChol supplementation is proven to
 - reduce serum cholesterol
 - reduce serum low density lipoproteins (LDL)
 - increase serum high density lipoproteins (HDL)
 - reduction of serum triglycerides
 - activation of LCAT
 - reduction of plaque build-up

PC and Liver Disease

- ❑ Toxic Liver Damage
- ❑ Acute Hepatitis
- ❑ Chronic Hepatitis
- ❑ Liver Cirrhosis

Toxic Liver Damage

- ❑ Earlier return to normal enzyme function
- ❑ Fatty degeneration less pronounced
- ❑ More rapid structural restoration of damaged liver cells
- ❑ Reduced mortality rate
- ❑ Accelerated recovery of patients

Acute Hepatitis

- Hepatitis is an inflammation of the liver
- Supplementation with PC resulted in:
 - ***Shorter hospital stays***
 - ***Shorter recovery phase***

Chronic Hepatitis

- Patients experienced rapid improvement in well-being
- Reduction in liver inflammation
- Reduction in liver necrosis

Liver Cirrhosis

- ❑ Accelerated elimination of fatty deposits from hepatic tissue
- ❑ Reduction in free phenol content
- ❑ Reduction of ammonia concentration
- ❑ Improved detoxifying capacity of the liver

PhosChol and the Stomach

- ❑ The mucosal lining of the stomach is very high in PC
- ❑ Numerous studies indicate the improvement in the ***decrease of gastric ulcers*** induced by non-steroidal anti-inflammatory drugs (NSAIDS)

PC for the improvement of Taste and Smell

- Hyposmia= the decreased sense of taste and smell.
- Odeiferous chemicals must pass through the nose to the olfactory receptors to the olfactory bulb which then signals the brain utilizing acetylcholine. Acetylcholine is predominant in the olfactory bulb

For Further Information Contact:

Nutrasal Customer Service

115 Hurley Road, Suite 2A

Oxford CT 06478

(203) 267-3030

customerservice@nutrasal.com