

# **PHOSPHATIDYLSERINE**

## **Essential for the Brain and Nervous System**

by Ronald L. Myers, CNC

Label data published by Biotics Research Corporation (BRC) states that this product contains “100mg of Phosphatidylserine” per capsule along with a “300mg blend of phosphatidic acid, phosphatidylinositol, soy phospholipids & glycerides, phosphatidylcholine and phosphatidylethanolamine”.

Dorland’s Illustrated Medical Dictionary, 27<sup>th</sup> Edition defines phosphatidylserine as “a phospholipid in which serine is attached to the phosphate group of phosphatidic acid by an ester linkage; it is an important constituent of cell membranes and is located preferentially in the inner surface of the plasma membrane. Abbreviated PS.”

### **FOOD SOURCES**

Virtually none, the body makes it through a complex series of reactions with a substantial investment of energy. Thankfully, it is available to us in supplemental form.

### **FUNCTIONS**

According to several citations from the peer-reviewed literature, improvement in the following conditions has been associated with Phosphatidylserine use: improves Concentration and Short Term Memory, effectively alleviates Depression - especially in elderly, increases brain Alpha Waves by 15-20%, helps stabilize Brain Wave patterns in Epileptics, increases Intelligence, prevents the decline in Learning capacity that occurs with age, prevents the decline in the number of brain dendrites that occurs with age, improves Mood (especially in elderly persons), is involved in Myelin Sheath repair, increases the number of neurotransmitter receptor sites, stimulates release of the brain neurotransmitter Dopamine, improves Reflexes [as judged by flicker-fusion response time], counteracts Cortisol that rises during intensive exercise and during stress, enhances the function of Nerve Growth Factor (NGF), increases production of the brain neurotransmitter acetylcholine, enhances brain glucose metabolism.

### **WOW!**

The daily dosage used in most of the studies to date was one 100mg capsule given 3 times a day. Dosages of 600mg or greater daily are not recommended as the patient may develop insomnia or some gastrointestinal discomfort.

Phosphatidylserine is a naturally occurring phospholipid nutrient. PS is essential to the functioning of all the cells of the body, but is most concentrated in the brain. Its relative abundance in this organ reflects its *proven* involvement in a variety of nerve cell functions, including neurotransmitter release and synaptic activity. Clinical studies have suggested that PS can support brain functions that decline with age. Cognitive decline in the healthy can begin as early as the fifth decade of life. Census figures indicate that more than 30 million U.S. citizens are over 65; of these more than half are likely experiencing impaired ability to recall names and numbers, impaired semantics, reduced ability to concentrate at work and maintain focus while at play.

*The findings from the clinical trial data completed to date are unequivocal: dietary supplementation with PS can alleviate, ameliorate, and sometimes reverse age-related decline of memory, learning, concentration, word skills, and mood. PS also may improve the body's ability to cope with stress and maintain the internal circadian rhythms.*

## LIMITED REVIEW OF THE RESEARCH

DESIGN—Care was taken to develop a starting hypothesis that could be tested as valid or invalid. Proven statistical techniques were used to randomly assign subjects to each dosing group (PS or placebo). These groups were matched as closely as possible by age, state of health, and other relevant factors. A **statistical probability (p value)** is derived which quantifies the probability that the observed differences could have occurred by chance, the lower the p value, the greater the chance that the observed difference is real.

Among the clinical trials conducted with PS, most were done with subjects who had experienced measurable losses in memory, judgment, abstract thought, and other higher mental functions, and sometimes also changes in personality and behavior. In these trials data was generated by detecting categories of affected functions, applying tests that measure such functions, and tracking changes on the tests with time in the PS and the placebo groups.

**Crook et al, 1991--** One hundred forty-nine (149) subjects, age 50-75, were studied. PS was given at 300mg per day (100mg three times per day), versus a placebo, for 12 weeks. Assessments were done at baseline, then at week three after beginning dosing (B+3w), week six (B+6w), week nine (B+9w), week 12 (B+12w), and lastly at week 16 (End+4w, four weeks after stopping the dosing). The subjects' compliance was good - they took their treatments reliably - and PS was well tolerated. By the first evaluation period, three weeks into the trial (B+3w), trends ( $p < 0.1$ ) were noted in three of the five primary variables and all favored PS:

- Learning names and faces (Name-Face Acquisition)
- Recalling names and faces (Name-Face Delayed Recall)
- Facial recognition (Delayed Non-Matching)

These trends did not hold up through the full 12 weeks of the trial, however. For a more meaningful trial outcome, the researchers turned to a subgroup or "cluster" of 57 subjects who were relatively more memory-impaired. These Cluster 2 subjects were slightly older (64.3 average age versus 61.6 for Cluster 1), and seemed to benefit more from PS. In the above three categories, Cluster 2 were found to have improved significantly at week 12 of dosing (B+12w), and the improved Facial Recognition persisted four weeks after these subjects stopped taking PS. Cluster 2 subjects were also significantly improved at (End+4w) on:

- Telephone number recall
- Misplaced objects recall
- Paragraph recall (Wechsler Memory Scale-Logical Memory Subtest)
- Ability to concentrate while reading, conversing, performing tasks

In addition to these improvements, the Cluster 2 subjects showed overall global improvement in cognitive status at dosing week 12 (B+12w), as assessed from detailed interviews conducted "blind" by trained interviewers. The investigators suggested PS might prove clinically valuable for Cluster 2 subjects. As a model they took Name-Face Acquisition. Here, PS had improved Cluster 2's performance by an average two points. They calculated that for this one measurable parameter of higher mental function, PS had "rolled back the clock" by roughly 12 years. In other words, from being at a "cognitive age" equivalent to a person age 64, Cluster 2 subjects were restored, on average, to a cognitive age of 52.

**Palmieri et al, 1987--** This trial was coordinated between three clinics in Italy. It involved 87 subjects with moderate cognitive deterioration whose ages ranged from 55-80 (mean 73.1 years). PS was given at 300mg daily in divided doses versus placebo, and evaluation repeated at 60 days (B+60d). PS was then discontinued, and follow-up evaluation done at day 90 (End+30d, 30 days after cessation of dosing).

The PS group benefited on tests that measured attention, concentration and short-term memory, Five-Word Acquisition improved significantly, while Five-Word Recall was highly significantly improved ( $p < 0.005$ , or only five chances in 1,000 of the finding being in error).

PS also was linked to improvements in activities related to daily living, and specifically to a lessening of apathy and withdrawal. These were measured using 12 items from the Geriatric Rating Scale of Plutchik et al (revised-1977). Items that were improved included:

- Self-sufficiency - activities of daily living (significant  $p < 0.05$ );
- Sleep disturbances (significant,  $p < 0.05$ );
- Disadapted behavior; initiative; overall behavioral deficit (highly significant at  $p < 0.002$ , or two chances in 1,000 that the finding was in error).

On these latter items, the benefits from PS roughly equated to lessened apathy and withdrawal. The authors states, "phosphatidylserine appears to exert an action in two distinct contexts: one relating to the cognitive effects of vigilance, attention, and short-term memory, and the other relating to behavioral aspects such as apathy, withdrawal and daily living..."

## Conclusion

After a quarter century of research with PS on human subjects, laboratory animals, cells in culture and molecules in the test tube, it is clear that this nutrient has profound value to the human brain. PS has been intensively studied for cognitive decline. Substantial amounts of mechanistic, experimental and clinical data are available on PS, and the findings **overwhelmingly indicate PS is highly effective and is safe to take.** The fact that PS is an orthomolecule, i.e., intrinsic to all the body's cells, is predictive of its safety for both short-term and long-term use. A reasonable supplementation strategy with PS is to begin at 300 mg per day (100mg with each meal) for a month, then go into a maintenance dose at a lower level of intake (100 to 200 mg daily). There is no indication of potential problems from long-term supplementation with PS.

As a general rule, because PS is *so safe* the more severe the subject's problems the more aggressive can be the supplementation strategy. Patients with severe memory problems can be kept on all their other supplements and medications, and be given PS with their meals at 300 to 500 mg per day on an ongoing basis. Subjects afflicted with motor problems may respond better at 500 mg per day. Mood problems may require a starting dose of 400 mg per day. For age-related cognitive decline (ARCD), a daily intake of 300 mg may be appropriate.

As I have written before and probably will again, NUTRITION RUNS THE BODY! Here is a nutrient that has shown itself effective in treating various brain disorders even when pharmaceutical agents have failed or had minimal affect. PS has been shown to be effective in alleviating the symptoms of Alzheimer's disease due to its ability to increase acetylcholine availability in the brain. Younger patients may benefit from PS as well due to its ability to fight stress, improve mood and sharpen mental faculties.

Here is a tool you can use to help patients of all age groups that to date has no known toxicity!

## References

Crook TH, et al, 1991. "Effects of phosphatidylserine in age-associated memory impairment." *Neurol.* 41: 644-649.

Palmieri G, et al, 1987. "Double-blind controlled trial of phosphatidylserine in subjects with senile mental deterioration." *Clin. Trials J.* 24: 73-83.

Crook T, et al. Effects of Phosphatidylserine in Alzheimer's Disease. *Psychopharmacol Bull* 1992;28(1):61-66

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