Severe memory impairment in the form of dementia is now epidemic in the industrialized countries. For the United States, as one example, reliable statistics from the Alzheimer’s Association of the United States indicate that more than 7.5 million citizens have some form of dementia.²¹ The Association has estimated that for Americans aged 65 and over the risk of developing Alzheimer’s dementia is about 1 in 10. For those past age 85, the risk is as high as 1 in 2! Not good odds for any of us.

Dementia doesn’t come out of nowhere. Dementia is the end result of years, probably decades, of progressive deterioration of the brain tissue. As it inevitably comes to afflict the entire brain beyond just the memory centers, dementia represents an extreme state of brain deterioration that is very difficult to treat by any means.

Abnormal Memory Decline Can Lead to Dementia
Dementia emerges from the progressive worsening of memory impairment. As introduced in the previous chapter, the conditions AAMI, ARCD, and MCI all feature measurable memory loss that is abnormal for that sample population. None of these is currently classified as a disease, but having any of them means having a higher risk for dementia than others in one’s age group. Having this degree of memory problem is a wake-up call to immediately take positive steps.

There is much about dementia that science and medicine do not understand, but one fact is clear: Memory loss is usually progressive. Memory loss gets worse unless positive steps are taken to revitalize the brain. As the extent of memory impairment
becomes ever more severe, there is less and less healthy tissue to work with, so that the chances of turning it around become ever more slim. At some point the degree of memory and other cognitive impairment will cross the line into dementia.

PS (PhosphatidylSerine)

The formal diagnosis of dementia can be made when the subject has severe memory impairment as well as impairment of one or more of the other measurable cognitive functions. Stedman’s Pocket Medical Dictionary defines cognition as: “the quality of knowing, which includes perceiving, recognizing, conceiving, judging, sensing, reasoning, and imagining.” These are the mental capacities that most make us human. Dementia is diagnosed when these capacities are grossly affected.

Dementia as Daily Existence
The term dementia is related to “de-mens” (out of mind) or “de-mentation,” translating as loss of mental capacity, loss of the capacity to reason. The disease of dementia marks a degree of cognitive deterioration so severe that social and occupational functioning is markedly impaired. Imagine the devastating consequences of not being able to think for yourself or otherwise take care of your basic survival needs.

The costs of dementia to the family and society are also great.
Useful Tools Against Severe Memory Loss

The Alzheimer's Association in the U.S. estimates that Alzheimer's care costs American families close to $19,000 a year and that the total cost to the nation in health care and lost productivity could be more than $100 billion. Also, more than 70 percent of Alzheimer’s patients are cared for at home, and the victim’s tragic situation often comes to include the persons who have to care for them.

The progression of dementia mercilessly destroys its victim’s humanity. Along with the relentless deterioration of cognitive capacities can come radical change in the personality, as other zones of the brain deteriorate. That previously mild-mannered, friendly, thoughtful relative can become aggressive, irascible, vulgar, the very opposite of what s/he was like as a younger person.

As the dementia progresses, that person may no longer be able to recall the things we all automatically file in our consciousness: what clothes they wore yesterday or the day before, where they went, what they ate, who they last talked with. They may no longer recognize close relatives. As their waning attentiveness signals to them that something is very wrong, they can withdraw from social life.

The patient with worsening dementia may reach a point where s/he has to be assisted with the most basic life functions like eating, washing, going to the bathroom—known medically as the “Activities of Daily Living.” The average Alzheimer’s patient lives some 8–20 years after being diagnosed.

Currently, the majority of diagnosed dementias are thought to be Alzheimer’s Disease, but the Alzheimer’s symptoms are often mimicked by other forms of dementia. On a symptomatic basis there is little to distinguish between them. The medical management strategy doesn’t differ very much, either. Modern medicine, with all its technology, still has very little to offer this patient population.

There is no cure for Alzheimer’s or the other dementias, and no breakthrough on the horizon. Currently there are three drugs currently approved to treat dementia. All are only minimally beneficial and many experts have noticed that their benefits tend to disappear after a year or two. Also, these drugs carry significant risk of bad side effects. Pharmaceuticals are no antidote for dementia.

All this makes clear that the best strategy against dementia is to prevent it from developing at all. But for those who already have dementia and for their loved ones, this option no longer exists. Their daunting challenge is to preserve as much as possible of the
PS (PhosphatidylSerine)

brain, for as long as possible. This is where PS offers some chance for improvement, but only as part of a total health management program.

**Total Health Management (THM) for a long and happy life**

THM means living actively by:

★ Exercising body, mind, and spirit
★ Avoiding chemical and physical toxic stressors, as well as emotional stress
★ Using nutrients to optimize the life functions, especially those orthomolecules proven very safe to use
★ Working with an integrative healthy practitioner trained to assess total health
★ Making the necessary lifestyle changes to support these activities
★ Turning to pharmaceuticals and other potentially life-threatening interventions only as a last resort.

In this toxic modern world, daily practice of THM is our best chance to experience our birthright of excellent health. Practicing THM gives us—whatever our age or stage of life—a real chance to cure, slow, or reverse biological dysfunctions that are obstacles to our happiness.

**Total Health Management Can Delay Dementia**

To conserve brain and mind and all the other features of good health, our best (and only) chance for a long and healthy life is to learn and practice total health management (THM). THM works best as a daily style of living, a manner of living that self-consciously takes into account all the factors that can positively or negatively impact our health. THM really is lifestyle, consciously integrating all the activities of daily life into a harmonious whole, untiringly urging the body and spirit toward health and happiness.

For those who have dementia or are progressing toward dementia, the daily practice of THM can help not only the patient but the caregiver and all others to avoid a similar fate. Intervening with THM at this relatively late stage amounts to a kind of brain circuit conservation. Using PS (and other safe brain nutrients) as part of the THM strategy additionally allows for the possibility of reactivating
sick circuits, promoting the brain's marvelous circuit adaptability (called "plasticity"), and possibly even to create new circuitry.

Current brain research is at a fascinating point: it's clear that the brain is extremely plastic, surprisingly capable of remolding existing circuits to replace lost ones. Also, the brain has powerful cells called stem cells, unspecialized reserve cells able to specialize into new nerve cells when called for. For these regenerative processes to be set in motion, it's likely that (a) degenerative processes already in place must be curbed; (b) sufficient mental activity must be occurring to stimulate regeneration (the brain must be used); (c) nutrients must be supplied that support the formation of new cells and circuits. All this is possible once the practice of THM is adopted and set into motion.

The first THM issue for successful, ongoing brain conservation is risk factor recognition and prevention. A number of factors are known to raise or lower the risk for dementia. So many of these are known that I speak of a dementia risk factor matrix (see page 26). By eliminating or lessening the negative factors, and reinforcing the positive factors, the THM person can substantially conserve his brain and in many instances experience a degree of cognitive rejuvenation.

**The Matrix of Risk Factors for Dementia**

As with other diseases, dementia is associated with risk factors of various sorts. Any of us can reduce or eliminate at least some of our risk factors, once we know what they are. The dementia risk factors differ in their degrees of impact on each individual, but all are known to initiate brain problems or make existing problems worse.

On a practical basis it's good to think of the dementia risk factors as making up a matrix. This matrix is a multi-dimensional interaction of the various risk factors as they vary in time of onset, duration, severity, and the relative degrees of interaction with each other. By implication, a risk factor matrix will be unique to each individual, and that person's gene makeup will have unique interactions with the matrix, actually being part of the matrix itself.

Let's look at a conservative assessment of risk factors for dementia, that is, staying with those factors most proven by science. This makes for a likely understated estimate of the risk factors. Even on an understated basis the matrix is considerable.
PS (PhosphatidylSerine)

PRIOR BRAIN INJURY is probably the single best proven risk factor for dementia. One or more of these can initiate the

**Dementia Risk Factor Matrix**

**Very Likely Risk Factors:** Prior brain injury; homozygosity (two doses) of apolipoprotein E-4; advanced age; family history of dementia or Parkinson’s disease; Down Syndrome; alcohol abuse; depression, stroke, reduced blood flow to the brain.

**Likely Risk Factors:** Long-term coronary heart disease, emotional stress, smoking; pollutant solvents, herbicides, pesticides; certain pharmaceuticals; nutrient deficiencies, metabolic deficits; hypertension; underactivity (mental or physical); low educational level.

dementia pugilistica of brain-damaged boxers, which clinically is hardly different from any other dementia. Just one concussion injury to the brain can increase the risk for dementia in later life to about four times (4x the usual risk).

BAD GENES can act as dementia risk factors. The most well known is ApoE4 (apolipoprotein E4). Homozygosity for ApoE4 (that is, two doses of this gene) increase the risk of Alzheimer’s. Yet ApoE4’s penetrance (fancy term for the gene’s degree of control over the outcome) is far from complete. That is, many of the people homozygous for ApoE4 will have a normal lifespan without developing Alzheimer’s.

Both the above risk factors contribute to risk factor synergy. This is the unfortunate reality, that having one risk factor can multiply the danger from another risk factor. For example, a person who sustained a head trauma might have about a 4-time risk of getting dementia. Another who is homozygous for ApoE4 also might have about a 4-time risk. But a person with previous brain trauma AND homozygous for ApoE4 has about a 10-fold risk of getting Alzheimer’s.

FOR ALL DEMENTIA, OTHER HIGHLY PROBABLE RISK FACTORS are Down syndrome (DS), depression, poor circulation to the brain (as with ex-smokers and/or drinkers). Down Syndrome has a major genetic component, yet many DS people are quite intelligent and many do not get dementia.

HYPERTENSION, STROKE, AND DIABETES ARE MAJOR FACTORS FOR VASCULAR DEMENTIA. Poor brain circulation is more linked to vascular dementia (VD) than
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to Alzheimer's, but clinically VD can be just as devastating. VD or its earliest manifestation can sometimes be helped by total health management. THM for VD especially should emphasize regular aerobic exercise to increase blood supply to the brain.

**ENVIRONMENTAL POLLUTANTS DAMAGE THE BRAIN.** Brain tissue is vulnerable to toxins of any kind, because it has an high metabolic rate and also because of its very high content of polyunsaturated fats. Toxins are brain stressors. The massive degree to which mercury and other heavy metals, solvents, and pesticides and herbicides now contaminate the planetary environment makes it virtually certain they are contributing to today's escalating incidence of dementia.  

**MANY PHARMACEUTICALS ARE BRAIN TOXINS,** legally sanctioned and even promoted for consumption by the general population. The toxicity of some can mimic dementia over the short term. As much as 10 percent of all apparent dementia cases may be induced by sleep aids, sedatives, antidepressants, or drugs from other categories. Fortunately these are reversible to some degree, if the responsible physician is sufficiently alert to make the connection. One exceptionally useful reference book for this purpose is *Worst Pills, Best Pills,* collectively authored by the Public Citizen Health Research Group of Washington, D.C.

**EMOTIONAL STRESS KILLS BRAIN CELLS.** A long-term clinical study done at McGill University in Canada tracked two groups of people for five years. These were good stress copers and bad stress copers. After five years, the bad stress copers had statistically greater damage to the brain's main memory-creating zone, the hippocampus. Other human studies and many animal studies altogether prove that mental stress can kill nerve cells in the hippocampus and effectively disable this memory zone of the brain.

The ongoing outcome of negative risk factors is to deplete circuits from the brain. At its peak performance state, which usually is reached in the early twenties, the human brain can have upwards of 10,000 connections for each of its approximately 100 billion nerve cells. This yields a "ball-park" figure of as many as 1,000 trillion cell-to-cell connections—a quadrillion separate pathways. But as it progresses toward dementia, the brain is suffering awesome circuit losses.

Consider the brain's cortex, for example. Elderly people in their eighties who are not demented, may have lost up to 20 percent of
their connections. In contrast, Alzheimer's patients upon autopsy can have lost up to 90 percent.31

Unbelievably, this may not be the worst. For the hippocampus, the brain region that normally initiates new memories, the damage from dementia may be more extreme. An Alzheimer's patient may lose just about all of the hippocampal CA1 cells crucial for memory formation.31

No one can expect to escape this tragic personal fate unless first they have eliminated the many known negative risk factors for dementia from their life. Secondly, they have to practice total health management with commitment and discipline. An important part of THM for the brain is to take advantage of nutrients that are safe over the long term, have proven brain benefits, and have shown real benefits in dementia. On the short list that exists, PS is at the top.

PS Double Blind Trials Show Benefit Against Dementia
A number of double blind trials have been conducted with PS on Alzheimer’s and non-Alzheimer’s dementia. The first double blind trial with PS on Alzheimer’s was conducted in Belgium by Delwaide and colleagues, and published in 1986.32 A summary of this trial is provided in Appendix 1.

The Delwaide trial found that PS significantly improved many of the “activities of daily living” for these dementia patients. These included personal grooming, dressing, feeding, bowel control, bladder control, ability to go to the toilet unaided, and verbal expression. After only six weeks, PS at 300 mg per day had made a real difference to Alzheimer’s patients and their families. The authors noted, “…the changes observed in the present study reflect an improvement in behavior which can be useful for patients and their families.”

The next double blind Alzheimer’s trial with PS was the Italian Multicenter Study of Dementia, carried out by 22 researchers working in seven Italian neurology research centers. Coordinated by Professor Luigi Amaducci, its findings were published in 1988.33 Perhaps because a lower dose of PS was used in this trial (200 mg per day), it took six months for the full effect of PS to come through. There was a statistical trend toward benefit from PS that fell short of the minimum required 95 percent probability. Within the PS group, however, a subgroup of the most severely afflicted patients had derived statistically significant benefit from PS as compared to placebo. An interesting outcome of this trial is
that these severe patients continued to improve for three months following the end of dosing with PS.

Then came the 1992 double blind trial by Dr. Tom Crook and his international collaborators. Using their advanced testing methodology, along with global clinical assessments done both by physicians and by the patients' family members, they also found that PS was useful for Alzheimer's. It could not be called a breakthrough therapy, but after three weeks on the 300 mg daily dose of PS, and continuing through the three months of the trial, the PS group performed significantly better on tests such as memory for names of familiar persons, misplaced object recall, details of events from the previous day, and details of events from within the past week.

In this trial, a subgroup of patients who were the least afflicted when they entered the trial were found to derive the most benefit from PS. These mild Alzheimer's patients significantly improved their ability to concentrate while on PS, became less inclined to complain that their memory was deteriorating, and showed significant improvement over placebo when assessed by physicians. Dr. Crook's group concluded that PS offered meaningful, if modest, benefit to patients with mild Alzheimer's progression.

Later came a large Italian multicenter double blind trial, coordinated by Cenacchi and published in 1993. This trial established that PS could be administered long-term (up to six months) to elderly patients taking a variety of drugs, without increasing the risk of bad side effects. The group who received PS at 300 mg per day had significantly improved memory and learning on a word test, also improved motivation and overall awareness. Crook and colleagues concluded, "The resulting improvements in adaptability to the environment can have an important impact on the quality of life of such patients."

Other trials were conducted with PS on dementia patients, with varying designs and looking at a variety of clinical and physiological measures. Taking all these trials into consideration, it is clear that PS is not a single-nutrient therapy for dementia, but it does offer some degree of value.

For some of these patients with dementia, PS achieved limited improvement of cognitive functions. For the majority of these patients, PS improved Activities of Daily Living, including personal hygiene and the other daily personal tasks that healthy people take
PET scanning measures energy production in the brain. This woman with Alzheimer's had very poor energy production (top row of scans) until after receiving PS at 500 mg per day for three weeks (bottom row). Note the scale at right, with yellow and red being the highest energy levels.

From Klinkhammer and colleagues.

for granted. In these respects PS seems to be as good as, or better than, any other single intervention for dementia.

Even for patients with full-blown Alzheimer's, PS sometimes would make a measurable difference to brain function. One German study with PS used high-technology "PET" imaging (positron emission tomography) to measure energy production across the brain in patients with advanced Alzheimer's. They displayed significantly enhanced brain activity after taking PS for three weeks at up to 500 mg per day.

However much PS does benefit a patient with dementia, the considerable clinical evidence available to us makes one thing clear: the earlier people start on PS, the better the result they can hope to get. The chances to slow or possibly partially reverse the declining cognitive functions are much better if the individual is started on PS at the stage of AAMI or some other stage less advanced than the dementia diagnosis.

The chapters that follow move beyond using PS for memory and cognition into detailing its proven usefulness also to improve mood, anxiety, and coping with mental or physical stress. As these themes are developed, the superiority of PS, the orthomolecular nutrient, continues to be evident, so also does the relevance of total health management to fuller realization of the benefits of PS.
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