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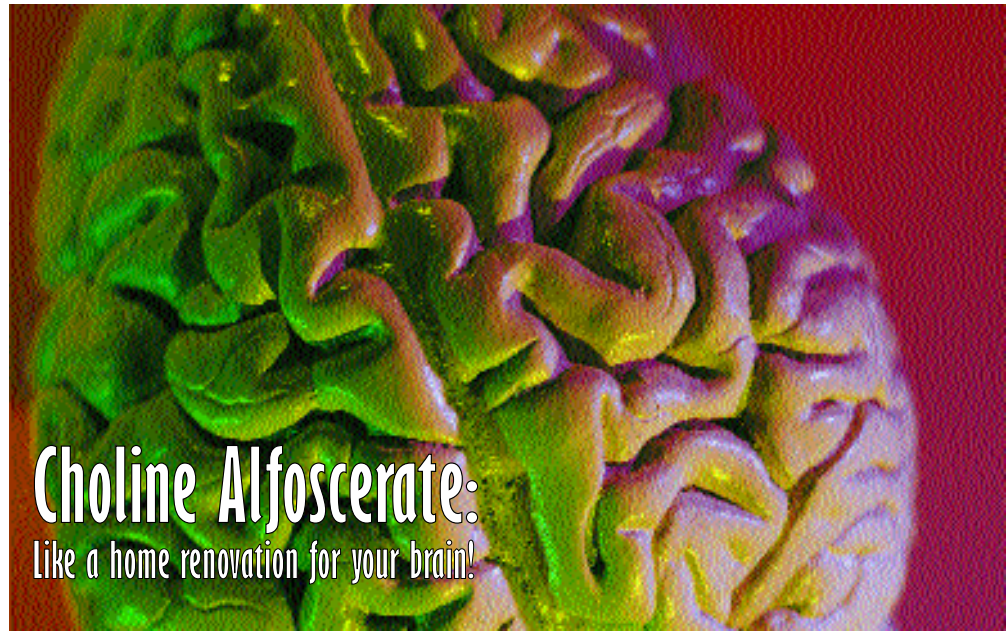
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A recent syndicated newspaper article reported the results of a survey of people's attitudes about aging. One of the most remarkable findings was the large number of people who reported that, given the option, they would not live to be centenarians. This result was at first quite surprising, granted that so many of us are working hard to ensure that we do just that! But the article later resolved the contradiction: most of these people are not afraid of *living long*; rather, they are afraid of *growing old*. What these respondents were concerned about was the slow *loss of function* which accompanies what we straight-facedly refer to as "normal" aging.

They have a point. From accelerating incidence of diseases of all kinds, to loss of strength and resilience, and the fading of youthful zest for life, growing *old* is not an

attractive option. And, perhaps not surprisingly, the single greatest fear expressed by respondents was **loss of cognitive function**. A long life with such terrible mental disturbances as **Alzheimer's disease (AD)** or **vascular dementias** is perhaps worse than no life at all: it is to be alive, but to lose what makes us who we are -- what makes us fundamentally human. And, even if we do not face such severe mental disorders, the loss of general mental function which often accompanies the aging process -- characterized as **Age-Related Cognitive Decline (ARCD)** by the American Psychiatric Association<sup>1</sup> -- leads to real loss of *quality* of life, which can make one question the value of more *quantity*.

### Cholinergic System Key

While complex mental process like memory and attention cannot be reduced to a single, simple chemical pathway, it is



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Holistic International, manufacturers and distributors of the most exciting lines of envelope-pushing nutritional supplements in Canada, welcomes you to the premier issue of The Holistic Lifestyle, published eight times a year. The Holistic Lifestyle is designed to provide our customers with essential information and news of breakthrough research to help you make the best decisions to meet your health goals through supplements and lifestyle choices.

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We want to hear from you!

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undeniable that the function of the **cholinergic system** of the brain -- that part of the brain which uses the neurotransmitter **acetylcholine (ACh)** as its chemical messenger -- is central to our mental function, and especially our ability to focus and to remember facts and verbal information. In younger subjects, this leads to a fairly simple equation: provide the brain with more choline -- the B-vitamin-like raw material from which the brain synthesizes ACh -- and the cholinergic system makes more ACh, and memory improves<sup>3, 4</sup>. But the same strategy fails in older subjects<sup>5</sup>. The problem -- and its solution -- lies in the **age-related decline in the structure and function of the cholinergic system itself**.

### Loss With Age

The aging brains cholinergic function is impaired at several points, all of which affect mental performance. First, there is the **ability of the brain to take in necessary raw materials**. Ordinary choline is an electrically charged particle, and such particles do not readily cross the **blood-brain barrier (BBB)**. Instead, the BBB uses special transport "shuttles" to draw choline out of the blood and into the brain. But the BBB has a limited number of these shuttles, and their number and efficiency declines with age, such that, when older and younger individuals are given an equal amount of choline, their plasma choline levels go up equally, but **brain choline uptake is roughly one-quarter as high in older subjects**<sup>19</sup>.

### Sluggish Enzymes

Next, there is the issue of enzyme activity. A key enzyme in the regulation of ACh is **choline acetyltransferase (ChAT)**, which makes acetylcholine from choline. In aging humans, ChAT activity is impaired, while the activity of acetylcholine breakdown enzymes is increased<sup>20</sup>, such that **aging brains make less acetylcholine** from the choline available to them, while **they tear acetylcholine down**

**more quickly**. When you put lower raw material supply together with slower production and faster breakdown, you have an acetylcholine "factory" whose production is hopelessly behind product demand.

### Brain Cell Retreat

Additionally, the **cholinergic neurons also atrophy with age**<sup>23, 24</sup>: the number of neurons declines, and those neurons which remain literally shrink, withering away and becoming less well-connected to the rest of the brain. The effect happens most pronouncedly in the regions of the brain just beneath the cortex<sup>25</sup>. This decay is made all the worse by the fact that **the ability of the surviving cholinergic neurons to release and respond to ACh is also impaired with age!** There are two main reasons for this loss of function. First, the composition of the **nerve cell membrane changes over time**, becoming less fluid and responsive. This makes it harder for the neuron which is sending the signal to release the ACh messenger, and harder for the receiving neuron to pick it up. In addition, some of the receptors to which ACh is designed to bind -- the "mailbox" to which they are addressed -- also decline with age. There are several types of cholinergic receptors, each of which controls a different type of activity in the body, from the control of smooth muscle to the regulation of the heartbeat. Only one such class -- the **muscarinic-type-1 (M1) receptors -- are involved in higher mental function**<sup>21</sup>. While most other cholinergic receptors remain plentiful throughout life, **M1 receptors decline with age**<sup>22</sup>. When the postal worker gets slower and the mailbox becomes harder to find, communications break down.

In short, the cholinergic system of middle-aged people begins to appear to be a chain with numerous weak links in it: strengthening just one link still leaves other weak spots, leaving the chain just as easy to break as it was to begin with. What we

# Choline Alfoscerate:

need is a **supplement which strengthens all the weak links in the chain of cholinergic function**. With so many aspects of cholinergic function decaying with age, this sounds like an impossibly long job description; amazingly, however, **such a supplement exists**, and its name is **choline alfoscerate**.

## Choline Alfoscerate

**Choline alfoscerate** (al-FOSS-er-ate), also known by the long-winded scientific name of **alpha-glycerolphosphorylcholine (GPC)**, is a **phospholipid** -- a member of the family of fatty substances which are the most important building blocks in the construction of nerve cell membranes. Other phospholipids include **phosphatidylserine** and **phosphatidylcholine** (see info. sheets on **PS-100** and **Mega PC-35**, as well as **Citicoline** (which is a phospholipid building block)). It turns out that **choline alfoscerate meets all the requirements for the restoration of cholinergic function**. To begin with, **choline alfoscerate is a rapidly-absorbed source of choline, which easily enters the brain**. **GPC** raises free plasma choline more rapidly than other uncharged choline precursors<sup>27</sup>. Because it is a lipid, it does not carry the electrical charge of dietary choline, and so freely crosses the blood-brain barrier, and the choline from **choline alfoscerate** is incorporated into brain phospholipids within 24 hours of absorption<sup>29</sup>.

While no human data is currently available, two animal studies suggest that **choline alfoscerate** may also **improve the levels of ChAT**. One study in aging rats<sup>28</sup> found that **GPC** partially restored youthful ChAT levels in the **hippocampus** (an area of the brain where short-term memories are consolidated into long-term ones). The study is hard to interpret, however, and as the authors note, the impact on the aging brain needs clarified by further studies. Another study<sup>29</sup> looked at animals which were given lesions to the **nucleus basalis**,

an area of gray matter in the forebrain which is extremely rich with cholinergic neurons. Not surprisingly, such animals showed reduced levels of all cholinergic enzymes tested; but, remarkably, these **losses were reduced by treatment with choline alfoscerate**.

## Brain Renovation

But it is in the **restoration of the physical structure of the cholinergic neurons** that **choline alfoscerate** exerts its most remarkable effects. Because it is widespread in cell membranes, **choline alfoscerate** is vital to the growth and maintenance of all cells, but most especially those of the cholinergic nervous system. In fact, **GPC is incorporated more readily into the brain than into other tissues**<sup>33</sup>. Indeed, human breast milk contains more GPC than any other choline-containing compound for just this reason<sup>26</sup>. Since soy-based infant formulas contain much less **choline alfoscerate**, concerns have been raised about how well these formulas can support the rapid growth of the brain and nervous system that infants undergo.

## Restored Fluidity

**Choline alfoscerate** makes an astonishing variety of aspects of the architecture of the cholinergic system more youthful. It **restores membrane fluidity**<sup>30</sup>, making the neurons more responsive and able to release ACh, both by direct incorporation into the membrane and because it **inhibits the enzyme that breaks down the other phospholipids**, such as phosphatidylcholine<sup>31</sup>.

## Restored Fluidity

More profoundly, **GPC selectively restores the number of memory-specific cholinergic receptors**. Recall that only one subclass of cholinergic receptors (M1) are involved with ACh's cognitive effects, and that they decline with age; by contrast,

other classes uninvolved with the mind (such as M2) remain constant throughout life. In animal experiments, **choline alfoscerate increases M1 receptor density without affecting levels of M2 receptors**<sup>31, 32</sup>. Neither choline itself, nor other choline compounds (such as phosphorylcholine) was able to accomplish this feat.

## Hold Onto Your Brain Cells!

Even more incredibly, **choline alfoscerate actually increases the number of cholinergic neurons as well**. Animal studies show that **choline alfoscerate counters the age-related loss of Purkinje neurons in the cerebellum**<sup>34</sup> and the **mossy fibers of the hippocampus**<sup>35</sup>, a nerve cell type *central to associative memory*. It also increases the density of these fibers after trauma<sup>36</sup>. In addition, **GPC may reverse the atrophy of existing cholinergic neurons**, as suggested by studies showing **GPC's ability to increase the number of receptors for nerve growth factor (NGF)**<sup>37</sup>. NGF is the peptide responsible for the growth of **neurites**, the bushy neuron "branches" which connect nerve cells to one another. Supplying NGF to aged rhesus monkeys clearly **reverses cholinergic neuron atrophy**, restoring the number and size of these neurons to more youthful levels<sup>25</sup>.

## Clinical Proof

When a supplement supports such a broad range of aspects of youthful cholinergic function, we expect to see impressive impact cognitive function -- in ARCD, Alzheimer's, and other cases of memory loss involving the cholinergic system. And, indeed, the clinical evidence proves this intuition correct. After preliminary trials in animals<sup>39</sup> and healthy humans<sup>43</sup> proved **GPC's ability to antagonize loss of memory and attention** induced by the anti-cholinergic drug **scopolamine**, trials were begun to see if **choline alfoscerate** could be helpful in a variety of dementias.





In one controlled trial in victims of **vascular dementia**<sup>44</sup>, **greater improvements on several measures of cognitive function were seen** amongst those patients treated with **choline alfoscerate** than in those given another choline precursor; the differences were statistically significant, and both patients and physicians rated the results with **GPC** more satisfactory.

### Alzheimer's Disease

Another controlled trial in **Alzheimer's disease**<sup>45</sup> compared the efficacy of **choline alfoscerate** to that of **acetyl-L-carnitine (ALCAR)**, a nutrient already proven to slow the progression of AD in younger patients<sup>46</sup>. **Most behavioral and mental function test results showed improvement in the choline alfoscerate group** -- improvements greater than those seen in the ALCAR group.

In addition to the direct impacts on cholinergic function, there appears to be an additional mechanism for the benefits observed in AD patients taking this remarkable supplement. The development of **AD is believed to involve inflammation of the affected parts of the brain**: degenerative portions of AD patients' brains show unusually high activity of the **cyclo-oxygenase II** enzyme, an enzyme involved in making proinflammatory cellular "hormones" (the **series 2 eicosanoids**). And, indeed, arthritis and leprosy patients who receive long-term treatment with anti-inflammatory drugs appear to be at decreased risk for developing AD<sup>6</sup>. A metabolite of **choline alfoscerate** reduces the release of **arachidonic acid**, the building block of these inflammatory microhormones, thereby reducing the production of these inflammation triggers<sup>7</sup>. This may be important in the development, and perhaps the treatment, of this all-consuming disease.

**Behavioral and mental function test results showed improvement in the choline alfoscerate group.**

### Stroke

Yet another trial monitored the progress of 2044 patients who had recently had **strokes** or **transient ischemic attacks (TIAs)** and who were being treated with **choline alfoscerate**<sup>47</sup>. **Statistically significant improvements were seen on several scales of cognitive performance**, such that the **Mini Mental State (MMS) score was found to be within the normal range**, Chrichton Rating Scale (CRS) decreased by a significant 4.3 points, and the **Global Deterioration Scale scores indicated "no cognitive decline" or "forgetfulness"** rather than clinical mental impairment.

### Hope For Michael J. Fox?

There is also a hint that **choline alfoscerate may prove of use in Parkinson's Disease (PD)**. PD is characterized by reductions in the production of the neurotransmitter **dopamine** in an area of the brain called the **substantia nigra**. This leads to a loss of motor control, typically manifesting in facial ticks or tremors, dry mouth, and a "mask-like" facial expression. In laboratory animals<sup>38</sup>, **measures of dopaminergic activity were enhanced by GPC treatment.**

### For Mind And Body

In addition to its exciting potential for supporting the healthy functioning of the **brain**, **choline alfoscerate** may provide us with part of the key to reversing some of the more visible symptoms of the aging **body**. For some time, research has been focussing in on the age-related loss of **human growth hormone (hGH, or somatotropin)** as a major source of the symptoms of aging. hGH helps keep our bones strong, our immune systems vigorous, our wound-healing abilities optimal. It builds muscle and burns fat. Its levels are high in our youth, when all of these functions are at their peak, and their

decline follows the decline in many aspects of youthful function. The power of hGH to reverse the "somatopause" (as it is now called) was demonstrated in a landmark experiment published in the *New England Journal of Medicine* in 1990<sup>2</sup>. Rudman and coworkers studied twenty-one older men with the low hGH levels typical of their age group, putting them through a variety of tests, and then giving them injections of either growth hormone or a placebo three times a week. Six months later, the group receiving dummy injections were the same as when they began the study. But the men in the hGH group had been transformed. With no change in their lifestyles, the men receiving somatotropin had **8.8% more lean body mass** than they had begun with, had **lost 14% of their body fat**, and had **gained 1.6% more bone mass** in their lumbar<sup>2</sup>. After a year of follow up, these results would become even more profound: their **skin thickness was elevated by 4%**, **liver volumes were 8% greater**, and **spleen volume was increased by 23%**, while a composite score of ten sites' **muscle mass showed increases of 11%**<sup>8</sup>. The spleen volume increase was singled out for particular



attention, as it suggested "the possibility that the repletion of GH in these elderly individuals may have some impact on the deficiencies in **cell-mediated [T-cell]**

# Choline Alfoscerate:

Like a full renovation for your brain!

immunity which are known to occur in many elderly people.” In the words of Dr. Rudman, the changes seen in these parameters “were equivalent in magnitude to the changes incurred during 10-20 years of aging.”<sup>2</sup>

## Cholinergic Connection

Instead of the blunt instrument of hGH injections, however, what we would ideally want would be to **restore our bodies’ own youthful somatotropin releasing pattern**. Surprisingly, the pituitary would appear to *produce* the same amount of hGH throughout life. It is not the production, but the *release* of the hormone which declines with age. This appears to be primarily due to an **increase in the production of somatostatin (SS)**, a peptide hormone which inhibits hGH release. And the reason for the increased SS would appear to be the very **reduction of the activity of the cholinergic system** which is so effectively reversed by **choline alfoscerate**<sup>13</sup>. **The cholinergic system is thus a central key to hGH release**. Indeed, it has been repeatedly shown that substances which increase the activity of the cholinergic system in the brain increase hGH output, and that substances which inhibit the system also inhibit hGH<sup>14, 15, 16, 41</sup>. In fact, the amino acid **arginine**, a favorite hGH releaser, can have its action **completely blocked by cholinergic inhibitors**<sup>14</sup>. And, indeed, arginine supplements do not appear to work as hGH releasers in older men<sup>18</sup>. The conclusion is obvious: **to restore youthful hGH release, restore youthful cholinergic function**.

## Restored Release

Based on the studies we’ve already reviewed, one would expect that **choline alfoscerate** might help unlock our hGH stores. And there *are* data -- both animal experiments<sup>40</sup> and a controlled human trial<sup>42</sup> -- to prove this guess right. But some proponents of **GPC** have disingenuously implied that **choline alfoscerate** will dramatically increase hGH levels in young

athletes when taken by itself, and there is simply no evidence to support these overblown claims. But the human study *does* show that that **GPC will significantly raise hGH release in older subjects, and will do so dramatically when used in combination with stimulation by growth-hormone releasing hormone (GHRH)**. GHRH is the hormone which plays the role of “accelerator” of growth hormone release to somatostatin’s “brakes.” As would be expected, younger subjects -- who already have healthy cholinergic systems, and whose SS levels are thus still at youthful low levels -- show much less improvement than older ones. While younger (average age 32) subjects treated with **choline alfoscerate alone** show almost no improvement in hGH release, older subjects’ levels rise quite significantly. More impressively, when the two groups are administered **GPC** in combination with GHRH, young subjects’ hGH levels increase 130% compared to GHRH alone; but when given the same **choline alfoscerate /GHRH** combination, **older subjects’ hGH is tripled** compared to the GHRH-alone treatment. Taking **choline alfoscerate** in combination with other hGH releasers -- especially those which directly stimulate hGH or GHRH, such as **niacin** (as in our **No-Flush Niacin**), **glutamine**, and serotonin precursors (such as **5-HTP** -- see our **Tryfonia** writeup) -- may thus provide the same potent synergistic effect seen in this trial.

## Hints For Future Therapies

**Choline alfoscerate** may also be of benefit in other conditions, although the evidence is preliminary. British investigators have reported that the **GPC** content of estrogen-sensitive breast tumors shows negative correlation with measures of cell proliferation<sup>48</sup>. That is, **the more choline alfoscerate in the cell membrane, the slower these tumors**

**grow**. There is also the possibility that **choline alfoscerate** may provide nutritional support for **muscular dystrophy**: in a mouse model of this disease, the synthesis of **GPC** is inhibited, such that one researcher has concluded that **defective choline alfoscerate synthesis is “the primary lesion”** in this model of the disease<sup>49</sup>. While cause and effect are uncertain in both these cases,

the tantalizing suggestion of benefit, and the supplements excellent safety and lack of any side effects more serious than upset stomach, make **choline alfoscerate** worth looking into.

**Choline alfoscerate** is already a major player in the treatment of ARCD, Alzheimer’s disease, and other cognitive dysfunctions in Italy, as **SAMet** is for depression. In making this versatile supplement available to North Americans, **Advanced Orthomolecular Research** expects to be on the crest of a similar breaking wave.

**Older subjects’ hGH is tripled compared to the GHRH alone treatment.**



Did you know?

Vinpocetine, the periwinkle extract, is usually thought of as a powerful enhancer of brain metabolism, increasing blood flow to the brain while making it easier for oxygen and blood glucose to cross the blood-brain-barrier. But studies show it can help protect hearing, reduce calcium deposits in the kidneys and help visual function in macular degeneration.





# Choline Alfoscerate

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## A new trial reports...

### B-Vitamins *Reverse* Atherosclerosis

Over thirty years ago, after reading the case records of *children* who, because of inherited defects in their ability to metabolize the toxic amino acid **homocysteine (Hcy)**, had died with advanced **arteriosclerosis** -- one of them a two-month-old infant! -- Dr. Kilmer McCully alerted the medical world to the possibility that homocysteine might be a major factor in the development of hardened arteries<sup>1</sup>. Through the '70s and '80s, McCully continued to sound the homocysteine alarm, despite the ridicule of the medical establishment, until powerful epidemiology -- published in such paragons of medical orthodoxy as The Journal of the American Medical Association<sup>2</sup>, The Lancet<sup>3</sup>, and The New England Journal of Medicine<sup>4</sup> -- began to prove McCully right. These studies found that **people with high homocysteine are approximately three times as likely to experience heart attack, stroke, or a cardiovascular death** as those with the lowest levels. This was a dramatic breakthrough, because controlled trials clearly show that **homocysteine levels can be safely and quickly lowered using some common B-vitamins and B-vitamin-like compounds: folic acid, pyridoxamine (vitamin B6), cobalamin (vitamin B12 -- in the form of methylcobalamin (see writeup for ThinkWell)), and trimethylglycine (TMG -- see writeup)**. Exactly because of this research, all of these nutrients are represented in **Jarrow Formulas' advanced methylation formula, Methyl Donors** (see our writeup on this product). The conclusion seemed obvious: **taking these nutrients represents a safe, inexpensive way to dramatically reduce a major independent risk factor for cardiovascular disease (CVD)**.

#### Skeptics

Still, there were skeptics in the medical establishment. Perhaps high homocysteine did not actually *cause* cardiovascular disease, they suggested: perhaps vascular disease caused elevated homocysteine, rather than vice-versa; or perhaps Hcy was a *marker* for arterial disease, but not a cause, and lowering Hcy would not affect the development of disease.

#### The Ravages

It is hard to take these arguments seriously. **Homocysteine impairs healthy dilation of the arteries** by nitric oxide (NO)<sup>7</sup>, **speeds the aging of blood vessel cells**<sup>8</sup>, **causes growth of smooth muscle cells in the arteries**<sup>10</sup>, **increases formation of blood clots**<sup>11</sup>, and **directly damages the endothelium**<sup>12</sup>, as well as possibly **increasing oxidative stress** in blood vessels<sup>9</sup> (ie. the balance between free radicals and antioxidant protector-molecules). Yet to be *absolutely certain* of the association, one thing is clearly missing: a randomized, double-blind, placebo-controlled prospective trial of B-vitamins and TMG against arteriosclerosis. And, indeed, Dr. Meir Stampfer of Harvard, lead investigator in one of the first truly conclusive studies on homocysteine and heart attacks<sup>2</sup>, has been crying for an immediate trial for years now<sup>5</sup>. But with the risks so small and the potential benefits so great, few health-conscious people -- especially those with a family history of CVD -- have been willing to wait for final, unarguable proof of a causal connection.

#### The Trail

Now, a new open trial<sup>6</sup> brings us dramatically closer to final certainty. Scientists in the Stroke Prevention and Atherosclerosis Research Center in London, Ontario administered high-dose **folic acid, B6, and B12** daily to 101 cardiovascular disease patients with both high and more "normal" Hcy levels, and then monitored the progression of their

atherosclerosis. Before entering the trial, these patients were all experiencing increases in plaque area on the artery leading from the heart to the brain, despite having been treated aggressively for standard risk factors with diet, exercise, cholesterol-lowering drugs, and having been helped to quit smoking. **B-vitamins not only slowed, but reversed, the progression of atherosclerotic plaque** -- not just in the high-homocysteine group, but also in those with "normal" Hcy. The high-Hcy group, who had been experiencing yearly increases in plaque area of 0.21 cm<sup>2</sup>, had *decreases* of 0.049 cm<sup>2</sup> after vitamin therapy; but **even those with "normal" Hcy levels showed reductions in plaque size**, going from annual spread of plaque area averaging 0.13 cm<sup>2</sup> to a yearly *disappearance* of 0.024 cm<sup>2</sup>!

**even those with "normal" Hcy levels showed reductions in plaque size**

Granted these astounding results, it is unfortunate that the trial was not a "gold standard" double-blind trial. For although the patients who received B-vitamins instead of placebo are surely grateful for getting "the real thing," many other patients will not hear about this low-risk, low-cost, simple solution to a deadly problem from their conservative physicians until the unarguable, conclusive proof of a large double-blind trial arrives. It's also too bad that the investigators did not include **trimethylglycine** in their homocysteine-fighting cocktail, since **TMG** is an extremely potent homocysteine-lowering agent, which even works in patients for whom other vitamins are ineffective because of enzyme deficiencies<sup>13, 14</sup>. Despite these limitations, however, this trial powerfully suggests two important conclusions. Firstly, as Dr. McCully has been predicting for a generation, **B vitamins lower homocysteine and reverse cardiovascular disease**. Secondly, and perhaps more surprisingly, **even persons with Hcy levels usually considered "safe" stand to benefit from these supplements**.

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# Eyes wide open



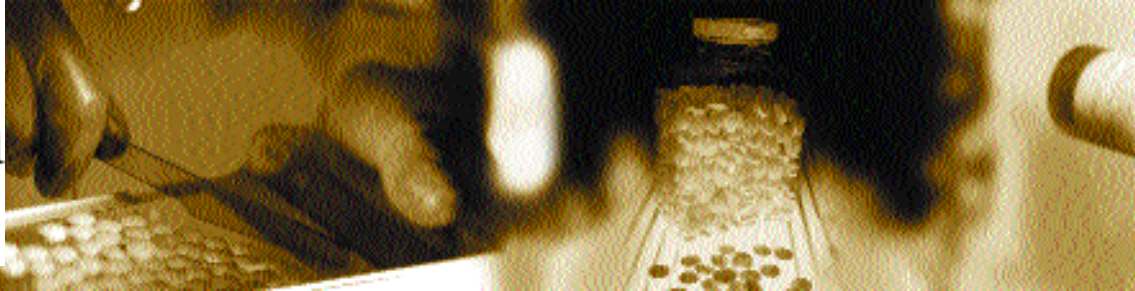
## Did you know?

**Lipoic acid (ALA)** is a rising superstar in the antioxidant field because of its role in recycling the "antioxidant network" and its ability to help reduce warping of proteins by blood sugar. But ALA is quickly flushed from the body- its half life is only 20 - 40 minutes! Thiotene SR is a pharmaceutical-grade sustained-release ALA system, providing six hours of continuous ALA production.



As the earth's protective ozone layer thins, cases of blindness from cataracts are beginning to skyrocket, while macular degeneration is already the leading cause of blindness in adults. Free radical damage, poor circulation in the retina, and AGEs (sugar-warped proteins) play roles in these diseases. Vision optimizer is specially formulated to provide nutritional support for healthy eye function.

- Potent antioxidants.
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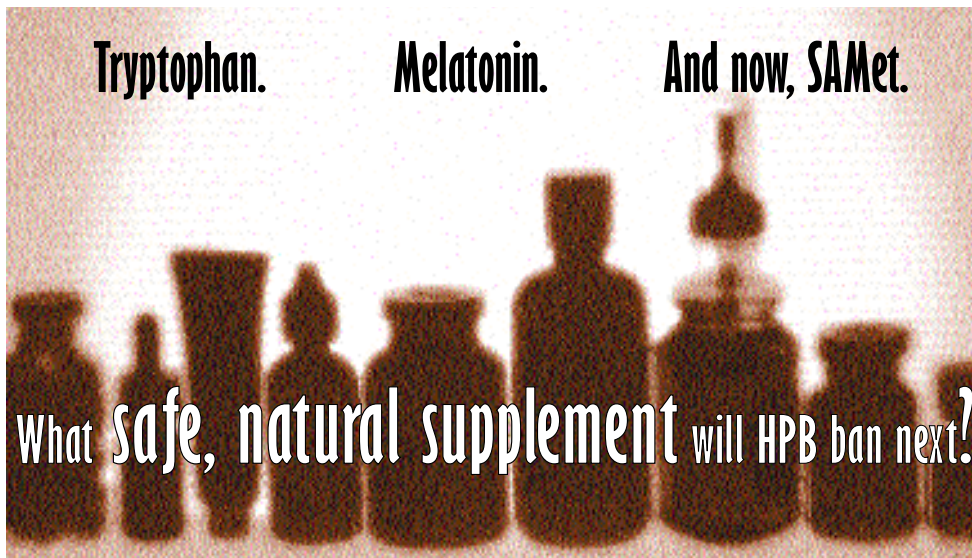


Canadians from all walks of life

have made it clear... that they are taking charge of their health.

They want freedom of choice in making health decisions. And, they want enhanced access... to a full range of natural health products”.

-HPB Web site



**SAMet** (s-adenosylmethionine) was first introduced to Canada by Advanced Orthomolecular Research, the flagship label of Holistic International, in October of 1998. At the time, it was an unknown, and thus demand for the product was not impressive, but AOR continued to quietly sell our stable, reliable formulation, pleased to be helping so many of our customers return safely and naturally to health.

All this changed by mid 1999, as North Americans discovered what health-conscious Europeans have known for twenty years: that SAMet is a remarkably safe and amazingly effective **antidepressant**, as well as providing support for **osteoarthritis, liver function, fibromyalgia**, and perhaps the **aging process** itself. We were happy with the increased sales, but at the same time, we were saddened by the many poor-quality imitation products which began to flood the market: products mislabeled as to content (indicating the amount of *total complex* rather than *active SAMet ion*); products not stably enteric-coated or packaged; products using poor-quality raw materials; and some products containing *no SAMet at all*. So when we learned that a major Canadian health magazine was running a feature on SAMet, AOR felt the time was right to place an ad outlining the quality issues differentiating our product from the many misleadingly-labeled or outright fraudulent products.

How ironic, then, that just one day after we had submitted this ad, we received notice that *Health Protection Branch (HPB) was banning SAMet* for sale in Canada. We -- and other SAMet manufacturers and distributors across Canada -- were notified that SAMet had been placed in **Section 2.1** of the Therapeutic Products Compliance Guide. This section declares a substance a *drug*, even in the absence of claims, and means that, before the product can be sold again, each manufacturer must go through the sort of approval process normally required for synthetic drug pharmaceuticals, rather than that applied to vitamins. Sometimes called the “**black hole**,” this status essentially ensures that a substance will never come to market: on the one hand, it cannot be freely sold as a nutritional supplement, like calcium supplements; on the other hand, because it cannot be patented, even a pharmaceutical giant would not invest the enormous amount of money required to undergo the process required to get approval, since their capital would go to a product which they could not exclusively control. For reference, this is the same status that has kept melatonin out for reach of Canadians except by mail order or black market for almost a decade now.

While we are complying with this new legislation, we are outraged by it, as have been many of our customers. Since the ban, we



have received many calls, ranging from the furious to the despondent, from retailers and individuals telling us how much SAMet had helped them, their clients, or their loved ones, and begging us to sell them just a few more bottles. And, bitterly, it is just this help -- as reported not just by our customers, but by dozens of double-blind, placebo-controlled trials published in peer-reviewed medical journals -- which HPB insists makes SAMet a Section 2.1 drug! To quote from one letter (99-038629) we were sent:

"This determination is supported by the fact that the substance is marketed in several European countries for the treatment of depression, liver disorders, and osteoarthritis ... Information and promotions from the internet advocate **drug** [their emphasis!] uses for SAME, eg, "SAME is critical in the maintenance of cartilage and in the manufacture of important brain compounds such as neurotransmitters." Of course, to all but the jaundiced eye of a hostile bureaucracy, these are *not* "drug uses," any more than the statement that "vitamin C is critical in the maintenance of healthy bones and gums and the manufacture of important structural compounds such as collagen" advocates "drug uses." Rather, these

claims describe the *normal physiological function of these biologically essential substances*. HPB recognizes, and allows, the latter claim on vitamin C bottles; how do the former claims, placed on the *internet* or in *magazine articles*, constitute "drug uses"?

We are sympathetic to those who will now be denied access to this powerful, versatile, highly safe compound, and outraged at the lack of consultation with the industry, or respect for the democratic process, evidenced by this decision. We know that SAMet users feel the same way, and expect that many non-users will be angered by the continued assault on their health freedom, even though the decision does not affect them personally. Concerned citizens may wish to contact the Minister responsible for oversight of HPB. Hopefully, with the

imminent activation of the new **Office of Natural Health Products**, public pressure will allow the ONHP to wrest SAMet away from Section 2.1 drug status, and place it where it clearly belongs: as a natural health product, in the hands of health-conscious Canadians.

**the substance is marketed in several European countries for the treatment of depression, liver disorders, and osteoarthritis ...**

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# Achieving optimal heart health just got a lot easier...

**Q** AOR's NADH costs about the same as [the other reputable NADH products], but [one competing product] is much cheaper than yours or anyone else's. What's the deal?

**A:** The company to which you refer is notorious for its low quality. When independently tested, its products have repeatedly been found to not contain the label claim for percent extract and/or amount of active ingredient. We would find it difficult to trust in the quality of *any* product in their line, and in the case of NADH one must be an extremely discerning consumer. This is because



NADH is an inherently unstable compound, which is difficult to handle and to deliver in a reliable dosage without having it undergo degradation. This instability is part of the very nature of the substance and its biological function: NADH is a high-energy compound, used by the body to shuttle energy derived from the food you eat into the **electron transfer chain** in the **mitochondria** (the cellular "power plants"), where **ATP** (the universal energy "currency") is manufactured. **NADH** is used for this purpose in the body precisely because it can take up and release energy easily; and because of this ready energy-surrendering property, it will quickly break down if not carefully stabilized and enteric coated by pharmaceutical professionals as is done with AOR's product. We have a hard time crediting this company with this level of quality control, granted that they have shown themselves unable to produce properly-standardized versions of such

basic "staple" herbals as St. John's Wort and Ginkgo biloba. Interestingly, the company's latest catalog does *not* refer to the substance as **NADH**, but as *NAD* -- the *breakdown product* of NADH, left over after NADH gives up its high-energy hydride ion! This might just be a typo, but granted the company's reputation, we wonder ...

**Q** What's the difference between TG-100 and T-100X? Which one should I take?

**A:** **T-100X** and **TG-100** are two different glandular products designed with different people in mind. Which to use depends on your particular health concern. **TG-100** is designed as a broad-based glandular formula, including moderate doses of many major glandulars to support the healthy functioning of the endocrine system as a whole. It is usually used by folks who are not concerned with the health of any *specific* gland, but are concerned about hormonal health. **T-100X**, on the other hand, is designed for people whose concern is targeted on the thyroid gland. **T-100X** contains a relatively high amount of thyroid glandular and several supporting botanicals and homeopathics, along with a small amount of other glandulars for balance, because the endocrine system does work as a whole, rather than each gland operating in isolation.

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Once a day with a meal...easy.

When it comes to heart health, cholesterol is not the whole story! High levels of the toxic amino acid homocysteine are now believed to be as big a risk factor as smoking, high blood pressure, or a bad cholesterol profile. Fortunately, homocysteine levels can easily be lowered with inexpensive B-vitamin family nutrients.



- B<sub>6</sub>, B<sub>12</sub>, and folic acid.
- Intrinsic factor for B<sub>12</sub> absorption.
- TMG-- The key nutrient! Also available on its own from AOR.

# The myth of the complex carbohydrate



## We have a difficult relationship with sugar...

On the one hand, our bodies use glucose as one of its principal fuels; in fact, the brain runs almost entirely on glucose, and cannot directly use protein or fat for its energy. Because it is a quick energy source, glucose is also good for quick bursts of energy, and our body thus releases a flood of glucose for immediate use in “fight-or-flight” emergencies. We’ve all experienced the problems of low blood sugar: sapping of energy, low motivation, and even wooziness as the brain is deprived of its energy source. On the other hand, high blood sugar is a major health problem, too -- and not just for diabetics.

Glucose is a chemically active substance, not an inert, neutral fuel. One of the things to which it likes to bind is protein. When blood sugar is high, it tends to react with the proteins in our cells, forming structurally-ruined protein /sugar complexes known as **Advanced Glycation End products (AGEs)**. This sticky refuse is appropriately named: the slow buildup of AGEs over the years stiffens our arteries, clogs our cells with the waste product **lipofuscin**, reduces the functionality of our kidneys, slows nerve transmission, and clouds over the lenses of our eyes. AGEs are a major source the complications of diabetes, but they are also implicated in the aging process itself.

Mention the word “sugar,” and most of us immediately think of soda pop and candy bars. But actually, all the carbohydrates in our diet are made up of sugars, from starches to monosaccharides. The differences in the carbohydrates present in our foods come down to two basic factors: the **length of the chain** of sugars strung together, and the **chemical structure** of the individual sugars making up the chain. All carbohydrates are made up of a fairly small number of very simple, isolated sugars called **monosaccharides**. From a dietary perspective, the most important of these is **glucose**. It is glucose that your body uses as fuel for the brain, and glucose is the most important sugar circulating in your blood. Other simple dietary sugars -- such as the **fructose** in grapefruits, or the **galactose** which forms part of the sugar content in milk -- are “isomers” of glucose: they have the same number and type of atoms in them, but these building blocks are arranged differently. But most of the carbohydrate in our diet does not come in the form of monosaccharides: instead, we get our sugars in longer or shorter chains, from the basic two-sugar-molecule **disaccharides** like the **lactose** in dairy products (which is made up of one glucose molecule bonded to one galactose molecule) to much longer sugar chains -- the so-called **complex carbohydrates**, like

the **starch** in wheat or potatoes (composed of long strings of glucose molecules). But when you break it all down, it all comes back to those three simple sugars.

So when, decades ago, doctors were first asked what changes diabetic patients could make in their diets to help keep their blood sugar levels stable, the answer seemed simple: more of the longer-chain carbohydrates. Complex carbs (so the theory went) would take longer to break down in the gut, and would thus give a “time-release” glucose supply, lowering the glucose spike and helping to fill in the blood sugar valley. It was a great-sounding little story. It made intuitive sense. In fact, it made *so much* sense that the story was preached as received truth, and accepted as



a proven fact, when it was never anything more than an hypothesis -- an hypothesis that had never been put to the test. The myth of the complex carb became so entrenched in mainstream medical thinking that it just didn’t seem worthwhile to invest the money and time to see just how quickly those sugars were really being released into the blood.

All this changed in the early 1980s. Starting in 1981, scientists like Thomas Wolever of the University of Toronto and Dr. Jennie Brand-Miller at the University of Sydney began giving subjects foods with equal amounts of carbohydrate in them and measuring just how much glucose was released into the bloodstream. And whether they used healthy volunteers, diabetic patients, athletes, or people with

# The myth of the complex carbohydrate continued



heart disease, the results were essentially the same: **the simplicity or complexity of the carbohydrate bore almost no relationship to the glycemic response**<sup>3</sup>. The “complex carbohydrate” story turned out to be a complete myth.

Make no mistake: there *are* real differences between the rate at which different foods release their sugars into the blood -- that is, between the **glycemic indexes (GIs)** of different foods. But cooking at a ranking of tested foods<sup>2</sup> is like staring

**The higher the GI of the carbs a person eats, the greater his or her risk of developing diabetes.**

into the looking glass: not only does the table not look like the ranking predicted by the “complex carb” story, **the glycemic index tables look like the expected tables turned on their head**. Wheat, rice, and potatoes, for instance, are among the *fastest* sugar-releasers yet tested; by contrast, many foods we think of as “sugary” because of their sweetness -- such as black cherries and grapefruit -- are extremely low-GI foods. Even candy bars and table sugar, while relatively high-GI, still beat an *equal amount of carb* in the form of whole wheat bread or rice cakes in terms of how quickly the sugars they contain spike -- and crash -- blood sugar levels. This doesn't make table sugar any more nutritious (it's empty calories, void of nutritional value) but it does mean that many foods that are both sweet *and* nutritious are better food choices than starches -- which are neither.

As it turns out, our GI tracts are a lot better at breaking down carbohydrate than anyone had guessed. True, there were some carbohydrates -- **dietary fibers** -- which the gut can't break down at all (although some of these fibers are digestible by our friendly bacteria). But when scientists looked at the *digestible* carbohydrate content of foods, they found that the GI tract made fast work of them, indeed. Chain length made no difference: irrespective of its “complexity,” carbohydrate is broken down into simple sugars in mere moments. What makes the difference is not the *length* of the

carbohydrate chains involved, but the *components* of the chain. The starch in potatoes and rice is made up entirely of **glucose, which is released directly into the bloodstream**. By contrast, the simple sugars in a grapefruit are dominated by **fructose, which must be converted into glucose in the liver before it is released into the blood**. And the lactose in milk is composed of 50% quick-release glucose, but also 50% **galactose, which is converted and released as slowly as fructose**.

Fiber content also makes a difference -- but it depends on the fiber type. The **insoluble fibers** typically present in grains have little effect on GI, so that white bread and whole-wheat have almost identical ratings. But **soluble fibers** -- the gums and pectins found in legumes and many fruits -- make the digested meal more viscous, slowing the emptying of the stomach and



thus the release of the sugars in the food. Another nutrient which slows gastric emptying, and thus lowers GI, is **fat content**, so that adding a little high-quality fat to a meal can help curb glycemic response. Other factors -- from the amount of processing of a carbohydrate (mashed vs. whole kidney beans, for instance, or parboiled vs. sticky rice), the

“superstructure” of starches (**amylose vs. amylopectin**), and even the presence of GI-lowering **fruit acids** like citrate and malate, also affect glycemic index<sup>6, 10</sup>.

The GI of a meal thus plays a major role in controlling our blood sugar, determining whether we get a sugary rush followed by will-sapping hypoglycemic doldrums on the one hand, or smooth sailing on the other. And this, in turn, affects a variety of parameters, from **insulin sensitivity and glucose tolerance**<sup>4</sup>, to **how much food we will eat** at our next meal<sup>5</sup>, to our capacity for **endurance sports**<sup>19</sup>. Further, because fast-releasing sugars drive up insulin levels, studies also show that there is a relationship between GI and risk of **diabetes: the higher the GI of the carbs a person eats, the greater his or her risk of developing diabetes**<sup>8,9</sup>. And because elevated insulin is a very powerful risk factor for **cardiovascular disease**, there is a strong argument to be made that high-GI carb eating may contribute to the development of this major killer too<sup>6</sup>.

So don't fall for the hype. Consider cutting back on the bagels, pasta, bread, rice, and potatoes, and eating more of most fruits, vegetables, and legumes. See how you like oatmeal as a breakfast cereal instead of Special K. You don't have to ride the blood sugar roller coaster.



## Did you know?

**The glycemic index broke into public consciousness with Barry Sears' Zone nutrition program. At the time, carrots were thought to have a very high GI (92), but newer research suggests it may be much lower (49). Now “zoners” --like wabbits-- eat carrots!**



**Representative Foods' Glycemic Indexes:**

100	.....	Glucose	44	.....	Oranges
98	.....	Baked Potato	42	.....	Whole Wheat Spaghetti
97	.....	Parsnips	42	.....	Whole Grain Rye Bread
87	.....	Honey	38	.....	Apples
80	.....	Cornflakes	38	.....	Tomatoes
72	.....	Whole Wheat Bread	36	.....	Ice Cream
72	.....	Watermelon	36	.....	Chickpeas
72	.....	White Rice	36	.....	Yogurt
69	.....	White Bread	36	.....	Lima Beans
68	.....	Mars Bar	34	.....	Pears
67	.....	Shredded Wheat	32	.....	Skim Milk
66	.....	Brown Rice	32	.....	Strawberries
64	.....	Beets	29	.....	Lentils
64	.....	Raisins	29	.....	Kidney Beans
62	.....	Bananas	26	.....	Peaches
59	.....	Corn	26	.....	Grapefruit
59	.....	Pastry	25	.....	Plums
59	.....	Table Sugar	23	.....	Cherries
51	.....	Bran	20	.....	Fructose
51	.....	Green Peas	15	.....	Soybeans
51	.....	Potato Chips	13	.....	Peanuts
51	.....	Sweet Potato	08	.....	Chana Dal
50	.....	White Spaghetti			
49	.....	Slow-Cook Oatmeal			
46	.....	Grapes			

For more complete, accurate GI lists, see Reference 2 below, or <http://www.mendosa.com/gilists.htm>

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You're only as strong as your weakest link

Over the years, some supplements have become so well-established, and so readily available, that we tend to think little of them, or (worse) think that they're all the same. Holistic International™ was the first to introduce some of these products (like Glucosamine Sulphate) to the Canadian market, and we continue to set the standard for purity and potency, where others cut corners on "commodity items." And we still occupy a unique niche with many of these classics, like our hypoallergenic tapioca-sourced Vitamin C and the precisely titratable dosing of the Ultra-Potent herbals. So remember next time you reach for that low priced name brand commodity item, how strong is your weakest link?



# The science of life...

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Ayurveda, literally "The Science of Longevity," is an ancient tradition of healing from India. Grounded in Indian philosophy, it focuses on balancing universal energies in the human frame, especially as manifested in the three *doshas* ("attributes" or "humors"): *vata* (vital spirit), *pitta* (bodily energy), and *kapha* (bodily stability). This process begins with detoxification and continues on to look at the health of the whole person.

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Kidneys

Adaptogen



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