

UNIVERSITY OF SCIENCE, ARTS AND TECHNOLOGY

Name: John F. Burchell

Address:

Email:

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Lloyd Jenkins

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INTRODUCTION

Nutrition or the food we eat provides the building blocks for a healthy body. We know, for example, that if a person was to consistently consume a low nutrition diet (i.e. Sugar soft drinks, potato chips, candy etc.), that quite possibly health challenges could result in the long-term, perhaps even the short-term. But the big question is: would their mental ability and skill for learning be compromised? Would their IQ actually decrease with nutritional deficiency?

Another equally compelling question is: would a diet rich in vitamins, minerals, phytonutrients, herbal supplements and proper fluids enhance a person's mental ability and skill for learning? Would their IQ and brain capacity actually increase with improved nutritional consumption?

The intent of this thesis is to explore nutrition and how it affects our ability to learn and perform in the area of education. To present compelling cutting-edge research showing that YES indeed our level of nutrition does affect our ability to learn and perform in the area of education.

SUBJECT OF INVESTIGATION

The focus of this thesis is to investigate The Importance of Nutrition in Our Educational System.

NEEDS, INTERESTS AND PROBLEMS DETECTED

Food manufacturers and processors often create “**food artifacts**” that look, smell and taste like the real thing. Are they reinventing what we think food to be, while the words “nutrition” and “food” have lost their true meaning in our advertising/marketing driven world?

Centuries ago food used to be brilliantly colored vegetables and fruits, deep brown grains, lean game meats, fresh fish caught in living lakes, rivers and oceans. Food used to be picked from the garden after a spring of planting and a summer of weeding and raking. It used to have roots deeply imbedded in the soil. Food as game animals used to feed on tender summer grass and drink from pristine lakes.

Food is different now.

Now we purchase packages, boxes, artificial flavors, nutritionally empty foods that strip the body of vital components. The question is: do they leave the brain nutritionally poverty-stricken as well? Modern food is colorful and flavorful, but not from natural sources. The

colors come from a chemist's lab, from Red No. 40 or Yellow No.5. The flavor comes from linalyl benzoate, allyl anthranilate or methyl delta-ionine. (No wonder the number of words in the English language is expanding so rapidly, we need to create new words for all of the new artificial food additives we invent each year!). Sauces and gravies are thickened with wood fiber (as if now the human race were from the beaver family) and emulsified by adding dioctyl sodium sulfosuccinate. While some of these artificial agents have been tested for their cancer causing properties virtually none have been tested to determine their impacts on brain chemistry.

The questions are:

Has our level of nutrition in the food we eat affected our ability to learn and to concentrate in our educational system?

Will higher levels of nutrient-dense food and nutritional supplements improve brain function and thus enhance our ability to learn and to concentrate in our educational system?

What foods or supplements are most effective for achieving this?

JUSTIFICATION OF THE THESIS THEME

The purpose of this thesis is to explore the Importance of Nutrition in Our Educational System. It outlines clearly, for teachers, parents and students, the deep need and methods to improve the nutritional intake for enhanced brain function.

OBJECTIVES

The main objective of the thesis is to show clearly through solid research the key needs and benefits of implementing a strategy for improved nutritional intake to enhance brain function.

GENERAL INFORMATION

It is my intent to present evidence so compelling that you will see beyond a shadow of a doubt that whether you are old or young (or in between) – enhanced nutrition definitely improves the ability to learn. Altering your diet, supplementing with vitamins, minerals and antioxidants keeps the brain functioning for a lifetime. Exciting strategies that could possibly boost performance on IQ tests, improve mood and memory and slash the odds of brain deterioration, as you get older.

GOALS

My primary goal is to prove beyond any doubt that the level of nutrition has a dramatic impact on the way we learn, remember, perform and feel in the process of education.

A secondary goal is to share methods for proper nutrition that have worked for myself and other researchers. If you take action on some of these golden nuggets of information and apply them in your own life, I know that you and all you share them with will reap great rewards.

How We Arrived At This Nutritional Destination

“Foods of the future will be different from foods currently consumed. They may have different shapes, colors, flavors, nutritional and pharmacological profiles, and longer shelf lives. Foods of the future may appear to be unusual and will probably be more intense in flavor and be natural or nature identical...they will have extended shelf lives, primarily due to irradiation. The only limitation may be the imagination of the food technologist.”¹

Over the past 150 years, the Western food culture has gone through an enormous transformation, so complete, that most people have lost sight of what constitutes a normal diet. In our quest for speed and convenience, we have pushed aside the notion that the purpose of eating is to provide energy for our day-to-day activities, and to grow & preserve the changing structure of our bodies and brains.

Beginning in the 1800s, agriculture yielded to technology. In the latter part of the 1800s, the rolling mill brought white flour to the everyday person. Earlier mills were inefficient in removing all the bran and germ from the grain, so it was still relatively rich in vitamins, minerals and fiber -- more nutritious than it is today.

Then in the 1900s, the new roller mills revolutionized our most basic foodstuff. The roller mills split the wheat grain into a hundred fragments. With mechanical precision, they sifted it into multiple streams, so that at the touch of a button the miller could select for his customers, flour whiter than ever before – and at the same time emptier of vitamins,

minerals and fiber. Side by side with the breakthroughs in food processing technology came changes in agriculture that depleted the farmer's soil of nutrients. Through overuse the soil itself, and the foods grown in it, became impoverished.

"In 1936 in U.S. Congress, the U.S. Department of Agriculture presented U.S. government document number 264 that clearly reported that the majority of the American population are not getting the minerals they need. It also says that all American farm and range soils were depleted by 85% of the mineral value the farms had 100 years ago. And if this was the case in 1936 then how much worse can it be today?"²

(We will explore the importance of vitamins and minerals for brain health further in the thesis.)

The consumption of sugar in our diet drastically increased over the last 150 years as well.

"Sugar consumption was about ten pounds per year in 1821, but after the turn of the century, sugar intake began to soar, rising decade by decade to over 147 pounds per person in 1993, with noncaloric sweeteners adding another 50 pounds per person in the United States. In 1942, the American Medical Association issued a warning about sugar consumption reporting that the consumption of sugar and other relatively pure carbohydrates has become so great during recent years that it presents a serious obstacle to the improved nutrition of the general public."³

Sugar overall is not overly detrimental, it is just that people are consuming much more than they used to. It is difficult for the body to rid itself of so much processed sugar and to detoxify. In her book *Your Miracle Brain* Jean Carper states in her section entitled "How

Sugar can AGE Your Brain” – “There’s another peculiar and startling hazard connected with high blood sugar that most people are quite unaware of, and it has serious implications for serious degenerative brain diseases, including Alzheimer’s. High levels of blood sugar can make your entire body, including your brain, age faster, which is hardly a happy thought. In short, high levels of blood sugar, as well as eating lots of sugar, can harm your brain by accelerating the aging process through chemical reactions in cells. Leading expert Anthony Cerami at the Picower Institute for Medical Research in Manhasset, New York, explains that glucose in the blood reacts with proteins to create aberrant so-called “glycated or cross-linked proteins” – a kind of cellular debris that accumulates in the cells, mucking up their mechanisms. These sugar-damaged proteins turn yellowish-brown, and are also called AGEs (advanced glycosylation end products), which is appropriate since they accelerate aging. They cause bones to yellow, joints to stiffen, blood vessels to toughen, and become clogged, and organs including the brain, to malfunction.”⁴

So why are we consuming so much processed food with sugar and other harmful chemicals in it? Well, packaged food companies such as Proctor & Gamble and General Foods employ some of the best and sharpest minds to study consumer psychology and demographics. In deciding what sorts of foods to sell us they invariably apply two laws:

- 1) Sell products with the highest margin
- 2) It is easier to sell more products to an existing customer than to sell that same product to a new customer.

When food companies sell high-margin products (fresh produce is some of the lowest-margin food products to sell) like Hostess Twinkies, Oreo Cookies and McDonalds Happy

Meals each company studies its customers (known as the “target market”) like mice in a laboratory. Customer feedback reveals their likes, dislikes, hopes, dreams, desires and heroes. No expense is spared to hit every psychological button that matters to these customers. Coca Cola spent \$277 million in advertising in 1997; Pepsi spent close to \$200 million. Pepsi hopes to take an even larger portion of the 47 billion beverage servings sold around the world. As the Nutrition Action Newsletter says, “*We are drowning in liquid candy!*”⁵

So if people in that market like a particular pop star, actor or singer, that very celebrity will appear on television, radio or billboards backing the product. If a certain look or feel appeals to the target market then hoards of ad designers create a campaign to simulate it. As a wild grouse caught in the sight of a hunter with a 12-gauge shotgun at close range, the target market never has a chance.

Typically, these strategies were limited to large tobacco companies which history shows “wrote the book on deceptive ad campaigns”, while getting the world addicted to nicotine (this is a thesis all in itself), however, big tobacco companies are now acquiring well-known brands of processed, addictive foods. In the first quarter of 2001 Philip Morris, the world’s largest tobacco company, purchased children food brands like Ritz Crackers, Oreo Cookies and Life Saver candies. This makes Philip Morris the world’s second largest food company following only Nestle Inc.

The typical American breakfast is certainly no better off than many of the fast foods previously mentioned. Breakfast cereals targeted at very young children have more sugar in them ounce per ounce than sugar soft-drinks, as shown in the table below:

<u>Item</u>	<u>Teaspoons of sugar per ounce</u>
Pepsi	1.2
Lucky Charms cereal	2.8
Froot Loops	3.3
Quaker Instant Oatmeal Cinnamon & Spice Flavored	4.3
Heinz Custard Pudding (Baby Food)	1.2

Carol Simontacchi, a well-known nutritionist worked in schools to determine the eating habits of the average teenager. In one of her experiments, she distributed food diaries to 55 students in a low-to-middle class high school and asked them to complete the diaries everyday for one week. Here is a sample that was picked from the more than 100 diaries submitted.

	Day 1	Day 2	Day 3	Day 4	Day 5
Breakfast	Orange juice Ham & Cheese Sandwich	Cereal and Milk	Biscuits and Eggs	Bread	Cornflakes and Milk
Lunch	Water	Ham Sandwich	Chicken Noodle Soup	Double Cheeseburger with Pickles	Tuna Sandwich
Dinner	2 Hot Dogs	Chicken Potpie	Hot Dogs	Burrito with Beef and Beans	Sirloin Burger with Country Vegetables
Beverages	Water (1 cup)	Apple Juice Water	Punch Water	Water	Water
Snacks	Cheese and Crackers	Banana	Orange		Applesauce

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According to Carol Simontacchi the sample is much better than most, since the student drank water and ate the occasional fruit.

You would think that kids attending an upper-to-middle class school would have better habits but take a look:

	Day 1	Day 2	Day 3	Day 4	Day 5
Breakfast	Pepperoni Pizza	Cinnamon Roll	Nothing	Nothing	Brownie
Lunch	Pepperoni Pizza	Pepperoni Pizza	Peanut- butter-and- jelly Sandwich	Teriyaki Chicken Frozen Dinner	Teriyaki Chicken Frozen Dinner
Dinner	Cheeseburger with ketchup, mustard and mayonnaise	Chicken, carrots, broccoli stir- fry, noodles, white rice, crescent rolls	Leftovers from night before	Tacos with cheese and lettuce on tortilla	Chicken with Rice and Baked Potato
Beverages	Water 2 cups Mountain Dew 1 can Milk 2 cups	Milk 1 cup Water 2 cups 7Up –1 cup	Milk 1 cup Apple Juice Water 3 cups Coke 2 cups	Milk 3 cups Mountain Dew – half can Water 1 cup	Choc. Milk Raspberry Pop 2.5 cups Tetley Tea 1.5 cups
Snacks	White & Cheddar Popcorn	Doritos		Brownie Marshmallows	Brownie

You would think that the upper-to-middle class student might eat better but according to Carol Simontacchi it's even the same with adults, according to national statistics and her extensive records. She finds it not uncommon to view a seven-day food diary containing 21 meals (7 days X 3 meals per day) with almost no vegetables, no fruit, no protein and no water.

According to researchers, *“sugar intake has grown by 20% from 1986 to 1996 and this now accounts for 20% of a teenagers calories. Rancid unprocessed fats account for another 50% of all calories that teenagers consume.*

“The consumption of fresh produce has plummeted, with fresh apples down 75%, fresh cabbage down 65%, fresh potatoes down 74% and fresh melons down 50%. The consumption of fruits that are processed has shot up 913%, processed vegetables up 306% and processed fats and oils are up 139%. Between 1960 and 1981, soft drink consumption increased 182%, food color consumption increased 1,006% and corn syrup is up 291%”⁸

Cognitive Disorders

Therefore, you have had a snapshot of how our eating habits have changed over the last 150 years. I believe that this has contributed greatly to the increase incidence of obesity and possibly even cancer, but that is not the focus of this thesis so I will keep on track.

The big question is: Has our cognitive ability or our ability to think and reason gone up or down? There are other factors of course that affect cognitive ability like the increased time watching television and the playing of video games. However, the fact is that cognitive ability or our ability to think and reason has diminished over the recent years.

Joseph Beasley M.D. in his book *The Kellogg Report: The Impact of Nutrition, Environment and Lifestyle on the Health of Americans* compiles study after study showing a depleting trend in cognitive ability, “scores have declined every year for sixteen years and were as of 1980, the lowest in the fifty year history of the test.”⁹

According to the *Statistical Abstract of the United States, 1995*, “SAT scores of college-bound seniors were lower in 1994 than they were in the counter-culture sixties.”¹⁰

Educators will not agree just why this is happening. However, the feeling is that formal education is not doing well, that students are not learning as affectively as we would have liked and that something is amiss in the classroom.

Sometimes it is difficult to evaluate how children in North America are truly doing because the tests have been progressively “dumbed down.” Because children have scored so badly on such national tests as the California Achievement TEST – thus showing what a dismal job the schools are doing – they changed the tests. The standards were lowered but the scores continue dropping.

“Because administrators tend to shun tests that make their children look stupid (and themselves incompetent), publishers are naturally pressured to make kids look good. When I compared the 1964, 1972, and 1982 forms on a typical widely used reading test, I was shocked to observe the differences. Each successive edition was so much easier than the previous one that it was hard to believe they were actually given to children of the same grade level! ... The most scary of all is a new Advanced form, designed for 9th Graders and published in 1988 which calls on such complex skills as reading a menu in a fast food restaurant.”¹¹

We know that something is amiss. Teachers blame the parents for not spending enough time with their children or for lax discipline. Parents blame the government for raising taxes and making them work even harder just to get by, thus cutting into quality family time. Parents blame the school boards for cutting back on teacher funding and overcrowding schools thus making the classroom an uncontrollable environment. But one thing is for certain the United States is spending more money on education than ever before and still the SAT scores of college bound seniors continue to drop.

Improving Food Nutrition

“POPULAR MYTH: You are born with a genetically determined brain of a certain size and potential, and that’s it. There is little or no way to alter its capabilities and functioning; thus, your chances in life are predestined, your fate sealed.

NEW SCIENTIFIC REALITY: the brain is a growing changing organ, its capabilities and vitality dependent to a large degree on how you nourish and treat it. Thus, you can dramatically influence your brain’s functioning and your own destiny. The long-neglected

brain is now being exposed to intense biological scrutiny, and the news is good for all of us.”¹²

We have come to learn a great deal about the brain in recent times, but still we do not consciously think on a daily basis that our brains or our minds function as the product of breakfast, dinner, lunch, supplement or snack. We do not think of the creation of our nerve cells with the Greek salad and salmon – or our Oreos and Coca Colas. We seldom study if our lifestyle and eating habits are supplying our brains with the necessary building blocks that form the neuron network. When the brain malfunctions – gets things mixed up, misplaces information, sends bizarre messages to our eyes, mouths or arms; we never wonder if the toxic neural message was the product of a toxic lunch or the buildup in the brain and body of toxic food chemicals.

We have been told the old myth that brains are formed within the first two years of our lives, and from then until we pass on, little change can be expected. We do not realize that within those first two years, from conception through breast-feeding, the brain must have the correct building blocks through the maternal diet otherwise it simply doesn't get built properly.

We do not realize that every day of our adult and teenage lives, cells are quietly removed and replaced with brand-new material. New vitamins. New essential fatty acids. New minerals. New protein. And where do the building blocks for these healthy cells come from? From our food. From our water. From our nutritional supplements.

However, if the good building blocks have been stripped from the food, (containing materials that are of no use to the brain) the brain cannot rebuild itself. It has nothing to build with. It simply will not be able to make the hormones and neurotransmitters from nothing.

In order to achieve optimum brain health we need to take a look at correct brain nutrition. The diet (what we eat) must supply the essential ingredients to build and maintain the brain. And the diet is the one MAJOR change that people in the west have experienced in the last 100 to 150 years. Our diet has altered the physical state and function of our brains and therefore affected the state and function of our minds. We must eat in a manner so as to feed our brains if we want them to be in a good state of health.

The question is: how does nutrition affect brain operation and chemistry? Will the quality of the food we ingest along with any nutritional supplements affect brain performance?

Nutrition and Brain Performance

Dr. Derelian has a Ph.D. in Educational Psychology, Learning and Instruction from the University of California at Irvine, and a Master of Science in Nutrition Sciences. She is a Registered Dietitian.

She has held many positions in the California Dietetic Association and nationally in the American Dietetic Association, including serving as president from 1994-1996. She is

internationally renowned for her expertise on a variety of nutrition topics. As president of Health Professions Training, she consults with more than 300 organizations on nutrition, chronic disease management, program evaluation, child nutrition and learning, teaching methods, and statistics.

"Breakfast is the most important meal of the day. Breakfast readies children for classroom demands of attention and learning. Regardless of socio-economic status, children who do not eat adequately experience "transient hunger" which can be corrected only by eating. Students require nutrients and energy for concentration on academic tasks, especially those demanding problem solving and creativity. Breakfast can provide those nutritional necessities and prevent symptoms such as headache, fatigue, restlessness and sleepiness from competing with educational outcomes. We have perhaps always known that breakfast is the most important meal, especially for children, now we have the research to prove it."¹³

When you do not eat breakfast, your blood sugar levels drop drastically. This in turn means that your brain will be short on fuel and cannot function with efficiency. Therefore trying to learn something on an empty stomach is subject to failure. When neural activity is stimulated, the brain gobbles up naturally produced glucose from the blood. This source of fuel needs to be replaced, which is done by eating something. That is one reason experts say that eating breakfast is an excellent way to kick-start your brain – especially true for schoolchildren and adolescents. Evidence shows that breakfast can increase brain functioning – learning, memory,

academic performance and general psychological and emotional well being. Here is the logic behind it: Breaking an overnight fast by eating a nutritional breakfast increases natural glucose supplies for the brain. In addition, regularly eating breakfast over the long-term may eliminate nutritional deficiencies known to hamper brain function.

“Abstract: This article compares the findings of three studies that explored the role of increased blood glucose in improving memory function for subjects who ate breakfast. An initial improvement in memory function for these subjects was found to correlate with blood glucose concentrations. In subsequent studies, morning fasting was found to adversely affect the ability to recall a word list and a story read aloud, as well as recall items while counting backwards. Failure to eat breakfast did not affect performance on an intelligence test. It was concluded that breakfast consumption preferentially influences tasks requiring aspects of memory. In the case of both word list recall and memory while counting backwards, the decline in performance associated with not eating breakfast was reversed by the consumption of a glucose-supplemented drink. Although a morning fast also affected the ability to recall a story read aloud, the glucose drink did not reverse this decline. It appears that breakfast consumption influences cognition via several mechanisms, including an increase in blood glucose. ”¹⁴

Fewer adolescents are eating breakfast. The percentage of 15 to 18 year-olds eating breakfast dropped from 90% to 75% among the boys and 84% to 65% among the girls.

J. Michael Murphy at Harvard Medical School, Department of Psychiatry, documents that a school breakfast improves academic, behavior and psychological well-being. He studied hundreds of kids in inner-city elementary public schools in Philadelphia and Baltimore. When compared with children who rarely ate breakfast, those who often ate breakfast had 40% higher math grades and were less likely to be absent from school or late. A morning without breakfast took a heavy toll emotionally. Non-breakfast eaters were twice as likely to be depressed and four times more likely to experience anxiety. They were also 30% more likely to be hyperactive compared with daily breakfast eaters. The bottom-line coming from Dr. Murphy's investigations showed that children who went from rarely eating breakfast to regularly eating breakfast had major upswings in academic performance. The same children also became significantly less anxious, depressed, and hyperactive.

Carol Simontachhi, Nutritionist and author conducted multiple programs at schools with a nutrient dense drink and its effects. She arrived early at the school each morning for 4 weeks to dispense the nutrient-rich drink to the kids. She took tests prior-to and after the 4-week testing period. The breakfast drink was an over-the-counter blend of protein, vitamins, carbohydrates and minerals. To the drink was added Omega-3, Omega-6, flaxseed oil, all of which are important for the production of energy and proper brain function. There was a control group and a

test group. All were asked to take mood states tests and cognition tests. The control group did not have the drink and thus continued to eat what they usually eat. However, the test group was supplied with the nutrient drink. At the end of the 4 weeks, she had the students gather in the auditorium to retake the tests. The Profile of Mood States (POMS) test measures 6 different emotional states:

- Depression-Dejection
- Tension-Anxiety
- Vigor-Activity
- Anger-Hostility
- Confusion-Bewilderment
- Fatigue-Inertia

The bottom-line after the tests were collected and tabulated and re-tabulated to make sure of no error was: **the nutrient-rich drink made a significant difference in how these teenagers felt emotionally. It also increased their cognitive ability.**

These results obtained from the study have been replicated around the world by other nutritionists, nutritionally minded physicians, and in private counseling sessions.

The research and studies are very compelling. Still we flood the market with food that is counterproductive for clear thinking and feeling. Instead of doing research needed to manufacture products that nourish our brain and provide essential nutrients, the large processed food companies are pumping out millions of tons of toxic food artifacts, stripped bare of nutrients needed to feed our brains. Over time we are systemically being brain-starved, robbed of our ability to reason and to experience peaceful states of mind. Artificial food products, chemical pesticides, synthetic additives inflict permanent structural and functional damage to the brain and body.

In order to revitalize our own brains and the brains and bodies of our children we're going to have to develop discernment and see clearly behind the death-trap of the advertising glitz. We are going to have to stop purchasing foods with the nutritional quotient of camel dung. We will need to get back to basics and consume wholesome foods and nutritional supplements. Equally important, we need to learn about the process of cleansing and detoxifying the body and brain. So that we can remove the trash of toxic chemicals that has built up over time in our bodies and brains through consuming foods laced with preservatives, artificial colors, sweeteners and heavy metals.

Cleansing and Detoxifying

The process of cleansing and detoxifying is not very well understood in our Western culture. Too often, when we have an ache, pain or behavior that is not desirable we run to the doctor who prescribes a synthetic drug to ease the symptoms or alter the behavior. This is only a short-term solution and not truly dealing with the problem. Since quite often the problem has to do with a buildup of toxins in the body and brain, a lack of proper nutrients, the inability for the body to absorb proper nutrients or an infestation of parasites in the body and brain.

The problem with cleansing and detoxifying is that sometimes during the process of cleansing and detoxifying the symptoms actually get WORSE before they improve. People think and say, “Hey I started taking this herbal cleanse program and I feel worse than before taking it!” This is because the cells of the body have been so full of toxins and poisons that when they all start releasing their garbage, the bloodstream becomes inundated with toxins and the body can experience what is known as a “healing crisis.” We have been conditioned by our “instant gratification” society to want immediate relief. It is important to realize that you did not get your body and brain into a poor state of health instantly, so you certainly should not expect to reverse it instantly. It comes from years of consuming toxic nutrient-stripped food & drinks, from irregular bowel movements. It comes from a buildup too of parasites – organisms that take your nutrients and leave you with their excrement! That is why the elimination of parasites is important along with eating

more nutrient-dense foods. You can boost up on vitamins and minerals but the happiest organisms when you do so could be the parasites living in your stomach, muscles and brain!

“There are studies that have shown interference with vitamin A absorption when roundworm or giardia is present. This absorption normalized after the elimination of the worms, with or without supplementation with vitamin A. In addition, during hookworm infestation, the more severity of iron deficiency anemia has been shown to be proportionate to the number of worms present. The more severe the infestation the more severe the deficiency.”¹⁵

Quite often in our Western culture, we smugly think that the subject of parasites is for an “underdeveloped” country. That we are somehow above it all and cannot possibly be experiencing poor brain function and debilitating symptoms because of parasites. Hold on to your hat because I plan on presenting research that shows just how much an infestation of parasites can induce negative behaviors in the host. One thing is for certain, parasites thrive in a toxic environment. The more toxins you have in your body, the more likely it is that you will be host to a variety of unwanted invaders.

In my practice as a Whole-Life Consultant, I had a lady come to me in Hong Kong complaining that she could not concentrate, could not sleep at night and experienced anxiety. This troubled her greatly since she had a hectic schedule of studying and

working. I suggested she cleanse for parasites. She stated clearly that, “there is NO WAY I have parasites,” and she even was tested by her Physician for parasites that week. The report from the Physician came back negative (no parasites of any significance detected in her). I still suggested she do a parasite cleanse, as her symptoms were worsening and she needed a solution. Reluctantly she started on the parasite cleanse and to her amazement in the first week passed what we think was a smaller tape worm and other little white “critters” that looked like small white grubs. The parasites one passes can be a delicate topic as most people squirm at the thought of them (not polite dinner conversation). The client was very happy to be rid of them and did not want to do the classification and family tree of her parasites! She continued on the parasite cleanse for 3 months and had a remarkable improvement in the state of her body and brain function (enhanced ability to concentrate, relax, and to experience restful sleep). The cleanse consisted of a:

- Natural laxative tea containing Senna leaf, Frangula bark, Peppermint leaf, Stevia leaf, Uva ursi leaf, Orange peel, Rugose rose hip, Marshmallow root, Japanese honey suckle, English Chamomile flower.
- Fiber added to water or juice containing Psyllium husk, Guar gum, Hibiscus, Grapefruit pectin, CaaÍnhem, Licorice, Alfalfa, Aloe Vera, Black Walnut, Buchu leaf, Burdock root, Cayenne, Chickweed, Cinnamon, Clove seed, Corn silk, Dandelion, Echinacea, False Unicorn, Fenugreek, Garlic, Ginger, Marshmallow root, Papaya, Peppermint leaf, Pumpkin seed, Red Raspberry leaf, Rhubarb, Slippery elm bark, Uva ursi, Yucca root.

- Herbal parasite removal capsules containing: Black walnut, Pumpkin seed, Wormwood, Cloves, Sage, Garlic, Gentian, Tansy, Male fern, Hyssop, Fenugreek, Chamomile, Black pepper, Peppermint, Thyme, Fennel, Chlorophyll.

It is important for the parasites and toxins to be cleansed from the body. The digestive tract is where much of our nourishment is absorbed into the bloodstream, nourishment that the brain needs to function at an optimum level. If we have been consuming a great deal of processed-chemical-laced food with little or no fiber we can be sure that the walls of our intestines are coated with layers and layers of thin putrefied fecal matter, like coats of paint on the walls of your house. Mucous and rubber-like impacted waste can easily adhere to the colon walls. This creates a situation known as autointoxication where the colon absorbs toxic residue into the blood stream impairing brain function and overall health. All brain cells are fed by the blood. The nutrients that reach your blood get there by way of the colon. Therefore, a clogged dirty colon may mean toxins in your blood that reach the brain. The laxative tea and fiber's significance comes from its ability to move food through the digestive system quickly and easily. A low fiber diet of processed foods creates a gluey state that cannot be processed by the intestines.

Parasites and Brain Function

A parasite is any organism that lives in, with or off another organism. Humans can play “host” to over 100 different kinds of parasites. Parasites can infect virtually every part of the body including the brain. *“The World Health Organization estimates that one-quarter of the world’s population suffers from chronic intestinal parasite infections.”*¹⁶

These organisms actually get their nutrition directly from the cells of your body. They can attach themselves anywhere and suck nutrition out of the cells. Some of these invaders are quite dangerous because they can travel to places in the body where they can do more damage than an organism living in the digestive tract. These creatures eat nutrients in your body before you do! They get the best nutrients and you get the scraps, leftovers and THEIR fecal matter! They grow healthy and fat while your organs (especially the brain) starve for nutrition.

Classic symptoms of parasite infections include: *“allergies, anemia, bloating, chronic fatigue, constipation, depressed immune function, diarrhea, eczema, enlarged lymph glands, excessive hunger, fever, flu symptoms, gas, grinding the teeth at night, hives, irritable bowel syndrome, irritability, jaundice, joint and muscles aches and pains, nervousness, rashes, reddened eyes, sleep disturbances, weight gain weight loss.”*¹⁷

The list of symptoms listed previously was long and not incredibly appealing.

However, some fascinating research has come from a scientist by the name of Hulda Regehr Clark, Ph.D. N.D. She has worked with and helped thousands of people and in her book *The Cure for ALL Diseases* says, “no matter how long and confusing is the list of symptoms a person has, from chronic fatigue to infertility to mental problems, I am sure to find only two things wrong: they have in them pollutants and/or parasites. I never find lack of exercise, vitamin deficiencies, hormone levels or anything else to be a primary causing factor. So the solution to good health is obvious:”

Problem	Simplest Cure
Parasites	Electronic and herbal treatment
Pollution	Avoidance

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Dr. Clark was seeking a method to eliminate parasites from the human body when she discovered that all living organisms emit a bioradiation. This bioradiation like a radio frequency is different for every living organism. It can be measured and increases in frequency, as each organism is more complex on the evolutionary scale. So here are some examples of frequencies emitted:

Animal	Lower Bandwidth (KHz)	Upper Bandwidth (KHz)
Arcyria	81	81
Herpes Simplex	291	293
Mold	280	320
Bacterium	400	420
Dust Mite	700	720
Ant	1200	1200
Goldfish	1300	1400
Chameleon	1400	5500
Cat – 5 years old	1520	7500
Man – 35 years old	1520	9460

Another equally interesting phenomena Dr. Clark discovered is that when we expose an organism to its own bioradiation frequency (particularly the organisms on the lower end of the scale) they are at first stunned by it and then further exposure causes their death. Fortunately, for human beings pathogens and parasites exist in the range from 77 KHz to 900 KHz.

Over time with a great deal of persistence and experimentation Dr. Clark and her son Geoffrey developed a positive offset frequency generator that is powered by a simple flashlight battery. It can be used by humans and generates the frequency range of pathogens. It is known by the name “Zapper” and can be built with parts purchased at Radio Shack for \$25 or you can purchase one from a supplier like Sota Instruments in Vancouver B.C.

“Any positively offset frequency kills all bacteria, viruses and parasites simultaneously given sufficient voltage (5 to 10 volts), duration (seven minutes) and frequency (anything from 10 Hz to 500,000 Hz)...Generating positive offset frequencies is the best way to kill all pathogens quickly. But it takes more than one treatment. It takes 3 treatments to kill everything. Why? The first zapping kills viruses bacteria and parasites. However, a few minutes later bacteria and viruses (different ones) often recur. I conclude that they have been infecting the parasites and killing the parasites released them. The second zapping kills the released viruses and bacteria, but soon a few viruses appear again. They must have been infecting some of the last bacteria. After a third zapping I never find any viruses, bacteria or parasites, even hours later.”¹⁹

At first I must say that I was very skeptical about the effectiveness of the “Zapper”, but I read Dr. Clark’s book *The Cure for ALL Diseases* and purchased a Zapper

from Sota Instruments (Dr. Clark supplies plans in the book to build your own Zapper. She has done this because she does not want such a device to be hampered by patents). From my experience the Zapper is effective. One experiment that I conducted had me lend my Zapper to a fellow teacher in Dubai. Sally had returned from Pakistan with tremendous stomach flu and diarrhea. She tried every pill that her Doctor had given her but with little success. She still had cramps and intestinal pain. I lent her the Zapper and the next morning I had a little yellow post-it note on my desk that read “I believe in miracles...your Zapper worked like a charm.” Everyone I lent my Zapper to eventually bought one, since they were so impressed with it (I was not selling Zappers, they bought directly from the Sota Instruments website and I received no commission). My wife, son and I traveled through Nepal for 10 days and used the Zapper everyday. In a place like Nepal where parasites and intestinal sickness is rampant, all three of us had optimum health for our entire journey.

I am certainly not implying that I have done extensive research on the Zapper nor do I claim to know exactly “how” it works. I have simply applied it in various situations and shared it with other people. I do believe (as does Dr. Clark) that the Zapper is very effective when combined with an herbal cleanse for parasites and toxins. This will in turn improve organ health – the brain being an important organ. What I do suggest is that people try these methods out for themselves to see if they are effective. Dr. Hulda Clark has caused quite a stir in the community of Health Practitioners and has been sued on multiple occasions. She does make several

broad-based statements in her various books *The Cure for ALL Diseases*, *The Cure for ALL Cancers*, *The Cure for Aids*. She simplifies healing to the elimination of parasites and the elimination of toxins in the body. I feel her research has merit but should be implemented with a discerning eye (ALWAYS think for yourself).

Toxins and Brain Function

Toxins are all dead things around us that should not get into the workings of the body since they interfere with the performance of it and the vital organs, including the brain. As long as they do not penetrate the tissues of your body, you are okay. Even if you have minute amounts of toxins, the body can flush itself of them and live in a healthy state. However, if the toxins are invasive and pervasive your body must struggle to remove them. Toxins can primarily invade your body through the food you eat and the beverages you drink. This is why it is so important to cleanse and detoxify the body on a regular basis and one the best methods is to use the herbal cleanse system with the natural laxative tea, fiber and parasite elimination capsules.

Examples of some common toxins found in or on food are:

TOXIN	SOURCE
Arsenic	Used in pesticide
Aflatoxin B	Some beer, and some bread
Aluminum Silicate	Processed salt
3,4,5 Benzopyrene	Flame cooked foods, toast
Mercury	Tooth fillings
Methyl ethyl ketone and Methyl butyl ketone	Flavored foods
Benzene	Flavored food
Hexanes	Decaffeinated beverages
Decane	Processed cookies and cereals
Methanol (wood alcohol)	Colas, artificial sweeteners, infant formula

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“Symptoms sometimes start as flu like symptoms. Neurotoxic chemicals and heavy and organic metals attack the immune system. They attack and destroy

the central nervous system (CNS), and the peripheral nervous system (PNS).

*Many have target organs like the liver, **brain**, kidneys, etc....*

“Medical symptoms include problems with memory, dizziness, lightheadedness, concentration, emotion, personality changes, sleep disturbances including sleep apnea and insomnia, extreme tiredness and chronic fatigue symptoms, headaches, pain and/or numbness in the arms hands legs or feet, learning ability, loss of motivation, loss of interest in daily activities and hobbies, attention complaints, impaired judgment, may include hearing problems including hearing loss and tinnitus (loud sounds, sirens, or ringing in the ears), visual disturbances, abnormal neuropsychological testing and often, (but not always), findings of cortical atrophy as demonstrated by CAT scans.

“Other signs that may occur on a daily or weekly basis are frequent nosebleeds for no apparent reason, unable to recognize familiar faces friends or neighbors, breathing difficulties or pains in the chest, recurring pneumonia, head arms hands or legs shakes, sinus pain and pressure, difficulty walking long distances, mood swings, heart palpitations or irregularities, plus many more.

“For the most part, long term memory remains intact and preserved, (i.e. where you went to school when you were young, other events from long ago). Short-term memory is usually heavily impaired, (forgetting recent

events or people, or what you did or what was said an hour ago, unable to remember new things or learn new abilities, etc.). ”²¹

Is not it interesting – some of the symptoms with the neurotoxicity of solvents that plague sufferers are related to brain function. Clearly, these substances contribute to the depletion of brain function. Where you find a concentration of toxins in the body, you will find parasites as well. That is why I recommend doing a full herbal cleanse for 3 months at the start and then a maintenance program of at least one month twice a year.

Heavy metals are real trace elements found in industrial wastes, paint in most houses and buildings, fillings in your teeth and some food. Heavy metals can wreak havoc on brain function and once the tissues of the brain and body have absorbed these substances it can be quite a challenge to cleanse and detoxify them from your cells.

The table below outlines some of the deadly heavy metals, their sources and effects on the brain and nervous system:

Heavy Metal	Sources and Effects of Toxicity on the Brain and Nervous System
Aluminum	Sources: deodorants, aluminum cookware, foil, baking powders, salts. Aluminum deposits have been found in the brains of people experiencing senile dementia and Alzheimer's. It may cause a short circuit of certain enzymes.
Arsenic	Sources: weed killers, insecticides. Excessive amounts can affect the heart, brain, kidneys and blood cells.
Cadmium	Sources: cigarette smoke, coffee, some paints, some refined grains. Zinc supplements and other vitamin supplements (chelation therapy – an intravenous vitamin therapy to pull metal from the tissues) are known to help extract cadmium from the body.
Lead	Sources: old paints, contaminated water, pottery, cosmetics, soldering cans, gasoline. Lead toxicity affects attention span, memory, hyperactivity, and learning capability.
Mercury	Sources: dental fillings, pesticides, cosmetics, fungicides, and some seafood. Poor memory and other neurological dysfunction can result.

The best way to rid yourself of heavy metal buildup is to 1) cleanse and detoxify on a regular basis (twice a year), using an herbal cleanse system like what was previously described and 2) keep the body fully boosted on vitamins, minerals and antioxidants (these are discussed in further detail later in the thesis), that flush out toxins.

Optimum Food for Your Brain

The brain is the most marvelous, astonishing and complex organ known to science. During development in pregnancy the brain grows about 360 million new nerve cells a day, ultimately totaling 100 billion of the most advanced cells anywhere. All body processes are under the overall control of the brain. All the concerns and interactions of the cells, tissues and organs are under the brain's control. Even the most sophisticated computer that we can imagine or create is crude compared to the limitless ability and complexity of the human brain. The brain performs an astronomical number of tasks 24 hours a day for a stretch of decades. The body has approximately 75 to 100 trillion cells, a very huge number. Understand that all of those 75 to 100 trillion cells are alive and sending out signals that they need responses to. The billions of messages buzzing through your brain at any given moment is sending, analyzing and receiving messages to all 75 to 100 trillion cells. Whether we are playing the violin, brushing our teeth, eating watermelon, singing in the choir, changing the baby's diaper, walking the dog or in a state of deep sleep the brain is still coordinating everything. Meanwhile as you are engaged in conscious

activities your brain is still monitoring temperature, blood chemistry, breathing and all other vital activities – all below your awareness in the area of the subconscious. When we consider the magnitude of the brain's duties for administrating the body, surely we can appreciate that such a sophisticated device would need the finest fuel for optimum performance.

“Nature's grand design for your brain's nutrient needs was laid out a few million years ago. It's still the best guide to brain building foods.”²²

Surely if you were to design a fine racing motorcycle, one that was one-thousandth as sophisticated as the human brain the quality of the fuel used would be part of your design. You could not expect that same motorcycle made to run on high-octane gasoline to high-perform if you put diesel oil or low-grade fuel in the tank.

For millions of years the human brain grew and evolved with plenty of fresh fruits, vegetables, lean meats and fresh fish to nourish it. Then in the last fifty years our diet suddenly took straight down a new road of empty brain-fuel-food and we wonder why we experience abnormal states of depression, lowered intelligence, memory decline. Perhaps these states are like the fuel light on the gas gauge of the racing motorcycle indicating that our brains have run out of energy. Our brains are crying out for fuel that we fed it 40 thousand years ago – and we feed it synthetic food that did not even exist 40 years ago! The brain craves the ancient nutrient rich diet from thousands of years in the past and we

feed it a burger and fries at Burger King and for desert a Twinkie! The poor brain must be famished and confused.

When I work with clients as a Whole-Life Consultant I tell them “if you want a fresh alive body and brain then eat fresh alive food – plenty of fresh fruits and vegetables. And mix it up, don’t get stuck in the same food patterns!” This diversity resembles the ancient diet where there was a diversity depending on availability and season.

People of the Stone Age, as we will call them, ate a diversity of wild fruits; vegetables, nuts and wild game and plenty of seafood, since a large portion of the population lived near the ocean. They had no domesticated animals and consumed very little or no diary products. Now, in the western world our modern diet consists 55% of new foods our bodies and brains have NEVER dealt with until now.

Stone Age Diet	American Diet
65% Fruits, vegetables, nuts, legumes, honey	55% “new” foods: Processed cereal, grains, milk, milk products, sugar, artificial sweeteners, separated fats, alcohol
35% lean game, wild fowl, eggs, fish, shellfish	28% Fatty meat, poultry, eggs, fish, shellfish
	17% Fruits, vegetables, legumes, nuts

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If you want to get the same brain boosting diet as our ancestors this is what you should do. Eat plenty of fresh fruits and vegetables, nuts and legumes. They are loaded with vitamins, minerals, antioxidants and fiber. Our ancestors had a diet that only people in our society get by boosting their diet with plenty of high-quality nutritional supplements. The Stone Age diet provided people with a whopping 100 grams of fiber a day, and we know that for minimal health a person needs 30 grams of fiber a day. The average in our modern society is a pitiful 10 grams of fiber a day.

Eat plenty of seafood. When I lived in the United Arab Emirates, I worked with the Royal family there and the young Sheikh (Prince) was a student of mine. I asked what the family health consultant advised for his father (one of the top 30 richest men in the world with access to top consultation) to consume for optimum health. The Sheikh told me that it was fish rich in oils that was top on the list and it should be baked in foil or a container, so that the precious oils could be preserved and consumed. Of course, he was referring to the Omega-3 fish oils that have been proven to support healthy brain and body function (we will learn more about them later). Next on the list were plenty of fresh fruits and vegetables, similar to the Stone Age diet. Another food high on the list was fresh garbanzo beans (chick peas) and sesame seeds used in fresh hummus with olive oil (a good supply of some Omega 3 and known to promote memory function with the elderly). Today the majority consumed in the modern diet is the Omega 6 oils present in processed corn oils, margarines and donuts, they tend to overpower the good Omega 3 fish oils and when there is too much Omega 6 oils, brain cells malfunction or shut down altogether. Animal fat was to be avoided.

It has been discovered that the type of fat you consume from birth will affect the growth and functionality of your brain. Keep in mind the next time you go out for a fast-food meal of hamburgers, milkshakes, fries, onion rings or cheese topped with fatty cheese: these saturated fats (according to research) may actually diminish the growth of your brain cells. Research has shown that the type of fat consumed consistently can alter the performance of your brain and even change the shape and configuration of your brain cells. Carol E. Greenwood, Ph.D. of the University of Toronto fed one group of rats polyunsaturated fats (soybean oil, olive oil) and another group of rats saturated fats (lard). The rats consuming the polyunsaturated fats learned very quickly whereas the rats on the saturated fats were much slower to remember and to learn new tasks. She actually found that the animals that were on a diet of only 10% saturated fat learned nothing! This is very strong evidence encouraging you to choose the right fats to consume. Dr. Greenwood discovered that olive oil (unsaturated fat) is actually beneficial to memory whereas the harmful effects of saturated fat (animal fat) on brain function are cumulative. The more you consume a high animal fat diet, the more you will experience an impairment of learning, like a “dumbing down” effect.

Good Brain Fats - UNSATURATED	Bad Brain Fats - SATURATED
Omega-3: Seafood, fish, fish-oil supplements, essential fatty acids supplement	Fatty meat (domestic), whole milk, butter, cheese
Linolenic acid: leafy green vegetables, nuts, flaxseed	Hydrogenated oils – Processed foods, mayonnaise, margarine, fried fast food
Olive oil: contains antioxidants and has been shown to improve memory Flaxseed oil, canola oil	Omega-6: Corn oil, safflower oil, sunflower oil

What is mind-blowing as well is that Dr. Greenwood found the amount of saturated fat needed to produce memory impairment in animals was the average amount that North Americans typically consume! (What was not clear to me though was what type of animals and whether they were always rats. If so then a body weight ratio should be used to compare the amount of fat consumed by humans as compared to a tiny rat). Still, a study conducted by Richard Mayeaux and colleagues at Columbia University indicated that people over the age of 65 years who ate the most animal fat were **five times** more likely to develop Parkinson’s disease than those who ate the least animal fat. Another point that Dr. Greenwood discovered is that the unsaturated fats actually IMPAIR brain function so that if you consume a lot of them, but think you are going to balance it out by boosting up on Omega-3 fish oil capsules, it simply will not work. The saturated fats cancel out and block the positive effects of the Omega-3’s. An overwhelming supply of the saturated Omega-6 (bad) fat is – processed vegetable oils! We are virtually drowning our brains in the wrong

kind of fats with fried foods, oils in salad dressings etc. Your brain is made up of mostly fat – fat you feed it, but it has to be the RIGHT KIND of fat. Too much bad fat and a shortfall of good fat can eventually lead to brain cell dysfunction and memory lapses in the old and young alike.

The bottom line is that consumed consistently – saturated fats actually IMPAIR brain function and unsaturated fats IMPROVE brain function and memory. The solution is to eat more foods with unsaturated fats and much less saturated fats. Supplementing with Omega-3 fish oil helps.

The most important components of the Omega-3 fish oils for improved brain function are DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid). The DHA is the most powerful player for brain chemistry. It makes up fully one-half of all fat in brain cell membranes, concentrated in the membranes of the synaptic communication centers – an important place. The EPA is another crucial fat for brain function that can be converted in your body to DHA. So the most important component in the fish oil is DHA. Ultimately, you are looking for a fatty fish, one that contains plenty of natural fish oil. The table below from the U.S. Department of Agriculture cites the fish with the highest DHA level per 100 grams:

Type of Fish	Grams of DHA per 100 grams
Anchovy	.9
Bluefish	.8
Herring	1.0
Mackerel	1.4
Sablefish	.9
Salmon	.8
Sardines	1.0
Lake Trout	.5
Tuna, blue fin	.9
Whitefish	.9

Barbara Levine, Ph.D., chief of nutrition, New York Hospital-Cornell Medical Center, says, “taking DHA supplements before an exam makes sense.” She also recommends eating fish because Americans have one of the lowest DHA blood levels in the world.

FISH OIL STUDIES

Investigator	Test Subjects	Resulting Conclusion
Antolin Llorente Ph.D. Baylor University	140 post-partum women (women who had just given birth)	Improved the women's mental functioning, especially their concentration and attention.
K. Myanaga, 1998 International Scientific Conference, Spain	26 normal adult volunteers were studied to evaluate "p300" brainwave (frequency associated with learning and memory)	Two hours after giving fish oil to the subjects, their "p300" brain waves were significantly faster.
Japanese Researchers	Rats with induced learning disorders	Rats on fish-oil reversed their learning disorders. They had much higher levels of acetylcholine (learning and memory chemical).
Japanese Researchers	Fed Pregnant Rats Omega-3 Limited Omega-3 in another group of pregnant rats	The new-born rats whose mothers received Omega-3 learned 100% of a task in 3 tries. The rats with no Omega-3 learned only 30% of the task after 20 tries!

Another excellent source for good brain food is flaxseed oil. The flaxseed oil doesn't actually contain DHA or EPA but the body is able to convert the short-chain components of the flaxseed oil to DHA and EPA.

There have been studies done on the effects of Omega-3 oils with children suffering from ADD. There are many testimonials about how the supplements have assisted these children, but little proof. Drs. John Burgess and Laura Stevens of Purdue University documented that boys age 6 to 12 years with low blood levels of long-chain Omega-3 were much more prone to have ADD along with other behavioral and learning problems. It certainly does not hurt to try ADD children on the Omega-3 supplements; in fact, many researchers give Omega-3 supplements along with the drug Ritalin, generally prescribed for ADD.

The bottom line is that eating high-fat fish and/or supplementing your diet with Omega-3 fish oil capsules is one of the most effective ways to build functional brains and to keep them that way.

Human breast milk contains Omega-3 fatty acids, mostly brain growing DHA. The amounts vary according to the mother's dietary intake. This is the reason scientists believe that a growing baby's brain thrives on human breast milk. Several studies show that breast-fed babies have higher intelligence test scores and higher developmental scores on standardized tests further on in life. The fact is that human breast milk contains about 30 times more Omega-3 brain developing DHA than cow's milk (the base for many commercial infant formulas). The sad thing is that the number of mothers nursing their

babies has dropped substantially over the years so that today only 60% are nursing in the hospital and only 30% for a period of up to 6 months.

In her paper *Essential Fatty Acids in Growth and Development* Sheila Innis writes, “*that the fats provided in artificial formulas, usually from a vegetable source like coconut, corn, safflower or soybean oil, differ substantially from the oils found in human milk in that they provide only minuscule amounts of the Omega-3 and Omega-6 fatty acids. She is particularly critical of the use of corn oils in formulas because they may not support normal biochemical development of the central nervous system when present as the only polyunsaturated oil in the diet.*

“...Animal studies indicate that when they are deprived of adequate amounts of essential fatty acids, the weights of their brains are up to 33% less than those animals that received adequate amounts of dietary fats. Even when the deficiency was corrected later, while they were still young, they never recovered beyond a 30% loss in brain weight. Rehabilitation could not reverse the changes in brain composition”²⁴

The following quote is very interesting; especially note the DATE:

“To my mind one of the greatest offenses against a man is to deprive him of the normal supply of nourishment during infancy. It gives a bad start. He is shorn of his natural rights...the present abundance of nursing bottles and infant foods in the drug stores is evidence of degeneration... Shall our children be sacrificed” – Ephraim Cutter, February, 1881

Breast Feeding and Cognitive Ability

Investigator	Test Subjects	Resulting Conclusion
British Researchers – MRC Dunn Nutrition Unit Cambridge	Premature infants fed breast milk via tube. Other premature infants fed formula.	Infants getting human breast milk scored an average of 8.3 points higher on IQ tests than infants fed only formula. All infants were IQ tested at age 8 years.
Psychologists at University of Houghton	204 – three-year-old children of normal birth weight.	The children who were breast-fed scored an average of 4.6 points higher on intelligence tests.
British Researchers	8 and 15 year old children.	At age 8 they had better picture intelligence and at age 15 scored higher in math, sentence completion, non-verbal ability than children who were fed formula as infants.

Sugar for the Brain

The brain and body run on a form of sugar-fuel circulating throughout the bloodstream.

This is known as glucose. Glucose is very much like oxygen – too much becomes toxic

and if we do not get enough we die. Therefore, like many life-sustaining substances we want to have the optimum or the proper balance running through our veins. It is like the example previously with the high-performance motorcycle. You have to get the correct carburetion mix of gasoline and air for the best engine performance. If you mix it too “rich” the engine bogs down from too much gasoline, if you mix it too lean then there’s simply not enough fuel in the air-intake so the engine quits. The key to optimum brain function is to eat in ways that give your brain cells steady access to the desirable levels of blood sugar.

SUGAR TABLE

Sugar Type	Source
Sucrose	Processed table sugar and many processed foods.
Fructose	Natural sugar found in fruits.
Glucose	Sugar in the blood

Most of what you eat – table sugar, baked potato, cereals, fruits, vegetables, fish etc. when digested and metabolized end up as glucose in the bloodstream. **Glucose is the energy your brain and body run on.** When you are learning or problem solving, the brain is most active and burning large amounts of glucose. The brain itself can hold about a ten-minute’s supply of glucose, so it needs to get this energy from the blood circulation. You want to have a steady flow of glucose in the blood stream and you want to avoid the “peaks” that say, drinking Pepsi and eating sugar cookies will cause and at the same time avoid the

“valleys” that skipping breakfast will cause. From my own experience I find fresh fruit in the morning for breakfast truly optimum and I generally have fruit for breakfast now every single day. It is an excellent source of brain-body glucose-energy, easily digested and supplies a steady flow of glucose. I got this habit from the book *Fit For Life II*, by Harvey and Marilyn Diamond, *“start with a beautiful bowl of fresh fruit [in the morning] and don’t have the other stuff sitting around [sugar cereals, pop tarts, etc.] under the kids noses first thing in the morning. If all they see is the fresh fruit and you sit down to enjoy it with them enthusiastically they may fill up on it and not want anything else. Then you can happily chalk up one more day for an elimination cycle that runs unhampered, cleaning built-up toxic waste [from processed foods and food chemicals] from their bodies. If you pack them off to school, after a fruit breakfast, pack more fruit for their morning snack, [since fruit digest rapidly and so they will be hungry again in a couple of hours] maybe even some sun-dried fruit. Remember FRUIT IS THE ONLY FOOD THAT WILL GIVE THEM ENERGY WITHOUT TAKING ENERGY. Once they make the transition from heavier foods to fruit in the morning – a process that can take from a few days to a few weeks to months – they will have much more energy to work in the morning, since a heavy meal is not draining their energy reserves. If you are worried in the beginning that they will be hungry add some raw nuts to their lunch boxes just in case”*²⁵

For optimum performance there are 3 basic guidelines that ideally should be followed (these are general guidelines but should NOT be rigid rules – so of course you can have a Krispy Kreme donut with a friend or a piece of sugar-laced birthday cake – have fun! But don’t make eating such foods an everyday occurrence.):

GUIDELINES FOR OPTIMUM BRAIN SUGAR LEVELS

Maintain “normal” levels of glucose in the blood by consuming a wide variety of unprocessed natural food like baked beans, peanuts, chickpeas, kidney beans, soybeans, apples, avocado, carrots, tomatoes, onions, pears, oranges, grapefruit, broccoli, lettuce, fish, lean chicken (without the skin which often contains fat). Avoid “spikes” of glucose levels by avoiding processed sugar foods, cake, cookies crackers, cereal, and soft drinks. Extra high or low levels of glucose affect or compromise mental function.

Blood glucose help regulate how you feel and think – mood and cognition. The amount of glucose in your blood alters mood, memory and learning capability.

What you eat greatly influences blood glucose fluctuations. Sweets, starches (carbohydrates) have the most impact in creating glucose that fuels the brain.

Eat small amounts of food more frequently. This is better for maintaining a steady flow of blood glucose if you eat several smaller meals 6 times a day, rather than the typical 3 times a day. This is the way our ancestors ate, so according to evolution we are designed to do the same.

Antioxidants and Their Sources

Although oxygen is vital to life, this essential element may contribute to organ aging particularly in the brain. When oxygen is metabolized or burned by the body, cells form by-products called free radicals. Free radicals travel through the cell, disrupting the structure of other molecules, which results in cellular damage. Antioxidants protect key cell components (particularly brain cells) from damage by neutralizing the free radicals.

Antioxidants that occur naturally in the body or through the diet may block most of the damage. Quite possibly some learning and mental problems from birth to death could stem from free radicals and not enough antioxidants. In essence, masses of oxygen free “gangsters” can cause great havoc, corrupting cells’ DNA, ripping their membranes, reducing normal function and sometimes destroying them altogether. The key is to have a strong internal antioxidant security force to limit free radical “gangster” damage. The brain is the most vulnerable to free radical damage for two reasons. One reason is that the brain itself generates more free radicals than any other organ because it uses so much oxygen. The second reason is that the brain is the fattiest organ (50% fat) and fat is the favorite breeding ground for free radicals. Eating processed foods laced with chemicals is one sure way of increasing the level of free radicals in your body. Processed refined foods are also almost devoid of antioxidant content (in fact, some processed foods have free radical chemicals already in them!). Now if you **do not** extinguish and dispose of the dangerous free radicals in your body, they will actually entice cells in your body (and brain) to self-destruct or commit suicide. This process is called apoptosis; researchers believe is what happens to destroy brain cells diseased with Alzheimer’s. That is why consuming food and supplements high in antioxidant content is important.

So what are the best foods to eat? Natural fruits and vegetables. How do we know this? Well, agriculture researchers at Tufts University in Boston developed a process whereby they he can know the antioxidant value of various foods (how quickly they can disarm free radicals). Known as ORAC (oxygen radical absorbency capacity), each food gets an ORAC score. The ORAC score indicates how well nature empowered that food to

neutralize cell-damaging free radicals. The foods with the highest ORAC value are fruits and vegetables!

Tufts University conducted ORAC tests on various fruits and vegetables and here is how they ranked for ORAC value:

Fruit or Vegetable	ORAC units per 100 grams
Prunes	5770
Raisins	2830
Blueberries	2234
Blackberries	2036
Garlic	1939
Kale	1770
Cranberries	1750
Strawberries	1536
Spinach, raw	1210
Raspberry	1227
Plum	949
Alfalfa sprouts	931
Spinach, steamed	909
Broccoli florets	888
Beets	841

Fruit or Vegetable	ORAC units per 100 grams
Avocado	782
Orange	750
Grape, red	739
Pepper, red	731
Cherry	670
Kiwifruit	602
Beans, baked	503
Grapefruit, pink	483
Beans, kidney	460
Onion	449
Grapes, white	446
Corn	402

So the bottom line is: to keep your brain in tip top shape you should eat plenty of berries, raisins, prunes, spinach and other deeply colored fruits and vegetables. Go picking blueberries if you get a chance! I grew up in Northern Ontario a place infested with wild blueberries during the early summer...what a blessing it is.

A research team at Tufts University headed by Dr. James A. Joseph had the question: once the brain has experienced dysfunction, can you rejuvenate it? Can you repair the brain's damaged circuits, restoring some of its lost functioning? They tried various fruits and vegetables and the best they could come up with was that spinach or strawberries prevented

decline. That was until he used the simple little blueberry (an antioxidant powerhouse). For the experiments, he chose rats that were 65 to 70 years in human terms. These rats had diminished memory, poor motor coordination, and poor balance – definite brain deficits. For eight weeks they were given a freeze-dried powder consisting primarily of blueberries, spinach and strawberries mixed in with their food. After the eight weeks, the animals were re-tested and something truly amazing happened. All the rats eating the blueberry-spinach-strawberry mix had their mental deficits dramatically reversed. He also discovered that spinach, strawberries and blueberries improve short-term memory. Only blueberries reversed deficits in balance and coordination.

In a further experiment, Dr. Joseph put blueberries to another test. He exposed neurons from animals to a toxic substance, one known to cause massive free radical damage in neurons, enough to cause dementia (total devastation). He then took the damaged cells and poured blueberry extract over them. When he tested the cells again, the dementia-induced toxicity had completely disappeared, neutralized by the blueberries! In an interview, he claims to have been looking for 22 years for an agent that could reverse motor behavioral and cognitive defects like blueberries can. Blueberries are the only substance that he knows of that can do this.

Other antioxidants are very effective at protecting and enhancing the brain.

In the table below are some listed with a brief explanation:

Antioxidant	Explanation on brain function
Fruit and vegetable – carotenoids (lutein, lycopene, beta and alpha carotene, zeaxanthin, cryptoxanthin)	French researchers at INSERN tested 1400 men and women and found that those with the highest blood levels of carotenoids from fruits and vegetables scored 35 to 40 % higher on tests of logical reasoning and visual attention than those with the lowest blood levels of carotenoids.
Vitamin C and beta-carotene	Swiss researchers studied 442 healthy men and women age 65 to 94. Found that higher blood levels of Vitamin C and beta-carotene predicted a superior memory in old age. Scoring high recognition, recall and vocabulary.
Lycopene – found in red fruits and vegetables. The king of lycopene source is the tomato – especially processed tomato products like tomato paste, tomato sauce and canned tomatoes.	Dr. Snowden at the University of Kentucky studied Nuns (women) ages 77 to 98 years. He found those with low blood lycopene were least able to walk, bathe, dress, and feed themselves. The more lycopene in their blood the sharper was their mental acuity.
Tea - Black or Green (NOT powdered, bottled or herbal teas)	Black or Green tea brewed for 5 minutes. A 5-ounce cup – ORAC of 1246 units!

It is recommended that you indulge in food with a high ORAC value and foods that supply many of the antioxidants mentioned. This will help to ensure optimum brain health and function.

Vitamins and Minerals – Building Blocks for Brain Health

Adequate nutrition is very important to maintain optimum brain health. Our dietary intake must contain adequate amounts of essential macronutrients (proteins, carbohydrates, and fats) and micronutrients (minerals and vitamins). Optimal dietary recommendations focus on providing the proper balance of these essential nutrients and staying away from over-consumption in any particular group. The most recent Food Pyramid developed by the USDA suggests daily consumption of a balanced diet that is low in fat and rich in fruits, vegetables, and fiber. Such a diet should provide adequate levels of essential minerals, vitamins and antioxidants. However, despite good intentions, most individuals fall short of these recommended levels.

“In 1936 in U.S. Congress, the U.S. Department of Agriculture presented U.S. government document number 264 that clearly reported that the majority of the American population are not getting the minerals they need. It also says that all American farm and range soils were depleted by 85% of the mineral value the farms had 100 years ago. And if this was the case in 1936 then how much worse can it be today?”²⁶

In addition, nutrient needs vary drastically for different groups of people, such as children vs. adults and women vs. men. Current research also shows that for certain nutrients the

Recommended Daily Allowance (RDA) may be inadequate to provide long-term protection against general health and brain degeneration. One thing is for sure – taking supplements can improve brain function, boost scores on IQ tests, improve memory and mood and reduce the chances of deterioration of the brain, as we get older.

There have been countless studies conducted showing that administering multi-vitamins supplements to students can dramatically increase their IQ scores.

A study conducted by British Psychologist Dr. David Benton gave 30 school children a multi-vitamin supplement and 30 other children a placebo pill for a period of 8 months. All the children took standard intelligence tests before and after the 8-month period. Dr. Benton discovered that the children who took the multivitamin had their “non-verbal” portion of the intelligence test soar by nine points from an average of 111 to 120. The placebo children had only a 1-point increase. Scores on the “verbal” portion of the test had no change. When asked about the difference, Dr. Benton feels that nonverbal intelligence reflects basic biological functioning, or brain potential, the same goes for the fact that as brain weight increases in infants and younger children so do their scores on nonverbal intelligence tests. Whereas one of the things that verbal IQ scores reflect is a better vocabulary – and taking vitamins is not going to give a better vocabulary. Verbal IQ scores also reflect environmental, cultural and educational factors – areas that the performance enhancing affect of a multi-vitamin will not enhance.

In 1991, Steven Schoenthaler a criminologist at California State University wanted to know if there was a link between delinquent behavior and diet. He gave either a multivitamin-

mineral supplement or a placebo to 26 teenage juvenile delinquents at a detention center. He did this for 13 weeks. Before and after he tested their intelligence, measured brain wave function on an EEG and measured their blood concentrations for 7 minerals and 10 vitamins to evaluate their nutritional status. After 13 weeks, all the children's verbal IQ scores did not change. However, verbal scores of the supplement takers went up 6 points. One teenager's IQ score shot up a whopping 25 points from 117 to 142! Another fascinating discovery was that those who were taking the supplements had their EEG brain wave abnormalities virtually disappear. In addition, antisocial behavior such as violent attacks on other residents and staff members dropped off as their nutritional status improved.

John Yudkin at Kings College in London joined Dr. Schoenthaler in a study of 615 eighth and tenth grade students. The researchers put some children on a placebo and the other half on a 100% RDA (Recommended Daily Allowance) supplement. At the end of the 13 weeks, they found that only 20% of the placebo group had a 15-point or more gain in nonverbal IQ. Whereas 100% of the children receiving the supplement had an increase of 15 points or more in verbal IQ.

Obviously, this increase demonstrates that the brain operates more effectively when these trace amounts of minerals and vitamins are present in the bloodstream. It certainly does not take for us to be physically body-malnourished in order for our brains to be receiving less than its optimum. So quite possibly detecting low levels of minerals and vitamins for brain performance is very subtle and can go on for years in an individual before a simple solution (like taking a multi-mineral-vitamin each day) is found. A test to find out if you are

vitamin-mineral deficient is to take a blood test before and after taking the supplements. If your vitamin-mineral-blood level went up then your body was deficient, since the body has the ability to flush vitamins and minerals out if there is excess. Most people on the western diet have some or even drastic vitamin-mineral deficiencies. What researchers discovered as well was that those who had the lowest blood-vitamin-mineral level were the students who improved the most, thus correcting lower level intellectual functioning due to deficiencies in diet. Deficiencies of micronutrients disrupt psychological functioning.

In 1998, Dr. Benton stated after conducted at least 7 studies that these studies show consistently that the consumption of multi-vitamin-mineral supplements can cause a relatively large increase a child's nonverbal IQ scores. He estimates that a third to a half of all children might improve their scores. Thus taking vitamin-mineral supplements does not push a child's brain beyond normal ability, it is just that a lack of vitamins causes the child to perform below optimum ability.

Researchers did similar studies with adult learners as well and found that when vitamin status in the blood was improved so did cognitive functioning. Interestingly the researchers found that it was the women who reaped the greatest benefits and increases in the studies. Females vitamin-takers had speedier reaction times and processed information more quickly.

B Vitamins for the Brain

All the B vitamins are related closely in function; a deficiency in one can result in the malfunction of the remainder of B vitamins. Important brain B vitamins are B6 and B12, both are very necessary for optimal brain function, but of course need optimal levels of the other B vitamins in order to be effective. Essentially the B vitamin class aid in energy metabolism and we know that the brain when engaged in problem solving and “thinking” uses a great deal of energy. B vitamins also work with essential enzymes that break down fats, carbohydrates and proteins. Vitamin B1, thiamin, was the first B vitamin to be discovered. Your body uses it to process, fats, carbohydrates and proteins. Every cell in your body needs thiamin to make the adenosine triphosphate (ATP), the body’s main energy carrying molecule. The brain and heart need thiamin to keep up their constant work and processing.

Since B1 or thiamin was the first B vitamin discovered the effects of a blood-thiamin deficiency has been known for decades. In the 1940’s Ruth Harrell of Columbia University Teachers College investigated extensively the impact of vitamins on students, especially those with substandard diets. In one double-blind study, she administered thiamin supplements to 11-year-old children in an orphanage. They simply consumed a meager 1 milligram of Thiamin per day and after a year taking it showed increases in intelligence, reaction time, visual acuity, and memory.

In the 1980s a researcher at the Cleveland Clinic Foundation, Derreck Lonsdale, M.D. specialized in pediatric and adolescent medicine did red blood cell studies on over 1000

patients – adults and children. He confirmed that 28% of these people had a thiamin deficiency, many of which had the deficiency for long periods of time. The 1000 plus patients had been referred because of behavioral problems such as: erratic temper, violent mood swings, hyper-activity, learning disabilities, tantrums, depression, sleep problems and anxiety. During the study, he gave them high doses of B vitamins or simply thiamin alone. Usually within a few months, their blood-thiamin became normal and in nearly all cases their symptoms lessened or disappeared altogether. Possibly the symptoms were caused by “disturbed brain chemistry” long attributed to a deficiency of thiamin. Dr. Lonsdale came to two conclusions – 1) the patients had the early symptoms of beriberi, a nerve destroying condition caused by acute thiamin deficiency, 2) a high incidence of abnormal tests indicates a widespread deficiency of thiamin in the USA.

Dr. Benton also worked with people who have normal blood-thiamin levels and decided to give them 50 milligrams of thiamin per day (about 30 times the RDA) and found that it increased their reaction times and decision speed on a specific mental performance test, whereas the placebo group remained the same.

Vitamin B2 – riboflavin works with enzymes critical to the body’s production of ATP, it is also used to activate B6 (memory vitamin) and folic acid (for memory also). Vitamin B3 – niacin (also known as niacinamide, nicotinamide, nicotinic acid), is required to work with over 50 enzymes, without it your body would not be able to release energy and is important in chemical signal molecules that the brain utilizes. Small wonder that many studies find niacin can have a profound and positive effect on brain function. Niacin may improve memory in people of all ages. At the Free University in Amsterdam, Dutch researchers

tested high doses of niacin on 96 healthy adults. Half of them took the real supplement and the remainder took a placebo. Testing short-term, long-term and sensory memories they concluded that the group consuming the supplement boosted memory performance by 10% to 40% above the placebo group. It was effective with young, middle-aged and older people alike.

Vitamin B5 -- Pantothenic acid is used to make proteins, hormones, red blood cells and acetylcholine (referred previously in a research experiment as a memory chemical) – an important neurotransmitter. Vitamin B6 – pyridoxine plays a major role in making proteins hormones and neurotransmitters (serotonin, dopamine, norepinephrine, GABA and taurine). Failing to get enough B6 can bring on sub-optimal brain performance and psychological distress.

In her studies Katherine Tucker, a researcher at Tufts University linked high B6 blood levels with memory among 70 middle-aged and elderly men. In tests to study the processing of new information, men with the highest B6 blood level scored 30% higher in recalling the most items and in recalling numbers backwards. They also had a better “delayed recall” – the ability to relay the details of a story read to them. In working with middle-aged men, she discovered that B6 was an even more potent memory booster and they responded even more dramatically. She discovered too that nearly one-half of the men studied had deficiencies in B6, suggesting a substantial general deficit that can easily be corrected.

Vitamin B7 – biotin also plays an important role in metabolizing the energy we get in food and assists four essential enzymes that break down, fats carbohydrates and proteins.

Vitamin B8 – inositol is present in all animal tissues with the highest levels in the brain and heart. It is part of all outer linings (membranes) of cells. Vitamin B9 – folate or folic acid plays an important role in cell division and memory.

A deficiency in folic acid has been linked to multiple cognitive and psychological problems for years. From 1966 to 1990, more than 25 studies show that psychiatric patients tend to be deficient in blood level folic acid. Dr. Botez at the University of Montreal describes “folic-acid-deficiency-syndrome” as mild to moderate depression, fatigue and minor neurological signs. After giving 15 mg of folic acid to 50 patients each day he found their verbal performance and IQ scores improved, and 85% were found to experience mood improvement.

Dr. Fava of Harvard gave 20 elderly depressed patients a large dose of folic acid for 6 weeks alone without any additional drugs or medication. An incredible 81% of them got better!

In 1997 Italian researchers from the University of Rome conducted a double-blind study testing folic acid with mild to moderate memory loss and low blood levels of folic acid. Half of the 30 elderly patients received 15 mg of folic acid and the others received a placebo. Clearly, those who received the folic acid scored higher on memory tests and with an increased attention span. Many studies have pointed to a folic acid deficiency as the thief of a good memory.

Vitamin B12 – cobalamin is required for the normal activity of nerve cells and is thought to work especially with folic acid and vitamin B6. A deficiency in B12 can lead to disorientation, memory problems and dementia. A deficiency in B12 can sneak up on people and not become noticeable for 20 to 30 years. Oddly enough a deficiency can affect the brain and nervous system and nothing else. A contributing factor is as well the fact that as we get older, that sometimes if not properly nourished, the stomach secretes less hydrochloric acid and pepsin, creating difficulty with B12 absorption from food. Stomach juices are severely depleted if we eat too much processed foods, empty of the raw materials fruits and vegetables provide (alive enzymes etc.) to build good stomach acid.

Another contributing factor to vitamin loss is the presence of parasites in the body. They compete for your nutrients and leave you with the scraps, leftovers and their toxic excrement. *“Tapeworms compete for vitamin B12 in the host. After the tapeworms are eliminated from the body, [do an herbal parasite cleanse for at least 3 months, as previously described] it can take up to one year for the B-12 levels to return to normal. It is therefore important that you are patient in replenishing body supplies and are consistent in a day-to-day rebuilding of reserves. You may have been carrying around this uninvited guest for several years, so it will take some time to regenerate your system.”*²⁷

In Hong Kong while working as a Whole-life consultant I had an Mutual Fund manager as a client who was always going to the doctor for an injection of vitamin B12, because he lacked energy at times, had sleep disturbances, was grinding his teeth at night. He was worried about his job since it demanded an optimum energy level and acute memory. His

physician again (as other times) confirmed his very low level of B vitamins, and would give him the injection. The client would feel energized for about 6 weeks after the injection, but then his energy level would again deplete. I told him in our consultation that I felt he had parasites, possibly a tapeworm. He was very skeptical, but I expressed that he had **nothing to lose** by trying the herbal parasite cleanse and so he purchased a kit and started that night. Months later he never needed another B vitamin injection and felt he had more energy and mental focus than he had since College. The beauty of what he did was to get right to the root of the problem (the vitamin sucking parasites in his body) and deal with them.

Vitamin B12 has been known to prevent senility. David Smith of Oxford conducted a study and found that older people with abnormally low blood levels of B12 were 4 times more likely to develop Alzheimer's disease. The important fact to note is that the sooner you catch the B12 deficiency and correct it, the better the chances of full recovery. A brain deprived of B12 for long periods of time can be damaged permanently.

Vitamin C for the Brain

The human body does not produce vitamin C, so all of this important nutrient's requirements must be obtained through our diets, which sadly, are frequently deficient of vitamins. Lifestyle factors such as environmental pollutants, smoking, and processed foods, can impact the level of vitamin C in the body. Most mammals have the ability to make their own vitamin C, but humans lack the proper enzymes, so we must obtain vitamin C through diet and/or supplementation. According to research, Vitamin C contributes to the creation of neurotransmitters, is found in high-concentration levels in brain cells and

passes easily through the blood-brain barrier. Knowledge of vitamin C has been around for a long time so numerous studies have been conducted showing high levels in the bloodstream boost cognitive performance for people of all ages.

Psychologists from Texas Woman's University in Denton, Texas gave 236 school children and 115 university students' age-appropriate IQ tests and also analyzed their vitamin C blood levels. They classified each individual as high or low vitamin C. They discovered that the students with the higher vitamin C blood levels had higher IQ scores exceeding them by 5 to 10 points. The big question was: could they raise the IQ scores of students with low C blood levels by giving them a vitamin C-rich orange juice over a 6-month period. The answer was yes! IQ scores rose with blood vitamin C concentrations. The low C students increased by 4 points. Students whom originally had high C blood levels showed no change.

In the U.K., investigators found that boys' age 13 to 14 with the highest levels of vitamin C in their blood had the highest scores on nonverbal IQ tests.

Vitamin C is a powerful antioxidant that helps to protect the brain from destructive free radicals. When animals hibernate, concentration of vitamin C in their brain cells soars and the blood level of vitamin C often increases by 400%. This is to protect the brain for when the animal wakes up and there is a sudden flow of blood and oxygen to the brain, due to activity. Many animals other than humans can manufacture their own internal vitamin C.

Vitamin C is much more than an antioxidant. It can directly influence electrical impulses, the release of neurotransmitters and their unique journey through brain cell synapses. Optimum levels of vitamin C ensure proper quality and quantity of brain transmissions.

Vitamin E for the Brain

Vitamin E is a powerful antioxidant, helping the body to rid itself of toxic substances.

Vitamin E is a fat-soluble vitamin and since the brain is mostly fat this vitamin is perfectly designed to preserve the integrity of your gray matter and fight free radicals. Without sufficient vitamin E, fatty parts of your brain could turn “rancid” (like lard left out of the refrigerator and allowed to decompose). Vitamin E has been proven better than all other vitamins to protect brain cells from the normal wear and tear of everyday use.

Supplements appear to be the best source of vitamin E, better than food, since many sources high in vitamin E are often high in fat. According to a study conducted by the National Institute of Aging, *“to get 100 I.U. (International Units) daily, a person would have to consume 7 cups of peanuts, 2 cups of corn oil, or 19 cups of spinach”*²⁸

A double-blind study conducted by researchers at Chicago’s Rush Institute for Healthy Aging and Harvard Medical School studied 633 people ages 65 years plus. They carefully examined what vitamins they took and gave them extensive memory tests. After 4 years the researchers re-examined their mental functioning through testing and neurological examinations. The result was that not a single person among the 27 who took vitamin E supplements developed Alzheimer’s (expected cases were about 4 or 15%). Also no one

among the 23 who took vitamin C supplements developed Alzheimer's either (again, 15% would be expected). It was found that they took between 200 to 800 IU (international units) per day of vitamin E. The average daily dose of vitamin E was 400 IU and 500mg for vitamin C. It is important also to note that taking multi-vitamins containing low doses of vitamin C (usually 60 mg) and vitamin E (30 IU) **did not** reduce the odds of Alzheimer's. Such multivitamin users as found in the study were just as likely to develop Alzheimer's as those who took no vitamins. According to researchers there is probably too little vitamin E & C in conventional cheaply priced multivitamin pills to protect the brain. Bottom line: the probability of individuals taking healthy doses of vitamin E & C and developing Alzheimer's is **zero**.

In addition, through research vitamin E has been shown to regulate message transmission within cells. This newly discovered role called (second messenger system) is vital in controlling and directing neurotransmitters once they enter the nerve cell. Vitamin E also reduces the clogging of blood vessels that are the pipelines of oxygen for living brain cells, so in essence vitamin E fights plaque buildup and promotes vascular flexibility. Thus, robust doses of vitamin E ensure healthy brain function.

Selenium as Brain Mood Booster

Selenium is an important antioxidant and naturally occurring mineral that varies in availability, depending on the contents of the soils in which food is grown. Excellent natural sources of selenium are: whole grains, wheat germ, brown rice, garlic, seafood: particularly swordfish, tuna and oysters. The queen of selenium source is the simple Brazil

nut – averaging 12 to 25 micrograms per nut! Bought in the shell a Brazil nut can provide up to 100 micrograms of selenium.

Numerous studies have shown its powerful cancer preventing capabilities. The amount of selenium needed in your diet each day cannot even be seen by the naked eye, but it is vitally important. Researchers went to the north central area of China where an inordinate number of people contracted stomach cancer each year. Over a five-year period, they tapped into a population of 29,000 people and created control groups that received a daily supplement of selenium and vitamin E. Their conclusion at the end of the study showed that by consuming such supplements these Chinese people would reduce their odds of stomach cancer significantly – by over 13%.

Selenium also has a profound impact on brain function. Selenium is vital for the creation of the enzyme glutathione peroxidase one of the brain's most important antioxidants, for breaking down toxic chemicals. Selenium deprived brains show disturbances in the activity of vital neurotransmitters. U.S. Department of Agriculture researcher James Penland fed a group of young men either a high-selenium diet or a low-selenium diet for a period of 3.5 months. The men on the high-selenium diet felt more confident, clear-headed, energetic, composed and elated. The selenium lifted the men's moods despite the fact that they had no signs of a deficiency. Quite possibly undetected deficiencies in selenium could be ruining our moods. Mr. Penland's high-selenium diet contained 220 micrograms per day, and the low selenium diet had a mere 33 micrograms. The average North American diet has about 40 to 60 micrograms of selenium per day. This is just slightly below the RDA (recommended daily allowance) but we will discuss RDA later, my findings show that

RDA is just for those who want to survive nutritionally, but truly **thriving** with proper brain and body health requires far more than the RDA.

David Benton a British psychologist worked with 50 participants ages 14 years to 74 years and had them take a 100-microgram supplement of selenium for 5 weeks. Some received the real thing and others got a placebo. All had no signs at the beginning of the study of a selenium deficiency and did a standard mood inventory evaluation. At the end of the 5 weeks, the selenium takers felt strikingly more energetic, clear-headed, composed, confident and agreeable. Selenium's greatest benefit was reducing anxiety. All individuals on the high-selenium supplement experienced increase on the mood test from 25 to 40 %.

From my research and experience, it is advised that you take about 200 micrograms of selenium per day to protect your brain and to reduce the risk of cancer. However, be very careful of high doses, since selenium is one of the few mineral supplements that can be toxic at high levels, although toxicity does not kick in until you consume 2500 micrograms per day. There is no need to exceed the 200-microgram amount per day.

Coenzyme Q10 for the Brain

Coenzyme Q10 (also known as Co Q10, Q10, vitamin Q10, ubiquinone, or ubidecarenone) is a compound that is made naturally in the body. Coenzyme Q10 is critical in the production of energy (ATP – adenosine triphosphate) in the mitochondria of living cells. It also helps cell membrane walls stay healthy and strong by preventing free radical damage.

CO Q10 has been studied for the last 40 years, focusing primarily on heart health benefits. It has not been until recently that the benefits of Co Q10 for brain function have been explored. It is now known that a shortage of CO Q10 creates an energy crisis in the brain where free radicals can attack the fatty cells turning them rancid. When this happens, message transmission is garbled and the cell's survival is in peril.

It is like the high-performance motorcycle used previously. Imagine that you get the engine all tuned up, but some of the spark plugs are missing from the cylinder head. You would turn over the engine but there would be reduced spark and the engine would be useless. The antioxidant Co Q10 is the cellular spark plug that sparks the tiny energy centers in nerve cells to produce ATP that fuels all life. A lack of Co Q10 and brain cells become sluggish, because they are not firing properly since most of the sparkplug material (Co Q10) is absent. A brain without Co Q10 will not work at full power – memory and learning skills decline. As we get older, we produce less and less Co Q10 so it is a good idea to supplement the diet with Co Q10.

An experiment conducted by Dr. Flint Beal M.D. at Harvard wanted to know if Co Q10 supplements taken orally would find their way to the brain where it does the most good. Dr. Beal administered Co Q10 to middle-aged lab animals, each receiving high doses of Co Q10. After a series of autopsies it was discovered that brain Co Q10 levels jumped 8% after one week, 16% after one month, and a 30% after 2 months. The best news was that the Co Q10 was concentrated in the brain mitochondria, where it is most effective and needed. This restored the brain levels of Co Q10 to those seen in young animals. It is

expected to do the same for humans. The end conclusion was that ingesting Co Q10 supplements rejuvenates brain cells.

Ginkgo Biloba for the Brain

Ginkgo Biloba comes from one of the world's oldest living trees, and has been cultivated throughout the world. Its distinctive fan-shaped leaves contain compounds that promote blood flow and, therefore oxygenation in the brain. It is also a strong antioxidant and has been shown to neutralize virulent free radicals like super-oxide, hydroxyl and nitric oxide. Many of these free radicals cause brain cell damage and inflammation of the brain. Therefore, ginkgo is considered as well to have anti-inflammatory properties.

Dr. Turin Itil a world-renowned neuropsychiatrist is the author of numerous pioneering studies involving ginkgo. He found that when people were hooked up to an electroencephalograph (EEG) and given ginkgo that the herb stimulates striking pharmacological activity in the brain. He found that supplements of ginkgo increased alpha brain wave activity. Ginkgo may also reverse brain aging by stimulating the re-growth of nerve cell receptors and increasing blood flow to cells, thereby boosting the nutrient flow to brain cells.

Studies show that ginkgo is not really a booster of memory and it does not enhance long-term storage and retrieval of information. However, it has been shown to speed up reaction times and accuracy involved in short-term or "working memory."

About 250 studies on ginkgo have been published in the last 15 years, mostly in Europe. The German government has ginkgo approved for such age-related difficulties as memory and concentration, absentmindedness, confusion and dizziness.

Pycnogenol for the Brain

Although ginkgo has been more widely tested, a very powerful antioxidant known as pycnogenol has great potential for protecting the brain. There are two sources of pycnogenol – pine bark and grape seed. After testing and evaluation, it has been found that the grape seed extract has more antioxidant power than the pine bark source. Grape seed extract could be a supplement that you can add to further protect and enhance brain function.

Choline for creating good Brain Memory

Choline is a remarkable amino acid. Researchers discovered that it is vital for expecting mothers to have a good supply of choline since it has a key role for building a superior brain in the fetus. A fetal brain that receives ample choline displays incredible memory and learning capabilities.

Scientists at Duke University Medical Center fed pregnant rats no choline, normal choline and extra choline, and then studied the mental functioning and brains of the babies that were born. It was clear that the rats that got the extra choline during gestation had vastly

superior brains, displaying greater memory and learning capabilities. Examinations revealed superbly efficient brain circuitry that transmitted messages very quickly, allowing them to learn more rapidly. Wondrous, when you think that with the addition of one nutrient – choline; enabled nature to assemble a brain of superior quality. At the other end of the spectrum rats with no choline during gestation had impaired memory and sluggish brains when they were older. As the babies who received choline got older their mental capacities were still going strong. Researchers surmise that choline is an ingredient necessary in the formative stage of building a top quality brain of flawless neurons and connections.

Dr. Steven Zeisel M.D. and her colleagues at the University of Carolina School of Medicine found that when there is a lack of choline, cell division is reduced and increased numbers of brain cells die when the brain is being formed in the fetal state. Thus the formation of the baby's brain is directly affected by what the mother eats during gestation – specifically food and/or supplements rich in choline.

Foods rich in choline are first of all eggs – specifically the yolks, lecithin, peanuts, leafy greens, fish, wheat germ, broccoli, cabbage and cauliflower. The best supplement form for choline is to take lecithin; one tablespoon of lecithin supplies 250 milligrams of choline.

A Memory Enhancer – Phosphatidylserine

“I’ve tested close to a hundred compounds for their effects on human memory, and phosphatidylserine (PS) is the most impressive one I’ve found so far.”²⁹

Phosphatidylserine or simply PS is a fatty nutrient present in all human cells but with high concentrations in brain cells. PS slips easily through the blood-brain barrier, so it gets into the brain very shortly after being ingested. PS is well respected among brain researchers because it has undergone numerous double-blind tests.

In one study, Dr. Crook, of the National Institute of Health had participants ingest 100 milligrams of PS three times a day and the other half of participants take a placebo. All the participants took a battery of tests every 3 weeks. By the end of the 12 weeks, those taking PS scored 30% higher on memory and learning tests. Those taking PS with the worst memories benefited the most, with greater recall for faces, names, telephone numbers, paragraphs and improved overall concentration.

In 1987, Italian researchers at the University of Catania worked with 170 patients suffering from moderate cognitive dysfunction. They took either a 300-milligram daily dose of PS or a placebo. The researchers tested cognitive function, memory and verbal fluency. Over time, those who took PS scored 50% higher than those on the placebo.

Originally, PS supplement was derived from cow brains, however after the mad cow disease incidents in Europe, PS is now derived from soybeans. Most PS in the world (95%) is made by one company Lucas Meyer, located in Decatur, Illinois, USA. Much of the original studies for PS was done using PS derived from cows, however Dr. Crook claims that the soy-based PS is identical in its memory-enhancing powers, possibly even superior. To prove this Dr. Crook did a test with people having memory troubles. He gave one

control group 300 milligrams of soy-based PS and another group a placebo. The group taking the PS had their ability to remember names jump a full 33% while the placebo group experienced no change.

In essence, PS super-charges the brain. Shown when investigators hooked people up to an EEG (electroencephalograph) and did PET scans of the brain. Daily, 300 milligrams were given to people with mild memory problems. This increased depleted EEG power levels to almost normal and their cognitive test scores increased proportionately. Studies show that PS boosts the levels of neurotransmitters and improves the structure of fatty-tissue neuron membranes so that the cells experience a form of super-conductivity between them. PS can also act as a protector against free radical damage, blocking the erosion of dendrite connections that typically occurs during aging.

The one downside to PS is that it can become expensive to consume. The total source (95%) of PS comes from one company -- Lucas Meyer, USA, which sells it to other companies who put it in their supplements on the market. A supply of a single 100-milligram capsule can cost \$1. If you take 300 milligrams per day (the suggested optimum amount) the cost is \$3 per day or \$90 per month. If you add that to your other supplement regimen, the expense can be substantial. There are no known side-effects with PS, however it is suggested that if you take 300 milligrams per day, that you take 100 milligrams 3 times daily with a meal, since taking 300 milligrams all at once on an empty stomach has been known to induce nausea. The best source of PS in your diet comes from fish, soy foods, rice and green leafy vegetables.

Other Minerals for Brain and Body Function

There are a host of other minerals needed for proper brain and body function. Some are needed in only trace amounts and quite often their daily amounts couldn't even be seen with the naked eye. However, if you go without them for periods of time, dysfunction in the brain and body will occur. It is important to note also that the minerals need to be in an organic or chelated form. There is a huge difference in organic zinc from nuts and seeds and the zinc you would get by chewing a steel nail down at the local hardware store. The zinc from nuts is in an organic form, one that your body can easily assimilate and put to good use. The zinc in the steel nail however is inorganic and can hardly be absorbed. That's why it is so very important to check that your mineral supplement tablet contains minerals in their proper absorbable form. Quite often cheap multi-vitamin-mineral supplements contain most of their minerals in inorganic form – and sadly the body can't absorb them or make use of them.

I have compiled a table briefly describing the importance of each mineral for brain and body health:

Mineral	Function, sources and other details
Calcium	Calcium is important for the structure of the body. Calcium depends on other minerals like magnesium and silicon. Calcium is especially important for proper nerve conductivity and needs magnesium for this. Sources: dairy products, green leafy vegetables, nuts, tofu, soymilk, dried figs and apricots.
Magnesium	Works with calcium in a 2 to 1 ratio (2 parts calcium 1 part magnesium) for proper nerve conductivity, protein synthesis and energy production. Sources: nuts, green vegetables, seeds, seafood, legumes, grains.
Potassium	Potassium works with sodium and helps to support electrical impulses across cell membranes. Sources: bananas, leafy greens, potatoes, nuts and seeds.
Sulfur	Sulfur is a major component in the antioxidant protectors for brain tissue called glutathione. Sulfur is a component in many enzymes that help the body eliminate many kinds of toxins. Sources: odiferous vegetables – onions, garlic, brussel sprouts, cabbage, turnips. Also fish, eggs and dairy
Boron	Works with calcium and magnesium for healthy bone strength. Sources: apples, grapes, nuts, legumes and leafy greens.
Chromium	Helps facilitate the entrance of blood glucose into your cells; particularly brain cells and is a requirement for abundant energy. Sources: whole grains, wheat germ, yeast, potatoes (with skin), beans, vegetables, meat, cheese.

Mineral	Function, sources and other details
Copper	Nerves and joints require copper for healthy functioning. It is a zinc balancing mineral, important in many enzymes as well as in the production of hemoglobin, the molecule that transports oxygen. Sources: nuts, seeds, whole grains, legumes, and vegetables.
Iron	Iron is essential for hemoglobin, which carries the oxygen in every red blood cell. Sources: liver and red meats, leafy greens, nuts, seeds, raisins, prunes, wheat germ and bran.
Manganese	It's important in many enzyme systems of the body and helps the body utilize brain vitamins like choline, thiamin-B1, and vitamin C.
Molybdenum	Helps to detoxify the body and to breakdown carbohydrates and the products of proteins (uric acid). Sources: whole grains, legumes and vegetables.
Selenium	Previously covered – important for brain function.
Vanadium	Plays a role in proper blood sugar balance. Sources: grains, carrots, cabbage, mushrooms, other green vegetables.
Zinc	Essential to many enzyme systems and for a robust immune system. It helps also to detoxify the body. Sources: oysters, shellfish, eggs, meats, nuts, seeds and whole grains.

Supplements and the RDA

The RDA (recommended daily allowance) represents the level of nutrient intake that will meet the needs of most people for health. It simply outlines what level of nutrition is needed to prevent overt deficiency diseases like beriberi and rickets. The RDA is a place to start, however, for example: when you construct a building the RDA is the foundation, but of course, you can build greater things beyond the foundation. **The RDA is designed for survival** but if you want to boost and energize the brain and body function then more than the RDA is required. For example, intake of selenium 2 to 3 times higher than the RDA may benefit overall mood, confidence, clear-thinking, elation and energy (as was shown in the study presented earlier with selenium). Taking 200 micrograms of selenium is actually 286% of the RDA!

Listed below are the nutrient levels from a premium supplement developed by Royal Numico of the Netherlands (the oldest and largest nutrition company in the world, 106 years old, with 400 research scientists on staff – half of which have their Ph.D.'s). Royal Numico is one the top developers of efficacious nutritional supplements and spend over \$95 million US per year in research – 80% of the research conducted for human nutrition on planet Earth. With their premium supplement (called Core Health), there is a formulation for men, women and children, since each has different nutritional needs. The table below shows the supplement for men and women with differences mentioned, for iron, ginseng and calcium.

Nutrient	Units IU – International Units Mg – milligrams Mcg - micrograms	% Of RDA (recommended daily allowance)
Vitamin A	10,000 IU	200%
Vitamin C	250mg	417%
Vitamin D	400 IU	100%
Vitamin E	200 IU	667%
Thiamin	10 mg	667%
Riboflavin	10 mg	588%
Niacinimide	25 mg	125%
Vitamin B6	10 mg	500%
Folic Acid	400 mcg	100%
Vitamin B12	50 mcg	833%
Biotin	300 mcg	100%
Pantothenic Acid	25 mg	250%
Calcium	200 mg – male	20%
	400 mg - female	40%
Iodine	100 mcg	67%
Magnesium	100 mg	25%
Zinc	15 mg	100%
Selenium	200 mcg	286%

Nutrient	Units IU – International Units Mg – milligrams Mcg - micrograms	% Of RDA (recommended daily allowance)
Copper	2 mg	100%
Manganese	2 mg	100%
Chromium	200 mcg	167%
Molybdenum	75 mcg	100%
Vanadium	15 mcg	N/A
Boron	1 mg	N/A
Inositol	10 mg	N/A
Choline	10 mg	N/A
Endridole 3-C (antioxidant)	100 mg	N/A
Panax Ginseng (male only)	250 mg	N/A
Iron (female only)	7.8 mg	44%
Soy Extract	30 mg	N/A
Lycopene	3 mg	N/A
Green Tea Extract	400 mg	N/A
Quercetin	25 mg	N/A
Lutein	3 mg	N/A
Citrus Bioflavonoids	25 mg	N/A
Mixed Carotenoids	295 mcg	N/A

Nutrient	Units IU – International Units Mg – milligrams Mcg - micrograms	% Of RDA (recommended daily allowance)
Activator – Ginger root, Capsicum, Black Pepper	17 mg	N/A

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These daily supplements are created with optimum body and brain health in mind. The formulations are based on the research conducted by Royal Numico and reflect the latest discoveries for creating robust health in human beings.

I feel that a supplement mentioned above, along with some of the other supplements mentioned (omega-3 fatty acids, Co Q10, phosphatidyl serine, choline) when taken on a regular basis with a diet of quality fresh clean food have the potential to build and maintain superior brains. I also feel that regular cleansing and detoxifying (twice per year) rids the body of brain-destroying toxins. With these strategies in mind:

- 1) Proper supplementation,
- 2) High quality diet,
- 3) Cleansing and detoxifying,

Our brains can be functioning properly. Moreover, with our brains operating in a peak state – education for students and teachers can be a much more rewarding and enjoyable experience.

CONCLUSIONS AND RECOMMENDATIONS

Outlined in the table below is some of my own research conducted with clients. In some instances, their names have been altered for purposes of privacy. It is written in point form

English:

<p>Name: James Wong Location: Hong Kong Age: 38 Occupation: Fund Manager Telephone: 852-25873838</p> <p>Concern: James was always going to the doctor for B12 injections, because he lacked energy, had sleep disturbances, was grinding his teeth at night. He worried about his job since it demanded an optimum energy level and acute memory. After a vitamin injection he felt energized for about 6 weeks – then his energy level would deplete.</p>	<p>Details: James took an herbal cleanse program of: Natures Tea, Paraway Plus, Bios Life 2 Fiber, Red Clover Plus, Men's Formula (Multi-vitamin-mineral). Later he added Phosphatidyl Serine (PS) and grape-seed extract. Drinking 8-10 glasses of water per day.</p> <p>Progress: Over a 3 month period, he felt his energy increase. He had more frequent bowel movements -- removed impacted waste from the digestive tract. Sleep disturbances disappeared, his ability to focus was enhanced, and had a greater feeling of relaxation. With the later addition of PS he noticed an improved memory, but found the supplement rather expensive.</p>
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<p>Name: Sarah Johnson Location: Hong Kong Age: 31 Occupation: Banker & Student Telephone: 852-28108694</p> <p>Concern: She could not concentrate, could not sleep restfully at night, experienced anxiety and menstrual problems. This troubled her greatly since she studied and at the same time worked as a banker.</p> <p>Tested by her Physician for parasites – but the test returned negative (no parasites of any significance detected in her).</p>	<p>Details: Sarah took an herbal cleanse program of: Natures Tea, Paraway Plus, Bios Life Fiber, Clorophyll Powder, Spirulina, Woman’s Formula I (Multi-vitamin-mineral). She also got into the habit of drinking 8-10 glasses of water per day.</p> <p>Progress: Bowel frequency increased (2-3 times /day). She started passing dark impacted waste from her colon. In the first week she passed what we think was a smaller tape worm and other little white “critters” that looked like small white grubs.</p> <p>Continued on the parasite cleanse for 3 months and had a remarkable improvement in the state of her body and brain function (enhanced ability to concentrate, relax, and to experience restful sleep). Also she experienced a normalized menstrual cycle. An improved ability to handle the stress of working and learning. Continued on Women’s Formula 1 Multivitamin</p>
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<p>Name: Cameron Smith Location: Ontario, Canada Age: 11 Occupation: Elementary Student Telephone: 001-905-857-3633</p> <p>Concern: Mother is working with him to reverse his challenges of ADD, learning disabilities and behavioral outbursts. Was put on Ritalin by a physician, but he and the Mother were not happy with the way he “felt” on the drug.</p> <p>Was tested for allergies, but only showed up allergic to ragweed on the skin prick test. Reacts with disruptive behavior to processed foods, hotdogs, Swiss Chalet sauce, soda pop.</p> <p>Cameron went on an elimination diet for allergies, but is now off it. He found it too rigorous while attending school and other social functions.</p>	<p>Details: While Cameron was on Ritalin he started consuming spirulina, Omega-3 fish oil, EFA – essential fatty acid capsules and acidophilus.</p> <p>Progress: Ritalin sedated him, calmed him and improved his focus, but his Mother observes that he loses his reasoning power and has outbursts of some bad behavior.</p> <p>Added spirulina, Omega-3 fish oil, EFA – essential fatty acids and acidophilus. Mother feels he is better with this addition, but when she took him off the Ritalin with only the supplements his bad behavior is more intense. So he is back on Ritalin. He will try the herbal cleanse over the summer holiday, since it takes persistence and focus.</p> <p>The Mother found also that the herbal supplements (spirulina, Omega-3, EFA etc.) need to be taken 2 to 3 hours before the Ritalin otherwise they interfere with the Ritalin and it is less effective.</p>
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From primary research I conducted, and secondary research of other reliable sources, I conclude that a high level of nutrition definitely enhances our abilities to learn and a low level of nutrition depletes our abilities to learn. However, I have taken this study beyond just the simple area of nutrition and explored two highly related areas. The first is the area of cleansing and detoxifying and the need for individuals to cleanse their bodies of built up toxins and internal organisms (parasites) that affect brain function. Cleansing and detoxifying can be a frustrating and uncomfortable experience for people not aware of it,

but the rewards, when we stick with it, are tremendous. The second area of exploration, moves beyond changing food habits and explores supplements that can be taken to enhance learning performance. Plenty of secondary research shows that these supplements enhance brain function when used efficaciously.

In closing I recommend for optimum brain function that everyone:

- Cleanse and detoxify twice a year, flushing the body of toxins and unwanted organisms
- Eat more brain friendly food – fruits, vegetables, nuts, berries, fish, legumes
- Enhance the diet with nutritional supplements known and proven to improve brain performance.

Putting these strategies into action will yield positive results over the short and long term.

May learning and education be the joy it is meant to be!

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