**News to Muse**

**Online Enrollment Up 17%** Fall online enrollments were up 17 percent from a year before, with about 4.6 million students taking at least one class online, according to the 2009 Sloan Survey of Online Learning.

With all higher education enrollments increasing only by 1.2 percent for the same time period, the share of students taking at least one course online reached 25.3 percent. As recently as fall 2002, not even 10 percent of students were taking at least one course online. The data reflect nearly 4,500 colleges and universities, with information gathered by the Babson Survey Research Group and by the College Board, and supported by the Alfred P. Sloan Foundation.

*Source: Inside Higher Ed, 1/27/10*

**The Grist on Diploma Mills** They really do go across the grain of a quality higher education. Diploma Mills can be defined as institutions that offer degrees but require little or no education or course work. In many instances it is strictly an exchange of dollars for degrees. Fortunately there is new congressional legislation introduced to further define and rein in these unauthorized colleges and degrees. Always check to be sure that a school that you may be considering is accredited by an agency that is recognized by the U. S. Education Department or the Council for Higher Education Accreditation.

"**May We Talk?**" Are you having challenges with a particular course? Or possibly wondering how your fellow students balance studies, work and family? Maybe you're looking for suggestions for new job possibilities once you secure your degree? Would you like to connect and communicate with some of your fellow students to share you challenges, hopes and dreams? Several of our students have created their own forums to do just this. If you are interested in joining in a chat forum, please contact Cheryl Freeman, Director, at HCHS: cfreeman@hchs.edu

**Tips from the Grads** Interested in hearing from graduates of HCHS? What career path/improvement resulted from their studies with us? Do you want to know how they utilized their HCHS experience (class selection) to broaden their areas of specialty and reach their goals? Is there a graduate from HCHS that could be a mentor for you? Email your questions and a HCHS graduate will respond in our next newsletter: cfreeman@hchs.edu

**Students Corner** Does the economy have you worried? HCHS wants to help take your mind off financial woes so you may concentrate more on your studies. Ask about HCHS's Interest Free Payment Plans. Instead of having to pay up front for your entire program of study , pay as you progress in your class work.

**ATTENTION ALUMNI WITH DIPLOMA OR ASSOCIATE DEGREES** Now is the time to get that next degree for personal satisfaction, professional growth and additional prosperity. YOUR PREVIOUS DEGREE IS 100% TRANSFERABLE TOWARDS A BACHELORS DEGREE. Call for details: 800-290-4226.
HCHS now participating in the G. I. Bill Educational Programs If you are a veteran and would like to take advantage of your G. I. Bill benefits at HCHS, we are happy to help. First contact your governmental benefits representative to determine which of the programs you qualify for and the specific benefits available to you. Once you have that information contact our Military Liaison Director, to confirm your enrollment and assist with processing the necessary paperwork to enable you to receive your benefits. kpeterson@hchs.edu

Benefits of your education through HCHS: 1. LOWER COST - approx. ¼ the average cost of a private university. 2. FULLY ACCREDITED - national accreditation by DETC (Distance Education and Training Council). 3. OPEN ENROLLMENT - start your course work when it is convenient for you. 4. SELF PACED - complete your course work on your time schedule. 5. ESTABLISHED - our 25th year in serving distance learning students. 6. RECOGNIZED & RESPECTED - for our integrative approach to nutrition and health sciences.

Meet Kelly Peterson, CAP Department Director

NO ... I do not wear a cap while I am work. And YES, many students ask me that question in a teasing manner. Actually CAP is an acronym for Central Assignment Processing.

I am the liaison between the students and the professors. All assignments come through me to the professors and the grade reports back to the students. I really enjoy the interaction with the students. Life is about relationships, right? It is always interesting finding out where people are in life and how nutrition is impacting them. Personally, I am married and have two grown girls. My oldest girl is in college playing basketball and my youngest is in college playing volleyball. I thoroughly enjoy watching them play sports at the collegiate level and spending time with them as they have grown to adults. I also referee high school and college volleyball and coach competitive volleyball.

The Truth About Olive Oil

Author, Neer Berchik, HCHS student

Many of us at HCHS know this well, but there are still those who believe that cooking with olive oil is a healthy alternative. This is absolutely wrong, and a practice that should be strictly avoided. Olive oil, I will explain, should be treated like the finest Dom Perignon, and never tossed onto fire, exposed to oxygen or light for any significant period of time. Rather it should be protected, corked, and preserved in a dark, dry place. This is why.

All oils consist of a fatty-acid chain composed of carbons and hydrogens. The carbons run along the middle of the fatty acid chain like a railroad track, while the hydrogens are linked to its sides. A methyl and an acid end complete the fatty acid chain on either side. Every carbon, by natural selection, is linked to four other molecules. This means a carbon can be linked to either a methyl or acid end, or a carbon on either side of it, plus one or two hydrogen molecules.

This is a typical saturated fatty acid chain:
When a hydrogen molecule is missing, the fatty acid is considered unsaturated. When many hydrogen molecules are missing, the fatty acid is poly-unsaturated. A good example of each is, olive oil (monounsaturated), and flaxseed oil (polyunsaturated). The unsaturated position can be anywhere along the fatty acid chain, but generally starting from left to right, and skipping every 3rd carbon. This means a fatty acid chain can be unsaturated on the 3rd position (OMEGA 3), 6th position (OMEGA 6), 9th position, 12th position, or 15th position. The all important OMEGA factor refers to fatty acids "essential" for the human body (and mind), and what is necessarily obtained from sources outside the body (i.e. we do not produce them ourselves, although plants can.) An example of the scientific inscription for the fatty acid is as follows: 18:3w3, meaning 18-chain fatty acid, 3 unsaturated positions, beginning on the 3rd position (i.e. positions 3, 6, and 9 are unsaturated).

This is a typical unsaturated fatty acid chain:

But what happens to the fatty acid when a hydrogen is missing? The carbon, as I have mentioned, is necessarily linked to four other molecules—but now one is missing! Yes, but the carbon found a way out of this predicament. As you can see from the diagram, it has formed a double-bond to its neighbor carbon! This double-bond twists the fatty acid chain towards the missing hydrogen position and creates what is called the Cis-configuration. Like all things natural, this configuration is healthy and good. It is better than the straight saturated fatty acid configuration found in butter, for instance. But the Cis-configuration has a price.

The double-bond in a fatty acid chain with a missing hydrogen is extremely volatile. It is ruined easily by excessive heat, light, or oxygen. The shelf-life is practically nil, and handling such a product requires extreme care. A note on "Extra Virgin"—this label means more care has been taken precisely to guard against destroying this double-bond configuration we are discussing. If cold-pressed, this means the process of extracting the oil was done carefully using temperatures below 50°C. Olive Oil is unsaturated at the 9th position (18:1w9), and is called Oleic Acid (OA). It is this 9th position double bond we are trying to preserve. The manufacturers, needless to say, abhor this double bond, or Cis-configuration, and the white lab coats soon set out to do something about it.

In the early 1950s, a new way of handling the Cis-configuration came into view. Why not pump hydrogen back into the double-bonds? This not only extended shelf-life infinitely, but also, by controlling the amount injected, gave a wide-variance of texture to the fat, from soft to crispy-hard. And so became a new configuration known to man, the Trans-configuration. This configuration is unnatural, unknown to the human body, and never before seen. It was believed, however, that anything is better than butter, the saturated staple-product par excellence, and so the world bought into it. The margarine explosion hit the markets, “it’s better than butter!” and so on, ads on TV with loving housewives holding this (otherwise toxic) box of sweet bread spread fooled the universe. Only later did we come to realize that Trans-Configuration, similar to certain known plastics, raises LDL (lethal cholesterol), lowers HDL (healthy cholesterol), is sticky in the blood vessels and blood
platelets, reaps free-radical havoc, and is responsible for innumerable degenerative diseases, chief among them, atherosclerosis (hardened, blocked arteries). Oh Oh. Now what?

This is a trans-fat configuration:

\[
\text{Double bond in the } \textit{trans} \text{ configuration}
\]

Cooking with olive oil damages the double-bonds of the unsaturated fatty acid similar to injecting them with hydrogen. They ruin, twist, churn, and burn, and become toxic. While hydrogenation requires a catalyst (usually nickel or aluminum, which is implicated with Alzheimer's Disease), the damage to the double-bonds while cooking can be even greater, with a sudden synergistic force of heat, oxygen, and light. While olive oil is not part of the "essential" fatty acid (EFA) group (OMEGA 3 or 6), it still yields, quite miraculously, the same health benefits. It lowers LDL, raises HDL, lubricates the pipes, is a key antioxidant (polyphenols), and makes elimination (ok, detoxification) more available. So best care for that double-bond in the 9th position as best you possibly can. (Ask yourself this: does it make sense to buy an expensive bottle of olive oil imported from the hills of Spain, in a dark green bottle, specially cold pressed below 50°C, only to be tossed onto a frying pan?)

In selecting an olive oil, look for the Extra Virgin label, cold pressed, and in a dark green bottle. The spout at the end of some bottles not only limit spillage, but allow less oxygen and light to re-enter the bottle once it is used (some are squeeze-types, especially on better oils like Flax-seed). All these are essential in preserving the double-bonds. And if you must cook with a lubricant, use butter. While it is all-saturated, the story ends there. It will never become toxic like the unsaturated fatty acid chains will. The rest mass market vegetable oils are unsaturated at the 6th position, which is not only hazardous to cook with, but also pose the problem of an Omega 6:3 imbalance even if well-preserved. So may I suggest cooking with water or steaming for best results. You can drizzle olive oil on your meal after it is cooked for that extra sharp tangy taste, to your healthy heart's content.

Olive oil, like other plant-derived foods, has no cholesterol. There is usually a peppery after-taste implicated with better brands, which means young, ripe, and undamaged olives were used in the pressing process. The darker the color also, but not always, is the better choice. The polyphenols are responsible for this, and are super-high antioxidants! If you detect a rancid taste or smell, throw it out. This probably means oxygen has done its damage, and the health benefits are nil, or in the negative. Olive Oil is relatively stable, however, this being one reason for its popularity for over thousands of years (particularly in the Mediterranean, prior to refrigeration). Olive oil is still the only unrefined oil sold on the general mass market. In its pure state you will find phytosterols, chlorophyll, magnesium, vitamin E (alpha-tocopherols), carotene, and other substances present in seeds and natural unrefined oils, and important 'minor' ingredients unique to olives. (Other mass market oils are generally refined, bleached, and deodorized, and robbed of any nutritional content). But like any good wine, there are over 100 volatile compounds that give olive oil its unique characteristic, its full-body aroma, and its delicious taste. So please appreciate that goodness next time you cook for that special someone (including yourself), and enjoy it to the fullest!

This is the depiction of an olive oil, unsaturated at the 9th position:
Do Vitamin C & E Reduce Insulin Sensitivity?

Author, Gene Bruno, MS, MHS, Dean of Academics, HCHS

A study published in *The Proceedings of the National Academy of Science* 1. found that in exercising individuals taking vitamins C and E, there was no improvement in insulin sensitivity and almost no activation of the body's natural defense mechanism against oxidative damage. The research suggests that the reason for this is that the reactive oxygen compounds (i.e., free radicals), which are inevitable byproducts of exercise, are a natural trigger for both of these responses-and the vitamins, by efficiently destroying the reactive oxygen, short-circuit the body's natural response to exercise. The researchers suggest, therefore, that if you exercise, you shouldn't take large amounts of antioxidants. One telling comment by the researchers is that the advice does not apply to fruits and vegetables even though they are high in antioxidants, since the many other substances they contain presumably outweigh any negative effect.

**Interpreting the results**

So, how do we interpret these results? Let's start by considering the researchers' motivation for doing this study in the first instance. If you read the full-text version of the study (which I have), the researchers hypothesize that reactive oxygen species are necessary for the insulin-sensitizing effects of exercise, and that taking the antioxidant vitamins C and E may nullify these effects. So, it is clear that they had an anti-supplementation agenda in the first instance. I say this because they had no problem with the consumption of fruits and vegetables which are high in antioxidants even though, theoretically, they could also nullify the insulin-sensitizing effects of exercise. There rationalization for this was that fruits and vegetables have many other substances that might outweigh any negative effect.

**The importance of using multiple antioxidants**

While such a rationalization seems unscientific and without substantiation at first glance, I can think of a reason why it might have merit. You may remember some years ago research suggesting that beta-carotene was linked to an increase in lung cancer among smokers who took the supplement regularly (N Engl J Med 1994; 330:1029-35). This study was ultimately found to be flawed, however, based upon a more thorough follow-up analysis. The analysis looked at the diets and other dietary supplements taken by subjects in the study, and discovered that the smokers' actual danger was due to low total antioxidant levels; not to the fact that they took beta-carotene (Am J Epidemiol 2004; 160(1):68-76). This makes sense given the fact that antioxidants function interdependently, and so should be taken together. This may also be the case in the current study published in *The Proceedings of the National Academy of Sciences*. Just using vitamin C and E alone may not be enough. A full spectrum of antioxidants may be needed to realize a positive effect. Of course that's just one possibility.

**Examining other research**

It also makes sense to look at other research. Let's consider individuals who have the most to gain by having good insulin sensitivity: diabetics. Studies show that high blood glucose levels cause an increase in urinary loss of vitamin C. This may explain why diabetic patients are known to have low levels of vitamin C 2.3. Furthermore, for diabetics, the benefits of supplementation with vitamin C include reducing glycation 4. and lowering sorbitol levels 5., which is important because cellular
sorbitol accumulation can damage the eyes, nerves, and kidneys of diabetics. In addition, a 16-year observational study of 85,000 women, 2% of whom were diabetic, found that vitamin C supplement use was associated with significant reductions in the risk of fatal and nonfatal coronary heart disease in the entire cohort as well as those with diabetes. This seems like a real good reason to take vitamin C.

Likewise, research has shown that plasma vitamin E levels are significantly lower in subjects with poorly controlled type 2 diabetes, and in subjects with type 2 diabetes complicated with coronary heart disease. Also, elderly type 2 diabetics have shown a significant age-related decline in blood levels of vitamin E. Research in type 1 diabetics also suggests that daily supplementation with vitamin E for 3 months lowers glycated proteins and triglyceride levels.

The significance of the other research
To consider the significance of some of these findings, you should know that measuring blood glucose levels only tells you how your glucose levels are at this particular point in time. It says nothing about long-term control of blood glucose levels. However, measuring glycated proteins (a blood test called A1C), tells you about long-term glucose control. Please note that both vitamin C and vitamin E were shown to reduce glycated protein over a period of time (e.g., three months). This means that long-term use of vitamin C and E is good for long-term glucose control.

The study in The Proceedings of the National Academy of Sciences only lasted four weeks, and concluded that there was no improvement in insulin sensitivity. The value in having good sensitivity is that you are more likely to keep your glucose levels down and not adversely high. Of course, lower long-term glucose control is exactly what occurs with long-term supplementation of vitamins C and E. Four weeks, however, is not long enough to realize the benefits of supplementing with vitamins C and E. One wonders if the researchers who published the study in The Proceedings of the National Academy of Sciences knew that when the designed the study protocol.

Conclusion
In conclusion, there is overwhelming evidence for the benefits of supplementing with vitamins C and E, as well as other antioxidants. Research has shown better long-term glucose control when doing so which, after all, is the whole point of having good insulin sensitivity. The study published in The Proceedings of the National Academy of Sciences did not use a full spectrum of antioxidants which would have been more appropriate, nor did it run the study for a long enough period of time to fully realize the benefits of supplementing with vitamins C and E. In my opinion, people who are exercising (especially diabetics) should not stop taking vitamins C and E. If anything, they should add more antioxidants to their supplementation program.

Research
What's with Oral Contraceptives?
Author, Dr. Arthur M. Presser, President, HCHS

The Good
It has been almost 50 years since FDA approved "the pill" for contraception. It is still the most popular and one of the most effective forms of reversible birth control ever invented. In fact, today more than 18 million women use birth control pills in this country. Unlike the original oral contraceptives, today's birth control pills have been changed to include less hormones, resulting in fewer side effects. The pill can also be used to help normalize an otherwise troublesome menstrual cycle.

The Bad
I am sure that every woman using Birth Control Pills (BC) has been thoroughly counseled by their physician about the risks taking these hormone drugs. Some of the severe but rare risks include: Heart attacks, but primarily in women over 35 and those who smoke. Stroke, again more of a risk factor in older women and smokers, venous thromboembolism, a rare blood clot condition that manifests as pain, swelling, and varicose veins.

According to the Mayo Clinic, BCs used for long periods of time increases your risk of some cancers like cervical and liver, but decreases your risk of ovarian and endometrial cancer. BCs may also affect cholesterol levels and increase blood pressure. I would like to add that BCs cause weight gain, but studies have shown that the effect on weight is small if it exists at all.

The Ugly
Back in the 1970's studies started appearing in the scientific literature that BCs were responsible for depleting a variety of nutrients. Subsequent studies now document the fact that oral contraceptives deplete the B Vitamins 2,6,12 and folic acid, the minerals Zinc and Magnesium, and Vitamin C. What does that mean to you? Have a seat and read on.

Vitamin B-2: This vitamin among other things is necessary for cell respiration, red blood cell formation, antibody production, and the metabolism of carbohydrates, fats and protein. It is key to eye health, tissue repair, and healthy skin. Deficiency symptoms of B-2 include lesions around the mouth and tongue, eye and vision problems, digestive disturbances, and impaired red blood cell formation resulting in anemia. Key benefits of adequate levels of B-2 are good physical performance, energy metabolism, regeneration of glutathione (one of the cells most important antioxidants), and activation of other B vitamins

Vitamin C: One of the chief functions of Vitamin C in the body is the production of collagen in the connective tissue. These fibers provide firm but flexible support for blood vessel walls, tendons, and ligaments, in addition acting as a matrix for bone growth. A deficiency of Vitamin C may result in symptoms which include: poor wound healing, easy bruising, hemorrhages in the eye, inflamed or bleeding gums, joint pain or swelling, excessive hair loss, loose teeth, compromised immunity, or anemia.

Magnesium: This is a mineral that is already frequently deficient in U.S. diets. Magnesium and Calcium work together interactively in the formation of bones and teeth. However in its own right, magnesium plays an integral role in nearly 300 functions in the body. Magnesium is necessary for normal functioning of muscle and nervous tissue. As a result, it is often known as the "anti-stress
mineral”. Deficiency symptoms include excessive irritability of nerves and muscles, nervous tics and twitches, weakness, insomnia, anxiety and depression.

**Zinc**: This mineral is necessary for wound healing and tissue repair. It is a constituent of over 200 enzymes involved in digestion and metabolism, is essential in the synthesis of nucleic acids and is necessary for normal blood sugar and eye function. Deficiency symptoms include depressed immunity, impaired taste, impaired smell, impaired wound healing, impaired memory, increased fatigue, frequent infections, hair loss, and mental disturbances.

**Vitamin B-6**: B-6 may be used in more body functions than any other vitamin. It is essential for the metabolism of fats, particularly the essential fatty acids, antibody production, DNA and RNA activity, glycogen conversion to glucose and red blood cell formation. However, it is more essential in the major role it plays in protein, hormone, and neurotransmitter production. A deficiency of B-6 can cause a reduction of the conversion of tryptophan into serotonin. A deficiency of serotonin is strongly associated with depression. In another pathway serotonin is converted to melatonin. If this is retarded insomnia will result. Other B-6 deficiencies include; irritability, hair loss, muscular weakness, and water retention.

**B-12**: This vitamin is fundamental in the metabolism of normal nerve tissue and in the healthy formation of red blood cells and oxygen transport, for this reason the nickname of this vitamin could be the "energy B vitamin.” A deficiency of B-12 may result in anemia. Other symptoms may include irritability, nervousness, fatigue, brain dysfunction and memory problems, depression, and mood changes.

**Folic Acid**: Unless one is a big fan of fresh green leafy vegetables the American diet is low in this vitamin. Folic acid plays a critical role in the production of DNA, the substance responsible for making new cells in the body. A deficiency of folic acid causes abnormal cells to be produced especially where a high rate of turnover occurs, like the bone marrow. Thus, a deficiency of Folic acid may look like low red blood cells, or, tiredness, weakness and lethargy.

**Homocysteine**: Folic acid, B-12, and B-6 are collectively required to convert a toxic metabolite of protein metabolism called homocysteine into a harmless by-product. Inadequate supplies of these B vitamins will result in a build up of homocysteine thus damaging arteries and leading to atherosclerosis. Most healthcare professionals consider homocysteine a marker for increased risk of cardiovascular disease and prescribe drugs against it. Other problems being associated with high homocysteine levels are; stroke, blood clots, Alzheimer’s, dementia, eye disorders, and kidney disease. (See article: What's with HOMOCYTEINE)

**The Take Home Message**
If you are a typical woman, eating a typical American diet, undergoing a woman's typical daily stress, and perhaps even dieting, you are probably already not getting enough nutrition through you food intake. In fact, The Third Nationwide Food Consumption Survey revealed that adult females failed to meet the minimum intake of Calcium, Vitamin E, Vitamin B-6, Magnesium, and Zinc. That is five major nutrients without taking BCs. If you are taking oral contraceptives, you are at a far greater risk of suffering a nutritional gap, the difference between optimal and suboptimal wellness. If you are suffering from fatigue, depression, anxiety, or impaired memory; if you get sick often, bruise easily, or have problems with your hair, skin, or nails; or if you are suffering from any of the other above mentioned deficiency symptoms, it may be directly the result of depletions caused by your BC.
What would I do, if I were a female, 40 years younger, and taking BC? I would bridge any nutritional gaps by taking dietary supplements. I would begin with a High Potency Multiple Vitamin. Read the label. See that it contains a minimum of the following: Vitamin C 250mg, Vitamin B-2 50mg, Vitamin B-6 50mg, Vitamin B-12 75mcg, Folic Acid 400mcg, Zinc 15mg. Keep in mind that a multi-vitamin that contains beyond the basics may require more than one tablet to hold the extras. If you are already taking a low potency, mass market multiple and want to use it up, consider adding on a Homocysteine Defense formula. This should boost up your Folic Acid, B-6, and B-12. If you have questions, ask you pharmacist.

In order to insure adequate intake of Magnesium, I would take a Calcium supplement that includes this valuable mineral. Look for a Calcium that contains a 2:1 ratio of Magnesium. I recommend 1000mg - 1500mg of Calcium daily. This would deliver you 500mg - 750mg of Magnesium daily. Magnesium, in addition to improving the utilization of Calcium by your bones, will also offset any constipating effects the Calcium may be causing you.

The bottom line is that it is very hard to eat a perfect diet. Americans are the most overfed population in the world, yet are far down the list of the healthiest countries in the world. Everyone should take a good multiple vitamin as an insurance policy for optimal health. Oral contraceptives are just one of a long list of drugs that can deplete essential nutrients.

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