

BreastWatch Times

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A Word From Henry

Special points of interest:

- Challenge Cuisine update
- ENRICH Selenium and Breast Cancer Prevention

Hi to all!

There is much to report since our last newsletter. We have completed the clinical phase of the Challenge Cuisine for Cancer Prevention research project and are now analyzing the data collected! In this issue of BreastWatch Times, we will give you a preliminary report on our findings. We would also like to announce a new program of research for women who are at increased risk for breast cancer. This project has been dubbed "ENRICH" and information about this research initiative is also provided in this newsletter. We also have included two articles related to calcium nutrition and hope that you find the information provided valuable.



Cuisine Program Updates From Becky

There have been many changes in our Cuisine for Cancer Prevention research group! We thought it would be appropriate to give everyone a brief update so that you are informed of what has been happening with us, as well as how to get in touch with our staff. The biggest news is that Henry and his laboratory group have joined the staff at Colorado State University (CSU) and are in the process of establishing a Cancer Prevention Laboratory (CPL) at that institution. Much of the end of the summer and fall were spent packing, selling and buying homes and moving. It has been a stressful, but exciting move for us and we look forward to continuing our research at CSU and in the Denver community. I am still a member of the CPL but will continue to work in Denver full time in Dr. Sedlacek and Dr. Paul's office, carrying out the CPL's research initiatives.

As far as the remainder of the cuisine staff, Jerianne is still at AMC one day per week and working mostly from her home in the Colorado Springs area. Ann (one of our study dietitians) had her second baby in September, a boy, and has decided to stay at home for a while. Caitlin (our other study dietitian) is also at home raising her daughter.

So, as you can see, we have been busy!!! We hope that the information we have provided you is helpful. If you have any questions, please feel free to call Henry or me at any time. My new number at Dr. Sedlacek and Dr. Paul's office is 303-370-7924 and Henry's new office number is 970-491-7748. Until the end of December, you may still email us at our AMC email addresses: meinecke@amc.org, or thompsonh@amc.org.

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Research Update

Challenge Cuisine for Cancer Prevention

Overview In the Challenge Cuisine research project, subjects were asked to participate in a study developed based on evidence that risk for cancer can be increased by the types of damage to a person's genes (DNA) caused by normal daily living. Some evidence indicates that one way DNA damage can be reduced, is by eating diets rich in plant foods such as fruits, vegetables, and grains. Plant foods have chemicals in them, which are referred to as antioxidants. Well known antioxidants include certain vitamins and minerals. However, many other chemicals of plant origin also have antioxidant activity. We had conducted a two week preliminary study that indicated eating more plant foods on a daily basis reduced measures of oxidative damage to DNA. The goal of this study was to confirm and extend these preliminary findings. We studied how diets high in grains versus fruits and vegetables affected oxidative DNA damage over a period of 8 weeks. Over 200 women completed this study.

Nutrition Component Three diets were designed for this project, the run in diet, the fruit and vegetable diet and the grain diet. The run in diet was followed by all participants during the first 2 weeks of the study. It was designed to follow the "typical American diet". It contained approximately 3 servings per day of fruits and vegetables and was higher in processed foods. One of the nutritional goals for the Challenge program was to make all 3 diets (run-in, grain, and vegetable & fruit [VF]) as similar as possible in macronutrient content (protein, fat, and carbohydrates). They were also designed to meet at least 66 percent of the Recommended Dietary Allowance (RDAs) values that has been suggested for research diets. In order to make the diets more convenient and flexible, exchange options and vendor-prepared meals were provided. The dietary pattern was less than 30% of calories from fat, about 55% of calories from carbohydrates and about 15% of calories from protein. Vegetables and fruits averaged 3 to 5 servings in the grain and run-in diets and 10 to 14 servings in the VF diet. The menus were designed to include broad botanical family diversity.

The recipes were tested and feedback from previous studies was used to revise menus and recipes. The average data indicate that for all 3 diets, participants were in good compliance and generally ate the planned amount of nutrients provided by each diet. The foods eaten by the participants on the grain and run-in diets met all the new RDAs for vitamins and minerals, except for Vitamin E. The recommendation for Vitamin E increased since the menus were created. The foods eaten by the participants on the VF diet met or exceeded all the RDAs.

At baseline, people randomized to the grain diet and VF diet were eating an average of 4.0 and 4.4 servings of vegetables and fruit, respectively. Self-reported compliance was 85%.

Biomarkers Component The type of damage to DNA that we evaluated is caused by oxidation. Oxidation is the chemical process that also is responsible for the brown coloration of some foods when they are cut and exposed to air and for the occurrence of rust on metal. We measured oxidation of lipids as well as DNA since lipid oxidation (termed "peroxidation") has been reported to increase the probability of DNA oxidation. The damage to DNA caused by oxidation makes the DNA more prone to the occurrence of a permanent type of damage referred to as a mutation. Increased mutation rates are associated with an increased risk for cancer. Hence our goal was to determine if increased plant food consumption would reduce the oxidation of DNA and lipids, and by extension, reduce the probability of mutations and the risk for cancer.

Our study consisted of two phases: the run-in phase during which everyone was on the run-in diet and the experimental phase during which approximately one-half of the participants consumed the grain diet and the remaining individuals consumed the vegetable and fruit diet. During the study blood and urine were collected at baseline and at two week intervals thereafter.

To estimate overall levels of lipid peroxidation ongoing in the body, we measured the excretion of 8-isoprostane F-2-alpha (8-EPG) in the urine. Interestingly, we observed a dramatic reduction in lipid peroxidation during the run-in phase of the study. There was a smaller additional reduction in lipid peroxidation in the VF diet group in comparison to the grain group. The most striking observations were the positive effect of all the Challenge diets in reducing lipid peroxidation, and that the reduction in lipid peroxidation was sustained throughout the 8-week duration of the study.

The oxidation of DNA was measured as levels of 8-hydroxy-2-deoxyguanosine in DNA isolated from the lymphocytes that were obtained from blood samples. Those analyses showed a pattern of diet-associated change similar to that noted for lipid peroxidation. However, the magnitude of the reduction in DNA oxidation was smaller than that observed for lipid peroxidation, and levels of DNA oxidation were unaffected by the run-in diet.

Project Status The evaluation of all the data that was collected is ongoing. We will continue to share our findings with you in the BreastWatch Times Newsletter. As data analyses are complete, this work will be prepared for publication and submitted for consideration in peer-reviewed journals. We will keep you informed of our progress.

Research Opportunities



Selenium and Breast Cancer Prevention



The purpose of this study is to determine whether selenium, taken as a tablet, causes changes in early indicators of breast cancer risk. The study is being conducted in a group of women at increased risk for breast cancer. Past research indicates that the amount and type of selenium can reduce deaths due to cancer of the lung, prostate, and colon. However, the effects of selenium on breast cancer have not been studied. That is the purpose of this project.

The change from a normal breast cell into breast cancer cells takes many years and occurs in many stages. It is thought that breast cells destined to become cancer display changes that can be identified by laboratory tests long before breast cancer occurs. Reversal of these changes by an agent such as selenium would suggest that we might be able to stop the cancer process. Due to selenium's antioxidant characteristics it may be possible to interrupt the chain of events that lead to breast cancer. The goal of this study is to determine whether taking selenium will decrease these cellular changes in the blood, urine, and breast which may then help to decrease the risk of breast cancer.

Role of Participants:

- You will be asked to schedule three clinic visits; baseline, 6 months and 12 months. At each visit you are asked to give a sample of blood and to provide three first void urine specimens. At the first and last clinic visit, a sample of nipple aspirate fluid will also be obtained (optional).
- You will be asked to take a selenium or placebo supplement along with a vitamin-mineral supplement on a daily basis for one year, at no charge to you.
- You will be asked to fill out a new BreastWatch questionnaire upon enrollment in the study, and fill out an update questionnaire at the end of the study.
- You will be asked to discuss any questions or concerns with the Clinical Coordinator at any time. Also, will also be asked to update your health and pregnancy (if applicable) status at the monthly follow-up calls.

Eligibility Criteria:

- Participant must be female
- Must not have been diagnosed with any type of cancer in the past (except basal or squamous cell skin cancer)
- Must be at least 21 years old
- Must be willing to limit alcohol consumption to 1 or less serving of alcohol per day (on average)
- Must refrain from using tobacco products
- Must not take a specific selenium supplement
- Must be willing to discontinue taking other vitamin-mineral supplements and take the vitamin-mineral supplement provided free of charge for everyone in the study. It is okay to continue Calcium supplements
- Must not be pregnant or lactating
- Must not intend to become pregnant during the study
- Must be a patient of Rocky Mountain Cancer Centers - Rose Office

*There are no costs to participate in this study apart from the costs associated with your regular clinic visit, and your annual mammography.

If you are interested in or have questions about the ENRICH study, please call Becky Meinecke at 303-370-7924 or email at Meinecke@neo.agsci.colostate.edu.

Are You Getting Enough Calcium?

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No bones about it, your body needs calcium, and a fair amount of it. The National Academy of Sciences currently recommends that children ages four through 18 consume 1300 milligrams of calcium daily to help build dense bones and promote maximum calcium retention later in life. From age 19 through 50 years, 1000 milligrams of calcium are recommended daily to maintain calcium balance and reduce the risk of osteoporosis. After age 50, the recommended intake increases to 1200 milligrams daily to minimize bone loss in later years and help keep osteoporosis in check.

Unfortunately, many of us don't even come close to meeting these guidelines. In fact, less than half of us do. Teens have the worst record. According to one study, 86 percent of teen girls and 65 percent of teen boys did not meet recommended levels. Adult women are not much better. On the average, American women consume 500 to 600 milligrams of calcium daily; about half the amount recommended. While the body can adapt to some reduction in dietary calcium by increasing the efficiency of absorption, such adaptations are often not enough. Also, one's ability to compensate for low intake decreases with age. This makes getting adequate calcium even more important in later years when risk of osteoporosis is highest.

Most doctors and nutritionists recommend that people look first to food for their calcium. This is because food sources of calcium tend to supply other nutrients, such as phosphorus, vitamin D and lactose, which help the body absorb and use calcium. Supplements are best used to help boost calcium intake, not be the primary source of it. To increase your calcium intake, consider the following:

- Dairy products are the most concentrated sources of calcium. Milk contains 300 mg per cup; low-fat yogurt 345-425 mg per cup; ricotta cheese has 340 mg per half cup; and hard cheeses from 200-270 mg per ounce.
- Good vegetarian sources of calcium include white beans and cow peas (200 mg per cup), baked beans (150 mg per cup), tofu made with calcium sulfate (130 mg per half cup), collard/mustard greens (100 mg per half cup) and broccoli (80 mg per half cup).
- Canned fish is another good source of calcium, if you can stomach the bones. A 3-ounce serving of salmon serves up 180 mg; sardines come in at 325-370 mg per three ounces.
- To optimize bone retention of calcium: Get moving! Activity that demands the skeleton to resist gravity and bear weight (walking, running, weight lifting) encourages calcium to stay in bones.

In concert with boosting intake, efforts can be made to minimize calcium loss. Protein, caffeine and alcohol all play a role in increasing calcium loss in urine. In one study, it was found that the more protein the subjects ate, the more calcium they lost. Furthermore, animal protein led to an even greater loss of calcium than plant protein. One theory to explain this is that the body dumps calcium into the urine to neutralize the increased acidity that occurs when eating meat. So, for optimal bone health, watch your intake of animal protein, caffeine and alcohol.

If getting the recommended level of calcium through diet alone proves too difficult, there are many calcium supplements on the market, each of which has advantages and disadvantages. Calcium carbonate and phosphate preparations have the highest concentration of calcium, about 40 percent. Calcium citrate contains 21 percent elemental calcium, but generally is better absorbed than calcium carbonate. Calcium lactate and calcium gluconate contain the least amount of calcium, 13 and 9 percent calcium, respectively. To maximize absorption, some clinicians recommend consuming calcium on an empty stomach; calcium carbonate, however, is generally better tolerated and absorbed when consumed with a meal. Regardless of the form consumed, it's recommended that no more than 500 mg of calcium is taken at any one time. Calcium-fortified orange juice is an excellent alternative to pills. One cup generally contains the same amount of calcium as a cup of milk, and is readily absorbed.

Look for labels that state the supplement meets USP standards or has passed a 30-minute dissolution test. Avoid supplements made with bone meal or dolomite; they may be contaminated with lead. Also, don't pay more for claims of "natural" or sugar- or starch-free formulas. Calcium is calcium. Even flavored chewable calcium tablets are not significant sources of sugar or calories. Finally, it's best to take calcium supplements with plenty of fluids. If you can tolerate milk, it's an ideal accompaniment as the lactose and vitamin D in the milk help enhance absorption.

Lactose Intolerance

By Lizzie Teichler, RN, PhD, FNP, HNC

Lactose intolerance is a common condition that occurs when there is insufficient lactase to digest the disaccharide (sugar) lactose, which is found in milk and milk products. *Lac-tose* is the milk sugar; *Lac-tase* is the enzyme needed to break down lactose during digestion (because of the similarity of names, this can be confusing). The enzyme lactase is highly active immediately after birth and declines during childhood and adolescence. Only 30% of people in the world retain sufficient lactase to fully digest and absorb lactose through adult life. Symptoms of lactose intolerance include rumbling tummy sounds, stomach cramps, stomach bloating or diarrhea. The condition is a little different in each person. Some people with this problem can safely drink small amounts of milk, especially if they eat other food with it. Other people can't drink any milk at all without having problems.

Lactase activity declines with age, and it may also diminish due to disease, certain medications, prolonged diarrhea, or malnutrition. The latter causes may be permanent or temporary. The prevalence of lactose intolerance varies widely among ethnic groups. Estimates are:

Southeast Asians	> 80%	Inuits	60%
Native Americans	> 80%	Hispanics	50%
African Americans	75%	Caucasians	20%
Mediterranean peoples	70%	Northern Europeans	<10%

Self care and management of lactose intolerance is highly individualized. It is usually **not** necessary to eliminate milk products. Many lactose intolerant people are able to consume foods containing up to 6 grams of lactose (1/2 cup) without symptoms. It is wise to gradually increase the intake of milk products; take milk products with other foods; and spread out their consumption during the day. The body's ability to adapt to milk products is based on a change in gastrointestinal bacteria, not on the reappearance of the missing enzyme. Other suggestions include:

- Using commercially available "lactase" preparations such as Lactaid
- Using lactose-reduced and lactose-free dairy products such as yogurt, hard cheese, and cottage cheese (note: lactose diminishes as cheese ages)
- Realizing that tolerance to lactose varies widely
- Reading labels, as many foods and medications contain lactose
- Using a cultured milk, acidophilus milk, which is lactose free (the bacteria in cultured yogurt and acidophilus milk digest lactose and therefore reduce lactose content)
- Checking all medications with a pharmacist, since 20% of prescription and 5% of over-the-counter medications contain lactose as a filler.

Individuals who are lactose intolerant are at risk for inadequate intake of calcium. Foods other than dairy products that are good sources of calcium include leafy greens (such as collard greens, kale and mustard greens), oysters, sardine, canned salmon (if you eat the salmon bones), shrimp, broccoli, brussel sprouts, tofu, apricots, blackstrap molasses, broccoli, dried figs, rhubarb, spinach, tofu, and yogurt. You can also buy orange juice with added calcium.

Reference List:

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Whitney, E.N. and Rolfes, S.R. (2002). Understanding nutrition (9th ed.). Belmont, CA: Wadsworth/Thomson Learning.

Other Information Sources: National Digestive Diseases Information Clearinghouse, 2 Information Way, Bethesda, MD 20892-3570 or www.niddk.nih.gov/health/digest/nddic.htm

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Questions, Comments, Suggestions . . .

If you have any questions, comments or suggestions regarding this publication, please contact Becky Meinecke at 303-370-7924 or by email at becky.meinecke@colostate.edu

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