

The Burnham Review

A Nutritional Wellness Self Study Program

Consider Nutritional Wellness for Optimal Health

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Issue 7-03

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Biophysiology, Nutritional Wellness and Homeopathy A Self Study Program

An Integrative Manual Therapy session often includes dietary and nutritional recommendations. Supplements are typically recommended for a short period of time from 3 days to 3 months, sometimes longer. A nutritional protocol for acute food poisoning might be recommended for 3 days where as supplements to facilitate the healing of the ileocecal valve in someone with a gluten allergy might include a gluten elimination diet with supplements for 3 months and essential fatty acids program might be recommended for a year or two in someone with a neurodegenerative disorder.

The following is a self study outline of just some of the information available to improve our knowledge of Biophysiology, Nutritional Wellness, Herbal Medicine and Homeopathy. At CenterIMT Biophysiology is the integration of Physical Functional Medicine (PFM), a hands-on way of

influencing pathophysiology and Nutrition Wellness. Of the loads of general Dorland's Medical Dictionary defines it as biophysiology [bio + physiology] structural or descriptive biology.

Using Biophysiology, therapists are looking for the perfect combination of: biochemistry; whole foods and protomorphology; homeopathics, and herbs for an individual's recovery.

The nutritional program has three aspects. First, a look at what is in the diet that needs to be removed. Consider the amount of pesticides, preservatives and artificial additives in your diet. In addition, there are several elimination diets to consider including processed sugar, gluten / wheat and grains, and dairy. There are also specific elimination diets for people with various disorders. For the sugar elimination diet consideration is give to the glycemic index and the glycemic load of the foods. Elimination diets are given to shift the reactivity of the immune system to the food, thereby improving the symptom picture.

There is a book on Elimination Diets available from DCR Products.

Of the loads of general information on the internet about nutrition, some is excellent, other information is misleading or inaccurate, always consider where the information is coming from and how much you trust the source. Some information is from universities, appears in journals - many of which can be found on PubMed. The Townsend Letter is a great source of information on natural therapies and nutrition.

The next part of a nutritional program is what to add to your diet such as finely chopped multicolored salads, kale and other leafy green, vegetable soups, vegetable juices (juicing), green tea (high in phytochemicals and antioxidants), milk shakes with whole organic milk and organic fruits, and good quality water. Motility testing, which can be learned at CenterIMT is an excellent way to evaluate the quality of what you eat.

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For clients, practitioners and all people interested
in feeling and functioning better with
manual therapy and CAM

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There is information about allergies and plant families at TheBurnhamReview.com as well as information on what plants will help clean the air in your environment most effectively. There is information on nutrients and food values available from the USDA. Anyone concerned about the pesticide levels in our food supply can get more information from organic and environmental organizations. There are also sites that talk about the effect of diet on brain function, neurotransmitters and the nervous system. One site is the Rainbow Diet Wellness Center run by Dr. Eric Braverman - author of The Edge Effect.

CenterIMT uses different kinds of supplements including individual nutrients, combined nutritional supplements, whole food supplements, protomorphogens, herbs, ayurvedic medicines, constitutional homeopathic remedies, phase remedies from homotoxicology and more.

There are a variety of ways to learn about nutritional wellness, functional medicine and homeopathy. There are several nutritional specialist courses that are Masters or PhD level programs, weekend courses or distance learning programs listed below. There are also links to information on licensing in the field of dietetic and nutrition. One way to approach the study of nutrition is to focus on the biochemistry as well as information provided by various companies on their products. The resource list includes links to companies with nutritional supplements, herbal medicine and homeopathy. Representative from many of these companies give lectures and have grand rounds at CenterIMT. For

more information on Biophysiology talk to Thomas Giammatteo, D.C. at CenterIMT. And consider programs, courses and lecture series through the Connecticut School of Integrative Manual Therapy.

The goals in using nutritional supplementation is to help normalize biochemistry, decrease exudate and improve tissue integrity. Many nutrients are beneficial to the immune system, digestive system, endocrine system and for decreasing pain and inflammation in the musculoskeletal system.

Herbal medicine can take several approaches - Traditional Chinese Medicine's approach to herbs, Rainforest herbs, Western herbs and Aruyvedic Medicines approach to herbs.

There are also many approaches to homeopathy with constitutional remedies, compound homeopathics, phase remedies, pleomorphics, isopathic homeopathy and Enderlein's Theory. The concept of reportorization also comes from homeopathy and can be done with knowledge from books, with help from a computer or Biomeridian Stress Assessment equipment. The goal is to affect and balance the milieu and the matrix, facilitating drainage and the removal of toxins and pathogens.

Ayruvedic Medicine is an interesting field of study within herbal medicine and scar healing. At CenterIMT therapists sometimes recommend Near Magic oil for skin related problems and scar tissue.

Some products are taken as tablets, some a pills and some as liquids. Some of the supplements or homeopathic remedies are used on iontophoresis patches to improve delivery to a specific area.

There are a variety of ways to evaluate for the allergies a person has or what supplements or remedies would be most appropriate. One way is motility testing. Motility testing consists of palpating the lymphatic or other rhythms in the body and evaluating how the product affects the rhythm when placed against the person. Certain toxicities can be picked up using Physical Functional Medicine (PFM) or palpation for certain aberrant motilities in the body. Other toxins affect the tone of certain muscles or joint movements. The Biomeridian Stress Assessment can be used to evaluate the effect of products on the electrical conductivity of the client giving an indication of whether the product would help them or not. The Biomeridian equipment has a variety of nutritional supplement frequencies for bio-reportorization or the product itself can be used. Life Work Potential has is a 172 page document with lists of all kinds of things that can be tested (ie) foods, preservatives, pathogens, etc.

Breast Cancer, Green Tea, Vitamin E, Flaxseed, Vitamin C and CAM

"Use of complementary and alternative medicine (CAM) by women with breast cancer is often said to be increasing, yet few data exist to confirm this commonly held belief. The purpose of this paper is to compare overall patterns of CAM use, as well as use of specific products and therapies at two different points in time (1998 vs 2005) by women diagnosed with breast cancer.

In 1998, 66.7% of women reported using either a CAM product/therapy or seeing a CAM therapist at some time in their lives as compared with 81.9% in 2005 (p = 0.0002).

Increases were seen in both use of CAM products/therapies (62% in 1998 vs. 70.6% in 2005) and visits to CAM practitioners (39.4% of respondents in 1998 vs 57.4% of respondents in 2005). Women in 2005 reported that 41% used CAM for treating their breast cancer.

The most commonly used products and practitioners for treating breast cancer as reported in 2005 were green tea, vitamin E, flaxseed, vitamin C, massage therapists and dietitians/nutritionists.

CAM use (both self-medication with products and visits to CAM practitioners) increased significantly from 1998 to 2005. Now that more than 80% of all women with breast cancer report using CAM (41% in a specific attempt to management their breast cancer), CAM use can no longer be regarded as an "alternative" or unusual approach to managing breast cancer."¹ (Boon, 2007)

Essential Fatty Acids

A Medline search turns up over 1000 references with "essential fatty acids" in the title of the medical article.

Krill Oil and Dysmenorrhea

"Neptune Krill Oil can significantly reduce dysmenorrhea and the emotional symptoms of premenstrual syndrome and is shown to be significantly more effective for the complete management of premenstrual symptoms compared to omega-3 fish oil."² (Sampalis, 2003)

Krill Decrease Hyperlipidemia

"The results of the present study demonstrate within high levels of confidence that krill oil is effective for the management of hyperlipidemia by significantly reducing total cholesterol, LDL, and triglycerides, and increasing HDL

levels. At lower and equal doses, krill oil was significantly more effective than fish oil for the reduction of glucose, triglycerides, and LDL levels."³ (Bunea, 2004).

Essential Fatty Acids and Children

"The effects of supplementation of basic diets with 'Polyen' in daily doses of 2.5-4.0 g during 30-40 days together with antioxidants were studied in patients with kidney diseases (diet No7, n = 14), different allergies (hypoallergenic diet, n = 37) and in control children (n = 12). It was shown positive dynamics in fatty acid contents in plasma and red blood cell membranes, in humoral and cell immunity indicators and in improving of clinical symptoms of diseases."⁴ (Ladodo, 1996).

Sinusitis and Fish Oils

"Use of flavored cod liver oil and a multivitamin-mineral with selenium as adjunctive therapy for children with chronic/recurrent sinusitis is an inexpensive, non-invasive intervention that clinicians can use for selected patients, pending the performance of definitive, large, well-controlled studies."⁵ (Linday, 2004).

Immunonutrition

"Nutrition and immunology are interrelated. Several nutrients like arginine, glutamine, omega-3-fatty acids and nucleotides enhance cellular immunity, modulate tumor cell metabolism and improve clinical outcome in stress situations. Glutamine supplementation has been shown to decrease incidence of sepsis and to reduce length of hospital stay in bone marrow transplant patients, low birth weight infants, surgical and multiple trauma patients. Studies with arginine have shown a reduction in infectious

complications and lower mortality, however a better understanding of the biology of arginine is needed. Omega-3-fatty acid supplementation as in fish oil stimulates the immune system. The beneficial effects of immunonutrition in surgical patients has been demonstrated in several studies. It significantly reduces infectious complications and length of hospital stay."⁶ (Singh, 2002).

Liver Disease, Turmeric, Green Tea, Licorice, Milk Thistle

"Clinical research in this century has confirmed the efficacy of several plants in the treatment of liver disease, while basic scientific research has uncovered the mechanisms by which some plants provide their therapeutic effects." The two part article reviews "botanicals used in the treatment of liver disease: *Curcuma longa* (turmeric), *Camellia sinensis* (green tea), *Glycyrrhiza glabra* (licorice), *Silybum marianum* (milk thistle) and *Picrorhiza kurroa* (kutkin)."⁷ (Luper, 1999).

Gluten Elimination

A gluten-free diet is a way of life for the person with celiac disease, a digestive disorders due to severe gluten sensitivity. No one needs to tell them to stay completely off of gluten, the protein component in many grains. But what about people with joint pain, brain fog, loss of balance or other neurologic and auto-immune disorders? All of these things have also been linked with gluten consumption.

One out of every 133 healthy adults in the United States¹ (Univ of Chicago Celiac Disease Program, 2006), has celiac disease and the accompanying digestive problems if they eat anything with gluten. Gluten is the protein component of several

grains. A variety of factors, including genetic inheritance, infections, liver function and even a summer birthday can influence gluten sensitivity.

According to the recent medical literature, people with the following conditions may benefit notably from a gluten-free diet: Rheumatoid arthritis, Multiple sclerosis, Parkinson's disease, Neuromyelitis (inflammation of the nervous system), Peripheral neuropathies, Seizures, Autism, Ataxia (loss of balance), Late-onset Friedreich ataxia, Down's syndrome, Cognitive problems (brain fog), Osteoporosis, Type 2 and Type 1 diabetes, and Anemia."⁸ (Burnham, 2007)

EFA and Cell Membranes

"Essential fatty acids (EFAs) form an important component of cell membranes, are eicosanoid precursors and are therefore required for both the structure and function of every cell in the body. EFAs can modulate the activity of protein kinase C, T and B cell response, free radical generation and lipid peroxidation, lymphokine secretion and cell proliferation. EFAs also have anti-mutagenic, anti-bacterial, anti-fungal and anti-viral properties. EFAs and their metabolites lower serum cholesterol, triglycerides and blood pressure. EFAs appear to be of benefit in atopic eczema, premenstrual syndrome, psoriasis, auto-immune disorders especially rheumatoid arthritis and systemic lupus erythematosus, prevention of target organ damage in diabetes mellitus, peptic ulcer disease, ulcerative colitis, coronary heart disease and atherosclerosis. EFAs and their metabolites can selectively kill tumor cells both in vitro and in vivo without harming normal cells. In addition, EFAs seem to play a

fundamental role in inflammation and immune response. In view of their actions and relative safety, it is anticipated that EFAs may be useful in the management of several diseases."⁹ (Das, 1999).

EFA and the Heart

"Over the past 100-150 years there has been an enormous increase in the consumption of n-6 fatty acids due to the increased intake of vegetable oils from corn, sunflower seeds, safflower seeds, cottonseed, and soybeans.

Studies indicate that a high intake of n-6 fatty acids shifts the physiologic state to one that is prothrombotic [more clotting] and proaggregatory [more grouping/clotting], characterized by increases in blood viscosity [blood thickness], vasospasm [spasms of the blood vessel wall], and vasoconstriction [narrowing of the blood vessel wall] and decreases in bleeding time. n-3 Fatty acids, however, have antiinflammatory [decreases inflammation], antithrombotic [decreases blood clots], antiarrhythmic [improves rhythmic beating of the heart], hypolipidemic [lowers blood fats], and vasodilatory [relaxes the blood vessel wall muscles] properties.

These beneficial effects of n-3 fatty acids have been shown in the secondary prevention of coronary heart disease, hypertension, type 2 diabetes, and, in some patients with renal disease, rheumatoid arthritis, ulcerative colitis, Crohn disease, and chronic obstructive pulmonary disease.

Most of the studies were carried out with fish oils [eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA)].

However, alpha-linolenic acid,

found in green leafy vegetables, flaxseed, rapeseed, and walnuts, desaturates and elongates in the human body to EPA and DHA and by itself may have beneficial effects in health and in the control of chronic diseases."¹⁰ (Simopoulos, 1999).

Gymnema and Diabetes

"Researchers are looking at herbal medicine (Gymnema), massage therapy, Yoga, Integrative Manual Therapy to help the 171 million people worldwide with diabetes. more... Gymnema: Diabetes Herbal Therapy: NIH Says Gymnema Lowers Serum Glucose Levels and Cholesterol."¹¹ (Burnham, 2007).

Respiratory Cond & Allergies

This from the Journal of Primary Care Medicine:

"Patients with asthma and allergic rhinitis may benefit from hydration [drinking enough water] and a diet low in sodium, omega-6 fatty acids, and transfatty acids, but high in omega-3 fatty acids (i.e., fish, almonds, walnuts, pumpkin, and flax seeds), onions, and fruits and vegetables (at least five servings a day).

Physicians may need to be more cautious when prescribing antibiotics to children in their first year of life when they are born to families with a history of atopy. More research is needed to establish whether supplementation with probiotics (lactobacillus and bifidobacterium) during the first year of life or after antibiotic use decreases the risk of developing asthma and allergic rhinitis."¹² (Jaber, 2002)

For more information and references see
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References and Further Information

Biophysiology

1. Biophysiology at CenterIMT www.centerimtasheville.com/Biophysiology.htm
www.centerimt.com/Course_Catalog/Course.asp?idno=&code=INTDG%20901
2. Dorlands Dictionary www.mercksource.com

Elimination Diets

1. Elimination Diets Book www.CenterIMT.com
2. Elimination Diets www.mercola.com
3. Elimination Diets : www.springboard4health.com/notebook/diet_elimination.html
4. Elimination Diets www.arthritis.org
5. Elimination Diets www.ic-network.com/handbook/eliminationdiets.html
6. Elimination diets http://homepages.paradise.net.nz/rwgully/action/ediet_howto.htm
7. Elimination diet for irritable bowel www.yorkallergyusa.com/validation/ibabstract.pdf
8. Elimination diets for migraines or arthritis <http://altmedicine.about.com>
9. Sugar Elimination www.mendosa.com/gi.htm
10. Sugar Elimination www.shaklee.com
11. Sugar Elimination <http://lpi.oregonstate.edu>

General Nutritional Information

1. University of Massachusetts site www.umassextension.org/topics/nutrition.html.
2. Natural Therapies www.natdat.com.
3. Sports Nutrition www.joe.org/joe/2001october/a1.html
4. Public Medicine www.ncbi.nlm.nih.gov/entrez/query.fcgi?DB=pubmed
5. The Townsend Letters www.townsendletter.com
6. Gourmet Greens in Vermont www.gourmetgreens.com
7. Green Tea www.CenterIMT.com
8. Plant families and allergies
9. Plants that help clean the air in buildings
10. Nutrients and Food Values www.nal.usda.gov/fnic/pubs/bibs/gen/diet_supp_antioxidant.html
11. Pesticides www.coopamerica.org and www.purefood.org/
12. Diet, brain function and neurotransmitters www.pathmed.com/
14. Nutrition Notes www.nutri-notes.com/

15. Vitamins and Nutrition Center www.vitamins-nutrition.org/

Courses and Licensing

1. Licensing http://lifestylemanagement.com/licensure_laws.htm
2. Licensing www.cdrnet.org/certifications/licensure/index.htm
3. University of Bridgeport www.bridgeport.edu
4. University of Maryland <http://www.umm.edu/altmed/>
5. Lifestyle Management <http://lifestylemanagement.com>
6. Nutritional Specialist Program (many listed for all over the world) <http://search.atomz.com/search/?sp-i=1&sp-q=Nutrition&sp-a=sp1001b6d8&sp-m=0&sp-f=iso-8859-1>
7. Canadian School Of Natural Nutrition www.csnndistanceeducation.org/
8. International Institute of Holistic Healing www.doctorajadams.com/NutritionCourse.html
9. HEEEL's Biotherapeutic Index: www.homotoxicology.net/Documents/biotherapy.pdf
10. Homeobotanical Therapy - Distance Learning College of Health Sciences www.achs.edu/
11. Kerry Bone's Phytotherapy www.mediherb.com/

Biochemistry

1. Biochemistry at Arizona www.biology.arizona.edu/biochemistry/tutorials/chemistry/main.html
2. Biosciences Virtual Library <http://vlib.org/Biosciences>
3. Biochemical Journal www.biochemj.org
4. Biochemistry site www.biopsychiatry.com

Nutritional Companies

1. 4Life www.4life.com
2. Aspen Group Inc. <http://b-naturals.com>
3. Biogenesis www.biogenesis.co.uk/homejcc.stm
4. Biotics Research Corp www.bioticsresearch.com/
5. Cera Products www.ceraproductsinc.com/
6. Designs for Health (DFH) www.dfhi.com and <http://www.designsforhealth.com/>
7. Discover Nutrition Enterprises www.lifessvigor.com/Discover-Nutrition.html
8. Emerson Ecologics www.emersonecologics.com/
9. Genestra www.seroyal.com/seroyal/Navigation/ProductLinePublic/Genestra_Line.htm
10. Haelan Products Inc www.haelanproducts.com/
11. Health Concerns <http://www.healthconcerns.com/>

12. Institute of Functional Medicine Training
www.functionalmedicine.org/
13. Integrative Therapeutics Inc www.integrativeinc.com
1 4 . M e d i - P l e x
www.gvi.com/scripts/prodList~idCategory~15.htm
15. Metagenics for improved biochemistry
www.metagenics.com/
16. Nature's Sunshine Products
<http://www.naturesunshine.com/index.asp>
17. NitroFX <http://www.extendlife.com/NitroFX.html>
18. Nutri-West www.nutriwest.com/home/index.htm
19. Phytopharmica
<http://www.phytopharmica.com/PhytoPortal/>
20. Rockwell Nutrition
www.rockwellnutrition.net/view_category.asp?cat=100
21. Standard Process (Whole foods and Protomorphology - for exudate) www.standardprocess.com/index.asp And www.theqxi.com/promorpheus/qxi_promorpheus_17.pdf and Aging and Protomorphogens www.nutrition-clinic.com/pdfs/July_august.pdf
22. Systemic Formulas www.systemicformulas.com
23. Thorne Research www.thorne.com/
24. Young Living www.webdeb.com/oils/vitamin.htm

Herbal Medicine

1. Acupuncture Today featuring Chinese herbs
www.acupuncturetoday.com/herbcentral/
2. Amazon Herbs Co. <http://carolyn.amazonherb.net>
3. Dr. Duke's Phytochemical and Ethnobotanical Databases www.ars-grin.gov/duke/
4. HerbalGram www.herbalgram.org
5. Herbal Power www.herbal-powers.com/index.html
6. Herb Drug Interactions from Lancet <http://fugh-berman.com/>
7. Holistic Online Herbal Medicine Index www.holistic-online.com/
8. MediHerb (Herbs) www.mediherb.com/
9. Phytochemicals
www.phytochemicals.info/resources.php
10. Phytochemical Images
<http://micro.magnet.fsu.edu/phytochemicals/>
11. Rain Tree <http://www.rain-tree.com/plants.htm>
12. Vita Herbal www.newvita.com/
13. Susan Weed Herbal Distance Learning Course
www.susunweed.com
14. Wise Woman Herbals
www.brier.com/wisewomanherbals/consumer-catalog.asp

Homeopathy

1. Aims www.aims.ubc.ca
2. BioResources www.bioresourceinc.com
3. What Practitioners Need to Know About Enderlein's Theory & Isopathic-Homeopathic Therapy"
www.bioresourceinc.com
4. Boiron www.boiron.com/index_en.asp
5. Deseret Biologicals www.deseretbiologicals.com
6. Hahnemann Lab www.hahnemannlabs.com
7. HEEL (Homotoxicology, Phase Remedies)
www.heelbhi.com
8. HEEL's Biotherapeutic Index:
www.homotoxicology.net/Documents/biotherapy.pdf
9. HVS www.hvslabs.com/introduction.htm
10. Nosode Therapy www.tierheilpraxis-stein.de/nosode_therapy.htm
11. Nosode Therapy www.homeopathic.org/crattack.htm
12. Pekana www.pekana.com and www.innovativemedicine.com/products
13. SanPharma
www.bioresourceinc.com/articles/vol1no2.html
14. Sanum www.sanum.com/materiamedica/index.htm
15. Seroyal (Integrity of tissues organotherapy)
www.seroyal.com/seroyal
16. Undas (Seroyal) www.seroyal.com/seroyal

Ayurvedic Medicine

1. Ayurveda www.ayurveda-herbs.com/
2. DCR Products - Near Magic (Sesame oil and Indian Frankincense) www.nearmagic.tv & www.CenterIMT.com
3. The National Institute of Ayurvedic Medicine
<http://niam.com/corp-web/index.htm>
4. Rain Tree <http://www.rain-tree.com/plants.htm>

Iontophoresis

1. Iomed www.iomed.com
2. Iontophoresis
www.genmedhealth.com/index.html?main/prion.html~main
3. Iontophoresis
www.neuraltherapy.com/ToxicityofAutonomicGangliaandPlexi.pdf
4. Iontophoresis and Homeopathy
www.heel.ca/servlet/jdoc/Journal_bt_summer_2001.pdf?id

Evaluation

1. Biomeridian www.biomeridian.com/
2. 172 page Testing document www.lifeworkpotential.com/

References

1. Boon, H. S., F. Olatunde, et al. (2007). "Trends in complementary/alternative medicine use by breast cancer survivors: comparing survey data from 1998 and 2005." *BMC Womens Health* 7:4.
2. Sampalis, F., R. Bunea, et al. (2003). "Evaluation of the effects of Neptune Krill Oil on the management of premenstrual syndrome and dysmenorrhea." *Altern Med Rev* 8(2): 171-9 from www.findarticles.com/p/articles/mi_m0FDN/is_2_8/ai_103194439
3. Bunea, R., K. El Farrah, et al. (2004). "Evaluation of the effects of Neptune Krill Oil on the clinical course of hyperlipidemia." *Altern Med Rev* 9(4): 420-8 from www.findarticles.com/p/articles/mi_m0FDN/is_4_9/ai_n9485702 www.rejuvenation_science.com/n_nko_lipids.html
4. Ladodo, K. S., M. M. Levachev, et al. (1996). "[Use of the fish oil "Polyen" in pediatric practice]." *Vopr Pitan*(2): 22-5.
5. Linday, L. A., J. N. Dolitsky, et al. (2004). "Nutritional supplements as adjunctive therapy for children with chronic/recurrent sinusitis: pilot research." *Int J Pediatr Otorhinolaryngol* 68(6): 785-93.
6. Singh, R., S. Gopalan, et al. (2002). "Immunonutrition." *Indian J Pediatr* 69(5): 417-9.
7. Luper, S. (1999). "A review of plants used in the treatment of liver disease: part two." *Altern Med Rev* 4(3): 178-88. from www.chiro.org/nutrition/ABSTRACTS/Review_of_Plants_Part_1.shtml.
8. Burnham, K (2007) Benefits of a Gluten-Free Diet, from www.suite101.com/profile.cfm/KimBurnham
9. Das, U. N. (1999). "Essential fatty acids in health and disease." *J Assoc Physicians India* 47(9): 906-11.
10. Simopoulos, A. P. (1999). "Essential fatty acids in health and chronic disease." *Am J Clin Nutr* 70(3 Suppl): 560S-569S from www.ajcn.org/cgi/content/full/70/3/560S.
11. Burnham, K (2007) Gymnema: Diabetes Herbal Therapy: NIH Says Gymnema Lowers Serum Glucose Levels and Cholesterol from www.suite101.com/profile.cfm/kimburnham
12. Jaber, R. (2002). "Respiratory and allergic diseases: from upper respiratory tract infections to asthma." *Prim Care* 29(2): 231-61.
13. Jaber, R. (2002). "Respiratory and allergic diseases: from upper respiratory tract infections to asthma." *Prim Care* 29(2): 231-61.
14. Jaber, R. (2002). "Respiratory and allergic diseases: from upper respiratory tract infections to asthma." *Prim Care* 29(2): 231-61.
15. Neychev, V. K., E. Nikolova, et al. (2007). "Saponins from *Tribulus terrestris* L are less toxic for normal human fibroblasts than for many cancer lines: influence on apoptosis and proliferation." *Exp Biol Med (Maywood)* 232(1): 126-33.
16. Kumar, M., A. K. Soni, et al. (2006). "Chemopreventive potential of *Tribulus terrestris* against 7,12-dimethylbenz (a) anthracene induced skin papillomagenesis in mice." *Asian Pac J Cancer Prev* 7(2): 289-94.
17. Neto, C. C. (2007). "Cranberry and its phytochemicals: a review of in vitro anticancer studies." *J Nutr* 137(1): 186S-93S.

IMT Testimonials / Case Studies

"Since beginning Center IMT's treatment plan in last year, Gregory has improved remarkably in the following area:

Physically - chronic sinus infections are a thing of the past. When antibiotics stopped working, an ENT specialist recommended he have his adenoids removed. In January 2001 he did. After the surgery, he was put on a 3 week course of antibiotics. Within 5 days of finishing his course of antibiotics, his nose started culturing the mucus again. This past school year he did not miss any school days due to illness. Thanks to CenterIMT and their nutritional supplements he is the healthiest that he has ever been." - **Mother of a boy with Autism**

"On a personal, exciting note. My cholesterol has always been 230 my entire adult life. I recently had my cholesterol checked, it is now 165! The doctor just said keep doing what I'm doing. Do you have any articles on biophysiology, functional medicine or nutrition relating to cholesterol I can give a friend of mine who is a doctor. His cholesterol is over 400 and also has poor CRP and homocysteine numbers. He claims it is genetic and any diet he has tried has not changed his numbers." - **D.S., Client with High Cholesterol**

"I live in Manhattan. It was 2 years ago, in August 2002 that I was overweight, unhappy, sluggish and feeling miserable in my body. Since starting IMT with Biophysiology nutrition my body has been transformed--I am no longer overweight, and many many other symptoms that I had--including hay fever, chronic sinusitis and digestive ills have improved dramatically."

- **Overweight Client**

"Looking back, I had been a mess and hadn't even realized it. Everything I craved had sugar. I loved ice cream, cookies, soda, frosted cereal, anything with sugar. I'd down a pound of jelly beans in front of the TV without a thought. I'd plan my outings to pass by the mall so I could get a Starbucks. My daughter no longer drank root beer because I'd always want to "share" it and return an empty can. I was addicted to sugar. So what's the problem – no problem, everyone eats sugar, the average American eats over 150 pounds of the stuff every year. I read the warnings – high sugar consumption will lead to obesity, kidney stones, osteoporosis, heart disease, and dental caries. So it causes cavities, so what.

But then my world turned upside down when the swelling in my lymph node wouldn't go away. The biopsy was followed by CT scans, MRI, the second opinion, the third opinion, and the phone consults. Then I got the dreaded label - cancer patient.

I prefer future cancer survivor, thank you very much and I decided early on that I was not going to take this lying down. I flew around the country to get the best doctors, integrating main stream surgery and radiation with a healthy dose of Integrated Manual Therapy. I decided early on that I'd do everything to stack the deck in my favor. I took a leave from work to reduce stress and focus on healing. I exercised twice a day and took nutritional supplements including Omega 3 fish oils. I drank green tea and a gallon of water each day and I started to think more about what I ate. Big salads with spinach instead of lettuce, collards, bok choy, broccoli, chard, all things that I hadn't even been able to pronounce a few weeks prior, became regulars on my plate.

But it wasn't until my wife and I were waiting for another test, a PET scan, that it dawned on me. "This is a glucose uptake test, we're going to inject you with glucose, it will collect in areas with cancer" the technician said. "Cancer thrives on glucose." "Cancer thrives on glucose!" we said it at the same time to each other! That was day one of the sugar elimination diet.

I gave up the things I loved, cold turkey. Gone are the treats, the cakes, cookies, and the candy. Gone, excised, eliminated. I lost 15 pounds almost immediately. I feel better, more active, and in charge of my life once again. It's been about a year now. Was it hard? Not really. I have to shop more carefully, though. I read all of the food labels. It's amazing what has sugar, often disguised as fructose, sucrose, or even the altruistic organic cane juice. The

hardest part has been standing out in the crowd. I'm different. I'll get over it. I now do much of my own shopping. I bring my own food to picnics. The cafeteria at work has added Garden Burgers to the menu for me. I have the found the right kinds of restaurants and I drink soda water when we go out. These are small prices to pay for the benefits of increased energy and less craving for other foods. Food tastes better now, whole foods that is. I no longer desire processed foods. I don't crave dairy products and I'm slowly acquiring a taste for those fresh organic vegetables." - **Cancer Survivor**

"A little over three years ago I got sick. I got weaker and weaker and over a period of about a month I was unable walk, then unable to sit up and then unable to even hold up my own head. I also had uncontrollable twitching in my neck and shoulders and when the twitching increased, it caused my whole body to go into violent convulsions. Obviously this was a little concerning, and I went to the hospital where they ran every painful and invasive test possible with no conclusive evidence as to what was happening to my body. I was sent home with a basket of drugs to try and see if any would help decrease my constant pain and discomfort. I was put on the waiting list to get into University California San Francisco/Stanford for a second opinion. I really just couldn't fathom living like this. From a very active 16 year old to some lump of flesh unable to brush my own teeth was quite unacceptable. So Stanford basically said the same thing - they didn't know what was wrong, but they thought some really nasty virus had somehow gotten into my spinal cord and caused massive amounts of neurological damage. They recommended I go to rehab, so I went and relearned slowly and painfully how to sit up and walk and made the fabulous progression of wheel chair to walker to cane. Everything was so exciting and my family and I rejoiced at every step (literally) I took. I was doing great and everything was going well, but then a couple months later I relapsed. Not quite totally quadriplegic – I could kind of flop around, but I still could not walk or sit or hold up my head. This went on a couple more times, getting better and then relapsing. Frustrated by this cycle we went looking for other sources of help.

We finally found Integrative Manual Therapy and started attending intensives every month in New Mexico or Connecticut. I was helped an incredible amount by IMT, especially considering every other road we took led to a dead end. IMT gave me the greatest gift of health, and a hope for the future without relapsing. I had several hours of treatment accompanied by Neurofascial Process homework. I also took the thymus protocol and other functional medicines. Some times when I get over tired or come down with a cold I will start to experience some of the same symptoms but never for very long or nearly as severe. One example of this is in early December 2002, when I got food poisoning. I was feeling miserable from the food poisoning, had weakness in my legs, and dizziness, so I turned to my IMT saviors! I got treated for two hours and received physical functional medicine techniques as well as supplements from Mediherb before treatment and then again three days later. I quickly recovered and was back to my old self in just a few days. I have been treated in multiple IMT centers by several wonderful therapists and know my life would be completely different without them. I am happy to tell you that I am "relapse free" for over year and a half. I am taking a dance class and playing volleyball. I don't have to go into the handicapped bathrooms. I get dressed all by myself! " -- **19 year old university student**

Respiratory Conditions and Allergies

This from the Journal of Primary Care Medicine:

“Patients with asthma and allergic rhinitis may benefit from hydration [drinking enough water] and a diet low in sodium, omega-6 fatty acids, and transfatty acids, but high in omega-3 fatty acids (i.e., fish, almonds, walnuts, pumpkin, and flax seeds), onions, and fruits and vegetables (at least five servings a day).

Physicians may need to be more cautious when prescribing antibiotics to children in their first year of life when they are born to families with a history of atopy. More research is needed to establish whether supplementation with probiotics (lactobacillus and bifidobacterium) during the first year of life or after antibiotic use decreases the risk of developing asthma and allergic rhinitis. ¹³ (Jaber, 2002)

Apr 20, 2007

Despite a theoretic basis for the use of vitamin C supplements in asthmatic patients, the evidence is still equivocal, and long-term studies are needed. The evidence is stronger for exercise-induced asthma, in which the use of vitamin C supplementation at a dosage of 1 to 2 g per day may be helpful. It is also possible that fish oil supplements, administered in a dosage of 1 to 1.2 g of EPA and DHA per day, also may be helpful to some patients with asthma. Long-term studies of fish oil and vitamin C are needed for more definite answers. For the patient interested in incorporating nutritional approaches, vitamin C and fish oils have a safe profile. However, aspirin-sensitive individuals should avoid fish oils, and red blood cell magnesium levels may help in making the decision whether to use additional magnesium supplements.

The article goes on to discuss the benefits of Boswellia, and ginkgo for asthma, as well as homeopathy for allergic rhinitis.

The researchers also note that the impact of “mind-body interventions such as yoga, hypnosis, and biofeedback-assisted relaxation and breathing exercises are beneficial for stress reduction in general and may be helpful in further controlling asthma. Encouraging parents to learn how to massage their asthmatic children may appeal to some parents and provide benefits for parents and children alike.”¹⁴ (Jaber, 2002)

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Cancer Benefits from Tribulus, Cranberry and Acer

“The objective of the study was to explore the influence of saponins derived from *Tribulus terrestris* L. (TT) on normal human skin fibroblasts and to compare it with their anticancer properties. In this study, [3H]thymidine incorporation and MTT to assess cell proliferation and viability, respectively, and immunoblotting and HPLC analysis to explore intracellular signal transduction pathways have been used. We found that TT caused a dose-dependent decrease in [3H]thymidine incorporation into the DNA of treated fibroblast compared to the untreated controls. Viability of treated cells remained within the control levels with treatment of up to 5 micro g TT/ml medium. It was significantly depressed with incubation in $>$ or $=$ 6 micro g TT/ml medium with an IC₅₀ of 12.6 micro g TT/ml of cultivating media. ERK1/2 was significantly dephosphorylated at 5 mins of incubation with TT until the 48th hour, when phosphorylation slightly recovered, but was still below the control levels. In contrast, p38 and JNK phosphorylation was positively influenced, with peaks at 1 hr and 24 hrs of incubation respectively. Phosphorylation/dephosphorylation events of SAPK/MAPK clearly correlated with Mkp-1 induction. Procaspase 3 was activated after 5 mins of incubation and coincided with a rapid actin cleavage. There was a significant decrease of putrescine concentration and a concomitant increase of spermidine and spermine at 2 mins of treatment. According to our results, TT is less toxic for normal human skin fibroblasts in comparison to many cancer lines investigated in previous studies. The molecular mechanism of this cytotoxicity involves up- and downregulation of polyamines' homeostasis, suppression of proliferation, and induction of apoptosis. Further research in this field using animal models would help to explore and interpret the potential properties of TT as an anticancer supplement.”¹⁵ (Neychev, 2007).

“In the present investigation, the chemopreventive potential of aqueous extracts of the root and fruit of *Tribulus terrestris* (an Ayurvedic medicinal plant) on 7, 12 - dimethylbenz (a) anthracene (DMBA) induced papillomagenesis in male Swiss albino mice was studied. A significant reduction in tumor incidence, tumor burden and cumulative number of papillomas was observed, along with a significant increase in average latent period in mice treated orally with *Tribulus terrestris* suspension continuously at pre, peri and post-initiation stages of papillomagenesis as compared to the control group treated with DMBA and croton oil alone. Treatment with *Tribulus terrestris* suspension by oral gavage for 7 days resulted in a significant increase in the reduced glutathione content in the liver ($P < 0.001$ for both root and fruit extracts). Conversely, lipid peroxidation levels were significantly decreased ($P < 0.001$).”¹⁶ (Kumar, 2006)

“This article reviews the existing research on the anticancer properties of cranberry fruit and key phytochemicals that are likely contributors to chemoprevention. Results from in vitro studies using a variety of tumor models show that polyphenolic extracts from *Vaccinium macrocarpon* inhibit the growth and proliferation of breast, colon, prostate, lung, and other tumors, as do flavonols, proanthocyanidin oligomers, and triterpenoids isolated from the fruit. The unique combination of phytochemicals found in cranberry fruit may produce synergistic health benefits. Possible chemopreventive mechanisms of action by cranberry phytochemicals include induction of apoptosis in tumor cells, reduced ornithine decarboxylase activity, decreased expression of matrix metalloproteinases associated with prostate tumor metastasis, and antiinflammatory activities including inhibition of cyclooxygenases. These findings suggest a potential role for cranberry as a dietary chemopreventive and provide direction for future research.”¹⁷ (Neto, 2007)

“Breast cancer is the most commonly diagnosed cancer in women in the US and is one of the leading causes of death due to cancer. Epidemiological studies have consistently suggested the inverse association between cancer risk and intake of fruits and vegetables. These health benefits have been linked to the additive and synergistic combination of phytochemicals in fruits and vegetables. Cranberries have been shown to possess anti-carcinogenic activities such as inhibition of growth of several cancer cell lines, and inhibition of ornithine decarboxylase (ODC) activity in vitro. However, the molecular mechanisms of the anti-cancer properties of cranberry phytochemical extracts have not been completely understood. Our data showed that cranberry phytochemical extracts significantly inhibited human breast cancer MCF-7 cell proliferation at doses of 5 to 30mg/mL ($P < 0.05$). Apoptotic induction in MCF-7 cells was observed in a dose-dependent manner after exposure to cranberry phytochemical extracts for 4h. Cranberry phytochemical extracts at a dose of 50mg/mL resulted in a 25% higher ratio of apoptotic cells to total

cells as compared to the control groups ($P < 0.05$). Cranberry phytochemical extracts at doses from 10 to 50mg/mL significantly arrested MCF-7 cells at G0/G1 phase ($P < 0.05$). A constant increasing pattern of the G1/S index was observed in the cranberry extract treatment group while the G1/S ratio of the control group decreased concomitantly between 10 and 24h treatment. After 24-h exposure to cranberry extracts, the G1/S index of MCF-7 cells was approximately 6 times higher than that of the control group ($P < 0.05$). These results suggest that cranberry phytochemical extracts possess the ability to suppress the proliferation of human breast cancer MCF-7 cells and this suppression is at least partly attributed to both the initiation of apoptosis and the G1 phase arrest.”¹

“Bioactivity-guided fractionation of cranberries was used to determine the chemical identity of bioactive constituents. Twenty compounds were isolated using gradient solvent fractionation, silica gel and ODS columns, and preparative RP-HPLC. Their chemical structures were identified using HR-MS, 1D and 2D NMR, and X-ray diffraction analysis. Antiproliferative activities of isolated compounds against HepG2 human liver cancer and MCF-7 human breast cancer cells were evaluated. Among the compounds isolated, ursolic acid, quercetin, and 3,5,7,3',4'-pentahydroxyflavonol-3-O-beta-D-glucopyranoside showed potent antiproliferative activities against HepG2 cell growth, with EC50 values of 87.4 +/- 2.7, 40.9 +/- 1.1, and 49.2 +/- 4.9 microM, respectively. Ursolic acid, quercetin, and 3,5,7,3',4'-pentahydroxyflavonol-3-O-beta-D-glucopyranoside showed potent inhibitory activity toward the proliferation of MCF-7 cells, with EC50 values of 11.7 +/- 0.1, 137.5 +/- 2.6, and 23.9 +/- 3.9 microM, respectively. Quercetin, 3,5,7,3',4'-pentahydroxyflavonol-3-O-beta-D-glucopyranoside, 3,5,7,3',4'-pentahydroxyflavonol-3-O-beta-D-galactopyranoside, and 3,5,7,3',4'-pentahydroxyflavonol-3-O-alpha-l-arabinofuranoside showed potent antioxidant activities, with EC50 values of approximately 10 microM. These results showed cranberry phytochemical extracts have potent antioxidant and antiproliferative activities.”²

“Abstract: Edible fruits and berries may serve as sources for novel anticancer agents, given that extracts of these foods have demonstrated cytotoxic activity against tumor cell lines. Semipurified, flavonoid-rich extracts of cranberry (*Vaccinia macrocarpa*) were shown previously to arrest proliferation of tumor cells and induce apoptosis. However, the ability of cranberry flavonoids to inhibit tumor growth in vivo has not been reported other than in a preliminary report. As model systems for testing this activity, human tumor cell lines representative of three malignancies were chosen: glioblastoma multiforme (U87), colon carcinoma (HT-29), and androgenindependent prostate carcinoma (DU145). A flavonoid-rich fraction 6 (Fr6) and a more purified proanthocyanidin (PAC)-rich fraction were isolated from cranberry presscake and whole cranberry, respectively, by column chromatography. Fr6 and PAC each significantly slowed the growth of explant tumors of U87 in vivo, and PAC inhibited growth of HT-29 and DU145 explants ($P < 0.05$), inducing complete regression of two DU145 tumor explants. Flow cytometric analyses of in vitro-treated U87 cells indicated that Fr6 and PAC could arrest cells in G1 phase of the cell cycle ($P < 0.05$) and also induce cell death within 24 to 48 h of exposure ($P < 0.05$). These results indicate the presence of a potential anticancer constituent in the flavonoid-containing fractions from cranberry extracts.”³

“Berry fruits are widely consumed in our diet and have attracted much attention due to their potential human health benefits. Berries contain a diverse range of phytochemicals with biological properties such as antioxidant, anticancer, anti-neurodegenerative, and anti-inflammatory activities. In the current study, extracts of six popularly consumed berries&sbdblackberry, black raspberry, blueberry, cranberry, red raspberry and strawberry&sbd;were evaluated for their phenolic constituents using high performance liquid chromatography with ultraviolet (HPLC-UV) and electrospray ionization mass spectrometry (LC-ESI-MS) detection. The major classes of berry phenolics were anthocyanins, flavonols, flavanols, ellagitannins, gallotannins, proanthocyanidins, and phenolic

¹ Sun, J. and R. Hai Liu (2006). "Cranberry phytochemical extracts induce cell cycle arrest and apoptosis in human MCF-7 breast cancer cells." *Cancer Lett* 241(1): 124-34.

² He, X. and R. H. Liu (2006). "Cranberry phytochemicals: Isolation, structure elucidation, and their antiproliferative and antioxidant activities." *J Agric Food Chem* 54(19): 7069-74.

³ Ferguson, P. J., E. M. Kurowska, et al. (2006). "In vivo inhibition of growth of human tumor lines by flavonoid fractions from cranberry extract." *Nutr Cancer* 56(1): 86-94.

acids. The berry extracts were evaluated for their ability to inhibit the growth of human oral (KB, CAL-27), breast (MCF-7), colon (HT-29, HCT116), and prostate (LNCaP) tumor cell lines at concentrations ranging from 25 to 200 $\mu\text{g}/\text{mL}$. With increasing concentration of berry extract, increasing inhibition of cell proliferation in all of the cell lines were observed, with different degrees of potency between cell lines. The berry extracts were also evaluated for their ability to stimulate apoptosis of the COX-2 expressing colon cancer cell line, HT-29. Black raspberry and strawberry extracts showed the most significant pro-apoptotic effects against this cell line. The data provided by the current study and from other laboratories warrants further investigation into the chemopreventive and chemotherapeutic effects of berries using in vivo models. Keywords: Berries; polyphenols; antiproliferative; apoptosis; cancer.”⁴

“Fatty acid synthase (FAS) has been identified as a potential antitumor target. The extract from the leaves of *Acer truncatum* Bunge (Extr) was prepared to assay its inhibitory activity against FAS, which was isolated from duck liver, and the correlated antitumor bioactivity. Its inhibition of FAS is composed of reversible fast-binding inhibition, $\text{IC}_{50} = 0.7 \mu\text{g}/\text{ml}$, and irreversible slow-binding inhibition following saturation kinetics with a dissociation constant of $0.68 \mu\text{g}/\text{ml}$ and a limiting rate constant of 0.0288 min^{-1} . The Extr exhibited different type of inhibitions against the three substrates in the FAS overall reaction. Compared with EGCG in inhibition constant and IC_{50} value, the Extr appeared to be a more efficient inhibitor, and exhibited a considerable inhibition against the growth of four kinds of cancer cells (patent application number 200510068054.2). It was inferred that the inhibitory activity is likely attributable to the co-operative effect of the components.”⁵

The Antiviral Properties of Cranberry

“Studies were undertaken to investigate the antiviral effects of comestible juices, especially cranberry juice, on non-related viral species. After exposure of bacteriophage T2 to a commercially available cranberry (*Vaccinium macrocarpon*) juice cocktail (CJ), virus infectivity titer was no longer detectible. After a 60-min exposure to orange (OJ) and grapefruit juices (GJ), phage infectivity was reduced to 25-35% of control, respectively. Similar data were observed for the bacteriophage T4. CJ inactivation of phage T4 was rapid, dose-dependent, and occurred at either 4 or 23 degrees C. Neither pH nor differences in sugar/carbohydrate levels among the juices may be ascribed to the recognized antiviral effects. Further studies were performed to identify the occurrence of antiviral activity by CJ to a mammalian enteric virus. The treatment of the simian rotavirus SA-11 with a 20% CJ suspension was sufficient to inhibit hemagglutination. Under scanning and transmission electron microscopy, CJ was observed to inhibit the adsorption of phage T4 to its bacterial host cells and prevented the replication of rotavirus in its monkey kidney (MA-104) host cells, respectively. The data suggest, for the first time, a non-specific antiviral effect towards unrelated viral species (viz., bacteriophages T2 and T4 and the simian rotavirus SA-11) by a commercially available cranberry fruit juice drink.”⁶

Anti-Fungal Properties of Tribulus

Antifungal activity of natural products is being studied widely. Saponins are known to be antifungal and antibacterial. We used bioassay-guided fractionation to have isolated eight steroid saponins from *Tribulus terrestris* L., which were identified as hecogenin-3-O-beta-D-glucopyranosyl (1-->4)-beta-D-galactopyranoside (TTS-8), tigogenin-3-O-beta-D-glucopyranosyl (1-->4)-beta-D-galactopyranoside (TTS-9),

⁴ Seeram, N. P., L. S. Adams, et al. (2006). "Blackberry, Black Raspberry, Blueberry, Cranberry, Red Raspberry, and Strawberry Extracts Inhibit Growth and Stimulate Apoptosis of Human Cancer Cells In Vitro." *J Agric Food Chem* 54(25): 9329-9339.

⁵ Zhao, W. H., J. F. Zhang, et al. (2006). "The extract of leaves of *Acer truncatum* Bunge: a natural inhibitor of fatty acid synthase with antitumor activity." *J Enzyme Inhib Med Chem* 21(5): 589-96.

⁶ Lipson, S. M., L. Sethi, et al. (2007). "Antiviral effects on bacteriophages and rotavirus by cranberry juice." *Phytomedicine* 14(1): 23-30.

hecogenin-3-O-beta-D-glucopyranosyl (1-->2)-beta-D-glucopyranosyl (1-->4)-beta-D-galactopyranoside (TTS-10), hecogenin-3-O-beta-D-xylopyranosyl (1-->3)-beta-D-glucopyranosyl (1-->4)-beta-D-galactopyranoside (TTS-11), tigogenin-3-O-beta-D-xylopyranosyl (1-->2)-[beta-D-xylopyranosyl (1-->3)]-beta-D-glucopyranosyl (1-->4)-[alpha-L-rhamnopyranosyl (1-->2)]-beta-D-galactopyranoside (TTS-12), 3-O-[beta-D-xylopyranosyl (1-->2)-[beta-D-xylopyranosyl (1-->3)]-beta-D-glucopyranosyl (1-->4)-[alpha-L-rhamnopyranosyl (1-->2)]-beta-D-galactopyranosyl]-26-O-beta-D-glucopyranosyl-22-methoxy-(3 beta,5alpha,25R)-furostan-3,26-diol (TTS-13), hecogenin-3-O-beta-D-glucopyranosyl (1-->2)-[beta-D-xylopyranosyl (1-->3)]-beta-D-glucopyranosyl (1-->4)-beta-D-galactopyranoside (TTS-14), tigogenin-3-O-beta-D-glucopyranosyl (1-->2)-[beta-D-xylopyranosyl (1-->3)]-beta-D-glucopyranosyl (1-->4)-beta-D-galactopyranoside (TTS-15). The in vitro antifungal activities of the eight saponins against five yeasts, *Candida albicans*, *Candida glabrata*, *Candida parapsilosis*, *Candida tropicalis* and *Cryptococcus neoformans* were studied using microbroth dilution assay. In vivo activity of TTS-12 in a *Candida albicans* vaginal infection model was studied in particular. The results showed that TTS-12 and TTS-15 were very effective against several pathogenic candidal species and *Cryptococcus neoformans* in vitro. It is noteworthy that TTS-12 and TTS-15 were very active against *Candida albicans* (MIC(80) = 10 and 2.3 microg/mL) and *Cryptococcus neoformans* (MIC(80) = 1.7 and 6.7 microg/mL). Phase contrast microscopy showed that TTS-12 inhibited hyphal formation, an important virulence factor of *Candida albicans*, and transmission electron microscopy showed that TTS-12 destroyed the cell membrane of *Candida albicans*. In conclusion, TTS-12 has significant in vitro and in vivo antifungal activity, weakening the virulence of *Candida albicans* and killing fungi through destroying the cell membrane.”⁷

Cranberries and the Digestive System

“AIM: To study isolation and chemical characterization of pectin derived from the common cranberry *Vaccinium oxycoccos* L. (oxycoccosan OP) and the testing of its preventive effect on experimental colitis. METHODS: Mice were administrated orally with OP two days prior to a rectal injection of 5% acetic acid and examined for colonic damage 24 h later. Colonic inflammation was characterized by macroscopical injury and enhanced levels of myeloperoxidase activity measured spectrophotometrically with o-phenylene diamine as the substrate. The mucus contents of the colon were determined by the Alcian blue dye binding method. Vascular permeability was estimated using 4% Evans blue passage after i.p. injection of 0.05 mol/L acetic acid. RESULTS: In the mice treated with OP, colonic macroscopic scores (1.1+/-0.4 vs 2.7, P<0.01) and the total square area of damage (10+/-2 vs 21+/-7, P<0.01) were significantly reduced when compared with the vehicle-treated colitis group. OP was shown to decrease the tissue myeloperoxidase activity in colons (42+/-11 vs 112+/-40, P<0.01) and enhance the amount of mucus of colitis mice (0.9+/-0.1 vs 0.4+/-0.1, P<0.01). The level of colonic malondialdehyde was noted to decrease in OP-pretreated mice (3.6+/-0.7 vs 5.1+/-0.8, P<0.01). OP was found to decrease the inflammatory status of mice as was determined by reduction of vascular permeability (161+/-34 vs 241+/-21, P<0.01). Adhesion of peritoneal neutrophils and macrophages was also shown to decrease after administration of OP (141+/-50 vs 235+/-37, P<0.05). CONCLUSION: Thus, a preventive effect of pectin from the common cranberry, namely oxycoccosan OP, on acetic acid-induced colitis in mice was detected. A reduction of neutrophil infiltration and antioxidant action may be implicated in the protective effect of oxycoccosan.”⁸

“BACKGROUND: *Porphyromonas gingivalis* is a major aetiological agent of periodontitis, a destructive disease affecting the tooth-supporting tissues. Recent reports have indicated that high-molecular-weight molecules from cranberry juice concentrate can prevent the attachment of human pathogens to host tissues. OBJECTIVES: The aim

⁷ Zhang, J. D., Z. Xu, et al. (2006). "Antifungal activities and action mechanisms of compounds from *Tribulus terrestris* L." *J Ethnopharmacol* 103(1): 76-84.

⁸ Popov, S. V., P. A. Markov, et al. (2006). "Preventive effect of a pectic polysaccharide of the common cranberry *Vaccinium oxycoccos* L. on acetic acid-induced colitis in mice." *World J Gastroenterol* 12(41): 6646-51.

of the present study was to investigate the effect of non-dialysable material (NDM) prepared from cranberry juice concentrate on growth, biofilm formation and adherence properties of *P. gingivalis*. METHODS: The effect of cranberry NDM on biofilm formation was studied using a polystyrene microplate assay and by scanning electron microscopy. The effect of cranberry NDM on the attachment properties of *P. gingivalis* was evaluated by a microplate assay in which mammalian proteins were immobilized into wells. RESULTS: Our results indicated that cranberry NDM is a potent inhibitor of biofilm formation by *P. gingivalis*. However, it has no effect on growth and viability of bacteria. Cranberry NDM also prevented significantly the attachment of *P. gingivalis* to surfaces coated with type I collagen, fibrinogen or human serum. CONCLUSIONS: Our data suggest that cranberry constituents may have a beneficial effect for the prevention and treatment of periodontitis by reducing the capacity of *P. gingivalis* to colonize periodontal sites.”⁹

“Cranberry juice (CJ) has biological properties that may provide health benefits. In this study, we investigated the influence of CJ (pH 5.5) on several activities in vitro associated with the development of *Streptococcus mutans* UA159 biofilms. The ability of CJ to influence the adherence of *S. mutans* to either saliva- (sHA) or glucan-coated hydroxyapatite (gsHA), and to inhibit the glucan production by purified glucosyltransferases adsorbed to sHA was determined. For the adherence assays, we used both uncoated and saliva-coated bacterial cells. Furthermore, we examined whether CJ interferes with the viability, development, polysaccharide composition and acidogenicity of *S. mutans* biofilms. A solution containing equivalent amounts of glucose, fructose and organic acids at pH 5.5 was used as negative control. The adherence of *S. mutans* (uncoated and saliva-coated) to either sHA or gsHA treated with 25% CJ (v/v) was remarkably reduced (40-85% inhibition compared to control: $p < 0.05$), indicating that CJ effectively blocked the bacterial adherence to binding sites in salivary pellicle and in glucans. In contrast, when the bacterial cells alone were treated with CJ they adhered to the similar untreated surfaces. Cranberry juice (25%, v/v) also inhibited the activities of surface-adsorbed GTF B and C (70-80% inhibition compared to control, $p < 0.05$). The effect of CJ on the viability of microorganisms in biofilms was not significant. Biofilm formation and accumulation were significantly reduced by topical applications of 25% CJ (v/v) twice daily with 1-min exposures ($p < 0.05$). The biomass and insoluble glucan content of the biofilms in addition to its acidogenicity were significantly reduced by cranberry treatments ($p < 0.05$). Our data show that cranberry juice inhibited glucan-mediated biofilm development and acid production, and holds promise as a natural product to prevent biofilm-related oral diseases.”¹⁰

“The ability of *Vaccinium macrocarpon*, the North American cranberry, to prevent bacterial adhesion has been used to advantage in the prevention of urinary tract infections and has recently been described for the prevention of adhesion of bacteria responsible for oral infections and stomach ulcers. This report documents the ability of cranberry juice to reduce nonspecific adhesion of bacteria to the borosilicate glass microscope slides used in an immunoarray biosensor format. Nonspecific binding of analytes in the array sensor leads to high background signals that cause increased detection limits and false positives. Reduction in background-to-signal ratios can be seen as the juice concentration is increased from 0 to 50% of the sample. This impact cannot be duplicated with grape, orange, apple, or white cranberry juice. Sugar content and pH have been eliminated as the agents in the juice responsible for the anti-adhesive activity”¹¹

Cranberries and Tribulus CardioProtective Effect

“A low HDL-cholesterol concentration is an independent risk factor for CVD. Studies have suggested that

⁹ Labrecque, J., C. Bodet, et al. (2006). "Effects of a high-molecular-weight cranberry fraction on growth, biofilm formation and adherence of *Porphyromonas gingivalis*." *J Antimicrob Chemother* 58(2): 439-43.

¹⁰ Koo, H., P. Nino de Guzman, et al. (2006). "Influence of cranberry juice on glucan-mediated processes involved in *Streptococcus mutans* biofilm development." *Caries Res* 40(1): 20-7.

¹¹ Johnson-White, B., L. Buquo, et al. (2006). "Prevention of nonspecific bacterial cell adhesion in immunoassays by use of cranberry juice." *Anal Chem* 78(3): 853-7.

flavonoid consumption may be cardioprotective, and a favourable impact on circulating HDL-cholesterol concentrations has been suggested to partially explain this association. The aim of the present study was to determine the effect of consuming increasing daily doses of low-calorie cranberry juice cocktail (CJC) on the plasma lipid profile of abdominally obese men. For that purpose, thirty men (mean age 51 (SD 10) years) consumed increasing doses of CJC during three successive periods of 4 weeks (125 ml/d, 250 ml/d, 500 ml/d). Before the study and after each phase, we measured changes in physical and metabolic variables. We noted a significant increase in plasma HDL-cholesterol concentration after the consumption of 250 ml CJC/d (+8.6+/-14.0% v. 0 ml CJC/d; P<0.01), an effect that plateaued during the last phase of the study (500 ml CJC/d: +8.1+/-10.0% v. 0 ml CJC/d; P<0.0001). Multivariate analyses revealed that changes in plasma apo A-I (R(2)=48%, P<0.0001) and triacylglycerol (R(2)=16%, P<0.005) concentrations were the only variables significantly contributing to the variation in plasma HDL-cholesterol concentration noted in response to the intervention. No variation was observed in total as well as in LDL and VLDL cholesterol. The present results show that daily CJC consumption is associated with an increase in plasma HDL-cholesterol concentrations in abdominally obese men. We hypothesise that polyphenolic compounds from cranberries may be responsible for this effect, supporting the notion that the consumption of flavonoid-rich foods can be cardioprotective.¹²

“There have been case reports suggesting that cranberry beverages may interact with warfarin. To date, no research study has been conducted to examine the potential interaction of cranberry and warfarin. The current study is a randomized, placebo-controlled, double-blind, crossover study to investigate the effect of cranberry juice on prothrombin time as assessed by the international normalized ratio (INR). Seven subjects with atrial fibrillation on a stable dose of warfarin for 3 months were randomized to consume 250 mL of cranberry juice for 7 days, then placebo for 7 days, or vice versa. The washout period was 7 days. The prothrombin time/INR was measured at baseline, and on days 2, 4, 7, 10, 14, 16, 18, 21, and 24. Data were analyzed by the Student t test for paired values. The baseline INR was 2.28+/-0.54 for the cranberry group and 2.13+/-0.50 for the placebo group. For all test points, the INR did not change significantly from baseline. At day 7 on cranberry juice, the INR was 2.23+/-0.53 for cranberry first group and 2.16+/-0.40 for placebo first group. The mean differences between the cranberry and placebo groups were not statistically significant. Our results suggest no significant interaction between the daily consumption of 250 mL cranberry juice and warfarin. When counseling patients on dietary changes necessary during warfarin treatment, it does not seem necessary to eliminate daily cranberry juice consumption at amounts of 250 mL, but the INR should be followed up closely.”¹³

“OBJECTIVE: To investigate the effect of Xinnao Shutong Capsule, whose main ingredients gross saponins from Tribulus Terrestris L (GSTT) on cardiac muscle cell (CMC) apoptosis and expressions of Bcl-2 Compound rat model of and Bax in murine model of hyperlipemia after myocardial infarction (MI). METHODS: MI and hyperlipemia was adopted. TUNEL assay was applied to detect CMC apoptosis after 4 weeks' administration of GSTT or simvastatin, and immunohistochemical SP technique was used to detect the expressions of Bcl-2 and Bax protein. RESULTS: GSTT can relieve the damage of CMC and attenuate the ventricular remodeling after MI; high dose of GSTT and simvastatin could decrease CMC apoptosis (P<0.05), and lower Bax protein expression (P < 0.05); and there was no significant difference among the effects in all the treated group (P> 0.05). CONCLUSION: GSTT can reduce CMC apoptosis through regulating protein expressions of Bcl-2 and Bax, which may be one of the mechanisms of its anti-ventricular-remodeling effects after MI.”¹⁴

“The effects of methanolic and aqueous extracts of Tribulus terrestris on rat blood pressure (BP) and the perfused

¹² Ruel, G., S. Pomerleau, et al. (2006). "Favourable impact of low-calorie cranberry juice consumption on plasma HDL-cholesterol concentrations in men." *Br J Nutr* 96(2): 357-64.

¹³ Li, Z., N. P. Seeram, et al. (2006). "Cranberry does not affect prothrombin time in male subjects on warfarin." *J Am Diet Assoc* 106(12): 2057-61.

¹⁴ Guo, Y., H. J. Yin, et al. (2006). "[Effect of xinnao shutong capsule on cardiac muscle cell apoptosis and protein expressions of Bcl-2 and Bax in hyperlipidemia rats after myocardial infarction]." *Zhongguo Zhong Xi Yi Jie He Za Zhi* 26(6): 541-4.

mesenteric vascular bed were investigated. The extracts dose-dependently reduced BP in spontaneously hypertensive rats (SHRs) with the aqueous fraction being more potent than the methanolic fraction at all doses tested. In vitro, the methanolic but not aqueous extract produced a dose-dependent increase in perfusion pressure of the mesenteric vascular bed. When perfusion pressure was raised with phenylephrine (10(-5) M), the aqueous extract produced a dose-dependent reduction in perfusion pressure at all doses. A low dose of the methanolic extract produced a vasoconstrictor effect while higher doses produced dose-dependent reduction in perfusion pressure. L-NAME (10(-4) M) significantly reduced but did not abolish vasodilation induced by the extracts. Vasodilator responses to aqueous and methanolic fractions were significantly reduced in preparations where perfusion pressure was raised with KCl (60 mM). A combination of KCl and L-NAME abolished the vasodilator responses induced by the extracts. It was concluded that methanolic and aqueous extracts of *Tribulus terrestris* possess significant antihypertensive activity in spontaneously hypertensive rats. The antihypertensive effects appeared to result from a direct arterial smooth muscle relaxation possibly involving nitric oxide release and membrane hyperpolarization.”¹⁵

Tribulus and Erectile Dysfunction

“SA1 is a mixture of 9 Oriental herbs (Korean red ginseng, fermented soybean, *Tribulus terrestris*, *Fructus Rubi*, *Fructus Lycii*, *Semen Cuscutae*, *Dioscorea Rhizome*, *Fructus Corni* and *Fructus Crataegi*) that are widely used as energizers and vitalizers in the indigenous system of medicine and have been alleged to improve the sexual functions in men. This study evaluated SA1 using both in vitro and in vivo experiments on laboratory animals in order to determine its effect on the sexual behavior and penile erection. The male rats used to examine the copulatory behavior were administered either the vehicle or SA1 (30, 100, 300, 600 mg/kg) orally for 2 weeks. The intracavernous pressure and systemic blood pressure were recorded in anesthetized rats. The responses to acetylcholine and SA1 of rabbit corpus cavernosum strips were also examined. There was an overall increase in the copulatory behavior parameters in the SA1-treated rats, which was reflected by a decrease in the mount and intromission latencies and an increase in the ejaculation latency and mount frequency. SA1 significantly increased the ratio of the intracavernous pressure to mean arterial pressure. In vitro, SA1 significantly enhanced the relaxation responses to acetylcholine. These results suggest that SA1 improves the sexual activity and erectile function.”¹⁶

Cranberries and the Urinary Tract

“Cranberry, which is rich in polyphenols, including anthocyanins and proanthocyanidins, has been found to have various effects beneficial to human health, including prevention of urinary tract infections. These effects have been associated with polyphenols in the fruit. We investigated the excretion of anthocyanins in human urine after ingestion of cranberry juice. Eleven healthy volunteers consumed 200 ml of cranberry juice containing 650.8 microg total anthocyanins. Urine samples were collected within 24 h before and after consumption. Six of 12 anthocyanins identified in cranberry were quantified in human urine by HPLC coupled with electrospray ionization and tandem mass spectrometry (HPLC-ESI-MS-MS). Among these, peonidin 3-O-galactoside, the second most plentiful anthocyanin in the juice, was found most abundantly in urine within 24 h, corresponding to 41.5 nmol (56.1% of total anthocyanins). The urinary levels of anthocyanins reached a maximum between 3 and 6 h after ingestion, and the recovery of total anthocyanins in the urine over 24 h was estimated to be 5.0% of the amount consumed. This study found high absorption and excretion of cranberry anthocyanins in human urine.”¹⁷

¹⁵ Phillips, O. A., K. T. Mathew, et al. (2006). "Antihypertensive and vasodilator effects of methanolic and aqueous extracts of *Tribulus terrestris* in rats." *J Ethnopharmacol* 104(3): 351-5.

¹⁶ Park, S. W., C. H. Lee, et al. (2006). "Effect of SA1, a herbal formulation, on sexual behavior and penile erection." *Biol Pharm Bull* 29(7): 1383-6.

¹⁷ Ohnishi, R., H. Ito, et al. (2006). "Urinary excretion of anthocyanins in humans after cranberry juice ingestion." *Biosci Biotechnol Biochem* 70(7): 1681-7.

“Cranberry juice has long been believed to benefit the prevention and treatment of urinary tract infections (UTIs). As the first step in the development of infection, bacterial adhesion is of great research interest, yet few studies have addressed molecular level adhesion in this context. P-fimbriated *Escherichia coli* play a major role in the development of a serious type of UTI, acute pyelonephritis. Experiments were conducted to investigate the molecular-scale effects of cranberry juice on two *E. coli* strains: HB101, which has no fimbriae, and the mutant HB101pDC1 which expresses P-fimbriae. Atomic force microscopy (AFM) was used to investigate both bacterial surface characteristics and adhesion forces between a probe surface (silicon nitride) and the bacteria, providing a direct evaluation of bacterial adhesion and interaction forces. Cranberry juice affected bacterial surface polymer and adhesion behavior after a short exposure period (<3 h). Cranberry juice affected the P-fimbriated bacteria by decreasing the adhesion forces between the bacterium and tip and by altering the conformation of the surface macromolecules on *E. coli* HB101pDC1. The equilibrium length of polymer (P-fimbriae) on this bacterium decreased from approximately 148 to approximately 48 nm upon being exposed to cranberry juice. Highly acidic conditions were not necessary for the prevention of bacterial adhesion, since neutralization of cranberry juice solutions to pH = 7.0 allowed us to observe differences in adhesion between the *E. coli* strains. Our results demonstrate molecular-level changes in the surfaces of P-fimbriated *E. coli* upon exposure to neutralized cranberry juice.”¹⁸

Tribulus and Mercury Detox

“The efficacy of the methanolic fraction (MF) of *Tribulus terrestris* fruit extract on mercury intoxicated mice, *Mus musculus* has been studied. At a median-lethal dose of mercuric chloride (12.9 mg/kg body wt.) administration an enhanced level of glutamate oxaloacetate transaminase (GOT), glutamate pyruvate transaminase (GPT) and simultaneously decreased level of acid phosphatase (ACP) and alkaline phosphatase (ALT) activities were noticed in the liver. Due to the mercury toxicity the liver cells are damaged to cause the alterations in their enzymes. During the recovery period, all the enzymological parameters are restored to reach near normal level. The result suggested that the oral administration of MF of *T. terrestris* fruit extract has (6 mg/kg body wt.) provided protection against the mercuric chloride induced hepatic damage in the mice, *M. musculus*.”¹⁹

The Food and Drug Administration (FDA) has proposed new federal regulations that will allow manufacturers and retailers to sell controversial irradiated foods without labeling them, as previously required by law. Consumers are justifiably wary of foods bombarded with nuclear waste or powerful x-rays or gamma rays--since irradiation destroys essential vitamins and nutrients, creates unique radiolytic chemical compounds never before consumed by humans, and generates carcinogenic byproducts such as formaldehyde and benzene. Although irradiation, except for spices, is banned in much of the world, and prohibited globally in organic production, U.S. corporate agribusiness and the meat industry desperately want to be able to secretly "nuke" foods in order to reduce the deadly bacterial contamination that is now routine in industrial agriculture and meat production. OCA and other public interest groups have repeatedly pointed out that the best way to reduce or eliminate America's 78 million cases of food poisoning every year would be to clean up the nation's filthy slaughterhouses and feedlots, stop contaminated runoff from intensive confinement feedlots from polluting adjacent farms (as in the recent spinach e-coli outbreak), and to stop feeding animals slaughterhouse waste and manure. Instead, FDA and corporate agribusiness have apparently decided, with the backing of the nuclear power and weapons industry, to take away consumers' rights to know if their food has been irradiated or not.

¹⁸ Liu, Y., M. A. Black, et al. (2006). "Role of cranberry juice on molecular-scale surface characteristics and adhesion behavior of *Escherichia coli*." *Biotechnol Bioeng* 93(2): 297-305.

¹⁹ Jagadeesan, G. and A. V. Kavitha (2006). "Recovery of phosphatase and transaminase activity of mercury intoxicated *Mus musculus* (Linn.) liver tissue by *Tribulus terrestris* (Linn.) (Zygophyllaceae) extract." *Trop Biomed* 23(1): 45-51.