



The following content has been generously provided by the Naturopathic Medicine Clinic of Excellence.

Table of Contents

1. Naturopathic Primary Preventive Care
 - a. Dietary Suggestions for Cancer Prevention
 - b. Fitness Plan For Cancer Prevention
 - c. Primary Chemopreventive Therapies

2. Naturopathic Supportive Care
 - a. Dietary Suggestions During Chemo/Radiation
 - b. Fitness Plan
 - c. Chemo-supportive Therapies

3. Naturopathic Recurrence Preventive Care
 - a. Diet Suggestions for Cancer Recurrence Prevention
 - b. Fitness Plan For Cancer Recurrence Prevention

Naturopathic Primary Preventive Care

Almost all colorectal cancers develop from adenomatous polyps (benign precursors of colorectal cancer cells) arising from “susceptible” cells lining the intestine which are characterized by hyperproliferation (rapid cell growth and division), impaired apoptosis (programmed cell death), and reduced differentiation (do not have the normal colon cell appearance). Removal of these polyps does not eliminate risk for adenoma recurrence (Fedirko et al., 2009) and adenoma recurrence can lead to cancerous changes.



There is hope, however, and the chance to make a change if preventive steps are taken early enough. Evidence suggests that adenomas (benign precursors to cancer) may present for ten or more years before cancer develops. (Leslie et al. 2002) Early prevention is extremely

important in helping to stop polyp formation and/or the recurrence of these polyps while allowing the body to be in its optimal, healthy state to offset any abnormal changes.

For many people, maintaining a healthy lifestyle and taking the steps towards wellbeing can be extremely difficult. There may be many barriers including things like stress, sleeping disorders resulting in an angry cycle of fatigue, preexisting medical conditions, decreased motivation and possibly lack of understanding or direction. Naturopathic doctors work in this area to help treat the root cause of the problem by using tools like dietary support, fitness modules, botanicals, supplements, acupuncture, lifestyle counseling and education. Looking at the mind, body and spirit of a person while using medical diagnostics allows for a thorough and complete plan of action to optimize health and prevent disease.

Reference:

Fedirko V, Bostick R, Flanders W, et al. Effects of vitamin D and calcium on proliferation and differentiation in normal colon mucosa: a randomized clinical trial. *Cancer Epidemiol Biomarkers Prev.* 2009;18(11):2933-2941.

Leslie A, Carey F, Pratt N, Steele R. The colorectal adenoma-carcinoma sequence. *Br J Surg.* 2002;89:845-860.

a. Dietary Suggestions for Cancer Prevention

A diet that focuses on colorectal cancer prevention includes increasing overall fiber intake through fruits and vegetables and choosing whole grains. Increasing consumption of fruits and vegetables, particularly organically and locally farmed produce, has been shown to reduce the risk of colorectal and other types of cancer (Miller et al. 2010) (Randi et al. 2010). Consumption of whole grains has also been associated with decreased risk of developing colorectal cancer. Those that consumed more whole



grains were less likely to develop colorectal cancer than those who consumed less (Haas et al. 2009).

Also important to cancer prevention is decreasing animal products and processed meat intake, avoiding foods that harbor toxic substances, avoiding allergenic or inflammatory foods, decreasing alcohol consumption, and drinking clean water.

The food we eat is important for physical sustenance but also for our families, communities and cultural groups. It is important to remember to keep the joy in both the preparation and consumption of the food we eat. Ensure your diet is not only physically healthy based on the recommendations but also emotionally nourishing. Eat a varied diet with flavors you enjoy and remember to experiment with new foods and new flavors! *(For more information please visit the MCNE website at www.mcne.ca)*

References:

Haas P, Machado MJ, Anton A, et al. Effectiveness of whole grain consumption in the prevention of colorectal cancer. *International Journal of Food Sciences and Nutrition.* 2009;60:1-13.

Miller P, Lesko S, Muscat J, et al. Dietary patterns and colorectal adenoma and cancer risk: a review of the epidemiological evidence. *Nutrition and Cancer.* 2010; 62(4): 413-424.

Randi G, Edefonti V, Ferraroni M, et al. Dietary patterns and the risk of colorectal cancer and adenomas. *Nutrition Review.* 2010;68(7): 389-408

Sandler R. Dietary and lifestyle measures to lower colorectal cancer risk. *Clinical Gastroenterology and Hepatology.* 2010;8:329-332.

Taskalova-Hogenova H, Stepankova R, Kozakova H, et al. The role of gut microbiota (commensal bacteria) and the mucosal barrier in the pathogenesis of inflammatory and autoimmune diseases and cancer: contribution of germ-free and gnotobiotic animal models of human diseases. *Cellular & Molecular Immunology*. 2011;8:110-120.

Toden S, Belobrajdic D, Bird A, et al. Effects of dietary beef and chicken with and without high amylase maize starch on blood malondialdehyde, interleukins, IGF-I, insulin, leptin, MMP-2, and TIMP-2 concentrations in rats. *Nutrition and Cancer*. 2010;62(4):454-465.

b. Fitness Plan for Cancer Prevention

Exercise is an important part of cancer prevention and disease prevention in general. Most of us know the benefits of exercise including increased energy and improved mood. However, physical activity is even more important in cancer for more significant reasons including decreased inflammation, decreased insulin-like growth factor levels which promote cancer growth, and increased immune function (Wolin et al. 2009). A study by the World Cancer Research Fund found that physical activity was associated with a 15% reduction in colon polyp risk (World Cancer Research Fund/American Institute for Cancer Research, 2007). A separate meta-analysis supported this by finding a significant 16% risk reduction of polyp formation when comparing the most active to the least (Wolin et al. 2011).

The most important attribute of any successful fitness program is the ability to stick to it safely and consistently. What determines that is whether one can tolerate and sustain the intensity of activity or, often more importantly, whether or not the activity is enjoyable. Getting a group of people to join or joining an existing gym or exercise class can help to keep the motivation and the fun in fitness routines. *(For more information please visit the MCNE website at www.mcne.ca)*



References:

Wolin K, Yan Y, Colditz G, et al. Physical activity and colon cancer prevention: a meta-analysis. *Br J Cancer*. 2009;100:611-616.

Wolin K, Yan Y, Colditz G. Physical activity and risk of colon adenoma: a meta-analysis. *British Journal of Cancer*. 2011;104:882-885.



World Cancer Research Fund/American Institute for Cancer Research. Food, Nutrition, Physical Activity and the prevention of cancer: a global perspective- systemic literature review – support resource, World Cancer Research Fund/American Institute for Cancer Research (ed). AICR: Washington, DC. 2007.

c. Primary Chemopreventive Therapies

The following is not a complete list but does contain some of the natural therapies with evidence-based research behind their use as chemopreventive agents.

Chemopreventive agents are vitamins, herbs or other biological agents or medicines that help prevent or delay the development of cancer. This is not to be mistaken for chemotherapy that is the treatment of cancer with a drug or combination of drugs that interferes with the division of fast growing cells. Please note that nutrients – like drugs – have a therapeutic window. This means that too little or too much of the nutrient can lead to either no difference to one’s health or adverse side effects. These natural therapies can also interact with medication or other supplements. Always consult a practitioner before supplementing.

Folic Acid (folate)

Folic acid is a water soluble B vitamin (B9). While folic acid is the non biologically active form, folate is the naturally occurring form most often found in leafy vegetables like spinach, legumes and sunflower seeds. It is essential in many bodily functions including DNA (the cell’s genetic blueprint) synthesis and repair. *(For more information please visit the MCNE website at www.mcne.ca)*

Calcium

Many are familiar with calcium and relate it mostly to healthy bones but calcium also appears to play a very important role in the prevention of cancer. There are multiple forms of calcium compounds including carbonate, citrate and phosphate. Each compound has a differing amount of “elemental calcium” – the actual amount of calcium in the supplement – and is absorbed differently by the body. Calcium carbonate contains more elemental calcium than other forms requiring fewer capsules (Fedirko et al., 2009). *(For more information please visit the MCNE website at www.mcne.ca)*

Vitamin D

The major source for vitamin D for most people is the sun. Optimal daily UV-B sunlight exposure translates to an oral dose of 20 000 IU vitamin D and is the main source of vitamin D for most individuals (Wei et al., 2008). There are very few dietary sources of vitamin D which include fish (salmon, mackerel, sardines).

However, among the same sources, amounts of vitamin D can differ based on where, for example, the fish are caught. While wild salmon contains approximately 500 to 1000 IU of vitamin D in 3.5 oz, farmed salmon contains only 100 to 250 IU in the same serving size (Holick 2008). Vitamin D3 (cholecalciferol) is the most optimal oral supplemental vitamin D as it takes advantage of the natural metabolism in the body to generate the most active form of vitamin D (Fedirko et al, 2009). *(For more*

information please visit the MCNE website at www.mcne.ca)

Please note that this is not an extensive list of natural therapies used for prevention and supportive treatments usable in colorectal cancer cases. Individualized treatment based on a person's health status, chemotherapeutic regimen or conventional treatment protocol is extremely important and requires expert guidance.

Naturopathic Supportive Care

In 2010, an estimated 22 500 Canadians were diagnosed with colorectal cancer (Canadian Cancer Society 2010) and most would have received some sort of chemotherapeutic or surgical intervention.

Despite the notable improvements in overall survival with these therapies, they are not without significant side effects. One of the largest concerns for these conventional therapies are the considerable side effect profiles which can most notably include neurotoxic effects in the case of oxaliplatin which can become dose-limiting (Kono 2009) (Kurniall 2010) (Nishioka 2011), leading to inability to finish prescribed treatments.



The use of natural therapies in this way to help enhance chemotherapeutic effects by decreasing side effects and the need to discontinue treatment is a way by which integrated cancer care can work to enhance a patient's treatment journey.

Reference:

Canadian Cancer Society. Colorectal cancer statistics. http://www.cancer.ca/Canada-wide/About%20cancer/Cancer%20statistics/Stats%20at%20a%20glance/Colorectal%20cancer.aspx?sc_lang=en. Last modified: May 2010. Last viewed: May 2011.

Kono T, Mishima H, Shimada M et al. Preventive effect of Goshajinkigan on the peripheral neurotoxicity of FOLFOX therapy: a placebo-controlled double blind randomized phase II study (the GONE study). *Jpn J Clin Oncol.* 2009;39(12):847-849.

Kurniall P, Luo L, Weitberg A. Weitberg A. Role of Calcium/Magnesium infusion in oxaliplatin-based chemotherapy for colorectal cancer patients. *Oncology.* 2010;24(3):289-292.

Nishioka M, Shimada M, Kurita N, et al. The Kampo medicine, Goshajinkigan, prevents neuropathy in patients treated by FOLFOX regimen. *Int J Clin Oncol.* 2011 Jan 22. [Epub ahead of print]

a. Dietary Suggestions during Chemotherapy and/or Radiation

Patients receiving chemo and radiation therapy often have significant gastrointestinal symptoms including nausea, vomiting, diarrhea, constipation, reduced appetite, etc. Proper nutrition is very important during this time to ensure treatment efficacy and tolerance and prevent weight loss. In order to ensure adequate intake of essential



nutrients, patients receiving chemotherapy and/or radiation should consume foods that are easy to digest while avoiding foods that will increase inflammation or stress in the digestive tract. This includes cooking vegetables and consuming nutrient rich broths and gentle meal replacement aids. General recommendations include eating enough fruits and vegetables (organic/local as much as possible), eating “free range” animal products as much as possible, avoiding canned food, drinking good water (reverse osmosis), and taking the time to eat slowly. Food can help mitigate chemotherapeutic side effects like ginger tea that has been shown to be one of the best therapies for reducing nausea and vomiting during chemotherapy (Pillai et al. 2011). *(For more information please visit the MCNE website at www.mcne.ca)*

References:

Pillai A, Sharma K, Gupta Y, Bakhshi S. Anti-emetic effect of ginger powder vs placebo as an add-on therapy in children and young adults receiving high emetogenic chemotherapy. *Pediatric Blood and Cancer*. 2011; 56(2): 234-238.

Wang J, Joshi AD, Corral R, et al. Carcinogen metabolism genes, red meat, and poultry intake, and colorectal risk. *International Journal of Cancer*. 2011.

b. Fitness Plan

Physical activity, no matter how minor, is beneficial before, during and after cancer treatment. Endurance exercise programs of 30 minutes or more per day can reduce the rate of cancer related fatigue, reduce the side effects of treatments, reduce the rates of cancer recurrence and improve survival. Chemotherapy and radiation therapy often cause side effects like anemia, cardiotoxicity, and neuropathy. All of these things can lead to increasing levels of fatigue. By reducing physical activity you lose lean body mass and decrease cardiovascular fitness that results in decreased ability to complete daily

activities and other physical tasks. Studies have shown that patients engaged in regular endurance training experience reduced side effects of cancer treatment (Halle et al. 2009). These improvements include reduced nausea and fatigue, increased physical endurance and quality of life. In addition to improving side effects, individuals that exercise have reduced rates of cancer recurrence and, in addition, improved survival rates (Ibrahim et al. 2010). Resistance training has also been shown to reduce some of the side effects of chemotherapy and radiation by improving stress coping mechanisms and increasing lean body mass (Esch et al. 2010).



Basic components of a cancer fitness plan during active cancer treatment can include a warm up, aerobic exercise, and resistance training. At this time, it is important that the fitness program is not too taxing to avoid weight loss and dehydration. In some instances, simply completing a warm up session with stretching and a brief walk (1-2 minutes) at home may be enough. After active cancer treatment, fitness goals

should focus on rebuilding body mass and overall exercise capacity. The warm up, aerobic exercise, and resistance training exertion levels can be higher than during active treatment, but care must still be taken. Regulating the intensity of a fitness program can often be a challenge for individuals who are used to a high level of physical activity, but monitoring the level of exertion will allow for continuation of a fitness program more consistently by avoiding excessive times to recuperate.

Just like everything else, a fitness regime should not be undertaken without proper guidance and supervision. Attention needs to be paid to the length of exercise, the intensity of exercise and the perceived level of exertion. A well trained fitness professional with experience in guiding individuals who are currently undergoing cancer treatment is essential. *(For more information please visit the MCNE website at www.mcne.ca)*

References:

Esch T, Stefano G. The neurobiology of stress management. *Neuro Endocrinology Letters*. 2010; 31(1): 19-39.

Halle M, Schoenberg M. Physical activity in the prevention and treatment of colorectal carcinoma. *Deutsches Arzteblatt International*. 2009;106(44): 722-727.

Ibrahim E, Al-Homaidh A. Physical activity and survival after breast cancer diagnosis: meta-analysis of published studies. *Medical Oncology*. 2010. [Epub ahead of print].

c. Chemosupportive Therapies

Chemotherapy is most known for its side effects, specifically decreased immune states, digestive issues, and fatigue among a few. Chemosupportive therapies are natural ways to help mitigate some of the side effects while helping to increase the efficacy of the chemotherapy and not impede the effectiveness of the chemotherapeutic drug.

Ascorbic Acid (Vitamin C) Vitamin C or Ascorbic Acid (AA) was first implicated as an anti-cancer agent through the research of Dr. Linus Pauling PhD and Dr. Ewan Cameron MD. Their first clinical trial began in 1971 and the results of this and other research was published in the book “Cancer and Vitamin C” in 1979. In their clinical trial they found a



four-fold increase in survival time by those individuals treated with 10,000 mg of AA intravenously. A later trial done by the Mayo clinic could not repeat these findings leading to a dismissal of AA potential role in Oncology. The major difference from the two trials was that the Mayo clinic trial used orally administered vitamin C while the Cameron and Pauling trial used intravenously administered

vitamin C. Ongoing research has shown the potential importance of vitamin C delivered in high doses by infusion as a supportive therapy in cancer care. *(For more information please visit the MCNE website at www.mcne.ca)*

Calcium and Magnesium Infusion

Calcium and magnesium infusions appear to have the ability to greatly reduce the severity and incidence of peripheral neuropathy due to oxaliplatin often used in a colorectal chemotherapeutic regimen (specifically FOLFOX). This is important as it has the potential to lead to better treatment outcomes through the decreased rate of interrupting or discontinuing therapy as a result of unbearable chemotherapeutic side effects. *(For more information please visit the MCNE website at www.mcne.ca)*

Curcumin



Curcumin is mostly associated with the very pungent smells often linked with ethnic cuisines from India, South East Asia and the Caribbean cuisine. It is the major active ingredient in turmeric (*Curcuma longa*) with no apparent toxicity as demonstrated in multiple human studies and has been found to be effective in inhibiting the growth of a variety of tumors (Sharma 2004). Using curcumin with conventional chemotherapy regimens could be an effective strategy to prevent emergence of chemoresistant colon cancer cells (Patel 2007). *(For more information please visit the MCNE website at*

www.mcne.ca)

Docosahexaenoic acid (DHA)

DHA is an omega 3 fatty acid that is found in highest amounts in cold water fish along with eicosapentaenoic acid (EPA). It is important for brain development and function and helps cardiovascular health. A diet rich in omega 3 fatty acids has been linked to reduced risk of colorectal cancer (Terry et al. 2003) (Caygill et al.



1996). *(For more information please visit the MCNE website at* www.mcne.ca*)*

Glutamine

Glutamine is, in normal circumstances a non-essential amino acid, which may be conditionally essential in patients with cancer who experience glutamine depletion. It is necessary in the body for protection and function of the gut (Li et al., 2009) and appears to have potential benefits as a supportive cancer therapy. *(For more information please visit the MCNE website at* www.mcne.ca*)*

Green Tea

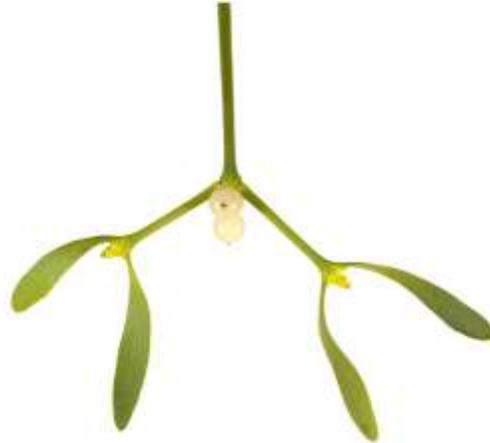
Green tea has been a topic for multiple scientific and medical studies to determine the extent of its health benefits. It is known for its most abundant polyphenol, epigallocatechin gallate (EGCG). As a potent antioxidant, it has many therapeutic properties in the treatment of cancer (Cao et al. 1999) (Gupta et al. 2002). There is



increasing evidence showing EGCG can be beneficial in not only treating but preventing certain types of cancer (Jatoi et al. 2003) (Kemberling et al. 2003) (Pisters et al. 2001).
(For more information please visit the MCNE website at www.mcne.ca)

Viscum album (European Mistletoe)

While most are reminded of Christmas at the sound of “mistletoe” this is actually one of the oldest and most used natural cancer therapies in Europe, especially in German speaking countries. The introduction of mistletoe as an anticancer therapy goes back to 1920 and its use is now reaching almost a century. Mistletoe or as it is known scientifically *Viscum Album* is one of the most well researched natural therapies in cancer care. Several large meta-analysis of clinical trials have validated its important role as a supportive care for improving quality of life and positively influencing cancer recurrence and overall survival (Legnani et al. 2008). *(For more information please visit the MCNE website at www.mcne.ca)*



Naturopathic Recurrence Preventative Care

After treatments are undergone patients may be left wondering what to do. In a majority of cases where chemotherapeutic regimens produce a response, emergence of resistance and recurrence of cancer can occur (Patel 2010). Prevention not only begins from the absence of cancer but continues after the presence and treatment of cancer.

Diet, fitness and natural therapies are just as important in this stage or more so to maintain a healthy immune system and to create a hostile environment for the formation of cancer. This step in a continuum of health is not only needed but is imperative in helping to ensure continued treatment success.



References:

Patel B, Deepshika G, Elliott A et al. Curcumin targets FOLFOX-surviving colon cancer cells via inhibition of EGFRs and IGF-1R. *Anticancer Research*. 2010;30:319-326.

a. Diet Suggestions for Cancer Recurrence Prevention

There are unique metabolic attributes of cancer cells. While healthy cells can utilize fats and protein as part of their regular energy source, cancer cells generally require sugar to drive their metabolic engines. In addition, over consumption of simple carbohydrates like starches or sugar rich foods can increase the levels of insulin in an individual's blood and insulin can potentiate cancer growth. Therefore, avoiding foods that contain substantial amounts of simple carbohydrates and starches (sugars), and also limiting foods that have moderate levels of carbohydrates becomes very important. By reducing (not eliminating) carbohydrate intake, we can "starve" tumor cells of their fuel and limit the activity of certain enzymes found to be elevated in cancer cells (Demetrius, Coy and Tuszynski 2010).

Secondly, epidemiological evidence has shown that the consumption of fruits and vegetables has been shown to reduce the rates of cancer and of cancer recurrence (Millen et al., 2007). Furthermore, produce such as green, leafy vegetables and certain berries are known to inhibit cancer growth (Hara et al., 2003) or prevent cancer cell creation. One way to easily ingest nutrient dense vegetables in substantial amounts is through juicing.

The MCNE cancer prevention diet also makes recommendations around the avoidance of foods that may contain environmental toxins which may contribute to illness or inhibit healthy immune and detoxification responses. Therefore, place emphasis on consuming organically and locally grown produce in addition to organic, antibiotic and hormone free animal products. Also proceed with caution when purchasing seafood as many may harbor potentially harmful toxins such as PCBs, mercury and cadmium. Finally, patients who have a history of inflammatory bowel conditions are encouraged to avoid certain foods that are more likely to cause allergic or hypersensitive reactions and consequently gastrointestinal tract dysfunction. *(For more information please visit the MCNE website at www.mcne.ca)*

References:

Demetrius LA, Coy JF, Tuszynski JA. Cancer proliferation and therapy: the Warburg effect and quantum metabolism. *Theoretical Biology and Medical Modelling*. 2010; 7(2).

Hara M, Hanaoka T, Kobayashi M, et al. Cruciferous vegetables, mushrooms, and gastrointestinal cancer risks in a multicenter, hospital-based case-control study in Japan. *Nutrition and Cancer*. 2003; 46(2): 138-147.

Millen A, Subar A, Graubard B, et al. Fruit and vegetable intake and prevalence of colorectal adenoma in a cancer screening trial. *American Journal of Clinical Nutrition*. 2007; 86(6): 1754-1764.

b. Fitness Plan for Cancer Recurrence Prevention

Perhaps the most important moment in the treatment journey is the time after all conventional treatments have successfully ended and “regular” life begins. If exercise is important for primary prevention it is just as important for recurrence prevention. Those with high physical activity have a lower risk of colon cancer recurrence and cancer related death (Vrieling et al. 2010).

Returning back to pre-treatment levels of activity may take some time or perhaps this may be a good time to create a new fitness plan that is enjoyable and works with the



current state of health. It is important that patients seek the advice of their naturopathic or conventional physician prior to initiating a physical fitness program as there may be the need to include modifications due to limitations created after conventional treatment (e.g. stoma). *(For more information please visit the MCNE website at www.mcne.ca)*

References:

Vrieling A, Kampman E. The role of body mass index, physical activity and diet in colorectal cancer recurrence and survival: a review of the literature. *Am J Clin Nutr.* 2010;92:471-90.

Please note that this is not an extensive list of natural therapies used for prevention and supportive treatments usable in colorectal cancer cases. Individualized treatment based on a person's health status, chemotherapeutic regimen or conventional treatment protocol is extremely important and requires expert guidance.