Lifestyle and Cancer Risk

Risk factors for disease associated with health risk appraisal have strongly sided with concerns for cardiovascular disease and metabolic conditions. Exercise and behavior modifications have focused on prevention of the number one killer of Americans, coronary heart disease along with its precursor’s hypertension, diabetes and hyperlipidemia. Interestingly though, the most feared disease in the United States gets little attention related to preventative behaviors. Cancer is not a single disease but rather a collective group of diseases that all lead to premature death if untreated. Changes at the DNA level account for the difficulty in reversing the process compared to diseases like type II diabetes, dyslipidemia, and hypertension which are very responsive to weight loss, dietary adjustments and exercise. Although some cancers can be managed with dietary strategies and some research supports the positive effects of exercise on outcomes, prevention is still the best strategy.

There exists some question as to the actual relationship between genetics and cancer risk and newer studies seem to suggest diet and lifestyle are now being thought of as predominant precursors. Although there are numerous types of cancer that affect different areas of the body some seem to be more associated to dietary intakes and behaviors, particularly colon cancer and breast cancer. The rates of colon cancer in various countries are strongly correlated with the per capita consumption of red meat and animal fat and, to a lesser degree, inversely associated with the consumption of fiber. Several epidemiological studies demonstrate the positive association of red meat intake with risk of digestive tract cancers, while data on the relation of meat intake with cancer risk at most other sites are inconsistent.

In one prospective study, among 88,751 women 34 to 59 years old with no history of cancer, inflammatory bowel disease, or colon polyps were tracked for cancer risk. During six years and 512,488 person-years of follow-up, 150 incident cases of colon cancer had been documented. After adjustment for total energy intake, animal fat was positively associated with the risk of colon cancer. Interestingly, no association was found for vegetable fat. The relative risk of colon cancer in women who ate beef, pork, or lamb as a main dish every day was higher compared with those reporting consumption less than once a month. Processed meats and organ meat were also significantly associated with increased risk, whereas fish and chicken without skin were related to decreased risk. The ratio of the intake of red meat to the intake of chicken and fish in particular was strongly associated with an increased incidence of colon cancer. The research also suggests a low intake of fiber may contribute to the risk of colon cancer, but this relation was not statistically independent of meat intake.

It seems that the cooking and processing of meats creates heterocyclic amines and polycyclic aromatic hydrocarbons which are the suspected carcinogens that are formed in meat when it is cooked at high temperature particularly for long durations. These compounds require metabolic activation by select enzyme before they can bind to DNA. It has been hypothesized that well-done meat increases the risk of colorectal cancer to a greater degree in individuals with the rapid phenotype for these enzymes. This association may be particularly strong in smokers because smoking is known to induce at least one of these particular enzymes. In fact, smokers, particularly those with a preference for well-done red meat,
demonstrated an 8.8-fold increased risk. These findings provide additional support to the hypothesis that exposure to carcinogens through consumption of well-done meat increases the risk of intestinal cancer, particularly in individuals who are genetically susceptible to these select enzymes and smoking facilitates this effect.

In addition to red meat consumption, alcohol also is positively associated with certain cancers. Alcohol has consistently been related to risks of carcinomas of the mouth, oral pharynx, larynx, and esophagus in numerous studies. Of particular relevance is that the collective effects of alcohol and smoking are greater than additive, and are probably multiplicative which suggest the chemical combinations act in biological synergism to promote cancer. Since consumable alcohol is the same in all major types of alcoholic beverages, all alcohol containing drinks have been implicated in the risk of these diseases. It seems nutrition is an important component in the risk, as the influence of alcohol on risks of upper digestive tract cancers seem to be higher in individuals with marginal nutritional status compared to better-nourished individuals. Low folate consumption in particular is associated with increased risk.

Alcohol has also been associated with an increased risk of colon and rectum cancer, liver cancer, and female breast cancer. In large cohort investigations, both lifetime and baseline alcohol consumption increased colon and rectum cancer risk, with more apparent risk for alcohol intakes greater than 30 g/day (2-3 drinks). Likewise, a positive relationship has been made with pancreatic, breast and liver cancer when consumption is greater than 60 grams per day (>5 drinks/day). Results from detailed analyses provide support for heavy alcohol consumption (including binge drinking) as a risk factor for pancreatic cancer in men and breast cancer in women. Likewise, the risks of mortality from esophageal cancer and colon cancer were higher among heavy drinkers, as compared with non-drinkers. The risks of mortality from colon cancer and bile duct cancer also rose with increasing alcohol consumption.

For females, the risk of digestive cancer mortality was higher among alcohol drinkers than non-drinkers. Likewise, females with a propensity for slower alcohol oxidation demonstrated a notably higher risk than those females with normal processing speeds. Women with the ADH1C1,1 genotype were found to be 1.8 times more at risk for breast cancer than those with another genotype. Slow oxidation of ethanol (genetic-driven) increased the risk of breast cancer by 14% per 10g alcohol/day. These findings suggest that females with increased risk for breast cancer should limit alcohol consumption to about one drink per day.

Regular and vigorous physical exercise has demonstrated significant evidence in the ability to provide strong preventative medicine against cancer. It is suggested that the potential influence of routine exercise may reduce incidence of cancer by up to 40%. To date the greatest effect has been seen for breast and colorectal cancers, although evidence is accumulating as to the protective influence exercise may hold for prostate cancer and other cancers. The benefits of exercise also seem to hold significant merit following cancer diagnosis. Exercise has demonstrated very positive benefits for improving surgical outcomes, reducing symptom experience, managing side effects of radiation and chemotherapy, improving psychological health, maintaining physical function, and reducing fat gain and muscle and bone loss. Large, prospective studies demonstrate irrefutable evidence that regular exercise following cancer diagnosis will actually increase survivorship by 50%-60% with the strongest evidence for breast and colorectal cancers. For individuals with prostate cancer exercise may limit or even
reverse some of the adverse affects of hormonal therapy by increasing muscle mass, functional performance, and cardiorespiratory fitness without elevating testosterone levels. The use of hormone therapies for breast and prostate cancer have shown significant potential to increase risk of cardiovascular disease, obesity, type 2 diabetes, osteoporosis, and sarcopenia. Exercise can dramatically impact these risks and aid in management decisions for optimal treatment. For this reason exercise should be a constant adjunct therapy for cancer patients particularly those treated with hormonal therapies.

Of significant relevance, exercise as supportive treatment has shown to greatly enhance the therapeutic effects of traditional radiation and pharmaceutical treatments by increasing tolerance, reducing side effects, and lowering risk of chronic diseases, even those not aggravated by cancer treatment. Exercise can positively affect anxiety, depression, and reduce counterproductive rest (depression/treatment driven inactivity). Clinical evidence suggests among all populations, exercise is well tolerated and benefits the patient in both psychological and physical measures. It is suggested that both one-on-one attention and small group exercise sessions should be used for cancer patients. Close supervision by an exercise professional provides a more motivating setting and the social interaction is critical for adherence and retention as well as greater psychological benefits such as reduced anxiety and depression along with enhanced social connectedness. In a six year follow-up, exercise did not hinder patient recovery or treatment. However, it is critical that the exercise prescription and management be tailored to the individual patient and that they are monitored by appropriately trained and professionally accredited exercise specialists. Individuals who demonstrate low exercise risk and who present without significant musculoskeletal issues can participate in community-based physical activity. For each patient emphasis should be placed on adherence, affordability, convenience, and enjoyment so no perceived barriers affect adherence.

Years of research and clinical evidence suggest that one’s risk for some cancers can be reduced based upon healthy living. A diet high in fruits and vegetables, lower in animal fat and red meat along with moderate consumption of alcohol can benefit risk of developing common cancers including both breast and colon cancer. Additionally, engaging in healthy behaviors such as participating in routine exercise and avoiding smoking and excess drinking can also contribute to a reduced risk. Making body wise decisions and siding with moderation can potentially prevent some of the most feared diseases. When it comes to most cancers how one lives seems to be the most important factor.