

# A Whole Grain, Plant-Based Diet Reduces the Risk of Colon Cancer

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**Abstract:** Colon cancer is the second deadliest cancer in the United States. One study shows that eating a diet of pork, processed meats, potatoes and coffee (identified as PPP) can cause a 37-61% increased risk of colorectal cancer in men and a 14% increased risk in women. In reverse, a diet that contained vegetables, legumes, and fish can cause a 14% decrease in women and a 41-51% decrease in men. An animal based diet increases the risk of colon cancer and a whole grain, plant based diet decreases the risk of colon cancer.

**Introduction:** What is colon cancer? It is a cancer that begins in the gastrointestinal system (GI) and affects the colon and rectum. The GI creates energy for the body and helps process waste. When food is chewed and swallowed, it travels down the small intestine, which is approximately 20 ft long. The small intestine breaks down the food and extracts the nutrients needed for a healthy body. The small intestine empties into the large intestine, a five foot long muscular tube. The colon is the first part of the large intestine (also known as a bowel). The colon continues to absorb water and nutrients and holds the waste products remaining from the digesting food. The second part of the large intestine is the rectum (about six inches long) where waste from the colon is ushered out the anus during defecation.

The colon has four parts; the ascending colon, the transverse colon, the descending colon, and the sigmoid colon. Cancer can begin on the outer tissue of the wall of any of these four regions. It begins in the form of a cancer polyp or adenomacarcinoma. Over 95% of colon cancer is adenocarcinomas, i.e. cancer of cells that line the colon or rectum.<sup>1</sup> Colon cancer is the second deadliest cancer in the United States.<sup>2</sup> Yet Americans continue to engage in harmful practices that increase the risk of developing the deadly disease. I hypothesize that consuming an animal-based diet increases the risk of Colon Cancer and conversely, consuming a plant-based, whole grain diet *reduces* the risk of Colon Cancer.<sup>3</sup>

**Method:** I examined articles from the Journal of Nutrition and the American Journal of Clinical Nutrition, along with *The China Study*. The evidence presented by nutritionists indicates that a whole grain, plant-based diet can reduce the risk of colon cancer in Americans. Furthermore, I examined the chemical structures of oleanolic acid and maslinic acid which are prominent in olive fruits and destroy the colon cancer cell HT-29. The fatty acids, oleanolic and maslinic, are deterrents for the formation of adenomacarcinoma cells, which create colon cancer. By consuming olives the risk of developing colon cancer is decreased.<sup>4</sup>

## Sources:

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Figure 1: Molecules in olives that destroy colon cancer cells

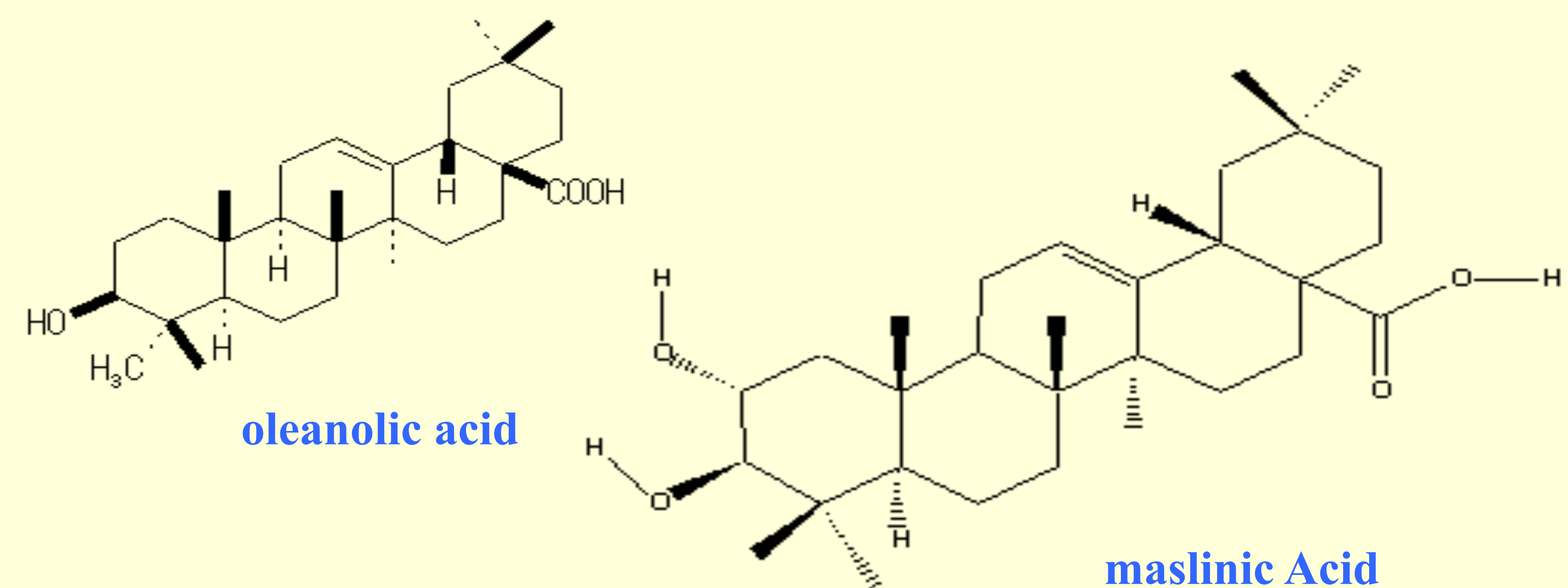


Figure 2: Healthy alternatives to meat

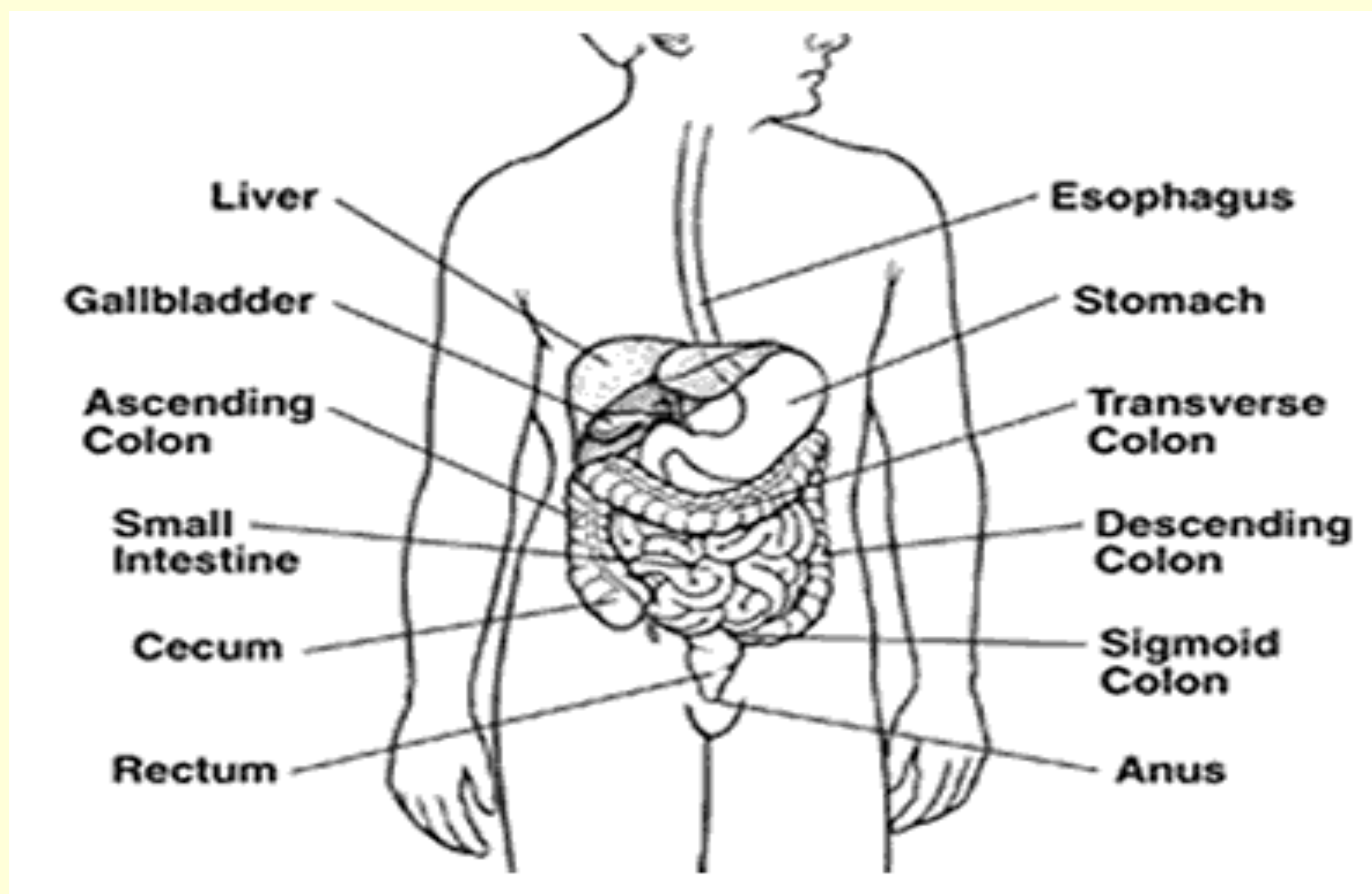
### In the Cupboard

- Beans: Black, pinto, kidney, chickpeas, lentils, refried
- Rice: Brown, long grain, rice mixes
- Pasta: Whole wheat, spaghetti, fettucini, penne, bowtie, ramen noodles
- Other grains: Couscous, orzo, cornmeal, whole wheat crackers, bread sticks, bread crumbs
- Onions
- Canned tomatoes: Diced, whole, seasoned, sun-dried, sauce, salsa
- Canned vegetable: Mixed vegetables, green beans, mushrooms
- Canned and dried fruits: Applesauce, raisins
- Sauces: Pasta, pizza, tomato
- Soups: Canned soups, broth and bouillon and dried soup mixes
- Meats: Canned tuna, salmon, minced clams, and chicken
- Peanut butter
- Evaporated milk
- Vinegars: Cider, red and white wine, balsamic
- Oils: Olive, canola, peanut, and nonfat cooking spray

### In the Refrigerator

- Vegetables and fruits
- 100% vegetable and fruit juices
- Whole wheat and corn tortillas
- Minced garlic
- Sauces: Worcestershire, soy, teriyaki, and chili
- Ketchup and mustard (spicy and Dijon)
- Salad dressings with olive oil or reduced fat <sup>15</sup>

Figure 3: The digestive tract



**Results:** While genetics influence the surfacing of cancer a healthy diet can severely reduce your risk of developing the disease. Eating a whole grain plant-based diet decreases the risk of developing colon cancer. Eating a diet of meat, potatoes and coffee increases the average male's chance of developing colon cancer by 37-51% and a women's by 14% <sup>1</sup>. A study documented in the American Journal of Clinical Nutrition found that eating a whole grain, plant-based diet decreased the average male's chance of developing colon cancer by 41-51% and by 14% in women.<sup>5</sup> This study monitored the men and women who consumed a PPP diet (meat, potatoes, and coffee) and those who consumed a whole grain, plant-based diet over a period of a year. It then compared the health status of the subjects at the end of the study. It was found that those who were regimented to a whole grain, plant-based, diet were less 'at risk' of cancerous diseases, including colon cancer. <sup>6</sup>

Another study found that "A high correlation between national per capita disappearance of fat and national rates of colon cancer led to the hypothesis that consumption of fat, especially from animal sources, increases the risk for colon cancer."<sup>7</sup> Again, significant evidence suggests that a whole grain, plant-based diet is a method of reducing the risk of colon cancer. This study examined two subject groups. One subject group ate a whole grain, plant-based diet, and the other consumed an animal-based diet. The evidence and data gathered concluded that those who consumed a plant-based, whole grain diet were less likely to develop cancer.

But what plant-based or whole grain foods can help reduce the risk of colon cancer? Olives are an excellent example. The skin of an olive contains wax and oils that protect the consistency of the fruit. The two main acids in olive skin are maslinic acid oleanolic acid. Because olive oils are mono-unsaturated fats they contain a high content of oleic acid which helps decrease the living HT-29 colon cancer cells in the human body. Olives and olive skins contain phytochemicals which promote antitumor reactions and inversely lead to the prevention of cancer.<sup>8</sup>

**Discussion/Conclusion:** Looking at the evidence provided I found conclusively that eating a whole-grain, plant-based diet decreased the risk of colon cancer development. Four factors were examined: incidence of cancer, correlation, causation and viability (i.e. is it worth it?)

**Incidence:** Colon cancer is the second deadliest cancer in the United States. The incidence was 42.8 per hundred thousand people in 1988-90, and 38.6 in 2000-2002. If you are a smoker or have a family history of cancer, especially if an immediate relative developed cancerous polyps before 60, your chance of developing tumors in the colon or rectum is increased.<sup>9</sup> Family genetics and lifestyle (aka smoker/nonsmoker) play a role in the development of colon cancer.

**Correlation:** Diet shows a strong correlation with colon cancer. The chance of developing colon cancer is decreased by approximately 41-51% if a whole grain, plant-based diet is consumed.<sup>12</sup> Eating a diet of meat, potatoes and coffee increases the average male's chance of developing colon cancer by 37-51% and a 14% increase in women. Eating a whole grain, plant-based diet decreased the average male's chance of developing colon cancer by 41-51% and by 14% in women.<sup>10</sup>

**Causation:** Fiber is found in whole grain, and plant-based diets, which help to clear food through the small intestine and eases in the digestion and defecation process. When fiber is consumed it makes the colon healthier and therefore decreases a person's chance of developing colon cancer.<sup>11</sup> Whole grain, plant-based diets contain high amounts of fiber. They also contain certain fatty acids such as oleanolic and maslinic, that protect the body from tumor formation. Olives, which contain omega-3 fatty acids, also contain phytochemicals which promote anti-tumor reactions and lead to the prevention of colon cancer, especially polyps on the tissue of the colon and rectum walls. If a whole grain, plant-based diet is consumed the human colon is stronger and healthier and there is less incidence of colon cancer.

**Viability:** Colon cancer is the second deadliest cancer in the United States<sup>13</sup>. Evidence shows that consuming an animal-based diet increases the risk of colon cancer and conversely, consuming a plant based, whole grain diet *reduces* the risk of colon cancer.<sup>14</sup>