



FRUITS, VEGETABLES AND CANCER PREVENTION - 2

In the last issue of *Nyam News*, the development of cancer and the relationship between the daily consumption of fruits, vegetables and cancer prevention was discussed. Plant foods, including vegetables and fruits, are a source of many micro-nutrients and bioactive compounds that may figure protecting against cancers of the mouth, pharynx, larynx, pancreas, stomach, oesophagus, colon, rectum, lung, and prostate.

As part of a well-balanced diet and for healthy eating, readers were encouraged to aim for at least a minimum daily intake of five servings of fruits and vegetables not only for the range of vitamins and minerals but also for the antioxidants and phytochemicals they contain.

Antioxidants

Antioxidants are the body's defence which act to attack free radicals before vital molecules are damaged. Vitamins C and E, found abundantly in fresh fruits are potent antioxidants. Vitamin C protects the body by neutralizing cancer causing compounds that can damage cell membranes and it also has an important role in the creation of connective tissue, hence the strength of cell membranes. A lack of vitamin C can cause a decrease in the strength of cell membranes and therefore allow tumours to more easily penetrate and grow. This decreased strength in cell membranes can also hinder the body from effectively enclosing a

tumour, so that the body is unable to prevent the tumour from growing and spreading. Vitamin C may also act to prevent cancer by scavenging, that is, picking up nitrites in the body. Less nitrites in the body means that less is available to create carcinogenic nitrosamine compounds in the body. Generally, vitamin C is abundant in fruits and vegetables, but especially good sources include West Indian cherries, guavas and citrus fruits. Care should be taken to avoid overcooking vegetables as vitamin C can be lost in this way. Most outstanding sources are West Indian cherries, guavas and citrus fruits.

Vitamin E also functions to reduce the formation of nitrosamines in the stomach and in a

less direct manner, helps to maintain the essential mineral selenium in a reduced state. This allows selenium to function as a potent antioxidant. Selenium is a trace metal that is required for proper functioning of one of the body's antioxidant enzyme systems. Selenium is found widely in fruits and vegetables.

While the most effective means of preventing lung, mouth and pharyngeal cancers, is to avoid smoking, there is evidence establishing the protective effects of fruit and vegetable consumption against such cancers. Smoking results in the formation of many free radicals within the body. If left unchecked, the free radicals will damage many cells and lead to cancer formation over time. Antioxidant nutrients such as vitamins A, C, and E, along with selenium will attack these free radicals rendering them harmless to the body.

Carotenoids

Carotenoids are a family of red/orange pigments found in varying amounts in fruits and vegetables. Some carotenoids, particularly beta-carotene can be converted into vitamin A (retinol), which functions to promote differentiation of cells, enhance immunity, and activate enzymes which break down carcinogens. However, retinol has no antioxidant properties and can be quite toxic when taken in excess. Carotenoids function as antioxidants in reducing oxidative stress, with lycopene being the most potent.

Lycopene is a carotenoid with potent antioxidant activity that has been identified as the compound involved in prostate cancer prevention.



Research suggests foods containing lycopene probably decrease the risk of developing prostate cancer. Lycopene is not produced by the body. Tomatoes are an excellent source of lycopene, and studies have shown that daily consumption of tomatoes or tomato products considerably decrease the risk of developing prostate cancer. This effect may be increased when tomatoes are eaten with other vegetables, particularly broccoli. Tomatoes also contain other carotenoids in addition to lycopene.

Generally, the redder the tomato, the more lycopene is present. However, packaged or heat-processed tomato products contain more lycopene than an equivalent amount of fresh tomatoes because the cell walls are broken down during processing allowing the lycopene to be more concentrated in the product. As a result, lycopene from processed foods is more readily available to the body. A small amount of mono or polyunsaturated fat added to lycopene-rich tomatoes during cooking may help to increase absorption.

The lycopene content of selected tomato-based products is as follows:

- 1 cup tomato soup 24.8 mg

- ½ cup tomato or spaghetti sauce 19.4 mg
- ½ cup canned tomatoes 11.8 mg
- 2 Tbsp ketchup 5.1 mg
- 1 medium fresh tomato 3.7 mg

Fibre

Fruits and vegetables are also excellent sources of fibre, especially when eaten raw. High fibre intakes may be beneficial for the prevention of many cancers, but most likely, for the prevention of colorectal cancers. These are some ways that fibre-laden fruits and vegetables help to decrease the risk of developing cancers of the colon and rectum. Fibre adds bulk to the formation of stool thus facilitating easier and faster passage through the colon and ultimately expulsion from the body. Faster passage of stool enables faster removal of carcinogenic substances contained in the foods we eat. This then decreases the time available for carcinogens in stool to cause damage to the cells of the colon and rectum. In addition, it is thought that the fibre may bind to the carcinogens, preventing them from coming into contact with the cells and causing damage.

Some types of dietary fibre can be fermented by bacteria naturally present in the colon. This fermentation leads to the production of the short chain fatty acid butyrate which is known to have anti cancer properties. The presence of the short chain acids also increases the acidity of the colon. This increased acidity

prevents the conversion of primary bile acids to secondary bile acids which are thought to promote cancer formation.

When vegetables and fruits, especially those with edible skins and/or seeds or dried fruits are eaten, dietary fibre intake is improved. The fibre content of fruits and vegetables vary. A medium banana or apple gives approximately 3 grams of dietary fibre. Guavas and passion fruit are also high in fibre.

Calcium

Calcium contained in green leafy vegetables may also help

decrease the risk of developing colon cancer. Calcium may reduce the growth of pre-cancerous colon polyps, which may lead to recurrence of colon cancer. This effect is thought to be achieved from the neutralizing effect of calcium on certain cancer causing digestive acids that can affect the colon. It may also help to regulate the growth of cells in the colon, thereby preventing cell proliferation that can lead to cancer.

Good Nutrition Protects Against Cancer

There is a strong and consistent pattern showing

that diets high in vegetables and fruits and other plant foods decrease the risk of many cancers. Maintaining a suitable body weight is also important in preventing cancer, but the good news is that having five to nine servings daily of a variety of fruits and vegetables goes a long way towards achieving and maintaining a good body weight. Regular physical activity is also important, so try to lead an active lifestyle too, in your quest for preventing cancer.



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