

## Natural beta carotene and cancer prevention

Cancer is the number two cause of premature death in Americans. Increasing cancer rates seem to be caused by environmental factors, especially diet. Scientists are examining foods and substances having protective factors. Beta carotene is one of the most well known natural anti-cancer substances. Over the past 20 years, cancer health authorities, National Cancer Institute and dozens of publicized studies have shown evidence that eating vegetables rich in beta carotene reduces the risk of all kinds of cancer.

Beta carotene is the main source of Vitamin A for humans. Our bodies convert beta carotene to Vitamin A as we need it. Although very high dosages of Vitamin A supplements are toxic, high amounts of beta carotene from foods and supplements are safe. Spirulina is the richest beta carotene food known, having over ten times more beta carotene than any other food, including carrots.

Beta carotene is one of the most effective substances for deactivating free radicals, which damage cells, leading to cancer. Free radicals are molecular fragments from environmental pollution, toxic chemicals, drugs, and physical and emotional stress. Beta carotene prevents free radicals from reacting, and decreases incidence of lung cancer, prevents chemically induced tumours in animals, prevents precancerous prechromosome damage and enhances immunological resistance.

Over 100 animal studies confirm Vitamin A and beta carotene inhibit the development of various cancers and tumours. Many human epidemiological studies correlated high Vitamin A intake with decreased cancer risks.<sup>12</sup> Beta carotene (and not the preformed Vitamin A from animal sources) correlated with lower cancer rates.<sup>13</sup>

Over 15 studies from 1975-1986 correlated lower incidence of lung cancer with beta carotene and Vitamin A. One study found the lower the serum level of beta carotene, the higher incidence of lung cancer.<sup>14</sup> Nine studies from 1974-1986 correlated lower digestive tract cancer (oral, stomach, colon, gastrointestinal) with beta carotene and Vitamin A. Two studies with women correlated lower breast and cervix cancer. A five-year study in China completed in 1993 with 29,000 people revealed daily doses of beta carotene, vitamin E and selenium reduced the incidence of cancer deaths by 13%.<sup>15</sup>

In 1982, the famous monograph "Diet, Nutrition and Cancer" published by the US National Research Council reviewed this overwhelming literature. It concluded, "the epidemiological evidence is sufficient to suggest that foods rich in carotenes or Vitamin A are associated with a reduced risk of cancer." The study recommended a diet including beta carotene rich vegetables to reduce cancer risks.<sup>16</sup>

A 1987 Israeli study demonstrated natural beta carotene is more effective than synthetic. Natural beta carotene is better assimilated by the body because it contains the 9-cis carotenoid isomer, lacking in synthetic carotene molecules. This means beta carotene in algae and vegetables greater antioxidant power than synthetic beta carotene.<sup>17</sup>

Controversy arose in 1995 when synthetic beta carotene was found ineffective preventing cancer in Finnish and U.S. smokers, and could even be harmful. Yet, these studies were flawed. Researchers chose only synthetic beta carotene lacking the cis isomer and gave high megadoses which may have

caused nutrient imbalance. These studies reinforced the interest in natural carotenoids in whole foods.

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#### Anti-cancer tumour effects

Because it is the richest natural beta carotene food, spirulina has been tested for anti-cancer effects. The Harvard University School of Dental Medicine reduced oral cancer cells with spirulina extracts. A beta carotene solution applied to cancerous tumours in mouths of hamsters reduced the number and size of tumours or caused them to disappear.<sup>18</sup> When a beta carotene extract was fed to 20 hamsters pretreated to develop mouth cancer, none developed the disease. Tissue samples contained an immune stimulating substance believed to have destroyed cancer cells before they could multiply.<sup>19</sup>

In 1995, spirulina reversed oral cancer in pan tobacco chewers in Kerala, India. Complete regression of oral leukoplakia was found in 45% of those using one gram a day for one year, compared to only 7% with a placebo. Within one year of discontinuing spirulina, 45% of the lesions returned. This was the first human study of its chemopreventive potential.<sup>20</sup>

Evidence linking natural beta carotene and cancer prevention is impressive. For those who do not eat 4-9 servings of fruits and vegetables daily, spirulina will add natural carotene insurance.

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