

# Winning the Battle Against Cancer Therapy Side Effects

Japanese mushroom extract protects and restores immune function.

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**I**ndividual victory in the war against cancer often means winning the battle against therapy-induced side effects, particularly immune suppression. Surgery, radiation and chemotherapies weaken immune system defenses leaving many patients vulnerable to opportunistic infections, contributing to mental and physical fatigue and allowing for post-therapy cancer reoccurrences and/or metastasis. Cancer experts used to accept therapy side effects as inevitable, but research in the growing field of "Complementary Therapies" has shown that certain natural and nutritional supplements can limit their severity and duration. One particularly beneficial supplement is the Japanese mushroom extract AHCC<sup>®</sup>, which medical research shows can reduce nausea, vomiting, pain, appetite suppression, liver damage, hair loss and immune suppression, resulting in improved quality of life and overall survival.

AHCC (Active Hexose Correlated Compound) was developed by the Amino-Up Chemical Company of Sapporo, Japan. It is made from a proprietary hybrid of Shiitake and other medicinal mushrooms grown with rice bran in a liquid medium (a controlled environment like hydroponic gardening for mushrooms), that is then fermented to extract a unique, low molecular

weight compound, not common to medicinal mushrooms. The active ingredient in AHCC has been identified as a 5,000 dalton weight molecule with an alpha-glucan structure (a Dalton is a unit of molecular weight equal to one Carbon atom). In contrast, the immune enhancing compounds of most mushrooms are identified as 100,000 to 1,000,000 dalton weight, beta-glucan molecules. AHCC has been the subject of more than 29 published studies since 1986 and is used in over 700 hospitals in Japan, so there is a great deal of scientific evidence that AHCC not only helps to prevent the side effects of chemotherapy, but enhances its primary effectiveness as well.

In terms of side effects, several animal studies have laid the groundwork for research in humans. A study published in the Proceedings of the American Association For Cancer Research in March of 1999 showed that AHCC was able to relieve the side effects of several standard chemotherapy drugs. Mice treated with fluorouracil (5-FU), cyclophosphamide (CY) or both daily showed decreases in weight, blood count and bone marrow that were "significantly restored" by co-administration with AHCC. Mice treated with Mercapto-purine (6-MP), and methotrexate (MTX) showed

decreased body weight, serum albumin, and liver functions, which were significantly improved when AHCC was administered together with the chemotherapeutic agents. "Severe" (50% to 100%) hair loss or alopecia caused by cytosine arabinoside (Ara-C) was reduced to "slight" when AHCC was taken simultaneously.

Damage to liver function is responsible for many of the systemic side effects of chemotherapy. A study in mice, which used carbon tetrachloride as a model for drug induced liver injury, showed that co-treatment with AHCC prevented declines in liver function, enhancing metabolism, preventing the buildup of carcinogenic compounds and preventing the development of hormone disorders that often accompany liver failure. AHCC showed an antioxidant like protection against free radicals as measured in liver enzyme profiles, protecting the liver itself and the body as a whole.

Hair loss, although often temporary, is an extremely distressing and common consequence of cancer therapy. The protective effects of AHCC in this regard was confirmed in another study where 5 out of 7 rats treated with the chemotherapy cytosine arabinoside (Ara-C) showed severe and 2 of 7 moderate alopecia. Mice given AHCC along with chemotherapy were protected. Microscopic analysis showed severe loss of hair follicles in controlled animals, and slight loss in the AHCC group.

The ability of AHCC to enhance the effectiveness of chemotherapy was demonstrated in a study where rats

were implanted with a cell line of spontaneous mammary adenocarcinoma. Three groups were observed for 38 days, a control group, a group treated with UFT, an oral form of the chemotherapy drug fluorouracil, and a UFT plus AHCC treatment group. Tumor growth was greatest in the control group. There was a slight, but significant enhancement of tumor suppression in the AHCC group compared to the UFT group.

The greatest difference was found in the growth of distant metastases, which were inhibited by the treatment with AHCC plus UFT, but enhanced by UFT alone. An explanation for this is found in AHCC's ability to prevent the suppression of immune function that occurs with chemotherapy. Distant metastases often occur when after primary tumors have been reduced or eradicated by therapies that often eliminate the host immune defense, allowing microscopic tumor to grow freely. UFT-only treated mice had suppressed Natural Killer (NK) cell function. AHCC restored and enhanced NK cell as well as macrophage function, and the production of anti-cancer cytokines.

In addition to an increased susceptibility to cancer metastasis, immune system suppression can also lead to life threatening opportunistic infections. AHCC helped prevent these complications and enhance survival in a study with mice whose white blood counts were suppressed with the chemotherapy cyclophosphamide, and exposed to *Candida albicans*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*.

Validation of animal research with AHCC is found in controlled studies and case reports with human patients. AHCC is widely used in Japanese hospitals, and since 1986 doctors have been meeting at the annual meeting of the AHCC Research Association to present the results

of their clinical experience demonstrating improved appetite, reduced vomiting and pain and other improvements in the quality of life of patients under going chemo, radiation and surgery for cancer. In a study that extended from 1992 to 1999, 70 patients with pathologically confirmed liver cancer took AHCC orally (3 grams per day) following surgery showed overall survival benefits. A clinically balanced control group of 82 liver cancer patients were followed who had surgery only. As of September 1999, 34 (49%) of the patients in the AHCC group had recurrences, versus 55 (67%) of the control group. More significantly, AHCC increased the 50% survival rate from 45 months to 68 months.

AHCC is a registered trademark of the Amino-Up Chemical Company, Sapporo, Japan.

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