Maitake
by Mark Stengler, ND

Introduction
One powerful ally in the battle against cancer and many other diseases is derived from the maitake (my-TAH-key) mushroom. So impressive is the science behind Maitake that one of the world's most respected cancer institutes was awarded a $500,000 grant to conduct research utilizing exclusively MaitakeGold 404® and its effects on breast cancer patients. This article will summarize what MaitakeGold 404® is, the scientific data that stands behind it, how it works, its safety record, and how best to use it both preventatively and therapeutically. MaitakeGold 404® is known commercially as MD Fraction in Japan.

What Is Maitake?
The botanical name for maitake is *Grifola* (“braided fungus”) *frondosa* (“leaf like”). Maitake grows in the forests of Asia, Europe, Canada, and parts of the Eastern United States. It grows in heavy clumps (sometimes 100 pounds or more) at the base of stumps and on the roots of trees. Indigenous to Northern Japan, maitake has long been a highly valued edible mushroom, described as having a meaty taste.

A Historical Perspective
For thousands of years, potent medicinal actions of specific mushrooms that can help humans prevent and recover from illness have been recorded. Medicinal mushrooms have long been revered in Asia and other areas of the world for their many healing benefits. Ancient Japanese and Chinese medical texts describe the medicinal properties of various mushrooms. In Japan, maitake has long been recognized as the “King of the Mushrooms,” and has held a special status among medicinal mushrooms. In fact, maitake was so revered in Japan that collectors would keep the forest locations of their mushroom-gathering grounds a secret.

Currently, MaitakeGold 404® extract is a popular therapy for cancer and associated adjuvant therapies in Japan and around the world. It has also shown some promise in treating hypertension, high cholesterol and triglycerides, weight loss, diabetes, malaria, chronic fatigue syndrome, HIV, and other chronic viral infections.

The Evolution of MaitakeGold 404®
In the early 1980s, Dr. Hiroaki Nanba, a professor of microbiology and expert mycologist at Kobe Pharmaceutical University, was intensively studying the medicinal properties of various mushrooms. During this time, much of his attention was devoted to the popular shiitake mushroom. However, when his research showed him that maitake had a unique molecular structure that exhibited greater antitumor activity than other mushroom extracts he had been working with, his attention was diverted. Maitake, he discovered, also was unique in that it showed the greatest effectiveness of any mushroom when given orally. This action was extremely important as most clinical studies on mushroom extracts had so far found injection to be the most efficacious route of administration. At this point, Dr. Nanba decided to devote his focus exclusively on maitake.

Maitake D Fraction
In 1984, Dr. Nanba discovered an important maitake fraction (or specialized component) that stimulated macrophages, the white blood cells that are essential to a powerful immune system. Through a special extraction method, the important “D fraction,” as it was named, was isolated. It was now possible to produce a standardized form of specific beta-glucan polysaccharides – beta-1,6 glucan and beta-1,3 glucan. Dr. Nanba patented this D fraction that same year in Japan. This isolation and extraction method of the D fraction was important as it now enabled one to focus on the components (specific beta-glucans) that improved immune function. It also allowed for more concentrated products to be developed so that massive quantities of the medicinal substance would not need to be ingested orally for a therapeutic response.

Beyond the D Fraction Extract – MD Fraction
Dr. Nanba continued his research on the D fraction extract in order to provide an even larger amount of the key compound for use in dietary supplements. His diligence paid off, and in 1996, he was awarded a Japanese Patent on an advanced form of the D fraction, which Dr. Nanba named MD fraction. By adding a step to the extraction process—a further purification of the D fraction whereby floating or adhering matter is removed—he was able to create the purest and most bioactive form of the D fraction. Thus, as the MD fraction patent describes, “Because removal of the floating and adhering matter brings about an enhancement in the antitumor activity and immunopotentiating activity of the extract, the step of removing said matter is extremely important.” Tests on the MD fraction have shown a superior effect in regard to antitumor and immunopotentiating activity. For example, tumors in mice were shown to be significantly more inhibited by the MD fraction when compared with the D fraction. The MD fraction or as it is known in the US as MaitakeGold 404® also demonstrated a much more favorable effect on
macrophages and killer T cells than that of Dr. Nanba's previous invention, the D fraction. Hence, based on 17 years of extensive clinical research utilizing a proprietary maitake strain, MaitakeGold 404® represents the most therapeutically potent and effective maitake extract ever developed by Dr. Nanba. MaitakeGold 404® is the only maitake extract endorsed by Dr. Nanba and is the only Maitake extract authorized by Dr. Nanba to utilize his science. It is important to note that any research references to Dr. Nanba's science on the D Fraction extract also applies to MaitakeGold 404®.

Maitake Potentiates the Immune System

MaitakeGold 404® is derived from a unique strain of organically grown maitake with which all of Dr. Nanba's studies on both his D and MD Fraction extracts have been conducted. As previously noted, MaitakeGold 404® contains a unique type of beta-glucan. These molecules are often referred to as host defense potentiators (HDP) because of their ability to stimulate the natural defense mechanisms of the immune system. Specifically, maitake beta-glucans activate and enhance the actions of macrophages, natural killer cells, killer T cells, and killer cells, all of which attack cancer cells, viruses, and other harmful intruders. In addition, maitake beta-glucans also stimulate chemicals in the body that enhance immune substances such as interleukins (1 and 2) and lymphokines. This results in a potent defense mechanism within the body to prevent and fight off cancer and infections. Maitake fills a void in conventional medicine for nontoxic agents that kill cancer cells and viruses through immunomodulation. One study found that cancer cell-destruction activity was two to three times higher as a result of the administration of the MD fraction. According to studies, MD fraction has the ability to both directly enhance the damaging activity of NK cells against cancer cells and to change NK precursor cells into activated NK cells.

The Four-Way Mechanism of MaitakeGold 404®

Dr. Nanba and other researchers have identified four basic ways maitake beta-glucans can counter cancer: 1) by protecting healthy cells from becoming cancerous, 2) by helping to prevent metastasis, 3) by slowing or stopping tumor growth, and 4) by working in conjunction with chemotherapy. Each of these actions is discussed below.

1. By protecting healthy cells from becoming cancerous.

In one study, twenty-week-old mice were injected in the back once with the cancer-causing substance 3-MCA, methylicholanthrene. Beginning on the 15th day after the injection, ten of the mice were fed 0.2 mg of D fraction for fifteen consecutive days. The other ten in the control group received saline solution. At the end of the thirty days, the number of mice with cancer was 30.7% in the maitake group and 93.2% in the control group. Dr. Nanba has noted that lentinan from shiitake extract also is effective against MCA-induced cancer, but only when given through intravenous (IV) injection.

In another study, mice were exposed to the carcinogen N-butyl-N-butanolnitrosamine (BBN), known to cause bladder cancer, every day for eight weeks and then, excluding a control group of ten mice, were fed medicinal mushrooms – maitake, shiitake, and oyster mushrooms. All ten mice in the control group developed bladder cancer. Among the rest of the mice, all of the mushrooms significantly reduced the number of bladder cancers, with the maitake being the most effective – 46.7% of the mice treated with maitake developed bladder cancer compared with 52.9% of those fed shiitake and 65% of those fed oyster mushrooms. In all, the mushroom extracts were shown to prevent a significant depression in lymphocyte and natural killer cell activity.

2. By helping to prevent the spread (metastasis) of cancer from one area of the body to another.

In one study, researchers injected liver cancer into the rear footpad of mice. The footpad was then removed some 48 hours later. Mice were divided into three groups. The control group received normal feed, while two other groups received either whole maitake powder as 20% of their diet, or 1 mg per kilogram of body weight, of D fraction intraperitoneaally (into abdomen cavity) ten times. After 30 days, mice were observed for tumor growth as a result of metastasis to the liver. In the control group, 100% of the animals showed metastasis. By comparison, the D fraction prevented 91.3% of that total, and the maitake-powder group 81.3%.

3. By slowing or stopping tumor growth.

Animal studies have also shown maitake to slow or stop the growth of tumors. This has also been seen with humans in a clinical setting.

In one study, researchers implanted different types of tumor and cancer-causing cells in the armpit area of experimental male mice. After 24 hours, the researchers administered into the abdominal cavity 1 mg per kilogram of body weight per day of a purified polysaccharide fraction extracted from the maitake. On the 25th day after the tumor and cancerous cells were implanted, the solid tumors were removed and weighed to obtain a tumor growth inhibition ratio. The maitake fraction was found to cause significant tumor growth inhibition.

In 1998, researchers at the University of Massachusetts at Amherst found that an extract of maitake had significant inhibitory activity against human cervical cancer and T4 leukemic cells. The researchers concluded that further studies were definitely warranted.
4. By working in conjunction with chemotherapy to lessen its side effects, such as hair loss, pain, and nausea, and to boost its positive effects.

A survey of 671 patients showed that combining chemotherapy with maitake treatment can reduce adverse reactions as well as diminish the pain that comes with terminal stage cancer.

Maitake also appears to make chemotherapy more effective. One study compared the effects of D fraction extract and the chemotherapy drug mitomycin (MMC) on mice with cancer. The D fraction alone inhibited tumor growth more effectively (80%) than MMC alone (45%). However, the most effective tumor inhibition was observed with the combination of these two substances with almost 98 percent inhibition. This is an interesting partnership as maitake supports immune function while the MMC directly kills tumor cells.

**MD Fraction: A Powerful Cancer Fighter**

In one interesting study showing the anticancer effects of maitake MD fraction, mice transplanted with MM-46 carcinoma (breast tumor) were given either 0.5 mg per kilogram of MD fraction by intraperitoneal injection or 1.0 mg per kilogram of MD fraction orally for ten days. After the twentieth day, the solid tumor was removed and weighed. A 75 to 85% tumor regression was observed. The activities of natural killer cells, cytotoxic T cells, macrophages, and delayed-type hypersensitive T cells were increased to 1.23 to 2.5 times by MD fraction. In addition, the production of Interleukin-1 (IL-1) from macrophage and of interleukin-2 (IL-2) from helper T cells were potentiated to 1.7 to 3.4 times normal.

The MaitakeGold 404® extract (MD fraction) had a significantly stronger inhibitory effect on tumor growth than that of the group given the D fraction previously formulated by Dr. Nanba. And as expected, the MaitakeGold 404® extract exhibited greater immune-enhancing activity than the D fraction. Table 5.1 below summarizes the effects on two key components of the immune system.

**Human Studies with Maitake MD Fraction**

Since MD fraction demonstrated beneficial effects against cancer in animals, a non-randomized clinical trial using MD fraction and maitake tablets (tablets contain whole herb maitake rather than the distilled fraction) was conducted to investigate a similar effectiveness with advanced cancer patients.

A total of 33 cancer patients in stages II, III, and IV, ages 33 to 68, participated in this trial; data was collected under the cooperation of their medical doctors in Japan. Patients were given either MD fraction with tablets only, or MD fraction and tablets in addition to chemotherapy. Cancer regression or significant symptom improvement was observed in eleven out of sixteen breast cancer patients, seven out of twelve liver cancer patients, and five out of eight lung cancer patients.

Dr. Nanba states that “These small and non-random trials indicated to us that maitake MD fraction has the ability to suppress cancers of the lung, liver, and breast. Though the data is preliminary, the results of limited clinical studies based on MD fraction suggest the potential of healing and preventing cancer.”

**Table 5.1. Effects on Macrophages and Killer T Cells**

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<thead>
<tr>
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<th>Macrophages</th>
<th>Killer T Cells</th>
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<tbody>
<tr>
<td>Control group</td>
<td>100%</td>
<td>100% (given physiological saline)</td>
</tr>
<tr>
<td>Group given substance A</td>
<td>157.2%</td>
<td>233.7% (D fraction extract)</td>
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<tr>
<td>Group given substance B</td>
<td>203.5%</td>
<td>284.5% (MaitakeGold 404®)</td>
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MaitakeGold 404® appears to be most effective against breast, prostate, liver, and lung cancers. To date, it has been less effective against bone, blood, and brain cancers.

**Recommended Dosage of MaitakeGold404®**

MaitakeGold 404® is available in both liquid and capsule form. The recommended dosage is 0.5 to 1 mg of MD fraction per kilogram of body weight per day. This level represents the therapeutic dosage recommended for people with cancer or who need substantial immune support (for example, those fighting infection). For maintenance or general support, the recommended dosage is 5-15 mg of the MD fraction daily. For best results, take MaitakeGold 404® twenty minutes before meals or on an empty stomach.

**Safety**

MaitakeGold 404® extract is produced using a special strain of organic maitake mushroom and is extracted without the use of harsh solvents such as acetone, methane, or hexane. It also contains no preservatives, alcohol, yeast, sugar, animal products, or artificial colors or flavors. It has a remarkable safety record with data showing it to be nontoxic. In a small percentage of cases, it may cause loose stools that can be alleviated by cutting down on the dosage.

It can be used by children with a reduced dosage (half to quarter adult dose) with medical supervision.

People who have had organ transplants and are on immunosuppressive medications should not use this product without the consent of their supervising physician.

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