

# *An Ancient Chinese Secret Promotes Longevity and Endurance*

Chinese medicine is well-known for items we in the west would consider bizarre. Cordyceps (*Cordyceps sinensis* (Berk.) Sacc.) can be counted among them. Yet it is also one of the most valued medicinal fungi in all of Chinese medicine and among the most potent. Long esteemed as a medicinal tonic used to promote longevity and endurance, the ancients claimed that the “qualities” of cordyceps were like those of ginseng and that 0.85 grams were eaten cooked in a duck, the benefits were equal to taking a 50 gram dose of ginseng. Today, cordyceps is cooked with chicken and with pork and is no less regarded than in ancient times. Pharmacologists have recently learned that cordyceps holds many of the properties indicated in folk medicine.

Cordyceps is widely employed to treat upper respiratory problems, impotence, weakened immune systems, and by athletes to increase endurance. Still other contemporary traditional uses of cordyceps in China include the relief of bronchial inflammation, and the treatment of chronic bronchitis, pneumonia, pulmonary emphysema and tuberculosis. To relieve exhaustion or tiredness, debility following illness, anemia, night sweats and cough, cordyceps is traditionally taken twice a day in the form of a simmered decoction using 3 to 9 grams of the dried fungus. Cordyceps has a flavor reminiscent of

licorice and is highly regarded for restoring vitality in convalescents and as a tonic for the kidneys.

#### COLLECTION AND HABITAT

Commonly known in China as *dong zhong chang cao* (winter worm, summer grass), or “caterpillar fungus,” cordyceps is found in the highland regions of Szechwan, Qinghai and other provinces at locations above 11,000 feet. A blade-like growth develops after fungal infestation of dead caterpillar larva in summer. Cordyceps is collected in June, July, and in the autumn when the fruit-body is seen protruding from the ground of treed slopes where there is decaying leaf cover, often beneath trees in loose soil, or in pastures. In the province of Szechwan, cordyceps is more easily harvested at elevations of 9800 feet on mountain tops before the snow melts at summer solstice. The dark brown blade-like growths are more easily spotted against the white cover of snow. Cordyceps is then cleaned and dried in the sun.

Cordyceps is parasitic on the larva of various types of moths, but especially the bat moth (*Hepialus amoricanus* Ober.). Bundles of the caterpillars with the blade-like fungal growth protruding from their heads are sold in the markets wrapped in bright red thread. At one time only the emperor and the upper classes could afford

(Photo courtesy of North American Reishi)



## Additional Health Benefits for the "Fermented Worm"

by Robert Kay

Cordyceps is traditionally sold as "fermented worm." But now, there is also high quality concentrated mycelial extract that has been grown under aseptic conditions in the U.S. Special cultures of cordyceps are carefully harvested and gathered by very knowledgeable mycologist from 15,000 foot mountain peaks of Nepal, brought back to the U.S. and grown in special fermenters on a base of sterile rice and produce a remarkably pure product. This is a very expensive way to gather a wild fungus, but the effort is well worth the benefit. The edible fungi *Cordyceps sinensis* contains many biochemicals which contribute to its adaptogenic activity. A precise description of how these phytonutrients promote overall health and ergogenesis remains to be published in the scientific literature.

One consistent finding in the literature is the significant amount of adenosine, a nucleic acid which can be used in the formation of nucleosides in cordyceps or in human cells. It may contribute to the formation of Adenosine Tri Phosphate (ATP), an idea supported by animal research which demonstrated a higher ratio of ATP to inorganic phosphate in mice livers after supplementation with cordyceps, hence more high energy compounds to use for work. Usage with athletes has prompted some manufacturers of dietary

supplements to begin designing controlled studies to demonstrate the performance enhancing effect of cordyceps. Athletes with more high energy compounds in the muscle tissues may have more endurance and stamina.

Users of ginseng have for some time extolled the benefits of that adaptogenic herb for many uses. But, ginseng has mild, restorative ergogenic properties. Those looking for a kick or significant boost of energy may enjoy using cordyceps as it has a more pronounced action. The literature reveals that cordyceps does enhance epinephrine (adrenaline), yet it does not seem to contain significant amounts of alkaloids, like ephedrine (found in ma huang/ephedra).

Cordyceps may be the ideal replacement for ephedra, by providing an energizing effect without the uncomfortable side-effects. Unlike ma huang, cordyceps has true rejuvenative effects. It is far more than just a hormone-like stimulant. The dried powdered culture is now available in the U.S. as a raw material and as a dietary supplement. Experts are currently being consulted by suppliers of cordyceps to answer these questions regarding the alkaloids or related substances in the mushroom that impart its very noticeable effects.

the wild fungus, which is still rare and expensive. When collected, the whole caterpillar body is composed of mycelium, which is the vegetative body of the fungus. All that remains of the caterpillar is the form and outer skin. Owing to the scarcity of cordyceps in the wilds and increasing domestic medical demands in China, during the 1980's methods of cultivating the mycelial stage were developed.

### A RESPIRATORY TONIC

Tests have shown the mycelial form of cordyceps is just as potent as in some cases more potent than the wild, caterpillar-body form. At the famous Meiji Institute of Health Science in Odawara, Japan, researchers found that an extract of the fungus inhibited tracheal muscle contractions and relaxed the airways of rats. An extract of the mycelia showed six times the potency of the wild fungus. It was concluded that cordyceps can facilitate an increase in ventilation during exercise and that the relaxing effect of the extract on the aorta might also prevent blood pressure from increasing.

The use of cordyceps by China's Olympic athletes to increase endurance may owe in part to this relaxing effect on the airways. As reported by *Newsweek* (Septem-

ber 27, 1993), when China's Olympic women's running team broke not one but three record distances at the World Outdoor Track and Field Championships in Germany in August 1993, rumors began to circulate of "drug" use. Gold medals were awarded to China's runners for the 10,000, 3,000 and 1,500 meter competitions. Weeks later at the National Games in China in October 1993, the same runners laid to rest another three world records, in the course shaving 42 seconds from the 10,000 meter event,

The question raised by officials in Germany is how could they break so many records in such a short time without taking drugs? Their coach insisted that drugs had nothing to do with it. The running team did recruit sports medicine experts from East Germany and they did take a special diet consisting of herbs and a potion made from cordyceps. But the head of the international governing body that polices drug violations for track teams could see no evidence of banned substance use. The coach of the Chinese women's Olympic running team insisted that the secret of their success was cordyceps, and that he expected his team would perform even better at the 1996 Olympics.

The effects of cordyceps on the airways-lessening their resistance to relaxing and opening-could also help to explain the traditional use of this medicinal plant in treating

various diseases of the upper respiratory tract, such as pneumonia, chronic bronchitis, pulmonary emphysema, and tuberculosis. And because cordyceps is regarded in Chinese medicine as an anti-asthmatic, an expectorant and as a cough suppressant, it could become an important ingredient in herbal cough drops and cough syrups.

#### PROTECTING THE KIDNEY

Cordyceps is traditionally classified as a kidney tonic in China and it has shown evidence of being just that. In rats subjected to kidney toxicity by aminoglycoside antibiotics, cordyceps protected the animals. This discovery was followed by a double blind, placebo-controlled trial in 52 patients at Jinling Hospital in Nanjing, China. The patients were hospitalized for febrile diseases or respiratory infections, had not suffered from kidney disease in the past, and their kidney function was normal.

After random division of the patients into two groups, one group received cordyceps orally and the other received a placebo. Both groups were administered aminoglycosides intramuscularly (gentamicin in younger patients and amikacin in older ones). Tests showed that compared to the placebo group, the group on cordyceps had been protected from kidney toxicity. Those on the placebo had developed greatly elevated signs of kidney toxicity, with readings close to double those of the cordyceps group.

#### POTENTIATING THE IMMUNE SYSTEM

Cordyceps has been the subject of many studies in immunostimulation and has shown potent effects. The active constituents are water-soluble polysaccharides. Cordyceps stimulates various cells of the immune system, including natural killer cells, macrophages, interleukin 1, Gamma-interferon, immunoglobulins M and G, leukocytes and helper T cells (CD4 lymphocytes).

A study in the ability of cordyceps to stimulate natural killer cell activity was conducted by Hunan Medical University in 1992. Researchers found definite activation of NK cells in cell cultures and in animals and significant antitumor activity. Cordyceps caused significant increases in NK cell activity in the lungs of mice and in mice with melanoma of the lungs.

The findings were enough for them to conclude that cordyceps could be used to potentiate the immune systems of cancer patients and of patients with immune deficiencies. Since low NK cell activity has been consistently found in patients with chronic fatigue syndrome, cordyceps may have clinical merit in this disease, too.

#### LOWERING HIGH CHOLESTEROL

The mycelial extract was tested for clinical benefits to patients with high cholesterol in a multi-center, double blind, placebo-controlled trial with 245 patients by Beijing Medical University in 1990. The dosage used was 330 mg, three times daily for two months. In the end, the average increase in high density lipoprotein (HDL), which is the good cholesterol in our blood stream, was significantly higher in those on cordyceps than in those on the placebo. In 76.2% of those receiving the mycelial extract, HDL cholesterol had increased by an average of 27.19%. Total cholesterol was lowered in 61.2% of the treatment group and only in 28.8% of the placebo group. The average drop in cholesterol was 17.5% versus 1.17% in the placebo group. These statistically significant results with such a time-honored, nontoxic food are a further testament to the legacy of cordyceps as a traditional Chinese longevity agent.

#### A TRADITIONAL TREATMENT FOR IMPOTENCE

In Chinese medicine, cordyceps has a long history of use in replenishing sperm and relieving sexual impotence. Today the fungus is also taken by women who have been unable to conceive. A placebo-controlled clinical study of the fungus in the treatment of impotence was reported by investigators at the Third Affiliated Hospital of Beijing Medical College in 1985.

Patients diagnosed with "sexual hypofunction" received a placebo, the mycelial extract or the wild fungus at a dosage of 330 mg, three times a day for 40 days. Those on the wild cordyceps showed improved or resumed sexual activity in 23.68% of cases.

Those on the mycelial extract showed resumed normal sexual activity in 28.93% of cases and improved sexual activity in another 35.22% of cases, for a total "effective" rate of 64.15%. Finally, in 31.57% of those who received the placebo, sexual activity improved or was restored. Naturally, further clinical trials will be required to confirm these findings.

As to what might cause sexual activity to be restored by cordyceps, recent animal studies in Japan have shown that the mycelial extract causes the smooth muscles of the *corpus cavernosum* of the penis to relax, which would allow blood to enter to create an erection as the blood becomes trapped. The wild cordyceps also showed this effect, but the mycelial extract was about twice as active. ž

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