GARLIC

Nature's Amazing Nutritional and Medicinal Wonder Food

Woodland Publishing, Inc.
Pleasant Grove, UT

Woodland Publishing Inc.
P.O. Box 160
Pleasant Grove, UT 84062

fied medical care.

TABLE OF CONTENTS

GARLIC
- Common Names 5
- Plant Parts 5
- Active Compounds 5
- Pharmacology 5
- Vitamin and Mineral Content 6
- Character 6
- Body Systems Targeted 6

HERBAL FORMS 6

HISTORY 8

FUNCTIONS 10
- Garlic and Cardiovascular Health 11
- Garlic and Cholesterol Levels 12
- High Blood Pressure and Garlic Therapy 14
- Garlic as a Natural Blood Thinner 15
- Garlic: A Natural Immunity Booster 16
- Nature's Antibiotic 17
- Yeast Infections and Garlic 21
- Cancer Treatment/Prevention with Garlic 22
- Stomach Cancer, Geography and Garlic 24
- Garlic as an Antioxidant 25
- Garlic as a Powerful Detoxifier 27

SUMMARY 27

SPECIFIC ACTIONS ASSOCIATED WITH GARLIC 28

COMBINATIONS THAT ENHANCE GARLIC 29

PRIMARY APPLICATIONS OF GARLIC

30
SECONDARY APPLICATIONS OF GARLIC 30
ENDNOTES 31

GARLIC

(allium sativum)

C*ommon Names:* Stinking Rose, Poor Man's Treacle

Plant Parts: bulb

Active Compounds: Garlic contains more than 200 chemical compounds. Some of its more important ones include: volatile oil with sulphur-containing compounds: (allicin, alliin, and ajoene), and enzymes: (allinase, peroxidase and myrosinase). Allicin is what gives garlic its antibiotic properties and is responsible for its strong odor. Ajoene contributes to the anticoagulant action of garlic. Garlic also contains citral, geraniol, linalool, A-phellandrene and B phellandrene. The allyl contained in garlic is also found in several members of the onion family and is considered a very valuable therapeutic compound.

Pharmacology: The allicins contained in garlic have a fibrinolytic activity which reduces platelet aggregation by inhibiting prostaglandin E2. Allivium sativum has also exerted some effect on glucose tolerance for both hypo-and hyperglycemia by reducing insulin require-ments to control blood sugar. The compounds contained in garlic have also demonstrated their ability to lower total serum cholesterol and triglyceride levels while elevating HDL levels. LDL synthesis is suppressed by garlic. Garlic allicins have also acted as a larvacide and bacteriostat, active against gram-positive or gram-negative microorganisms. In addition, the compounds can destroy certain fungi such as Candida albicans. Several other microbes are effected by garlic, including some viruses. Most researchers agree that the sulfur containing compounds of garlic, especially allicin, alliin, cy-croalliin, and

diallyldisulphide are the most biochemically active. In addition, certain unidentified substances of garlic will probably emerge as other therapeutic agents.

(*Note:* Before a bulb of garlic is crushed or chopped, it contains relatively few medically active compounds. Once it is cut, however, chemical reactions take place which create dozens of new compounds.)

Vitamin and Mineral Content: B-vitamins especially B-1, vitamin C, vitamin A, flavonoids, ascorbic acid, phosphorous, potassium, sulphur, selenium, calcium, magnesium, germanium, sodium, iron, manganese and trace iodine. Seventeen amino acids are found in garlic, including eight essential ones.

Character: antibiotic, antihistamine, anticoagulant, expectorant, antibacterial, antiparasitic, alterative, diaphoretic, diuretic, expectorant, stimulant, antispasmodic, promotes sweating, lowers blood sugar and blood cholesterol levels, lowers blood pressure

Body Systems Targeted: respiratory, cardiovascular, digestive, and nervous systems

HERBAL FORMS

Fresh Rub: A fresh clove of garlic can be used directly on warts and verrucae. When added to the diet, it works as a prophylactic against infection, helps to reduce high blood cholesterol and improves the cardiovascular system. Eating garlic regularly can also help to lower blood sugar levels.

Juice: Garlic juice can be taken for digestive disorders, infectious diseases and for atherosclerosis (hardening of the arteries).

Capsules: Powdered garlic can be taken in capsules and can be purchased in deodorized form. Garlic capsules are a convenient way to supplement the diet with garlic and are good for heart disease, high blood pressure and to fight infections of any kind.

Pearls: Pearls are capsulized garlic oil which have been deodorized

and are sometimes used as an alternative to the capsules.

(Note: Garlic pearls which have been deodorized are sometimes less potent in their biochemical action. Garlic's strong, pungent odor compounds are excreted through the lungs and the skin. Eating fresh parsley and lemon juice can help to neutralize garlic odor on the breath.)

Maceration: Garlic cloves can be steeped in water overnight and taken as a treatment for intestinal parasites.

Aged Oil: Considered by some to be a superior form of garlic.

Storage: Fresh garlic can be stored in a cool, dry, dark place. Garlic extracts and oils should be kept in dark bottles and can be refrigerated.

Regulatory Status

US:	generally recognized as sage
UK:	general sales list
Canada:	over-the-counter drug status
France:	traditional medicinal use
Germany:	commission E approved as over-the-counter drug

Recommended Usage: Garlic pills and extracts should be taken as recommend on their labels. If using garlic in cooked form, it can be eaten abundantly. Raw garlic is stronger and should not be eaten indiscriminately as gastric upset might occur. Capsules and pills are best taken with meals.

Safety: Garlic is considered safe when taken in reasonable amounts however it is very heating and when ingested in excess can irritate the stomach. Taken in therapeutic doses during pregnancy or while nursing may cause some gastric upset. Placing fresh, raw garlic or garlic oil directly on the skin may also cause irritation or contact dermatitis. When using garlic externally, apply a layer of olive oil to the skin first.

Very high dosages of garlic tincture have been known to cause leukocytosis. Garlic does not have to be consumed raw to be effective. Moreover, the typical odor of garlic does not always

have to be present in order for it to still posses health benefits. If you experience side effects such as a burning sensation when urinating, heartburn, flatulence or belching, you may want to use a processed garlic extract. To avoid garlic breath, deodorized forms of garlic are available. If taken properly, the safety and efficacy of garlic has been well established.

HISTORY

For thousands of years amazing magical and medicinal powers have been attributed to garlic. Prized as a legendary protectant against vampires in Transylvania, it has also been used to enhance sexual prowess and fight off infections. Referred to as "the stinking rose," it is mentioned in *Bible,* the *Talmud,* and in the *Odyssey* by Homer as well. The Egyptians looked to garlic as a tonic which boosted physical strength and consumed it while building the pyramids. The Greeks utilized its laxative properties, and the Chinese prescribed it for high blood pressure. Vikings and Phoenicians alike extolled the virtues of garlic and used it both for flavoring foods and treating disease.

Garlic is a hardy, perennial bulb which is native to the Mediterranean regions of Africa and Europe. Along with onions, leeks, chives and shallots, garlic is a member of the lily family. The botanical name for garlic, *allium sativum* may have been derived from the celtic word *all* which refers to "pungent." The edible portion of the garlic plant grows underground and consists of a cloved bulb.

Hippocrates believed that garlic could treat uterine cancer and Native Americans used it for stomach cancer. During the Bubonic Plague years in Europe, garlic was used to boost immunity against the infectious organism responsible for so many deaths. Several accounts relate that survivors of the plague were frequently those who had routinely ingested large amounts of garlic. A sixteenth-century herbalist writes, referring to garlic, "The virtue of

this herb is thus. It will unbind all wicked winds within a man's body."[1]

During the eighteenth century, Russians utilized garlic to treat influenza. Eventually, garlic would become known as "Russian penicillin." American colonists regarded garlic for its ability to kill parasites.

In the nineteenth century, Louis Pasteur finally proved scientifically that garlic contains antibiotic properties. His discovery led to the initiation of hundreds of studies which have substantiated his findings. What was thought to be nothing more than a culinary ingredient has medicinal value. Garlic can effectively kill bacteria, fungi, viruses and parasites. In the late nineteenth century, garlic was routinely used by physicians as an effective treatment for typhus, cholera and whooping cough. It was highly recommended by medical practitioners and considered as staple treatment for infection.

Albert Schweitzer used garlic for treating amebic dysentery in Africa. Early in this century, tuberculosis was treated with garlic and it was also used as an antibiotic/antiseptic for wounds during World War II. American and European doctors alike noted a remarkable high cure rate in tuberculosis patients treated with garlic.[2] Septic poisoning and gangrene, which can so quickly develop in battlefield wounds were prevented to a significant degree by using garlic.

During the 1950's Chinese scientists used garlic to successfully treat influenza. Subsequently, western studies found that garlic was an effective treatment for the common cold.

Today the widespread use of antibiotics have relegated garlic to the back burner of medicinal therapies for infection. The discovery of penicillin resulted in classifying garlic as nothing more than a folk remedy. Unfortunately, for several decades its medicinal potential was no longer taken seriously by scientists. Over the last decade, scientific interest in garlic has dramatically escalated. In 1990, the First World Congress on the Health Significance of garlic and Garlic Constituents was held in Washington D.C.

Herbalists have always considered garlic as an effective treatment and preventative agent against colds, flu and other infectious diseases. The present focus on garlic as a medicinal agent promises to support the notion that garlic should be utilized by medical practitioners much more than it currently is.

Recently, medical research has focused on garlic's potential value in treating cardiovascular disorders and as an anti-cancer agent. This renewed interest in garlic has contributed to the development of the "Designer Foods Program" which is sponsored by the National Cancer Institute.[3] This agency investigates foods that may be effective cancer preventatives. Garlic is one of those foods which may have profound cancer prevention potential.

FUNCTIONS

Garlic can rightfully be called one of nature's wonders. It can inhibit and kill bacteria, fungi, parasites, lower blood pressure, blood cholesterol and blood sugar, prevent blood clotting, protect the liver and contains anti-tumor properties. If that wasn't impressive enough, garlic can also boost the immune system to fight off potential disease and maintain health.

Garlic has the ability to stimulate the lymphatic system which expedites the removal of waste from the body. It is considered an effective antioxidant and can help protect cells against free radical damage. In addition, it nourishes and supports the heart, stomach, circulation and the lungs. Current research suggests that garlic may help prevent some forms of cancer, heart disease, strokes and viral infections.

Garlic alone can provide us with over two hundred unusual chemicals that have the capability of protecting the human body from a wide variety of diseases. The sulphur containing compounds found in garlic afford the human body with protection by stimulating the production of certain beneficial enzymes.

Most experts agree that garlic does not have to be eaten in its

raw form to be effective. Cooked garlic or various aged extracts and oils can in some cases provide better protection against free radicals and infection than raw garlic. In countries like Germany and Japan, it is customary for large segments of the population to take a garlic supplement on a daily basis.

GARLIC AND CARDIOVASCULAR HEALTH

Recent research has supported the fact that garlic shows excellent potential in the treatment of cardiovascular diseases. Disorders of the heart and the circulatory system claim more lives than any other disease. It is the obstruction or clogging of the coronary arteries which causes more deaths that any other factor. The arteries, which supply the heart with blood and oxygen, become increasingly narrower as plaque builds up over time. When blood supply becomes so restricted that a certain portion of the heart is deprived of oxygen, a heart attack occurs.

The two greatest predictors of heart disease are high blood pressure and high blood serum cholesterol levels. Both of these determinants are directly impacted by the therapeutic action of Garlic. What is particularly relevant about the role of Garlic in coronary heart disease is that several studies done on rabbits found that even pre-existing atherosclerotic deposits and lesions could actually be reversed if garlic was consistently consumed.[4]

Granted, the above study has not been performed on humans, however, its implications are extremely significant. It is important to remember that it is not always what we are eating that causes heart disease, but what we are not eating. Studies like the one just described suggest that even if our diets were high in cholesterol, adding chemical compounds like the ones found in garlic may keep us from developing cardiovascular disease. This might explain why some cultural groups which consume high fat diets do not suffer the coronary consequences so typical of our population.

What is particularly exciting about the potential of garlic for anyone suffering from heart disease is that it can help reverse the disease and substantially reduce the risk of a second heart attack. The longer garlic is used, the better its results are. For example; people who have heart disease showed more improvement after the third year of garlic therapy than before. A possible explanation for this is that using garlic consistently over time progressively reverses hardening of the arteries, therefore the longer the garlic usage, the less the risk of heart attack.[5]

The *New York Times* ran an article on garlic in their September 4, 1990 edition. Concerning heart disease and garlic, it stated:

> "...most exciting to those attending the conference, which was co-sponsored by Pennsylvania State and the Federal Department of Agriculture, were the results of a three year study in India among 432 coronary patients who had already suffered one heart attack. The patients were randomly divid ed into two groups, with one group receiving daily supple ments of garlic juice in milk. Those who took the garlic sup plements suffered fewer additional heart attacks, had lower blood pressure and serum cholesterol levels and were less likely to die during the study. After three years, nearly twice as many patients had died in the group not taking garlic . . . Patients who drank the garlic supplement were more likely to report such subjective benefits as an increase in vigor, energy and sexual desire, improvements in exercise tolerance, and a decrease in joint pains and asthmatic tendencies."

GARLIC AND CHOLESTEROL LEVELS

Several controlled studies have conclusively proven Garlic's ability to lower blood serum cholesterol levels.[6] Dozens of these studies conducted throughout the world have compared high fat diets with garlic and without and their resulting cholesterol counts. When

Garlic is consistently consumed, the lowest cholesterol levels are obtained.[7]

Apparently, the allicin compounds in garlic help to block the creation of cholesterol. Consequently, serum-triglycerides and beta-lipoprotein levels were lowered while HDL levels (good cholesterol) were raised. The way in which garlic accomplished this specific action is not totally understood. What is known is that the presence of Garlic provides a simple restriction in the rise of blood cholesterol and lipid levels.

For anyone with a tendency to develop atherosclerosis, these findings are highly significant. When administered in therapeutic dosages, garlic protected the arteries against atherosclerotic lesions. The implications of studies such as this one are that ingesting garlic on a regular basis may have significant value for anyone suffering from heart disease due to hardening of the arteries.

Garlic clearly suppresses cholesterol synthesis in the liver by lowering total serum cholesterol. It appears to accomplish this by inhibiting the synthesis of harmful LDL cholesterol which boosts the amount of beneficial HDL cholesterol in the blood.

An added bonus of garlic is that some of its chemical components also keep the liver from producing its own cholesterol.[8] Laboratory rats whose diets were supple-mented with garlic not only had fewer lipids in their blood and tissue samples, but less cholesterol and triglycerides in their livers as well.

Interestingly, the sugar factor plays a role in cholesterol production and garlic can also be of benefit here. Excess sugar is metabolized into materials which are required for the making of cholesterol and other fats. If the diet is high in sugar, triglycerides levels can rise. Tests have shown that when diets high in fat and sugar were supplemented with garlic, the expected rise in blood lipids did not occur.[9]

Apparently, in some of these tests, aged Garlic extract was the most effective form. Interestingly, in some studies, blood lipids initially rose after taking garlic and then declined. It is believed that because garlic removed fats that were deposited in the tissues into the bloodstream, lipid levels rose temporarily, however, the garlic also

helped to metabolize those fats and excrete them from the body.[10]

Extensive data strongly suggests that garlic is of great value in both the prevention and treatment of cardiovascular disease which is a result of arterial fatty deposits. Using garlic can decrease the phospholipid content of the blood even when the diet is high in saturated fat. This particular action is nothing less than extraordinary.

Garlic's ability to affect a significant reduction in cholesterol appears to be dose-dependent. In other words, the more garlic consumed, the greater the results. Epidemiological studies support this fact and have shown an inverse correlation between cardiovascular disease and garlic consumption in various populations worldwide.[11]

HIGH BLOOD PRESSURE AND GARLIC THERAPY

Garlic has been used for generations in China and Japan for as a traditional medicine for hypertension. Even today, it continues to be a popular remedy for a disease that has become an epidemic in the western world. Taking a daily dose of garlic can result in a 12 to 30 mmHg reduction is systolic blood pressure and a 7 to 20 mmHg reduction in diastolic pressure in people who suffer from essential hypertension.[12]

One scientific study revealed that 40 out of 100 patients with high blood pressure experienced a reduction of 20 mmHg or more after a week of garlic treatment.[13] Apparently, rabbits and humans who have been tested with garlic have demonstrated a rapid and continued decrease in blood pressure. One reason for this is that garlic seems to dilate blood vessel walls.[14] It is the methyl allyl trisulfide contained in garlic which creates this action.

Evidently, the effectiveness of using garlic for high blood pressure is dependent to some extent on the type of garlic used. Bulgarian studies suggested that aged Garlic extracts were more effective although this view has been subject to debate. Most practitioners who use garlic for their hypertensive patients recommended

a high dosages initially.

In 1992, an article in *Planta Medica*, a German scientific journal, suggested that gamma-glutamyl-S-allyl-cysteine, a peptide found in Garlic, inhibits a certain enzyme which is involved in the conversion of certain hormones that actually regulate blood pressure. Angiotensin I does not raise blood pressure, however, Angiotensin II can. The peptide found in garlic inhibited the enzyme that changes Angiotensin I into Angiotensin II.[15] Consequently, blood pressure levels dropped.

In addition to the actions discussed above, the ajoene compounds in garlic also help to prevent high blood pressure by inhibiting the tendency of blood cells to adhere together and create clots. Garlic oil can increase the breakdown of fibrin by over 100 percent in humans.[16] When the blood is discouraged from clotting, blood flow is not restricted, therefore, blood pressure does not rise.

Some people who have been on hypertensive drugs have gradually been able to wean themselves off using garlic. If you decide to use garlic for high blood pressure, make sure you check with your doctor and do not abruptly stop taking your medication.

(Note: People who have abnormally low blood pressure need not avoid eating garlic. There is evidence to suggest that hypotension benefits from the therapeutic effects of garlic as well as hypertension. Considering these findings, it would seem that garlic acts to normalize blood pressure whether it be high or low, an action which prescription drugs cannot accomplish.)

GARLIC AS A NATURAL BLOOD THINNER

Blood clots pose a significant threat to one's health and longevity and substantially raise the risk of heart attack or stroke. Blood clots consist of platelets and fibrin. The amount of fibrin in the body is believed to be significantly related to heart attack or

stroke risk. In fact, new medical tests are currently being developed to test more carefully for fibrinogen levels in the blood as a predictor for heart attacks and stroke.

The chemical constituents of garlic can actually reduce fibrin formation and help to decrease fibrin that already exists in the blood. Some researchers have even gone as far as to state that Garlic is more effective at preventing blood clots than aspirin therapy.[17]

Ajoene, a sulfur compound contained in garlic seems to be responsible for its anti-clotting effect. Because ajoene is only viable at room temperature or above, it is not present in raw or freeze-dried garlic. It is believed that adding garlic to the diet can help to increase the breakdown of fibrin from 24 to 130 percent in people who have cardiovascular disease.[18]

Researchers reported at the First World Congress on garlic that ajoene is such a powerful anti-clotting agent that may prove valuable in cardiac surgeries, including balloon angioplasty, in which blood vessels are artificially dilated to facilitate better blood flow.[19]

Europeans routinely used garlic as a natural blood thinner which has none of the side-effects associated with synthetic drugs. It should be noted, however, that anyone who suffers form a hemorrhagic disorder (bleeding) should not take commercial garlic products which contain significant amounts of ajoene.

GARLIC: A NATURAL IMMUNITY BOOSTER

With the arrival of new and frightening viral diseases like AIDS and flesh eating bacteria, boosting immunity is receiving new attention. Because these types of diseases have no effective cures or treatments, strengthening the body's ability to fight off infection has become even more important.

Garlic has an abundance of sulphur containing amino acids and other compounds that seem to initiate increased activity in the

immune system. For example, macrophages, which kill invading pathogens are stimulated by the presence of garlic.[20]

The Journal of the American Medical Association states, "it [Garlic] may become known as one of the grand conductors of the body's immune symphony,"[21]

Several studies have shown that garlic stimulates immune function by making macrophage or killer cells more active. In so doing, garlic can prevent the onset of colds and fevers by increasing resistance to infection and to stress. It is common knowledge now that stress can compromise immune function. We are constantly assaulted by inadequate nutrition, cigarette smoke, physical injury, mental tension, and chemical pollution. Recently, the notion that vaccinations may also tax the immune system has emerged. In light of the enormous pressure which our immune systems sustain, supplemental nutrients like garlic are clearly needed.

Unfortunately stress, is here to stay and affects us daily through poor diets, environmental pollution and nervous tension. One study from Japan revealed that when mice were exposed to stress, their immunoglobulin production decreased making then more susceptible to infection. When Garlic extract was added to their diets before experiencing stress, their immune systems were protected to some degree.[22]

Another reason why garlic is such a powerful immune system booster is offered by a medical doctor. Concerning garlic, Dr. Robert Atkins, M.D. of New York City has said: "Garlic is an important nutritional food, The most reasonable explanation for its effectiveness [as a contributor of power to the immune system] is that it picks up toxic materials and transports them out of the body."[23]

The food factors contained in garlic also play a role in beefing up the body's defenses against disease. Garlic is full of nutrients including 17 amino acids. Recent studies have found that the changes which occur in the immune system when autoimmune disease is present are the same as those found in malnutrition.[24]

Garlic is one of the best immune system fortifiers available. It furnishes the kind of support that only nature can provide. Its

remarkable content of germanium alone offers excellent immunostimulation. In addition to germanium, Garlic contains thiamine, sulfur, niacin, phosphorous, and selenium. Mother Nature knew what she was doing when designing garlic for human consumption.

NATURE'S ANTIBIOTIC

Russians commonly refer to garlic as "Russian penicillin" and use it extensively in their clinics and hospitals. They do not hesitate to prescribe it in every conceivable form including vaporizing it for inhalation. Medical doctors in Russia routinely advise their people to consume plenty of onions and garlic as a disease preventing measure.

Scientists in Russia and elsewhere have studied the antibiotic properties of garlic. Clinical tests using garlic extracts on infected wounds found that treatment with the phytocides of garlic resulted in an increase of RNA and DNA levels as well as a significant inhibition of bacterial growth. Consequently, the wound healed faster.[25]

In addition to its sulfur-containing compounds, six percent of the dry weight of garlic is made up of specific bioflavonoids known as quercitin and cyanidin. Continually emerging research is finding that these bioflavonoids have tremendous value in the treatment and prevention of diseases and infection.

Indian studies have established that the active factors in garlic including allistatin I and allistatin II are powerful agents against staphylococcus and escherishiacoli (E. coli) bacteria. For this reason, in Russia, garlic is routinely used to treat whooping cough, grippe and a whole host of infectious diseases.

INFECTIONS AND GARLIC

Bacterial Infections

With the advent of modern antibiotic drugs, garlic lost its

status as an effective infection fighter. Unfortunately, Garlic's past track record was diminished by the arrival of new and potent antibiotics like penicillin. Ironically, several years ago, garlic was reported to be more valuable than penicillin when treating throat infections.[26] One reason for this may be that the allicin component of garlic is effective against the streptococci bacteria.

Traditional Oriental medicine utilized garlic in a variety of forms to treat all kinds of infections: garlic juice for typhoid, and meningitis, garlic vapors for whooping cough, garlic suppositories for yeast infections and garlic soup for pneumonia.[27]

According to studies in the *Journal of the National Medical Association*, Garlic has proved its ability to act as a potent antibiotic against various gram-negative, gram-positive and acid fast bacteria.

In view of the fact that garlic has even been shown to be effective against some antibiotic-resistent organisms, it should be utilized more in standard medical treatments. Several medical practitioners have discovered that like throat infections, ear infections also respond nicely to garlic. The great advantage of using garlic over antibiotics is that Garlic will not kill friendly intestinal bacteria or make one more susceptible to future infections. Antibiotics will. In cases where antibiotics are deemed necessary, they should at the very least be supplemented with garlic.

Current research supports the fact that garlic does indeed inhibit bacterial growth.[28] Several strains of Mycobacterium are suppressed by the presence of garlic. For anyone who fights chronic bladder infections, garlic may prove invaluable. It has been shown to inhibit the growth of several organisms associated with urinary tract infections.[29]

Evidence suggests that garlic can effectively treat bacterial ear infections, sore throats, and infected wounds. Several reports have shown that aged garlic extract is particularly effective for the kind of ear infections that children are prone to develop.

(Note: Ingesting raw garlic is not a practical way to utilize its allicin compounds as an effective antibiotic. Too much raw garlic would be

required to be effective.)

Viral Infections

It is common knowledge that as of now, viruses do not respond to antibiotics and are extremely resistent to other forms of treatment. A virus usually has to run its course, as those of us who suffer periodically from colds and flu know all too well. Because viruses are so hardy, it is important to know that garlic possesses antiviral as well as antibacterial properties.

Dr. Andrew Weil M.D. states that the best home remedy he has found for the treatment of colds is to eat several cloves of raw garlic at the first indication that a cold is developing.[30]

Several laboratory tests have shown that garlic is an effectual treatment for both the influenza B virus and herpes simplex virus.[31] Two independent researchers in Japan and Romania have found that garlic is able to protect living organisms form the influenza virus.[32] Chinese scientists have studies the effect of garlic on viral encephalitis for almost 30 years.

Clarissa McCord of Cloverdale, British Columbia used garlic extract to treat a stubborn virus that attacks horses. She relates:

> "A bottle of liquid garlic administered on two successive days to each animal does the job of curing. One of my race hors es developed the virus symptoms and was to be scratched from the racing program scheduled for the following day. I gave one bottle of liquid garlic to the animal and he improved sufficiently to enter the race. He hit the board first, second and third."[33]

In relation to human beings, it would seem that Garlic is especially effective in cases of influenza as both a treatment to shorten the duration of the disease and as a preventative. Again, garlic's ability to stimulate the immune system seems intrinsically linked to its anti-viral action. Whether the infection is bacterial or viral, garlic mobilizes immune function, thereby potentiating the body's ability to defend itself against infectious organisms.

Fungal Infections

Garlic in certain forms is considered a potent antibiotic and can be particularly effective against certain fungal infections. Like viruses, fungal infections are particularly difficult to treat. Traditional medical treatments for fungal infections are usually toxic and can be ineffectual over the long term. To the contrary, garlic has proven itself as an effective anti-fungal agent against candida, aspergillus and cryptococci.

A report from a Chinese medical journal delineates the use of intravenous garlic to treat a potentially fatal and rare fungal infection of the brain called cryptococcal meningitis. In the report, the Chinese compared the effectiveness of the garlic with standard medical treatment which involved a very toxic antibiotic called Amphotericin-B. The study revealed that intravenous garlic was more effective than the drug and was not toxic regardless of its dosage.[34]

One study using liquid garlic extract found that candida colonies were substantially reduced in mice that had been treated with the garlic. This same study also revealed that garlic stimulated phagocytic activity. This implies that infections such as candida may be controlled because garlic stimulates the body's own defenses.

Applied externally, garlic oil can be used to treat ringworm, skin parasites and warts. Lesions that were caused by skin fungi in rabbits and guinea pigs were treated with external applications of garlic extract and began to heal after seven days.[35]

Allicin is primarily a fungistatic substance which can slow or completely stop the proliferation of the microorganisms. As an external treatment, garlic has also been found to effectively treat acne and thrush.

YEAST INFECTIONS AND GARLIC

Garlic has proven over and over that it is an effective anti-fungal agent. For anyone suffering from recurring yeast infections,

garlic should be added to the diet. Its compounds are very active against candida albicans which causes yeast infections. Some studies have shown that garlic is more potent in treating yeast infections than nystatin, gentian violet and six other reputable antifungal agents.[36]

Yeast infections plague millions of Americans and can cause conditions such as thrush, vaginal yeast infections and intestinal yeast disorders. Candida albicans has been linked to a wide variety of symptoms including chronic fatigue, depression, infertility and allergies.

Much of the scientific research done on garlic has centered around its antimicrobial activity, especially against infectious fungi like C. albicans which causes yeast infections. Chicks that were inoculated with the C. albicans organism were cured after ten days of ingesting garlic.[37]

A study reported in Mycologia in 1977 concluded that garlic significantly inhibited all isolates of yeast-like fungi that were tested. Once again, it is important that the allicin component of garlic is present in order to receive the antifungal effect.

Some research has suggested that raw garlic was not effective against yeast infections, while aged extracts were very good. An added bonus of using garlic to treat yeast infections is that no clinical stains of C. albicans have been known to become resistant to garlic therapy.

Because high blood sugar is also related to a higher risk of yeast infections, garlic therapy has an additional advantage. Garlic compounds have demonstrated their ability to lower blood glucose levels which would help to decrease one's risk of developing a yeast infection.

CANCER TREATMENT AND PREVENTION WITH GARLIC

One of the most exciting aspects of the therapeutic value of garlic lies in its potential use as an anti-cancer agent. Several animal

experiments have suggested that Garlic can inhibit or even reverse the growth of certain tumors.

One in three people will develop cancer at some time during their life and one in five will die from it. Cancer ranks second only to heart disease as a leading cause of death in the United States. Projections put cancer as the number one killer of Americans sometime after the year 2000. While cancer research has spent millions of dollars searching for the elusive cure, thousands continue to die from cancer. Garlic has finally caught the attention of cancer research and is currently under scrutiny for its anti-carcinogenic properties.

Several laboratory tests have found that certain enzymes contained in some cancers are totally inhibited by alliinase and other compounds contained in garlic. Several Japanese experiments suggest that injecting garlic into rats with certain types of sarcoma blocked tumor cell reproduction and caused mutations in the cancer cells themselves.[38]

As is the case with other infectious diseases, garlic's role in simulating the body's immune defenses may also be linked to cancer control and prevention. Because garlic helps to mobilize the immune system, carcinogens which may initially begin tumor formation may be attacked and destroyed by heightened immune function.

Because garlic enhances the action of the body's natural killer cells, it boosts their ability to attack tumor cells before cancers can develop. In laboratory tests, the natural killer cells of garlic-eating subjects destroyed 159 percent more tumor cells than those who had not consumed garlic.[39]

> "In animal studies by Weisberger and Pensky of Western Reserve University, as reported in *Science*, mice injected with cancer cells died within 16 days. When cancer cells were treated with Garlic extract and injected into the animals, no deaths occurred for a period of 6 months. In other studies, feeding fresh Garlic to female mice completely inhibited the development of mammary tumors."[40]

Studies in cancer Research in the *Journal of the National Cancer Institute* reveal that stomach cancer risk was significantly reduced with the consumption of allium vegetables including garlic and scallions. The high germanium content of garlic may also play a role in cancer treatment and prevention.

At this writing, continuing research unfolds on garlic and its effect on cancer cells. The National Cancer Institute is planning a study of garlic's role as a cancer-preventing agent. The study was planned after reports indicated that people who live in China and Italy and eat a lot of garlic seem to enjoy a certain degree of protection against stomach cancer.

Dr. William J. Blot of the Institute stated that these people eat a lot of garlic and related vegetable such as scallions and onions, a habit that correlates with a lower incidence of stomach cancer.[41]

STOMACH CANCER, GEOGRAPHY AND GARLIC

Less than five years ago, the New York Times reported:

> "Large differences in cancer rates were seen between regions of high and low consumption of these allium vegetables. Those living in high-consumption areas had less than half the risk of developing stomach cancer as people who lived where little or no garlic-type foods are eaten. And while fre quent consumption of other fresh vegetables and fruits was also linked to a reduced cancer risk, garlic seemed to multi ply the benefit, providing even more protection than would be expected from simply adding on its separate benefits."[42]

No one totally understands garlic's anti-cancer properties. One possible explanation is that garlic has the ability to block nitrosamines which are considered powerful carcinogens in the digestive tract. Clinical studies have suggested that garlic extract is more effective than vitamin C in blocking nitrosamine formation

not only in the laboratory, but in humans as well. Research has clearly shown that garlic can guard living tissue against carcinogens that cause cancer of the breast, esophagus, stomach, colon and rectum. The fact that garlic inhibits tumor growth, blocks the action of cancer-causing substances, and boosts the immune system makes it a valuable cancer preventative.

BLOOD SUGAR AND GARLIC

The allicin compounds of garlic have been found to possess a significant blood sugar lowering action. Clinical studies have suggested that these compounds lower glucose levels by competing with insulin sites in the liver which results in an increase of free insulin.[43] Research has found that animals and humans with diabetes experienced a decline in blood sugar while taking garlic. Interestingly, if blood sugar is normal, the garlic did not promote this lowering effect.

Several animal and human studies have shown that garlic may be a very valuable therapeutic agent for diabetes. Diabetics routinely struggle with high blood sugar readings. Studies in India conducted by medical doctors revealed that garlic is one of the few completely natural and harmless substances which is effective in the treatment of diabetes. Onion and garlic juice were given to rabbits who had been turned into artificial diabetics. Immediately, their blood sugar levels decreased. Some diabetics who find it difficult to stabilize their blood sugars with insulin injections, may want to experiment with garlic.

Apparently, some of the sulfur-containing compounds of garlic have special sugar metabolism regulating capabilities. As mentioned earlier, these factors are desireable in cases of both low and high blood sugar disorders.

GARLIC AS AN ANTIOXIDANT

The term “antioxidant” has become a buzz word over the last decade. Defending ourselves against a wide array of chemicals, heavy metals, pollutants, radiation and poor nutrition has become a vital area of scientific focus and research. Oxidizing agents or free radicals attack our bodies constantly and have the potential to damage our cells, which compresses human tissue.

Substances which have been found to help protect us from the cellular damage caused by free radicals include vitamin C, bioflavonoids, vitamin E, vitamin A, beta carotene and selenium to name a few. Garlic is not usually found on standard antioxidant lists and probably should be.

Garlic has an abundance of sulfhydryl which is an excellent antioxidant. It’s important to know that raw garlic did not demonstrate this ability. In fact, raw garlic actually has some oxidant action, which is not desireable. Garlic can also help to lessen free radical damage because it has the ability to protect against radiation. In this regard, it may significantly decrease our risk of developing certain degenerative diseases such as cancer and premature aging. In addition, anyone undergoing radiation or chemotherapy should supplement their diet with garlic.

“Based on a number of studies conducted by research teams from throughout the world, scientists have concluded that part of the preventive effect of garlic against cancer is due to protection against free radical damage. But that protection extended beyond the mere ability to protect against disease. The ability of garlic to protect against free radical damage may have yet another important benefit to cancer victims: it can, according to several published articles, protect against the damage that results from radiation treatment and chemotherapy commonly given to many cancer patients.” [44]

Garlic also contains a number of amino acids which are required for the formation of an enzymatic antidote to free radical pathology which is created by cigarette smoke and other pollutants. Cysteine, glutamine, isoleucine and methionine found in garlic help to protect the cells from free radical damage.

Garlic works as an antioxidant the same way that onions, and green chilies do. In his book *The Miracle of Garlic*, Paavo Airola states:

> "An Indian study showed that garlic exhibited a high antiox idant property as determined by the peroxide values of the products by the swift stability test. Garlic restrained the development of all characteristic indexes of rancidity (acids, peroxides, iodine no. etc.). Garlic retained its antioxidant property for a half year after harvesting."[45]

Because our food, air, water and environments are heavily contaminated with pollutants of all kind including food additives, preservatives, artificial colorings, flavorings, sweeteners, chemical fertilizers, etc., garlic should become a permanent addition to our nutritional array of supplements.

GARLIC IS A POWERFUL DETOXIFIER

One of the most difficult toxins to neutralize in the body is heavy metal poisoning. Lead, mercury, cadmium, arsenic and copper pollutants threaten our health on a daily basis. Industrial pollution pumps out enormous quantities of lead and mercury, not to mention the contribution of certain paints and amalgam fillings. Fish are frequently contaminated and copper can enter our bodies form metal water pipes commonly installed in our homes and work places.

Treating heavy metal poisoning has involved a process called chelation. Japanese research has discovered, however, that raw garlic extract can effectively protect the body from metal toxicity. Controlled studies performed on both animal and humans concluded that arlic can prevent the toxic effect of heavy metals from damaging and destroying erythrocyte membrane (certain type of blood cell).

> "In another study, conducted in Russia, a drug made from

> Garlic extract was given to workers in industrial plants who were suffering from chronic lead poisoning. The daily doses of Garlic improved the symptoms of chronic lead poisoning and lowered the high porphyrin levels in the urine. The preparation also normalized elevated blood pressure in the majority of workers."[46]

SUMMARY

In 1990, the First World Congress on the Health Significance of Garlic and Garlic Constituents was held in Washington, D.C. Forty-six presentations were heard by fifty scientists on the health benefits of garlic. Topics addressed included garlic's ability to fight infection, especially Candida albicans, and to prevent cardiovascular disease and cancer.

Finally, ancient medicinal practices regarding garlic are being vindicated by twentieth-century scientists who, for a long period of time, literally turned up their noses at the prospect of garlic as a viable therapeutic agent.

Today, both scientific and herbalist tradition support the fact that garlic, in its various forms can provide extraordinary health benefits. Unquestionably, it can significantly reduce the risk of cardiovascular disease and certain kinds of cancer. Taking garlic in certain dosages can help protect human cells from oxidation, free radicals and certain types of radiation. Garlic is an effective immune system booster and has anti-bacterial, anti-viral and anti-fungal properties. Garlic promises to emerge once again, as a powerful medicinal agent which will most certainly impact 21st-century health practices.

SPECIFIC ACTIONS ASSOCIATED WITH GARLIC

- *Antioxidant:* Protects cells against damage by free radicals found

in environmental pollutants including heavy metals. Garlic contains the highest level of the antioxidant selenium, which affords excellent cellular protection.

- *Anti-toxic:* Can be considered a radiation antidote in that it stimulates cellular detoxification.
- *Anti-cancer:* Blocks the ability of carcinogens to mutate healthy cells into malignant ones. In some cases, Garlic can even inhibit the early proliferation of cancerous cells.
- *Decongestant:* Helps to rid the respiratory tract of mucus.
- *Artery Cleanser:* Significantly lowers blood levels of triglycerides which have been associated with an increased risk of heart attack.
- *Anti-artherosclerotic:* Promotes the regression of fatty deposits in blood vessels, a major cause of atherosclerosis, and can even help reverse arterial blockages caused by the collection of plaque.
- *Antibiotic:* Works as an immune system stimulant which helps the body fight bacterial, viral and fungal infections. Enhancing immune defenses may also help the body rid itself of cancerous invaders.
- *Anticoagulant:* Reduces the tendency of the blood to clot and helps to dissolve existing clots. Both of these actions are very significant in reducing the risk of heart attack and stroke.
- *Tonic:* Garlic has a positive effect on the heart, stomach, lungs and spleen.
- *Anti-infection:* Externally, garlic can be used as a drawing poultice.
- *Antiparasitic:* Garlic has traditionally been used in enemas to rid the colon of intestinal parasites.
- *Blood Purifier:* Helps to stimulate the lymphatic system to more efficiently get rid of waste material.
- *Glucose Control:* Garlic has been found to be useful in controlling glucose tolerance and is beneficial for both hypo and hyperglycemia. Anyone with diabetes can benefit from garlic as well.
- *Swelling:* Garlic suppositories have been used to shrink hemorrhoids.
- *Anti-inflammatory:* The anti-inflammatory action of garlic

makes it a valuable treatment for arthritis. Garlic reduces joint swelling and inflammation

- *Antihypertensive:* Garlic has been recognized by the Japanese Food and Drug Administration as an official treatment for high blood pressure.
- Garlic is a "wonder" food that is considered to be one of the most effective natural healing substances in the world.

COMBINATIONS THAT ENHANCE GARLIC

- garlic, capsicum and vitamin C
- garlic, coenzyme Q10, carnitine, selenium and hawthorne berries
- garlic, ginseng, echinacea, and white willow
- garlic, horehound, echinacea, chickweed, mullein and licorice
- garlic, onion, raspberry leaves and licorice

Garlic: Primary Applications

- asthma
- arthritis
- blood pressure
- Candida Albicans
- cancer prevention
- colds
- contagious diseases
- ear infections
- fever
- fungus
- heart disease
- infections (viral, bacterial and fungal)
- liver disorders
- prostate gland
- artherosclerosis
- blood clots
- bronchitis
- cardiovascular disease
- circulation
- colitis
- coughs
- digestion
- flu
- gas
- hypertension
- parasites
- respiratory diseases

- staph and strep infections
- yeast infections

Garlic: Secondary Applications

- acne
- allergies
- arthritis
- diabetes
- diarrhea
- emphysema
- gallbladder
- hypoglycemia
- insomnia
- kidneys
- pneumonia
- rheumatism
- sinus
- ulcers
- warts
- worms

ENDNOTES

[1]Daniel B. Mowrey. *The Scientific Validation of Herbal Medicine.* (New Canaan, Connecticut: Keats Publishing, 1986), 122.

[2]Ibid.

[3]Earl Mindell. *Garlic, The Miracle Nutrient.* (New Canaan, Connecticut: Keats Publishing, 1994), 7.

[4]Ibid., 59.

[5]Ibid., 71.

[6]Korotkov, V.M., "The Action of Garlic Juice on Blood Pressure," *Vrachebnoe Deloebnoe*, 6, 123, 1966. See also: "The Study of the Hypotensive Action of Garlic Extract in Experimental Animals," in the *Journal of the Pakistan Medical Association*, 32 (10), 237-239, 1982.

[7]A. Bordia and H.C. Bansal. "Essential Oil of Garlic in Prevention of

Atherosclerosis." *Lancet,* ii, 1491, 1973.

[8]Mindell, 58. See *The Journal of Nutrition* for entries under the subject of garlic.

[9]Ibid., 59.

[10]Ibid., 62. See also *Nutrition Research* for an article published by Doctor Benjamin Lau of Loma Linda University School of Medicine in California.

[11]Robert H, Garrison Jr., Ma., R.Ph. and Elizabeth Somer, M.A., R.D., *The Nutrition Desk Reference.* (New Canaan, Connecticut: Keats Publishing, 1990), 193.

[12]Ibid., 192.

[13]G. Piotrowski. "L'ail en thrapeutique." Praxis 37, 488-492, 1948.

[14]Ibid.

[15]Mindell, 66.

[16]D.Y. Norwell and R.S. Tarr. "Garlic, Vampires and CHD," *Osteopath Ann.* 1984, 12, 276-80. See also A.K. Bordia, H.K. Josh and Y. K. Sanadhya, "Effect of Garlic OIl on Fibrinolytic Activity in patient with CHD." *Atherosclerosis,* 1977, 28. 155-59.

[17]Mindell, 68.

[18]Garrison, 193.

[19]Mindell, 70.

[20]Ibid., 39.

[21]Ibid.

[22]Ibid., 49.

[23]Morton Walker, D.P.M., *The Healing Powers of Garlic.* (Stanford, Connecticut: A New Way of Life, 1988), 19.

[24]Ibid.

[25]Paavo Airola, Ph.D., *The Miracle of Garlic.* (Phoenix, Arizona: Health Plus Publishers, 1978), 20.

[26]M.N. Fortunatov. "Experimental Use of Phytoncides for Therapeutic and Prophylactic Purpose." *Voprosy pediatri i Okhrany materinstva:* Detstva, 20 (2), 1952, 55-58.

[27]Mindell, 93.

[28]Louise Tenney. *The Encyclopedia of Natural Remedies.* (Pleasant Grove, Utah: Woodland Publishing, 1995), 57.

[29]Murray, 258.

[30]Andrew Weil, M.D., *Natural Health, Natural Medicine.* (Boston: Houghton-Mifflin Company, 1990), 237.

[31]Mindell, 97.

[32]Mowrey, 122.

[33]Walker, 49.