

## **DISEASE PREVENTION SUPPORT FROM HYBRID MEDICINAL MUSHROOMS**

Good health and disease prevention are about providing the body's cells with the essential tools to keep all cellular functions operating efficiently and effectively. This is done by providing the correct biological ratios of essential inorganic and organic chemistry through a comprehensive diet.

Chronic diseases are a major factor in the continuous growth of medical care spending. [1] Healthy People 2010 reported that more than 75% of the \$2 trillion spent annually in US medical care are due to chronic conditions; spending are even higher in proportion for Medicare beneficiaries (aged 65 years and older). [2] Disease prevention can be achieved through good nutrition and exercise. Published reports on the studies show this to be true.

Each cell of the body is composed of approximately 4,000 specific proteins and chemicals. Each cell has literally tens of thousands of chemical interactions (signal transductance) occurring every second. Thermodynamically, these reactions will not occur without specific catalysts. Catalysts lower the starting materials reaction energy threshold. Catalysts (enzymes) are provided from our food source.

Proteins are long molecular chains made from one of the 20 basic building blocks of life, Amino acids. The amino acids in a polymer are connected together by the peptide bonds between the carboxyl and amino groups of adjacent amino acids. The carboxyl group contains 1 carbon and 1 hydrogen atom and 2 oxygen atoms (CO-OH). The amine group contains 1 nitrogen atom attached to 2 hydrogen atoms (H-N-H). [3]

We, as animals, have evolved and adapted in this world over the last 50 million years. Our bodies chemistry set is based upon the food source around us. Each cell of plants and fungus contains an extremely complex mixture of thousands of specific organic molecules, which are presented in the food, in the correct biological ratios. We have evolved with the food, and it is necessary not to deviate too far from the synergy between our "food" source, and our bodies.

As little as two hundred years ago we were an agrarian society. We grew a garden behind the house, we hunted for meat from the local forest, and we scavenged for mushrooms and berries from the forest. Fruits and vegetables are imperative to a healthy diet, but what our modern society does not get is a regular supply of medicinal mushrooms (a class of mushrooms). White and brown button mushrooms (that are sold in the market), are grown because they are easy and cheap to grow. They are not grown for their healthy chemistry, and these mushrooms do not mimic the health benefits found in medicinal mushrooms.

Specifically grown hybrid strains of Medicinal mushrooms are essential to our good health. They provide all the amino acids for proper protein synthesis. They have approximately 2000 enzyme catalysts, which assist in the digestion of our foods in our intestines. They are the only source of L-Ergothioneine, an essential amino acid which is a shuttling molecule used to move polyphenols (anti-oxidants) to points of oxidative stress throughout our cells. These medicinal mushrooms provide very unique tri terpenoids chemistry, which mimics steroids, but are not toxic or dangerous. Other small triterpenoids found in medicinal mushrooms reduce the stress within the protein forming organelles (endoplasmic reticulum), by 60%. The mushrooms provide anti-oxidants, vitamins B and D. Most important, they have very complicated sugar chemistry (beta-glucans),

which plug into the cell's surface receptors causing an up regulation and modulation of the immune system.

Several studies have also shown that beta-glucans from a variety of medicinal mushrooms blunt the glycemic and insulin response. Moreover, beta-1,3-glucans improve the body's immune system defense against foreign invaders by enhancing the ability of macrophages, neutrophils and natural killer cells to respond to and fight a wide range of challenges such as bacteria, viruses, fungi, and parasites. [40]

Our immune system is an extremely large and complex array of organelles, cells and proteins which scavenge invading pathogens like bacteria and viruses. We are constantly bombarded with billions of bacteria and viruses. We would be overcome with infection in two days and would be dead within five days if not for our very powerful defense system.

Cancers are cells of our body. These cells have become corrupt. They become corrupt through many types of stresses placed upon our body's cells. One type of stress is oxidative stress caused by free radical formation in the mitochondria. UV and gamma radiation from the sun destroys cell structure in an indiscriminant way. Another stressor is a lack of proper functional proteins, caused by improper manufacture and folding, and/or a lack of amino acids used to make proteins.

Another stress is DNA fragmentation, caused by radiation and chemical teratogens from our environment, as well as lack of nucleic acids in our cells. There are many other cellular stresses which cause the cell to fail partially or catastrophically. Our only defense against cancer is our powerful immune system. All people on earth have cancer cells in their bodies each and every day. What keeps us from developing and dying from massive amounts of these corrupt cells is a strong immune system. Cancer cells are targeted by our immune system for programmed cell death (apoptosis).

When our immune systems become weak or deficient, cancer cells can mask themselves by utilizing portions of our immune chemistry. Here is how it happens. When we get an infection or a wound, the first defense of the body is an inflammatory response. When this occurs the body rushes white blood cells to the wound. These white blood cells then activate interleukins which call complement proteins to the area.

These specialized proteins signal the cells at the wound site not to die. They signal the cells to reproduce rapidly to heal the wound area, to produce telomerase, a special protein which extends the ends of the DNA strand, so that the cell can replicate many more times than it normally can. These wounded or infected cells reproduce until other chemistry tells them to stop. After about a week the immune system then down regulates the interleukins and complement proteins, causing an anti-inflammatory response. This is the natural process. But when we have a chronic inflammatory condition, this is when a corrupt cell of our body (cancer), has the opportunity to use the inflammatory response to its advantage by growing rapidly, producing tumors, and then migrating to other places in the body to take hold (metastasis). Fortunately for us, many of the wild medicinal mushrooms regrown in sterile clean rooms from the forest contain chemistry which has been shown and is published in Journal articles, to down regulate the pro inflammatory interleukins. These mushrooms produce an anti-inflammatory response. A very common cause of chronic inflammation is gum disease. Another is a chronic inflammation of the colon. By providing mushroom chemistry which is anti-inflammatory, cancer no longer can mask itself from our immune system. Since medicinal mushrooms significantly increase white blood cells, now the immune system has the direction and intensity to seek out and destroy existing cancer cells.

Radiation treatments and Chemotherapy are what is currently the common thing available for cancer treatment. Both of these treatments are nonspecific, and they do collateral damage to cells around the cancer. Both of these

treatments also depress the immune system. With a depressed immune system, bacteria and viruses and new cancer cells proliferate. Then these hazardous drugs do damage to our vital organs like kidneys and liver. And, the effectiveness of chemo therapy is limited. Only a two percent increase in survivability is expected on average. Worsening the situation, biopsies of tumors are taken and tumors are removed surgically. Each time an incision is made, an inflammatory response is created. The cancer cells can then use this inflammatory chemistry to further mask itself from our immune system. Tumor metastasis accounts for 90% of cancer-associated deaths and is almost inaccessible by chemotherapy, surgical operation or radiotherapy. [4]

Screening of small molecule libraries offers the potential to identify compounds that inhibit specific biological processes and, ultimately, to identify macromolecules that are important players in such processes. To date, however, most screens of small molecule libraries have focused on identification of compounds that inhibit known proteins or particular steps in a given process.[5]

Peer reviewed research which is published in scientific journal articles show medicinal mushrooms cause re-growth of liver and kidney tissue. When we provide the body's cells with the essential chemistry tools, the body will heal itself. The chemistry comes from quality foods. Mushrooms unlike drugs do not degrade body organs, but rather cause re-growth of tissue.

Our body's energy source is provided from carbohydrates, fats and proteins. These are broken down in the colon to provide glucose used by the mitochondria. This organelle in each cell of the body then produces Adenosine Triphosphate (ATP), the energy currency of the body. Carbohydrates are complex sugars and have to be broken down by enzymes in our gut to produce small sugars which are then absorbed into our blood. Our modern food manufacturing processes have now created soft drinks. These are nothing more than glucose water with flavor. This glucose is provided in an unnaturally high concentration. Day in and day out of high levels of glucose causes the cells to respond to this stress. It is possible to overwhelm the systems of the body. The body is very adaptive, and responds to chronic large amounts of glucose by down regulating the insulin receptors' sensitivity. Insulin plugs into the receptor, to open the gate so glucose can flow into the cell. With the insulin receptor now desensitized, the glucose is unable to flow into the cell. High concentrations of glucose taken chronically are a major contributor to type II diabetes. The American population drinks unlimited refills of soda pop, available at all the fast food joints.

When the insulin receptor becomes desensitized, the body produces more insulin in the pancreas. This new insulin tries to plug into the cells insulin receptors to let glucose in. But the receptors are already filled with insulin. Now the blood has high blood glucose and high blood insulin levels. The cells sensing that there is not enough ATP being produced feels the body is being starved. So the cells create new protein enzymes to break down muscle tissue to create more blood protein. This protein is then broken down into amino acids; the tissue also produces lipids, cholesterol and carboxylic acids. The Ph of the blood decreases, the blood pressure increases, plaques form on the arteries, because of thick polluted blood. All of the processes within the cells decrease, because there is not enough available ATP, and all the nerves in the body suffer, and then begin to die through neurosis, because glucose is their only organic source which produces ATP in these cells. This leads to loss of sight, memory loss, and poor healing.

The medicinal mushrooms have been shown in peer reviewed Journal Articles to attach to PAMP receptors and increase the AKT proteins within the cells signal transductance mechanism. This then allows glucose to flow freely into each cell. When this occurs, blood pressure begins to decrease, arterial plaques diminish, the pancreas and liver are not over worked, and blood cholesterol levels decrease and the efficiency of all cells in the body improve. All because we have provided the body with the essential tools to heal itself. This chemistry is natural, it is provided at the correct biological ratios, as the body was intended to have. And because the mushrooms have no direct action, but rather communicate through cell receptors, there are absolutely no toxic effects on any body organs. Mushrooms, fruits and vegetables are safe whole foods and provide essential chemistry necessary to your ongoing good health. Good health and disease prevention is done by providing the correct biological ratios of essential inorganic and organic chemistry through a comprehensive diet. Not all mushrooms are created equally, in order to provide the beneficial chemistry without the toxins in soil, water or the air the fungi must be grown in a sterile environment and fed sterile substrates (the food) so you get a totally clean product. Food service mushrooms are exposed to the other fungi that cause candida and it suggested that you cook them before consumption.

### **These Medicinal Mushrooms Do Support Your Immune System**

THE FUNCTIONAL BENEFITS OF MUSHROOMS ON THE HUMAN BIOLOGICAL SYSTEM:

1. Boosting the human's immune system response, increasing neutraphils and natural killer cells (white blood cells).
2. Boosting the body's ability to uptake oxygen and increasing the generation of ATP.
3. Increasing cognitive ability.

Research continues to determine those species of mushrooms that have specific beneficial biochemical properties. The growing of the fungi must be done in a clean room environment just list each research did to get the most beneficial chemistry with no contamination.

THE FUNCTIONAL BENEFITS OF CLEAN MUSHROOMS ON THE HUMAN BIOLOGICAL SYSTEM:

The mushrooms are a class of fungi which possesses a wide variety of functional chemistry. Fungi live via an extra cellular life process. The mushrooms exude protein catalyts which digest the foods around it. The digestion is then transported back into the fungal cell for use. Because of this feeding method, mushrooms possess a large amount of Enzymes.

The mushroom's cellular structure is composed of hundreds of very specific types of complex sugars, called beta-glucans. Along with these long chain sugars, the mushrooms also produce glycol-proteins. Sugar structures attached to a protein stem. Enzymes, beta glucans and glycol-proteins all have very specific shapes which interact with structures that are on the cells membrane. These “sensors / receptors” on the inside and outside of the cells couple with the mushrooms chemistry and cause the body’s cell to produce a multitude of proteins. Each protein reacting with the next, like a relay race with many runners involved. This is a cascade

reaction. These cascade reactions can be used by the cell to communicate within the cell, or between cells in the body. They can cause genes within the DNA to create more proteins for different biological activity, or cause more enzymes to be produced, which assists many more chemicals to be formed.

Cell transductance (communication through these sensors/receptors), can open the cell walls to a flood of calcium ions, or increase the flow of glucose, adrenaline, and insulin across the membrane. These sensors can cause the synthesis of good cholesterol versus bad cholesterol, can cause chemicals to dilate blood vessels, and cause the creation of NO, nitric oxide, as well as produce chemicals to quench free radicals. Because mushrooms have their own life to live, which in many respects is very similar to an animal's cell life.

Remember, fungi breath oxygen and exhale carbon dioxide, just as humans do; the mushroom cell needs and uses the same basic building blocks. Fungi therefore contains all the essential amino acids, nucleotides, transition metals, vitamins, including B12, C, niacin, D, L-ergothioneine and a large contingent of enzymes to make the process work.

The components of mushroom blends, are the very same that our cells need. Fungal metabolites have major immunomodulating effects. They include effects like mitogenicity, and activation of immune effector cells, such as lymphocytes, macrophages, and natural killer cells, resulting in the production of cytokines, including interleukins, tumor necrosis factor alpha, and interferon gamma. One particular effect is the ability to selectively modulate the differentiation capacity of CD4 T cells to mature T helper 1 and or T helper 2.

#### THE OUTCOME OF THE RESEARCH AND EXPERIMENTS:

Proprietary Medicinal Mushroom Blends are available and come from hybrid strains of medicinal mushrooms species from around the world. The species chosen for cultivation were chosen after thorough research from scientific papers and the collaboration with research scientists to determine the best types of mushroom to use from various species. The researchers determined the best growing mediums to use for various hybrid strains of various species of mushrooms, all grown in sterile environments. The outcome of all of this is the commercial growing of a variety of hybrid strains of medicinal mushroom species at sustainable quantities that provide the most nutritious benefit to mammalian chemistry. The products are grown in a sterile clean room and certified organic facility and are certified organic. Hazmat suites are worn, and no one can breathe in the sterile controlled atmosphere in each growing room. This is exactly how each university grows the hybrid strains. The products can be found at [www.mycoldiscovery.com](http://www.mycoldiscovery.com)

#### ISSUES RELEVANT TO COMMERCIAL PRODUCTION

Cultivating medicinal mushroom strains at large scales requires methods to provide consistent, safe, effective and reliable products. The current production methods and standards in the market need upgrading before they can achieve these results. Product quality can also be impacted by the fact that many manufacturers and resellers rely on several sources of mushrooms, and some are of dubious origins. These different sources often show considerable variation with respect to substrates used and manufacturing practices. Unfortunately, the perceived future growth of this market has also resulted in an ever-increasing number of less-reputable companies, and their questionable practices will inevitably lead to more intensive scrutiny of the medicinal

mushroom market as a whole. There is urgency for the medicinal mushroom manufacturing industries to develop and adopt acceptable and reproducible protocols for growing the raw product and for the processing of the final products. Enforcing these standards will ensure high-quality, standardized, and safe products. Such practices are essential for earning and maintaining the public trust, which is vital for securing expanding markets in the future.

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More science about the mechanism in the mushroom chemistry can be found at: <http://www.quanthealth.org/>

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