

ASTRAGALUS AND IMMUNITY

by Kimball Chatfield

Our immune system is a very complex combination of cells. It's a community of cells really. That community of cells communicates with each



other and responds to anything deemed as non-self or foreign, as well as any substance it views as dangerous. Over the last ten years a tremendous amount of research has been done on immune cells and the chemicals they produce.

If a person is familiar with astragalus, it is often in the context that they have heard that astragalus helps immunity. There are over 100 scientific studies on astragalus' effect on immune function. Actually, if we include studies on cancer and other diseases that are governed by immune function, the amount is over 300 studies. For hundreds of years doctors have seen astragalus work in clinical practice, but in the 21st century we also want to know how it does what it does. Fortunately, modern research has now shown how astragalus affects our immune system at the molecular level. Researchers can now see how astragalus works. And work it does. In a bacterial infection for example, astragalus increases the body's response against the bacteria. White blood cells are created faster, recognize the bacteria quicker, move towards it faster, and kill it quicker with much more powerful effects. Our white blood cells spit very toxic oxidant free radical chemicals (super oxide, hydrogen peroxides, singlet oxygen, etc.) at the bacteria while at the same time protecting themselves with antioxidant chemicals. Astragalus enhances these actions dramatically.

Perhaps astragalus' best immune effect is in preventing infections. In traditional Chinese medicine (TCM), preventing disease by assisting in patients' good health is the premier goal. Preventive medicine has been a hallmark of TCM for over 2,000 years. As a person takes astragalus over several days or weeks, the immune system is nourished to be

smarter, stronger, and much more efficient. One of the most effective uses of Astragalus clinically is in people who chronically get bacterial or viral infections. It is not normal to get several colds and/or influenza every year. Astragalus can be a great preventive for these people. I have had many patients take astragalus in this situation with dramatic improvements. I once treated an Olympic wrestler who, although he looked healthy, consistently came down with bronchitis and subsequent pneumonia nearly every winter. I prescribed moderately large doses of astragalus for him to take every day in both tea and pill form. He never had bronchitis/pneumonia again.



One myth about astragalus is that it will cause acute viral infections to worsen, especially herpes viruses and varicella (chicken pox/shingles). There is absolutely no data to support this absurd claim. The truth is that astragalus directly enhances immune function to eliminate viral infections and greatly increases the effectiveness of many, if not all, anti-viral medicines.

If there is any toxicity or inappropriate use of astragalus it may be with individuals who have transplanted tissue in their bodies. Immunosuppressive drugs that prevent the transplant recipient from rejecting the transplanted foreign organ do so by lowering immunity in that person. Astragalus has been shown to reverse immune suppression and that action may theoretically cause organ rejection. Many health care practitioners believe that because astragalus increases immune function, it would also cause a rejection of transplanted tissue.

There are few examples of this either way. In the two studies that actually looked at astragalus' effect on transplantation, the opposite occurred. Allografts are transplanted tissue within the same species who are not related genetically. In an experiment to see if transplanting allograft blood vessels from one strain of mice into another type of mice would be rejected as normally expected, scientists observed that the mice who did not receive astragalus showed white blood cells attacking and rejecting the transplanted arteries. In the astragalus group there was no immune system attack. Astragalus prevented the inflammatory immune response that would have caused tissue rejection.

In a more recent Japanese study on allograft survival, mice receiving transplants showed no difference in rejection between an astragalus group and an immunosuppressed group who were given cyclosporine. Sophisticated investigation of the molecular mechanisms responsible for this anti-rejection effect showed that astragalus reduced the genetic expression of inflammatory genes and organ damage in autoimmune diseases such as lupus.

More research is needed, but these are very interesting early findings.

Organ transplant is one of the three situations that astragalus intake may be contraindicated. One other is during high fever due to infection. Some natural health care practitioners are concerned that astragalus may drive fever higher in what is called a cytokine storm, where the immune system gets too revved up for our own good, and drives fever to dangerous levels. However, there is no scientific evidence that cytokine storms caused by astragalus actually occur. In fact, astragalus does not enhance the type of cytokines, called IL-1 beta, that cause inflammation and high fevers. It appears that the opposite is true. Researchers at the University of Texas-Houston Medical School found that astragalus reduces pro-inflammatory fever responses that occur during infection. Astragalus also inhibits Tumor Necrosis Factor, which is the other main cause of fevers.

Lastly, simply because not enough studies have been done with pregnant women and astragalus, it is advised not to take astragalus during pregnancy. There was one study on pregnant rats and rabbits that showed that astragaloside IV caused fetal death and toxicity to the rats in the study. Upon close examination, the human equivalent of the doses used in the experiment was over 720,000 milligrams of astragalus. For people, that would be about two and one-half pounds of astragalus each dose. This would be impossible to achieve in humans.

Astragalus has been broadly researched and clinically utilized in a variety of immune diseases and illnesses. Astragalus has been shown to reduce herpes simplex 1 infection and multiplication, prevent toxoplasmosis infection, increase the effectiveness of HIV antiviral drugs, prevent and cure cytomegalovirus infections, cure systemic candidiasis (yeast infections), reduce infection, speed repair after tissue injury,

improve immune function in myasthenia gravis patients, prevent cryptosporidium infection, increase immunity in individuals with poor immune function, increase white blood cell and red blood cell counts to normal, and reduce infections.

As we will see in the chapter on cancer, astragalus reduces the immune suppressing effects of chemotherapy and radiation therapy as well.

The research on myasthenia gravis is especially interesting. This is an autoimmune disease where the body creates antibodies to its own acetylcholine receptors. These nervous system receptors control our ability to move. Damaging them causes significant muscle weakness and fatigue, especially in the eye muscles. Utilizing astragalus for this disease may surprise even the most experienced herbalists who may believe that astragalus, being an immune stimulant, would feed the autoimmune response and worsen this disease. The exact opposite occurred when 60 myasthenia gravis patients were studied in this astragalus experiment. Thirty patients were given prednisone and thirty patients were given astragalus. Prednisone is an effective immune system suppressor with significant side effects when delivered at large dosages for several weeks or longer. In the experiment both prednisone and astragalus reduced inflammation and the overproduction of white blood cells. Astragalus did not increase an abnormal immune response, but instead reduced the autoimmune response just as effectively as prednisone. Perhaps the most important safety finding was that in the prednisone group five patients experienced temporary liver damage. There was no liver damage, or any other side effect, with the astragalus group.

Almost everyone in the U.S., at one time or another is checked with the tuberculin skin test to make certain they are not infected with tuberculosis (TB). In this terrible disease, lung tissue is slowly destroyed by TB organisms. Other organs can be infected as well, such as the brain, kidneys, liver, etc. When a person is infected with tuberculosis, the first major response is from immune cells called macrophages. It is the macrophages' job to recognize and signal an attack on tuberculosis. If macrophages are too few in number or sluggish and weak in their action, tuberculosis will increase its invasion into our bodies and require serious medication for its cure. Health care workers who specialize in TB treatment must have efficient immune function to ward off this disease. Scientists studying TB at Lanzhou University in China found that astragalus significantly increases the power of macrophages to attack and destroy the mycobacterium that causes tuberculosis.

Over the last thirty years the world has seen an epidemic of Human Immunodeficiency Virus (HIV). HIV

hijacks immune cells known as CD4 cells. The virus enters the CD4 cell and uses the cell as a breeding ground for itself. This kills the CD4 cell in the process, thereby severely lowering immune function. Other immune cells are also killed, including dendritic cells and macrophages. Over the last three decades, scientists have been developing drugs to combat HIV infection. Many countries are struggling to deliver medicine to infected people to extend their lives. HIV medicines, called retrovirals, are expensive. Many people in the world infected with this disease cannot afford these medications. The current drug strategy is to combine two to three drugs together to give HIV infected people the best chance of living a longer life. Researchers throughout the world are working on finding a cure for HIV infection.

Research with astragalus and HIV began in 2004, when a study utilizing astragalus in a combination medicine showed reduction of HIV infection by up to 35%. In a gold standard study (randomized, double blind, placebo-controlled) from the Thailand Ministry of Health, HIV-positive people were given either a standard two drug combination (ZVD and ddC) combined with a placebo, or the same two antiviral drugs plus an astragalus-based herbal combination. Their findings were impressive. While the two antiviral/placebo combination did moderately lower the levels of HIV in the patients blood stream and increased CD4 cells, it was the astragalus combination that significantly lowered HIV count in 4 weeks and continued to increase the number of CD4 cells far better than in the two drug/placebo group. This study lasted for 6 months, and left researchers with the opinion that astragalus could be very helpful and much less expensive than adding a third synthetic drug to anti-HIV regimens.

Our thymus gland, which sits on top of our heart and lungs, produces immune cells called T lymphocytes (the "T" comes from the word thymus), especially when we are young. It reaches maximum size just before puberty. Sex hormones created during puberty signal the thymus to shrink. It continues shrinking as we age. The thymus weighs about an ounce at age ten and is about half that weight when we are about fifty. By the time we are in our seventies it is only about a quarter ounce in weight. Stem cells (thymocytes) are sent from the bone marrow to the thymus where they mature into T-cells. T-cells are extremely important for proper immune function. For example, one of the main reasons elderly people are more susceptible to infection is their reduced thymus size and activity. Fortunately, we create a large storage of T-cells early in life that continue to reproduce themselves for many years. T-cells help the body recognize foreign invaders such as viruses. This ability for T-cells to distinguish between normal tissue and foreign invading microbes enables us to properly fight infection. An interesting study at the Shantou University Medical College in China found that astragalus could increase the size of the thymus gland, and improve its ability to create T-cells, even after it was insulted with the immune suppressing drug cyclophosphamide (Cytosin). An even better thymus-stimulating effect was found when astragalus was combined with the herb he shou wu (*Polygonum multiflorum/Reynoutria multiflora*).

Astragalus is a powerful immune system modulator. It has been shown to increase specific immune responses to multiple diseases as well as alter immune function to reduce immune response when that benefits the patient. Either alone or in combination with other herbs, astragalus offers an opportunity to live a healthier life with fewer infections and immune diseases.

Bio:

After graduating from San Diego State University with a degree in Natural Resource Management, Kimball Chatfield began his formal training in herbal medicine in Naturopathic medical college. He then attended the California Acupuncture College. He received his doctorate in traditional Chinese medicine researching the healing effects of acupuncture in pesticide poisoning. He has taught acupuncture, herbal medicine, and clinical nutrition at three acupuncture colleges and most recently taught Botanical Medicine and Medicinal Plants of the Sierra Nevada at Lake Tahoe Community College. He has authored numerous scientific technical articles, reports, and journal papers, as well as the book Medicine From the Mountains: Medicinal Plants of the Sierra Nevada. He maintains a busy natural health care practice in South Lake Tahoe. He lives in the Sierra Nevada county of Alpine in California. Dr. Chatfield is available for e-mail consultation on the use of astragalus in clinical settings: tahoeacupuncture@gmail.com