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EPICOR™
NOVEL IMMUNE SYSTEM ENHANCER STRENGTHENS
MICROBIAL AND MUTAGENIC DEFENSE
BY CHRIS D. MELETIS, ND

Immunity is one of our body's most important resources. Yet, some of the most devastating diseases can affect this aspect of our health including HIV, cancer, and autoimmune diseases such as rheumatoid arthritis, lupus and multiple sclerosis. Even if we're not subject to any of these chronic conditions, we can become vulnerable to a host of influenza viruses or bacterial infections. It's therefore integrally important to reinforce our immune systems.

Over the last three years some of the top laboratories in the nation have been researching a substance that appears to modulate the immune system in such a way as to make it resistant to pathogenic organisms. After personally communicating with the director of the research team responsible for investigating this new substance, I have concluded that it is one of the most promising agents I've seen. However, before I describe its discovery and how it supports the immune system, I must describe several key aspects of our bodies' immune defenses.

One of the ways we can nurture this aspect of health is to enhance the activity of natural killer cells, key players in immunity. Natural killer cells are lymphocytes, cells present in the blood and lymphatic tissue that are integral to immunity. Natural killer cells bond to viral-invaded cells and release cytotoxins that kill the infected cells. They act similarly on many types of tumor cells.

While natural killer cells are an important aspect of immunity, they are not the only aspect. The immune system is a complex tapestry that also relies upon the proper functioning of T-cells. These cells emerge from the bone marrow in an immature state and must migrate to the thymus gland, where they are programmed to transform into:

- 1) CD4 helper cells, which orchestrate the immune response by activating other immune cells and stimulating the production of antibodies by the B- cells.
- 2) CD8 suppressor cells, which suppress killer cells by signaling the termination of an attack.

Therefore, if we could find a natural substance that decreases the number of CD8 suppressor cells in relation to the number of CD4 helper cells, we would improve the CD4/CD8 ratio, strengthening the immune system's ability to defend against viral, bacterial, and parasitical invaders.

A third aspect of immunity involves immunoglobulin A (IgA). IgA is the principal immunoglobulin in exocrine secretions. It is important in protecting mucosal surfaces from invasion by pathogenic bacteria and viruses. Its presence in colostrum is thought to be the main reason behind colostrum's anti-infective properties in newborns.

While the aforementioned aspects of immunity are important, they are, in a sense, oversimplifying how the immune system works, as it is a complex interplay of many different factors. However, understanding each of the factors I mention above will help explain how the new discovery discussed below has a novel and fascinating effect on the immune system.



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Accidental Discovery

The discovery of a unique yeast-derived product called EpiCor™ began when insurance adjusters noticed that employees of a leading manufacturer of animal nutrition products, experienced unusually low sick leave rates and filed significantly fewer claims than employees of similarly sized companies. In fact, while 2004 annual insurance premiums increased an average of 11.2 percent nationally, this company's 2004 premiums didn't increase at all.

The owners suspected this low illness rate was due to a fermented yeast culture the company manufactured for production animals since the workers who came in contact with this fermented yeast culture experienced an unusual lack of illnesses.

Consequently, the company commissioned a research group to perform a series of studies investigating EpiCor's effects, its safety and whether it was the agent responsible for the enhanced immunity at the company's production facility plant.

Prior to conducting these studies, the research group visited the manufacturing facility and interviewed the employees. They began with the plant manager, who had previously worked at another company for more than 20 years. His wife was an emergency room nurse and often caught viral infections while on the job. While working at the other company, the plant manager and his children contracted 3 to 5 colds or flus per year. However, he had now worked with the fermented yeast product for 9 years and had not had a cold or flu for at least the last 7 years. His wife and children continued to contract a number of illnesses every year.

After hearing similar stories from other members of the production facility staff, the researchers were intrigued. Among the production facility workers, there had been no admissions for any emergency room visits, no incidence of any chronic diseases. In the administrative building, where employees rarely came in contact with the fermented yeast product, there was a greater incidence of colds and flu.

There definitely seemed to be a reason to investigate this product.

Background on EpiCor

The ingredient to be investigated was an end product of fermentation of baker's yeast (*Saccharomyces cerevisiae*). The company has produced this product for 63 years as an additive to animal feed products and they distribute it worldwide.

The process used to manufacture the product, while not patented, is a trade secret that other large companies have failed to replicate. Consequently, EpiCor's producer has dominated in the feed marketplace for many years, especially since it wasn't uncommon for animals consuming the animal feed version of EpiCor to have an increased litter size compared to what would normally be expected.

Antioxidant Powerhouse

First, the team of researchers broke down EpiCor's composition to help determine why it might have an immunomodulating effect. In doing this, it was noted that EpiCor had an excellent profile of mono unsaturated and polyunsaturated fatty acids and a small amount of saturated fat. In addition, all of the essential vitamins and minerals were in the product as well as trace elements. Interestingly, they also found it contained compounds known to exert free radical fighting activity such as phytosterols and phenolics including catechins and trans resveratrol. The researchers were surprised to find compounds such as squalene, which is found in sharks and only a very few plant



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species. Given this profile of substances known to exert antioxidant activity, they decided to subject EpiCor to studies investigating its antioxidant potential.

The first study conducted was designed to determine whether EpiCor could inhibit the formation of radical oxygen species (ROS) in freshly purified human neutrophil cells. They exposed the cells to hydrogen peroxide to induce severe oxidative stress then compared the EpiCor-treated cells to the cells left untreated. They discovered significant reduction of all ROS formation at EpiCor concentrations as low as 1 part per trillion compared to control cells challenged with only hydrogen peroxide. They continued to observe inhibition of ROS formation at concentrations even lower than one part per trillion. This effect didn't stop until they reached a concentration of 0.01 part per trillion. The antioxidant activity of EpiCor (or ORAC activity, as its called in the industry) was actually significantly greater than that of blueberries.

Microbial Studies

Next, the researchers found that EpiCor dramatically reduced the growth of E. Coli bacteria and Candida Tropicalis. At concentrations that continued all the way down to 1 part per billion they noted total inhibition of E. Coli and Candida Tropicalis. It did not, however, inhibit Staphylococcus aureus.

After conducting this study, they concluded that EpiCor may provide protection against infection with coliform bacteria (a common cause of food poisoning) and candida. The study also indicated that EpiCor may support the growth of desirable mucosal flora in the intestinal tract.

Stability and Toxicity Studies

The research team also decided to conduct a study to determine if EpiCor had a sufficient shelf life, an important consideration if it were to be consumed by humans. They first determined that when the product sat at 77 degrees Fahrenheit for 28 days, levels of mold, Salmonella, and Staphylococcus aureus stayed below the acceptable limit. Other tests have shown that it is extremely stable for at least 22 months.

In another study, they asked a leading lab to check for 139 different pesticides. EpiCor was found free of all 139 compounds tested for at the detection limits.

They also performed oral toxicity studies in rats. They gave 2,000 mg of EpiCor per kg of body weight to 20 rats—the equivalent to 140 grams administered orally in humans. After 14 days, the animals treated with EpiCor had normal body weights and no deaths occurred during the treatment period. In addition, no gross pathological changes were observed.

In a 90-day toxicity study, they treated 4 groups of rats (40 animals per group) with either 30, 200 or 1,500 mg of EpiCor per kg of body weight. A fourth group served as the control. EpiCor-treated rats did not have an increased rate of mortality, there were no treatment-related clinical symptoms, no significant differences in body weight, nor any pathological changes in any areas examined. In addition, there were no gross pathological lesions found in any organs.

The researchers concluded that EpiCor was well tolerated in daily oral doses up to 1,500 mg for 90 days. (A 90-day rodent study is equivalent to 1.5 years of human consumption in a 70 kg adult male or a 50 kg adult female).

Other tests have shown that EpiCor is not mutagenic and does not have the potential to cause gene mutation.

Before delving into human studies they also investigated whether EpiCor is contraindicated in people taking any type of



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pharmaceutical drug. So they looked at whether it would affect drug-metabolizing enzymes such as Cytochrome P450. They conducted a test called the immortalized human hepatocyte assay, considered the gold standard for inducing drug-metabolizing enzymes. Through this test, they found that EpiCor is not toxic, does not induce the expression or enzymatic activity of cytochrome P450 or other drug metabolizing enzymes and therefore does not interfere in drug metabolism.

Human Studies

They were almost ready to conduct human studies on EpiCor's immunomodulating potential. However, first, they wanted to ensure its safety. For one month, 15 men and women ages 15 – 40 consumed 500 mg of EpiCor in a single daily dose. They measured baseline values 3 days preceding the study's start. Multiple blood samples were taken on day 2 and 28 and additional blood and saliva samples on days 0, 14, 21, 28. EpiCor was well tolerated with no evidence of adverse effects on the immune system nor any clinically relevant changes to any vital signs.

Now that they had determined that EpiCor is safe, non-toxic, non-mutagenic, is not harmful to cells, and is pesticide free, they were ready to begin studying if and how it affects immunity in humans. They compared one group of 10 production employees who are exposed to EpiCor on the job at the facility with another group of 10 gender and aged matched non-production facility employees not exposed to EpiCor.

They analyzed blood samples and what they found was fascinating. The group exposed to EpiCor showed a significant decrease in CD8 suppressor cells, resulting in an improvement in the CD4/CD8 ratio. The CD4/CD8 ratio suggested that these EpiCor-exposed individuals had at least 2 to 3 times the natural killing activity against viruses, bacteria and cancer cells than would normally be expected!

This was quite striking to the laboratory. The director called one of the researchers and said, "I've never seen anything like these results before. These people seem virtually immune from contracting almost anything."

The researcher then asked him to go through the results and highlight the ones he thought were significant while the researcher did the same. They did not hold the code as to whose blood samples they were observing. The code was still kept by a scientist at the facility. But when they broke the code they had both 100 percent successfully separated the production from the non-production employees based on their immune profile.

One of the other interesting aspects is that natural killer cells in EpiCor-exposed subjects had a much higher killing efficiency of pathogen-infected and abnormal cells despite a significant decrease in the natural killer cells' number. To use an analogy, if we sent out soldiers, we could send out less soldiers because they had become more efficient at doing battle. At the same time, EpiCor-exposed subjects experienced a significant inhibition of interferon gamma production, which indicates that EpiCor has anti-inflammatory abilities.

They also found significantly higher levels of total salivary secretory IgA in the EpiCor subjects. The IgA levels were surprisingly high—more than 300 mg per ml. This indicated that the EpiCor subjects had the equivalent of an immunological envelope protecting all the membranes in the eyes, nasal passages, and all the places where pathogenic organisms enter into the system.

They also found significantly lower levels of immune complexes and higher levels of glutathione in erythrocytes (red blood cells). Higher levels of immune complexes are responsible for inflammation, and lowering their levels would result



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in less inflammation and tissue damage.

These same immune-modulating effects were seen in the study mentioned earlier in this article, in the 15 subjects treated with EpiCor for 28 days.

Calcium Signaling

Another aspect of the EpiCor studies worth mentioning is known as calcium signaling. Calcium signaling between cells is pivotal to the coordinated response of cells in tissues and organs within the whole body. It is now well established that cells do not behave as selfish entities but rather tend to form "micro-societies" whose proper functioning requires a precise coordination of signals that the cells emit and receive. When these signals are not working properly, this can result in pathological situations that can range from abnormal cell proliferation to cell death. The research has shown that EpiCor can influence calcium signaling, thereby offering a potential explanation for how EpiCor supports immunity and defends against invading pathogens.

Additionally, it was determined that EpiCor affects the activity of Nuclear Factor Kappa B (NFK-B). NFK-B plays an important role in inflammation, immunity, autoimmune responses, cell adhesion, cell proliferation, cell development and cell death (apoptosis) because it regulates the expression of genes involved in all these processes.

GRAS Status

After conducting these studies, an expert panel of toxicologists was assembled to review the data. The panel was chaired by the former director of the division of drugs and environmental toxicology and the human food safety program at the FDA. Other panelists included EPA scientists and the editor of the journal Food and Chemical Toxicology. As a result of the panel review, EpiCor has now received FDA's Generally Recognized as Safe (GRAS) classification.

Conclusion

I have never been so impressed by the effects of a compound as I have been with EpiCor. At this writing, there is one published study depicting the immune modulating aspects of EpiCor (Schauss AG, Vodjani A. Discovery of an edible fermentation product with unusual immune enhancing properties in humans. FASEB J. 2006;20(4):A143). Because this information is so new, a majority of studies mentioned in this article are still unpublished. The researchers expect to submit 5 manuscripts to peer reviewed journals within the next six months. Meanwhile, the confirmed safety of EpiCor and its effects on various immune parameters indicate that it is an immune modulating substance par excellence.

Chris Meletis, ND

Dr. Chris D. Meletis is an educator, international author and lecturer. Dr. Meletis has authored 14 books and was awarded the 2003 naturopathic physician of the year by the American Association of Naturopathic Physicians. He has also written over 200 nationally published health and wellness articles. He served as Chief Medical Officer and Dean of Naturopathic Medicine for the National College of Naturopathic Medicine and has participated in starting 16 clinics providing care for uninsured families.

His personal mission is "Changing America's Health One Person at a Time." He believes that when people become educated about their health that this is when true wellness is achieved.



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