

NutrAward 2009 Submission:

In October 2008, Gourmetceuticals, LLC announced a deal with specialty pharmaceuticals company, Curamedics Pharmaceuticals. The two companies are collaborating to co-develop functional food and beverage products for the human and veterinary markets. The companies will utilize both of Gourmetceuticals' ingredients: PPL-240™, a potent antioxidant proven to scavenge free radicals that cause cell damage and GLPH-1™, a clinically proven immune booster, to develop final products.

Gourmetceuticals' ingredients meet current Good Manufacturing Practices (cGMP) as outlined by the FDA. Both ingredients are derived from botanicals, are organic and kosher. They have been (and continue to be) researched extensively and are published in dozens of peer reviewed journals. Research spans from basic to safety, pharmacokinetic, pharmacodynamic and efficacy to human clinical studies. They are highly stable and water-soluble; versatility allows them to be used in virtually any type of functional food including candies, beverages, snacks, confections, pet treats, as well as premium veterinary foods and feeds.

Intended application of the products:

Gourmetceuticals and Curamedics will utilize both of Gourmetceuticals' functional ingredients to co-develop a beverage, candy and chewable wafers for the human market as well as animal treats for the canine and equine markets. The two companies will utilize these functional food and beverage products to provide high quality ingredients in products that consumers can easily fit into his/her daily regimens. Products are expected to launch nationally in 2009. The business objective of the deal is to capitalize on a growing functional food market, anticipated to reach \$39 billion by 2011.

Increasing the market credibility for functional food and beverage products, the two companies are leading the industry with the premise that functional food ingredients should meet similar safety and efficacy standards as set forth by the Food and Drug Administration (FDA) for pharmaceutical products. Together the two companies demonstrate a higher level of scientific validation for their co-developed products and are setting the bar for other companies within the industry.

Mechanism of action / Proof of efficacy:

*Scientific merit, efficacy, safety and mechanism of action of both PPL-240™ and GLPH-1™ are below:

Manufacturing of PPL-240™

PPL-240™ is obtained by the aqueous extraction of the PLE dried leaves. The initial extract is filtered and concentrated and, after that, the concentrated extract is mixed with maltodextrin, dried and normalized. The resulting product is PPL-240.

Clinical Support/Mechanism

PPL-240™ has been the subject of extensive pre-clinical and clinical research demonstrating the ingredients safety and efficacy. It inhibits reactive oxygen species (ROS) generation and photoisomerization of trans-urocanic acid, promotes the removal of DNA photoproducts, reduces the number of UV-induced mutagenic cells, prevents depletion of epidermal Langerhans cells and retains their morphology. In addition, PPL-240 has been demonstrated to inhibit cell death as well as apoptosis in keratinocytes and Langerhans cells.

In vivo research on humans demonstrated that it is the first natural agent that can help control phototoxicity, a long-term side effect of PUVA therapy. PUVA therapy combines Psoralen, a photosensitizing agent found in plants, with UVA exposure to treat vitiligo, psoriasis and eczema.

Further studies have also shown that a single dose of PPL-240 can suppress damage caused by UVB radiation. These results, as well as studies on in vivo animal models, suggest that PPL-240 might be able to protect against long-term UV damage, such as photoaging and photocarcinogenesis. Ongoing research with Sloan Kettering Cancer demonstrates the ability of PPL-240 to reduce UVR-induced skin cancer and the ingredients ability to prevent UV-induced skin carcinogenesis.

In a double-blind pilot study, 19 patients with generalized vitiligo were randomized to receive PUVA plus PPL-240™ or placebo for 12 weeks. The percentage of subjects who achieved greater than 50 percent skin re-pigmentation was significantly higher in the PPL-240 group than in the placebo group. There is a clear trend towards an increase in re-pigmentation of vitiligo vulgaris affecting the head and neck area when narrow band UVB phototherapy is combined with oral PPL-240 compared to the results found when narrow-band UVB was given as the sole treatment. Presently, narrow band UVB phototherapy is considered the treatment of choice for vitiligo. It is estimated that vitiligo affects 50 to 100 million people worldwide and two to five million people in the United States.

GLPH-1™ – Immune Booster

GLPH-1™ is a polysaccharide extract derived from the cell wall of the botanical yeast, *Candida utilis*, which has been clinically proven to be safe and efficacious in its ability to boost immune health in more than 20 clinical trials. FDA approved for both human and animal consumption and approved for pharmaceutical and nutraceutical consumption in Europe, GLPH-1 works as an anti-inflammatory agent through multiple mechanisms, including stimulating the immune system's white blood cells to combat illness. The extract is available in a highly stable liquid form or a water-soluble powder that can be easily added to human or veterinary food products. Commercialized products, derived from *Candida utilis*, have been sold in Europe for more than 20 years.

Patents for human and veterinary-immune system and poultry-weight gain are currently in process. An application for Center for Veterinary Medicine (CVM) status is currently in review, it has applied for ODI status and a self-affirmed GRAS certification is also in process.

Manufacturing of GLPH-1™

GLPH-1™ is a phosphorylated glucomannan that grows on the sugars and minerals present in wood pulp. In general, extraction of GLPH-1 involves the *Candida utilis* being washed with water, concentrated, pasteurized and spray-dried. GLPH-1 is extracted from the cell wall of the dried *Candida utilis* using a complex mixture of enzymes and salts in water at 37-40° C and is further purified by ultrafiltration/diafiltration and concentrated by ultrafiltration.

Clinical Support/Mechanism

GLPH-1™ has been the subject of extensive pre-clinical and clinical research as the active ingredient in the products AM3 and Imunoferon™. The combined research has shown GLPH-1 to have anti-inflammatory and immune boosting activities, as well as the ability to decrease muscle degradation during strenuous exercise or athletic activity. The mechanism of action for these activities of GLPH-1 is well researched and documented. First, the anti-inflammatory activity of GLPH-1 is due to its suppression of TNF at the molecular level. Second, the immune boosting activity of GLPH-1 has been demonstrated to be a result of the binding of GLPH-1 to specific cellular receptors that activate and expand the immune system.

GLPH-1 has been investigated in several conditions and diseases known to be associated with inflammation including muscle damage, viral replication and various other inflammatory areas, such as conditions that present in the lungs. In all inflammation studies, GLPH-1 positively modulated the immune response by stimulating certain white blood cells known to have anti-inflammatory properties. This response has been studied in patients with lung ailments and hepatitis B, as well as people looking to prevent muscle injury.

Lung Ailments

In studies of patients with chronic obstructive pulmonary disease (COPD), GLPH-1 was shown to improve health-related quality of life by reducing the symptoms associated with the disease, and restoring function of the immune system's ability to control inflammation in the lungs when combined with a common treatment vaccine. Patients who received GLPH-1 in combination with a vaccine reduced the need for antibiotics by 22 percent and missed work 41 percent less than vaccine or placebo alone.

Virus

In clinical trials with patients with Hepatitis B virus (HBV), GLPH-1 demonstrated the ability to stimulate white blood cells to produce immune cells that have anti-viral activity through the regulation of inflammation.

Muscle Injury

GLPH-1 has been shown to prevent chronic muscle injury associated with strenuous exercise. It is believed that GLPH-1 can modulate the activity of several inflammatory cytokines, and by doing so, it reduces inflammation in the body. In clinical studies looking at competitive athletes, the concentration levels of biochemical compounds, which signal inflammation and muscle damage, pre- and post-workout were identified. The athletes were then given GLPH-1 and asked to workout again. The resulting post-workout concentration levels of the biochemical signals were actually lower than the athletes' pre-workout levels.