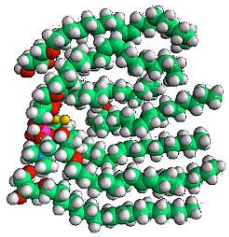

BioMolecular Products, Inc.

Lym-X-Sorb™ (LXS™), a Revolution in Drug Delivery

Platform Technology

Lym-X-Sorb™ (**Lym**phatic **X**enobiotic Ab**Sorb**ability), winner of the 2004 Eurand Award, is a unique drug delivery with controlled release. Lym-X-Sorb™ was developed as an analogue to the basic products of fat digestion by David W. Yesair, PhD., founder of BioMolecular Products, Inc. Dr. Yesair first described the physiologic arrangement between the principal products of fat digestion, lipids; specifically, lysophosphatidylcholine (LPC), monoglyceride (MG), and fatty acid (FA). In the intestinal lumen, these lipids form a unique three-dimensional, non-liposomal monomeric unit that is absorbed in the jejunum. Once reconstituted into chylomicrons, these lipids are transported via the thoracic lymph and enter the systemic circulation thru venous blood at the juncture of the subclavian vein. When manufactured and formulated with a drug agent, the Lym-X-Sorb™ monomer shields the drug from the hostile environs of the stomach and the upper intestine by enveloping it in the void created among the acyl-constituents of the lipid anchors. Directing this "lipid glove" from the intestinal lumen to the lymphatic system is the body's underlying mechanism for fat absorption. Lym-X-Sorb™ is manufactured with Generally Regarded as Safe (GRAS) lipid materials in a range of molar ratios: 1:2:4 to 1:4:2 LPG:MG:FA respectively and Lym-X-Sorb™ can be lamellar, hexagonal, inverse hexagonal. Lym-X-Sorb™ is licensed to Envara Health, Inc.

Drug Delivery

As a lipid-based monomer, the Lym-X-Sorb™ drug complex is recognized in the intestinal lumen as a nutrient and therefore allowed to proceed into the thoracic lymph for systemic delivery, thus avoiding the liver and subsequent first pass metabolism. This recognition and metabolic by-pass greatly enhances the ultimate drug concentration in plasma. When examined at equivalent does in beagle dogs, Lym-X-Sorb™ - N - (4-hydroxyphenyl) (fenretinide) complexes demonstrated 3 to 4 times the peak plasma concentrations of current delivery systems. Human bio-equivalence studies demonstrate 65mg doses of fenretinide complexed with Lym-X-Sorb™ present nearly identical plasma levels to 300 mg dosages via conventional corn oil delivery - 5 times the Lym-X-Sorb™ dose.

Medically Nutritive

Lym-X-Sorb™ can help people who have temporary or permanent, often debilitating, medical conditions which make it impossible for them to digest fat in the normal way. Lym-X-Sorb™ makes it possible for them to survive, even gain weight when ordinarily they would waste away. Such conditions include certain cancers, advanced AIDS, cystic fibrosis, acute alcoholism, malnutrition, and many others.

Dermatologic

Additional uses of Lym-X-Sorb™ exploit the lower surface tension of Lym-X-Sorb™ in relation to skin surfaces. An included drug/Lym-X-Sorb™ aqueous formulation will spread easily and thinly on the skin, such that the moisture is quickly evaporated to provide a cooling sensation. Physical properties of Lym-X-Sorb™ are ideally suited for application to biological surfaces. In addition, this cutting edge platform Lym-X-Sorb™ technology has many applications for cosmetic formulations, skin moisturizers as well as a drug delivery system for treatment of skin problems.

Sports Applications

Trained individuals oxidize more fat and less carbohydrate than untrained individuals. However, the metabolic processing of fat is compromised under stress. Bile and pancreatic flows are reduced, resulting in the decrease enzymatic processing of biliary phosphatidylcholine and orally triglycerides. These lipids that are not enzymatically processed are transported to the large intestine where the micro flora will produce carbon dioxide and debilitating cramps, etc. Using Lym-X-Sorb™ as a nutritional high caloric supplement will reduce cramps and provide the lipids needed by athletes. For high altitude climbers, Lym-X-Sorb™ can provide readily absorbed calories and lipids even when the liver and stomach are not functioning because of reduced oxygen.