MUTANT ALPHA-1-ANTITRYPSIN COMPOSITIONS

Prof. Eli Lewis, the Department of Clinical biochemistry and pharmacology, Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer-Sheva, Israel

Technology

Human Alpha1-antitrypsin (hAAT) is a serum glycoprotein presently prescribed for patients with genetic AAT deficiency. It is administered in the form of a plasma-derived affinity-purified protein. hAAT is also a potent modulator that diverts injurious inflammatory responses towards resolution and healing. Wounds heal faster with topically administered AAT; blood vessels irrigate tissues better and skin regeneration is improved. Prof. Eli Lewis's lab has generated several hAAT derivatives with improved biological activity and production, among them the CPAT. CPAT is 500-fold more anti-inflammatory compared to native hAAT, i.e., the required dose of CPAT is 500-times lower than that of commercially available hAAT and still reaches a blunting of inflammatory signals. In-addition, CPAT demonstrated superiority over serum-purified hAAT in expedition of tissue repair in vitro and in vivo in several tested models. Lastly, CPAT has a larger distribution volume and extended half-life in vivo. Efficient production of CPAT was demonstrated in HEK293 and CHO cells.

Application

The global advanced wound care market size is predicted to reach $13.07 billion by 2022 from $10.43 billion in 2017 at a CAGR of 4.6% driven by the increasing prevalence of surgical wounds & ulcers, aging population, demand for evidence-based advanced wound care products and rising R&D activities. In a study held in BGU CPAT was integrated into an emulsive topical aerosol and was shown to expediate tissue repair and recovery in vivo in cases of full-thickness skin wounds in an early surgical suture removal model. CPAT treatment is currently tested as potential treatment for corneal injuries and dermal burns as a result from heat or radiation exposure. CPAT production and topical formulations development is currently conducted with the support of the Israeli Innovation Authority

Advantages

- **Design**– CPAT is based on, and consistent in physical properties to normal hAAT, a substance approved by the FDA for intravenous infusions with an outstanding safety profile in humans.
- **Regulatory** - CPAT is designed for topical (skin) preparations; together with the choice of a design that is based on a physiological molecule, the process of FDA approval will be most probably expedited compared to other products under this category.
- **Production -**Recombinant-based technology enables low cost compared to plasma-extracted products; this format also abrogates the safety concerns and costs associated with blood-borne diseases.

Patent PCT