Preventing Vision Loss from Blast Injuries with Regenerative Biomaterial

Principal Investigator: ROLLINS, BENJAMIN V
Institution Receiving Award: BOMBYX TECHNOLOGIES, INC.
Program: DMRDP
Proposal Number: DM090278
Funding Mechanism: Applied Research and Advanced Technology Development Award

PUBLIC ABSTRACT

Wounds to the surface of the eye are painful and frightening to the millions of people who receive them each year. Such wounds are commonly associated chemical burns from household cleaning agents, traumatic impact from falling objects, diseases, and infection. In our nation's military, blast and fragmentation ocular wounds are common on the battlefield. Moderate eye injuries can incapacitate a person due to heavy pain, tearing, swelling, and blurred vision. Severe wounds cause scarring and can result in vision loss.

Bombyx Technologies in collaboration with Cornell University is developing a new and unique clear bandage that can be applied directly to the surface of the eye to rapidly reduce healing time and reduce the risk of vision loss. The bandage resembles a contact lens, and when it is placed on a wounded eye it relieves pain, reduces inflammation, and stimulates the healing process. Over a few days, it dissolves completely leaving behind healthy tissue. Because the device is small, durable, and easy to apply, it could be included in any first-aid kit and administered immediately after injury, which minimizes risk of further complications and vision loss.

With the funding provided by this grant, Bombyx Technologies expects that within a 2-year timeline, the regenerative lens will be FDA cleared for use in humans. In 3.5 years, patients could expect to see the new treatment being administered by ophthalmologists. It will be used for traumatic injuries and to also aid in healing after surgeries such as cataract, retinal, and refractive procedures. The lens has the potential to prevent expensive reconstructive surgeries, which would result in millions of dollars in savings to the American health care system. Eventually, the regenerative lens could be as ubiquitous to eye wounds as the Band-Aid is to skin wounds.

The proposed work of this project will be to perform the necessary animal studies to obtain FDA clearance for testing in humans. The work also includes demonstrating that the lens can be manufactured into a medical grade device in a location that is sterile and certified for the manufacturing of medical devices.