Use of Arthropod Silk as a Biomaterial for Wound Treatment And Cellular Regeneration

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ABSTRACT:

Certain arthropod taxa, such as the spiders and various families of insects, have evolved the capability to produce silk via specialized gland-type organs within their bodies. Silk is generally composed of multiple fibrous polymerized structures organized into long strand-like chains. The end result is an elastic supportive fiber that also displays a high amount of tensile strength relative to its width (Craig, 1997).

The unique qualities of arthropod silk display potential for biotechnological applications, such as incorporation into treatment for dermal wounds or burns. Specifically, secreted silks can be processed to extract fibroins, which are used to produce a film-like substance. This film can function as a fabric base to promote cellular regeneration, known as a scaffold or mat (Reimers et al., 2015).

This presentation will discuss arthropod silk production in nature, as well as the unique qualities of silk that make it useful in medical applications. Additionally, details will be provided on how silk is incorporated into healing techniques and examples will be provided highlighting in-lab usage. Examples will include in vivo application for dermal treatment in rodents, as well as in vitro reparation of peripheral nerve defects and damage.

References
