Firm uses genetic modification to coax spider silk from silkworms

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(PhysOrg.com) -- In what many in the textile industry have for years been calling the holy grail of materials science, genetic engineers from Kraig Biocraft Laboratories Inc. have succeeded, using Sigma Life Science technology, in creating genetically modified silkworms that are able to produce a silkworm/spider silk combination that is much stronger and more elastic than natural silk, paving the way for improved products such as sutures, other medical devices and even airbags.

The effort, conducted with research partners from the University of Notre Dame and the University of Wyoming, strove to combine the advantages of silk created by spiders, with silk created by silkworms. Spiders create webs from silk that has a very high tensile strength and is very elastic; it can be stretched to almost one and a half times its own length without a problem; but unfortunately, spiders aren't big producers

of such silk, needing only to create a simple web. Silkworms on the other hand are big producers of silk, due to their natural inclination to use it for creating a cocoon. Thus, it was deduced, if silkworms could be induced to create the same kind of silk as spiders, and at the same rate they normally produce regular silk, we humans could benefit by garnering rapidly produced strong silk.

The research was led by Malcolm J. Fraser Jr., professor of biological sciences at Notre Dame and was founded on a process he has developed called the piggyBac, which is where a piece of DNA can be made to insert itself into the genetic material of a cell. Used in conjunction with Sigma's proprietary CompoZr® Zinc Finger Nuclease (ZFN) technology, spider silk genes were transferred to silkworm cells, causing silkworms to produce a type of silk that is a combination of their natural silk, and that of the silk produced by a spider. The new silk, as yet unnamed, is far stronger and more flexible than any other silk ever produced by silkworms and the researchers believe that by removing some of the DNA material from the silkworm genes prior to the addition of spider material, they can produce something even better in the near future.

Because techniques have already been developed for producing mass quantities of regular silk using silkworms, all of the parties involved are confident that they will soon be able to produce a silk so strong it might one day replace Kevlar in bullet proof vests, or provide surgeons with sutures strong enough, and elastic enough to allow them to perform life-saving procedures in far less time. It’s possible that one day this new super-silk might make regular silk something that’s only used for creating very soft comfortable clothes.

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