China’s CRISPR gene-edited silkworms spin fibers 6 times tougher than Kevlar

Scientists in China have synthesized spider silk from genetically modified silkworms, producing fibers six times tougher than the Kevlar used in bulletproof vests. The study, published September 20 in the journal *Matter*, is the first to successfully produce full-length spider silk proteins using silkworms. The findings demonstrate a technique that could be used to manufacture an environmentally friendly alternative to synthetic commercial fibers such as nylon.

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Scientists have eyed spider silk as an enticingly sustainable alternative to synthetic fibers, which can release harmful microplastics into the environment and are often produced from fossil fuels that generate greenhouse gas emissions. But turning to nature for alternatives isn’t without challenges.

To spin spider silk from silkworms, Mi and his team introduced spider silk protein genes into the DNA of silkworms so that it would be expressed in their glands using a combination of CRISPR-Cas9 gene editing technology and hundreds of thousands of microinjections into fertilized silkworm eggs. The microinjections posed “one of the most significant challenges” in the study, said Mi, but when he saw the silkworms’ eyes glowing red under the fluorescence microscope—a sign that the gene editing had been successful—he was overjoyed.

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