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GM goat spins web based future



Modified goat milk will contain web protein

A goat that produces spider's web protein is about to revolutionise the materials industry.

Stronger and more flexible than steel, spider silk offers a lightweight alternative to carbon fibre.

Up to now it has been impossible to produce "spider fibre" on a commercial scale. Unlike silk worms, spiders are too anti-social to farm successfully.

Now a Canadian company claims to be on the verge of producing unlimited quantities of spider silk - in goat's milk.

Using techniques similar to those used to produce Dolly the sheep, scientists at Nexia Biotechnologies in Quebec have bred goats with spider genes.

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New kids on the block

Called Webster and Pete, the world's first "web kids" cannot dangle from the ceiling, nor do they have a taste for flies.



Webster and Pete
- first of many

In fact they look like any other goat. But when they mate, it is hoped they will sire nanny goats that produce milk that contains the spider silk protein.

This "silk milk" will be used to produce a web-like material called Biosteel.

Naturally occurring spider silk is widely recognised as the strongest, toughest fibre known to man.

Its tensile strength is greater than steel and it is 25 percent lighter than synthetic, petroleum-based polymers.



Spider's web is lighter and stronger than steel

These qualities will allow BioSteel to be used in applications where strength and

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lightness are essential, such as aircraft, racing vehicles and bullet-proof clothing.

Kind to humans

Another advantage of spider silk is that it is compatible with the human body.

That means BioSteel could be used for strong, tough artificial tendons, ligaments and limbs.

The new material could also be used to help tissue repair, wound healing and to create super-thin, biodegradable sutures for eye- or neurosurgery.

"The medical need for super-strong, flexible and biodegradable materials is large," said Costas Karatzas, Nexia's Vice President of Research and Development.

"This breakthrough in goat nuclear transfer technology will move our BioSteel program into the clinical testing phases earlier than by using traditional strategies,"

Cloning the future

Nexia's first transgenic goat, called Willow, was born in 1998. Willow's genes had been engineered to produce a therapeutic human protein.

A year later Willow was followed by Clint, Arnold and Danny, the

world's first cloned goats.

Using a technique similar to that used to produce Dolly the sheep, cells were taken from the body of one goat and transferred into mature unfertilised eggs.



Dolly - world's first cloned sheep

These eggs had had their original nuclei removed and replaced by nuclei taken from cells grown in culture and obtained from a separate, source goat.

Using spider genes pinpointed by researchers at the University of Wyoming, Nexia then succeeded in breeding Webster and Pete, the world's first goats to carry the spider web gene.

The two goats have now been transferred to a stud farm in New York state and are expected to start work siring a herd of "silk milk" goats this autumn.

Attempts to create artificial spider's web have failed in the past because it is difficult to make the very long protein chains found in the natural version.

The silk milk technique works because the way mammals

produce milk proteins and spiders make silk proteins are broadly similar.

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