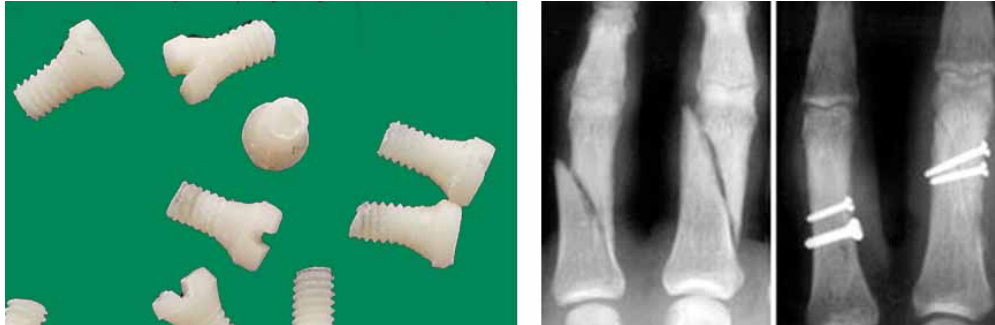


Fixing bones with silk



Screws made of silk protein (left) could one day replace metal parts. The picture on the right shows x-ray images of screws being used to repair bones. [Photo: Gabriel Perrone.]

We think of silk as something really soft, yet scientists say it could be used to screw bones together. SHAMEEN IDICULLA reports.

Silk does not just make beautiful clothes. Experiments have proven that it can also help fix broken bones. This discovery could change the way doctors do their work.

Normally, surgeons use metal plates and screws to hold together bone fragments till a fracture heals. This has many **disadvantages**. For one, metal plates are hard and stiff, which can damage the much-softer bones. They can also cause infections and delay healing sometimes. And, once the bones are joined back together, doctors often have to perform a second surgery to remove these metal devices from the human body.

Medical engineers have found that silk protein can be folded to produce a tough material that can replace metal.

Silk may be better

“Silk materials are extremely robust,” says Dr David Kaplan, who heads one of the teams. While it is tough enough to hold bone pieces together, it is also lighter and more flexible than metal. Therefore, there is less chance of it causing damage to bones.

Doctors can also track better how the injury is healing. Metal plates and screws are visible on x-rays and tend to block the doctor from seeing certain sections of the fracture. Silk, on the other hand, is not picked up on x-rays, and will thus give the doctor a clearer view.

Another advantage is that silk can dissolve over time without harming the body. Thus, silk screws and plates will slowly disappear

on their own once their jobs are done, without doctors having to perform a second surgery to remove them.

Dr Kaplan adds that different medicines can also be integrated into these silk devices so as to prevent infection and aid in the regrowth of bones.



A silk moth (left). Silk cocoons (right) are the pupa stage of this creature's metamorphosis. The cocoons are spun out of fine silk fibre by silkworms, which are the caterpillar or larva stage. [Photo: Ash Bowie, KWZ.]

Research continues

To test their theory out, the scientists created 28 special screws from silk fibres and fixed them on the hind legs of six rats. The screws stayed for four to eight weeks, which was long enough time for bones to mend. Afterward, the silk screws began to dissolve. Just as the scientists hoped they would. The next step would be to test the screws out on larger animals and then on humans.

“The future is very exciting,” says Dr Kaplan. “We envision a whole set of **orthopaedic** devices for repair based on this — from plates and screws to almost any kind of device you can think of where you don't want hardware left in the body.”

VOCAB BUILDER

disadvantages (say 'dis-ad-van-te-jes'; noun) = conditions that cause problems.

orthopaedic (say 'or-tho-pe-dik'; adjective) = a branch of medicine dealing with bones or muscles.

THE SILK CRAZE

Silk was one of the main reasons for trade between China and Europe 2,000 years ago. When Europeans found out about the silk cloth produced in China, they fell in love with this soft and shiny material. It was much more attractive than the rough wool they were used to.

Merchants of the Han Dynasty in China sold huge quantities of silk to the Romans. They transported their goods over land, through the deserts of Central Asia, usually on the backs of camels. These trade routes came to be known as “the Silk Road”.

The Silk Road was heavily used from about 200 BCE to 1450 CE. It wasn't just used for Chinese silk. Traders also transported olive oil and wine from Italy; Chinese gold, silver, iron, and porcelain; Indian cotton; Arabian incense, spices, and tortoiseshells; and East African ivory.

However, perhaps the most interesting thing that was traded was ideas. The Silk Road allowed religions like Buddhism and Islam to spread peacefully across Asia.

Activity

Jumbled words

Put the letters in the right order to figure out the real words. Hint: You can find them all in the article.

1. FIUUTABLE
2. RONBEK
3. MAADEG
4. ELMCAID
5. APESIPRAD
6. SHAMUN
7. TUBSOR
8. RAINTEC

For answers, go to Story16 at <https://digital.whatsup.sg/2021/05/jumbled-words/>