Using cotton candy to create bloodflow routes

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(PhysOrg.com) -- Cotton candy has delighted children for a century. Now it may have found a new role: helping scientists grow replacement tissues for people. The flossy stuff may be just right for creating networks of blood vessels within laboratory-grown bone, skin, muscle or fat for breast reconstruction, researchers suggest.

A lollipop at the end of a doctor's visit may ease the sobs of a crying child, but now, researchers hope to use other sugary structures to heal patients.

A team of physicians and scientists from NewYork-Presbyterian Hospital/Weill Cornell Medical Center and the Ithaca campus may have developed a way to create engineered tissue that is well accepted by the body. Results from the project were published online Feb. 9 in the journal *Soft Matter* (DOI: 10.1039/b819905a).

Currently, engineered tissues are used to take the place of damaged tissue due to injury, burns or from surgical procedures. However, they are limited in size and often die from a lack of blood supply that provides life-giving nutrients.

"For decades, the lack of a suitable blood supply has been the major limitation of tissue engineering," said Dr. Jason Spector, a plastic surgeon at NewYork-Presbyterian/Weill Cornell and assistant professor at Weill Cornell Medical College. "Without a network of blood vessels, only small, thin swaths of engineered tissue have longevity in the body."

Using crystalline sugar, scientists created a network of tiny tubes to act as tunnels, capable of shuttling nutrition-rich blood between the body's natural tissue and an artificial graft. To create the sugar fibers, researchers at the Cornell Nanobiotechnology Center (NBTC) used a common cotton candy machine.

A polymer was then poured over the fibers. Once hardened, the implant was soaked in warm water, dissolving the sugars and leaving behind a web of three-dimensional hollow micro-channels.

The study is in early stages and not yet approved for clinical use. However, promising early findings show that the novel method infuses implants with life-giving blood. The goal is to allow development of larger and more complex implants, fed by a person's own circulatory system.

More information: dx.doi.org/10.1039/b819905a

Provided by Cornell University

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