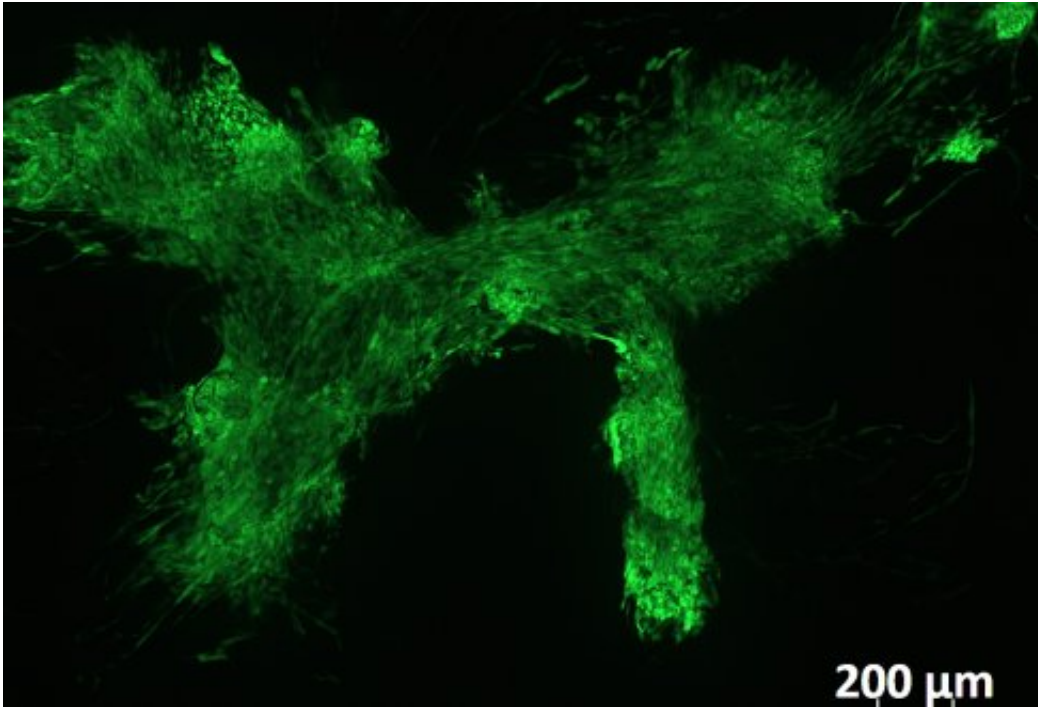


New protein gel for tissue regeneration

January 21 2016



Cytoskeleton, stained in green, of the bone type cells growing on the top of protein gels.

The human body can repair a lot of tissue damage itself. But sometimes, for instance in case of operations of wounds, it needs help. In her doctoral research, Gosia Włodarczyk-Biegun developed a protein polymer that provides a basis for the development of new biomaterials that stimulate tissue regeneration using living cells. Włodarczyk-Biegun was awarded her doctorate by Wageningen University on 18 January.

For some time now, Wageningen University has been carrying out research into the development of protein polymers, whose structure and properties can be verified very accurately. Gosia Wlodarczyk-Biegun made 'her' protein using a yeast cell. By slightly modifying the DNA of the yeast cell, she was able to control the sequence of the building blocks of the protein, the amino acids, and in this way build in functionalities.

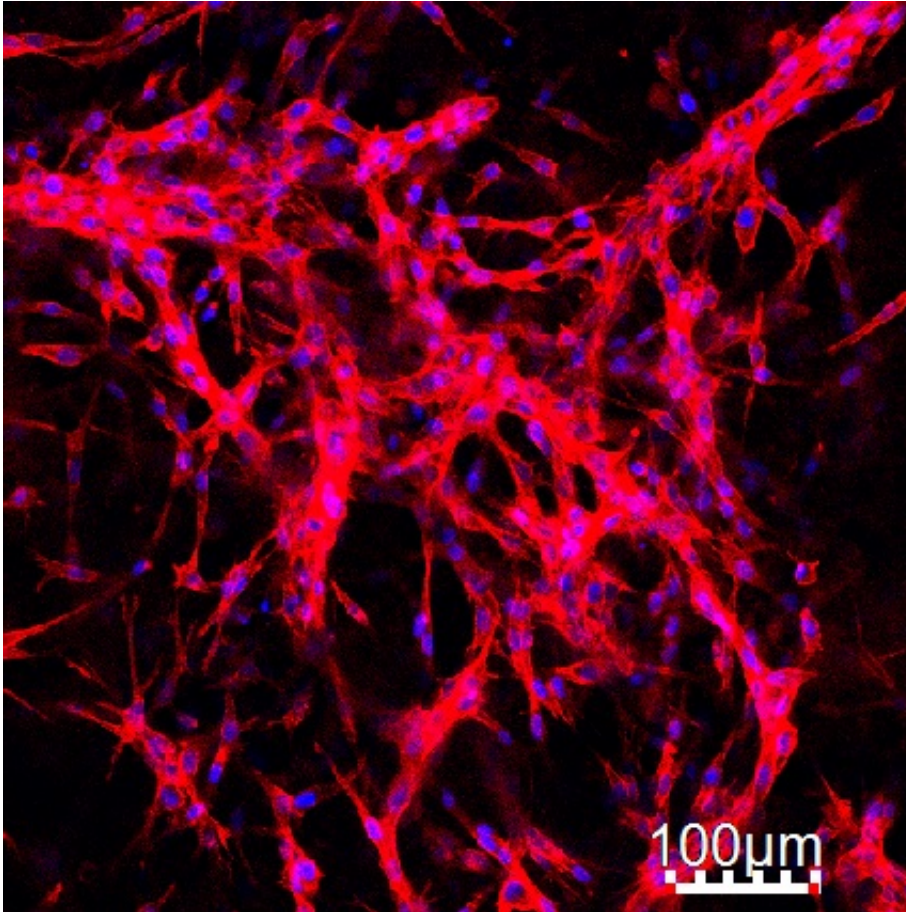
Protein polymer

The protein polymer reacts on contact with the body. "It is a liquid solution with a low pH. The body has a higher pH. You can inject the liquid and a gel is formed by the change in the pH, so you can place it very accurately in a specific position. Its structure is similar to that of natural silk," says copromotor Marleen Kamperman.

The protein is also a good growing medium for cells, as the PhD candidate demonstrates in her dissertation Silky gels for cells.

Kamperman: "The cells adhere to the hydrogel, spread over it and multiply, and this too makes the hydrogel special."

Medical application



Nuclei, in blue, and actin, in red, of the bone type cells growing inside the protein gels modified to improve cell adhesion.

The gel-forming property makes the protein polymer highly suitable for biomedical applications, such as [tissue regeneration](#) in operations and wounds. The self-made protein material also offers possibilities for toxicological research. "It enables you to look at the reaction of [cells](#) to certain substances so it's an ideal alternative to animal testing," according to Kamperman. Further research on this is needed.

Provided by Wageningen University

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