ETH zürich

Licensing Opportunity

3D microfibrillar scaffolds for in vitro cell culture, tissue engineering and surgical applications

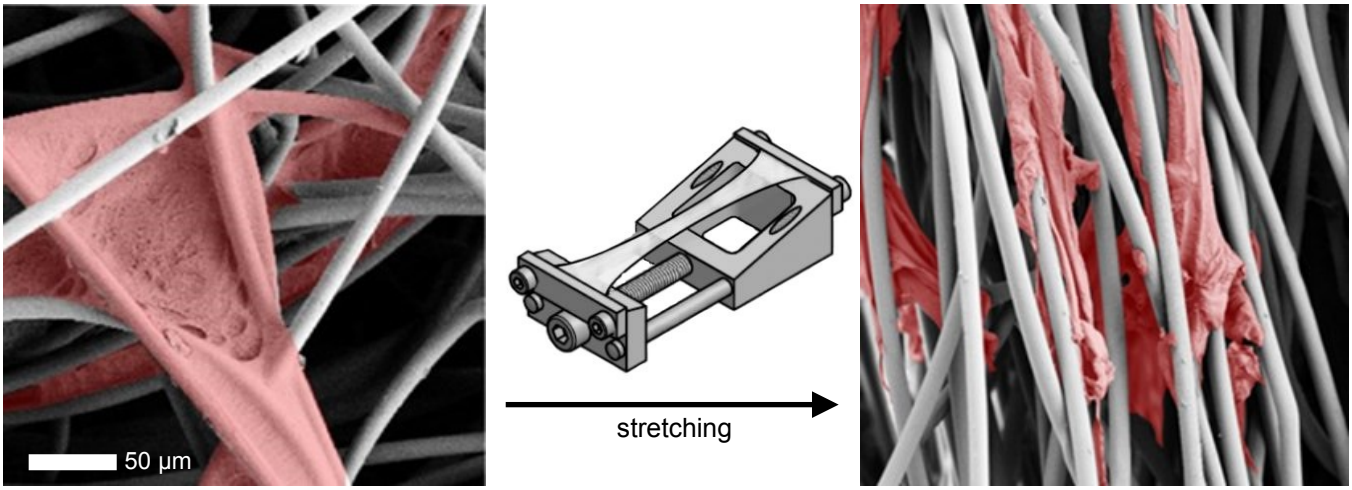


Fig 1. *(left)* False colour electron microscope image of unstretched scaffold visualizing the connection between the PGA and P4HB polymers, *(middle)* stretching the elastic scaffold, *(right)* stretched scaffold with aligned fibres [1]

Summary

With this easy and fast method a highly porous and aligned 3D scaffold can be prepared for biomedical and clinical applications.

Background

Proper cell organization is a requisite when engineering tissue with a specific functionality. The topology of a scaffold helps cells to align in the right way. 3D scaffolds with large enough pores for cell infiltration, aligned morphology and reasonable preparation times remain a challenge.

Invention

A 3D scaffold is built from commercially available and clinically approved nonwoven microfibrillar meshwork (PGA), coated with a secondary polymer (P4HB) to entangle the individual fibres. An unidirectional strain is applied to the polymers while the temperature remains above the glass transition temperature of both polymers. Uncoiled fibres align parallel to the strain axis giving rise to a 3D scaffold with large pores for cellular infiltration. The microfibrillar scaffold was successfully tested on re-growing rabbit tendon on a millimeter scale.

Features & Benefits

- Preserving huge amounts of porosity
- Efficient cell seeding
- Aligning the cells and tissues

Fields of Application

- Tissue engineering
- Reconstructive surgery
- Basic cell research

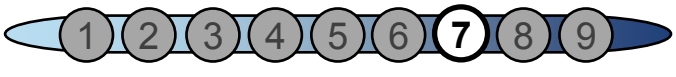
Patent Status

- Patent pending

Publication

[1] Hosseini V., Evrova O., Hoerstrup S., Vogel V., “A simple modification method to obtain anisotropic and porous 3D microfibrillar scaffolds for surgical and biomedical applications”, *Small*, 2018, 14, 1702650

Technology Readiness Level



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