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Recombinant spider silk matrices for cell culture

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Abstract

Spider silk has extreme mechanical properties, is well tolerated when implanted in living tissue and has been shown to enable regeneration of peripheral nerves1. The miniature spider silk protein 4RepCT can be processed into solid films, fibres and foams2. The material is of non-animal origin since it is produced in *E. coli* and is well tolerated when implanted subcutaneously in rats3. Furthermore, 4RepCT can easily be fused to cell binding peptides and thereby a customized matrix can be produced4.

4RepCT matrices support the proliferation of undifferentiated rat neural stem cells, and the cells can then successfully be differentiated into astrocytes, neurons or oligodendrocytes[5]. Current work is focused on 1) enabling culture and studies of neural stem cells in three-dimensional environments, and 2) to culture human embryonic stem cells and induced pluripotent stem cells on the spider silk matrices. The possibility to make implantable three dimensional, mechanically robust structures of the recombinant spider silk proteins, in combination with the option to functionalize the material with cell adhesion peptides make recombinant spider silk a unique material for cell culture and tissue engineering.

Biography

Anna Rising is a veterinarian and completed her Ph.D. at the age of 31 years from the Swedish University of Agricultural Sciences (SLU) and currently holds positions as an Assistant Professor at Karolinska Institutet and as Lecturer in Translational Veterinary Medicine at SLU. She is co-founder of Spiber Technologies AB, a spin-off company producing recombinant spider silk. She has published more than 20 papers in international peer reviewed journals.