A 3D BioSilk network as support for pancreatic aggregates

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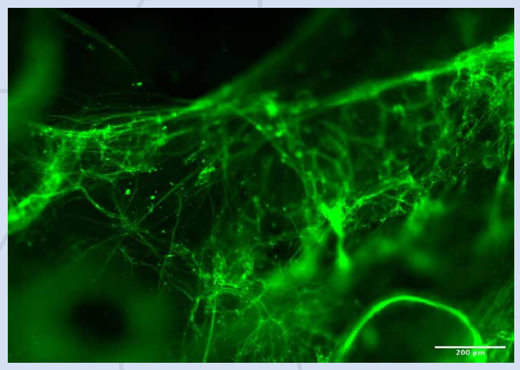
1. Aim of the study

Design of a 3D spider silk scaffold (BioSilk) to mimic the extracellular matrix (ECM) to support fuctional maturation of pancreatic aggregates derived from human embryonic stem cells for transplantation to diabetic patients or high-throughput drug screening.

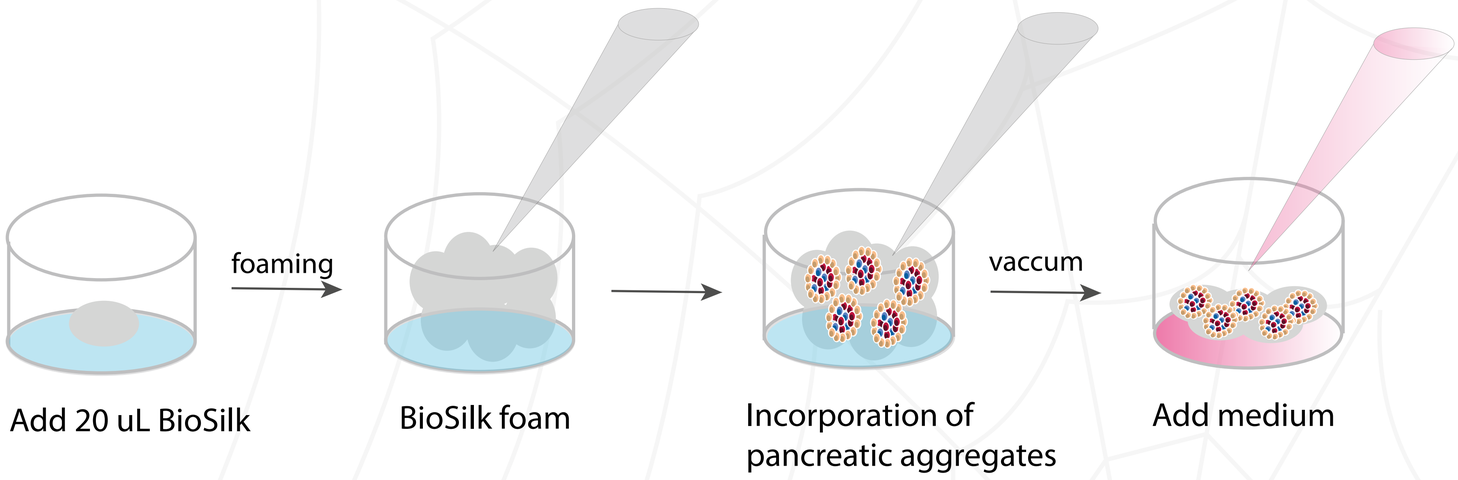
Why use BioSilk?

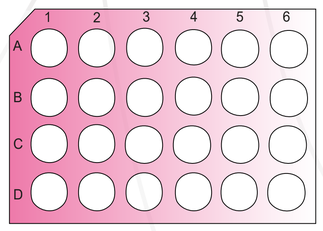
BioSilk is a silk protein recombinantly produced in *E.coli* and functionalized with a fibronectin derived RGD motif to improve cell adhesion. It self-assembles into a stable 3D network to support pancreatic aggregates during maturation.



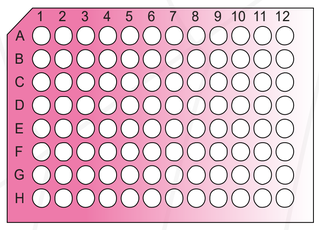
Foam network created with BioSilk labelled with Alexa-Fluor 488

2. Methods



1. 

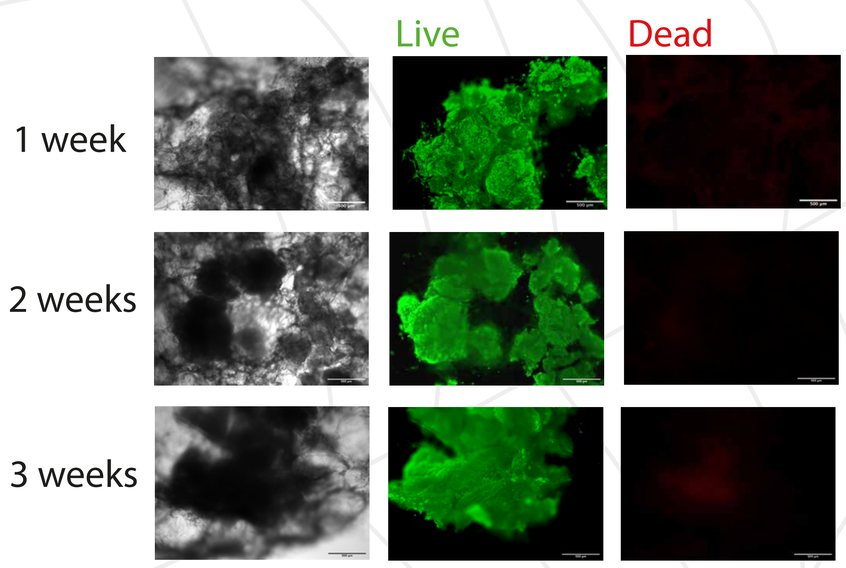
Large BioSilk network
40 µl BioSilk +
300 aggregates per foam

2. 

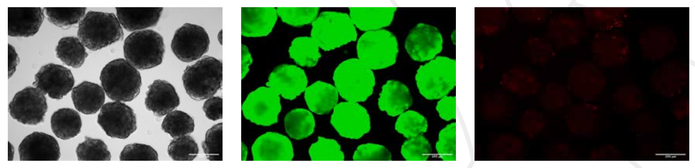
Small BioSIlk network
20 µl BioSIlk +
100 aggregates per foam

3. Results

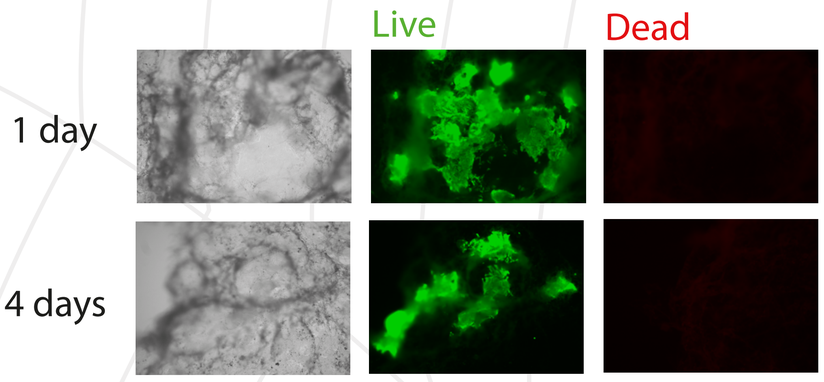
Viability of large BioSilk networks



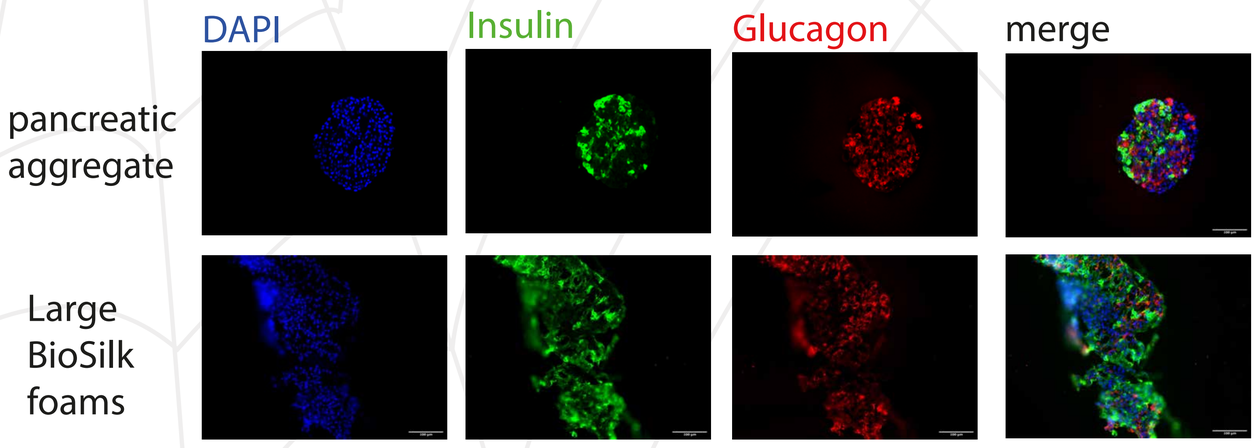
Viability of pancreatic aggregates



Viability of small BioSilk networks



Functionality in large BioSilk networks after 3 weeks



4. Conclusions

Pancreatic aggregates incorporated in BioSilk networks remain viable and produce insulin and glucagon over 3 weeks of cultivation. Both foam sizes could be used for multiple applications e.g. the large BioSilk format for transplantation to diabetic patients and the small BioSilk format (96 well) for high-troughput drug testing.

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This project has received funding from the European Union's Horizon 2020 framework programme for research and innovation under the Marie Sklodowska-Curie grant agreement No 813453.

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