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Design of bioartificial scaffolds as *in vitro* models of pathological human cardiac tissue



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In vitro models of human pathological cardiac tissue are promising tools to screen new therapies for cardiac regeneration. In this work, 2D and 3D bioartificial scaffolds based on polycaprolactone (PCL) were developed and functionalised with gelatin through a mussel-inspired approach. Bioartificial scaffolds with different geometries were populated with human cardiac fibroblasts (HCFs) to reproduce the complexity of *in vivo* human cardiac fibrotic tissue. HCFs cultured on bioartificial scaffolds showed improved attachment and proliferation compared to non-functionalised scaffolds, and the secretion of cardiac extracellular matrix proteins. Concluding, a platform of PCL-based scaffolds with different geometries able to support long-term HCFs culture and to mimic different severity degrees of human cardiac fibrosis was prepared useful for the *in vitro* testing of advanced therapies for cardiac regeneration.

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