



Combining adult stem cells and polymeric devices for tissue engineering in infarcted myocardium

Submitted by Emmanuel Lemoine on Fri, 07/18/2014 - 13:52

Titre	Combining adult stem cells and polymeric devices for tissue engineering in infarcted myocardium
Type de publication	Article de revue
Auteur	Karam, Jean-Pierre [1], Muscari, Claudio [2], Montero-Menei, Claudia [3]
Editeur	Elsevier
Type	Article scientifique dans une revue à comité de lecture
Année	2012
Langue	Anglais
Date	15/05/2012
Numéro	23
Pagination	5683-95
Volume	33
Titre de la revue	Biomaterials
ISSN	0142-9612

Résumé en anglais

An increasing number of studies in cardiac cell therapy have provided encouraging results for cardiac repair. Adult stem cells may overcome ethical and availability concerns, with the additional advantages, in some cases, to allow autologous grafts to be performed. However, the major problems of cell survival, cell fate determination and engraftment after transplantation, still remain. Tissue-engineering strategies combining scaffolds and cells have been developed and have to be adapted for each type of application to enhance stem cell function. Scaffold properties required for cardiac cell therapy are here discussed. New tissue engineering advances that may be implemented in combination with adult stem cells for myocardial infarction therapy are also presented. Biomaterials not only provide a 3D support for the cells but may also mimic the structural architecture of the heart. Using hydrogels or particulate systems, the biophysical and biochemical microenvironments of transplanted cells can also be controlled. Advances in biomaterial engineering have permitted the development of sophisticated drug-releasing materials with a biomimetic 3D support that allow a better control of the microenvironment of transplanted cells.

URL de la notice	http://okina.univ-angers.fr/publications/ua3645 [4]
DOI	10.1016/j.biomaterials.2012.04.028 [5]

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[5] <http://dx.doi.org/10.1016/j.biomaterials.2012.04.028>

Publié sur *Okina* (<http://okina.univ-angers.fr>)