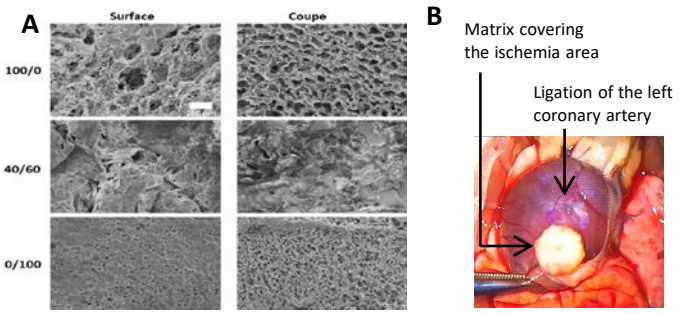
BIOMATERIALS

3D matrix for mesenchymal stem cells (MSC)

Autologous graft of MSC is used for the treatment of cardiac ischemia. The organ functionnal recovery is mainly attributed to paracrine effects, thus depends on cell survival rate after introduction. Current injection methods offer low survival rate after 3 days, limiting the efficacy of the therapeutic strategy.

DESCRIPTION*

- 3D matrix made of alginate and chitosan complexes suitable for MSC culture and displaying the following *in vitro* features:
  - Preservation of cell phenotype
  - Preservation of MSC viability to c.a. 80% after 1 month
  - Preservation, or even increase, of the paracrine secretory capacity of the MSC compared to 2D cultures
- Production process compatible to GMP standards while controlling the architecture
- *In vivo* property: excellent biocompatibility, significant improvements of the cardiac function and of the neovascularization of the infarcted tissue, limitation of the ventricular fibrosis



Photos : CIRIMAT & I2MC.

A) Surface and transversal section of the matrix porosity under various alginate/chitosan mass ratio observed by scanning electron miscroscope; B) Picture of a matrix positionned on a rat heart 4 weeks after implantation.

TECHNICAL SPECIFICATIONS

Pore size	0,2µm to 400µm
Porous volume	60% to 98% of total volume
Elasticity module at 50% of deformation	1 to 100kPa

COMPETITIVE ADVANTAGES

- Compatible with *in vivo* use (biocompatible, biodegradable, ingredients and GMP process compatible)
- Adaptable and reproducible functionnality (control of 3D architecture and porosity)
- Easy handling (mechanical resistance)

APPLICATIONS

- *In vitro* cell culture
- Cell therapy based on paracrine effect, especially in the field of cardiology

INTELLECTUAL PROPERTY

- Patent pending

DEVELOPMENT STAGE

- Technology validated in lab

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LABORATORIES

- Inter-university Material Research and Engineering Centre (CIRIMAT)
- Institute of Cardiovascular and Metabolic Diseases (I2MC)

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