



Industrial Consultancy & Sponsored Research (IC&SR)

Cardiac nanomatrix bioscaffold and method of developing and characterizing the same

IITM Technology Available for Licensing

PROBLEM STATEMENT

- In the present era, Myocardial Infarction (MI) accounts for 50% of all cardiovascular Heart Disease(CVHD)-related mortality and morbidity in the developing countries including India.
- Further, following MI, the myocardium is damaged and is replaced by fibrotic scar tissue which leads to dyskinesia of the infarcted segment leading to poor ventricular activity (ejection fraction) deteriorating the overall cardiac function.
- There are a few therapy discussed in the background of the present invention wherein regenerative therapy and other therapy like cardiac matrix based biomaterials discussed which are unable to identify cardiomyogenic differentiation in efficient manner.
- Hence, there is need to address the issues in efficient manner.

TECHNOLOGY CATEGORY/ MARKET

Technology: Cardiac nanomatrix bioscaffold;

Industry: Pharmaceutical, Healthcare;

Application: Nanomatrix bioscaffold;

Market: The global Bioresorbable vascular scaffold market is projected to grow **USD 316.7M** by **2031** at a **CAGR of 7.8%** during the forecast period 2022 to **2031**.

TECHNOLOGY

- Present invention describes about **a method for development & characterization of the cardiac nanomatrix bioscaffold from *in vitro* cultured cardiac fibroblast derived extracellular matrix (ECM).**
- Said method facilitates culture and differentiation of Bone Marrow Stromal Cells (BMSCs) into cardiomyogenic lineage and which can mediate angiogenesis of endothelial cells in the infarcted myocardium.

- The features of the claimed method comprises a few steps depicted in smart chart:

1

Nanomatrix is derived from cardiac fibroblast to form a nanomatrix scaffold of cardiac extracellular matrix (ECM);

2

Further this seeded with bone marrow derived stromal/stem cells and with steps of decellularization, is finally formed into a cardiac Nanomatrix.

KEY FEATURES / VALUE PROPOSITION

Technical Perspective: Nanomatrix may be seeded with cells which promote **cardiac repair** including **Fetal cardiomyocytes**, Embryonic Stem cells (**ESCs**), Cardiac Progenitor cells (**CPCs**), Skeletal myoblasts, Smooth muscle cells, Endothelial Progenitor cells (**EPCs**), & etc.

Industrial Perspective: Cardiogel from non-coated plates used for **proteomic analysis**, while cardiogel from gelatin coated plates used for evaluating its biological properties such as **cytocompatibility & regenerative potential**.

INTELLECTUAL PROPERTY

IITM IDF Ref.: 1190;

IN Patent No. 424022 (Granted)

TRL (TECHNOLOGY READINESS LEVEL)

TRL- 3, Proof of Concept Ready Stage

RESEARCH LAB

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CONTACT US

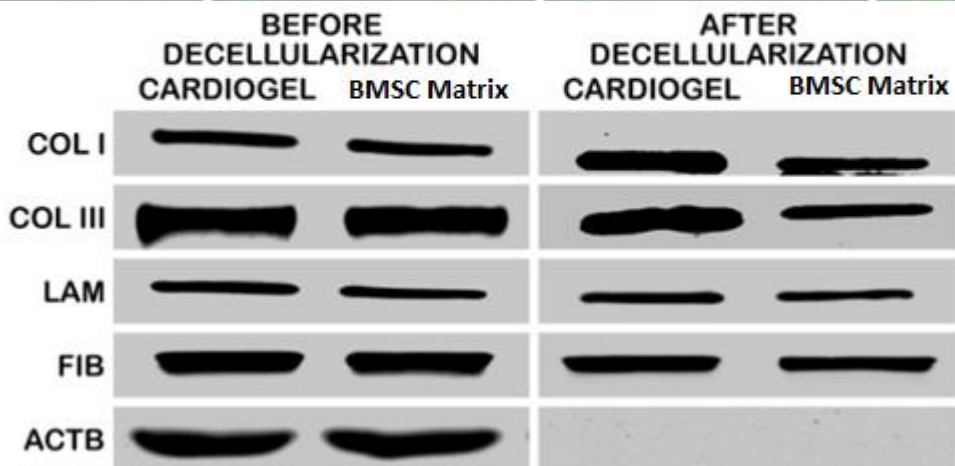
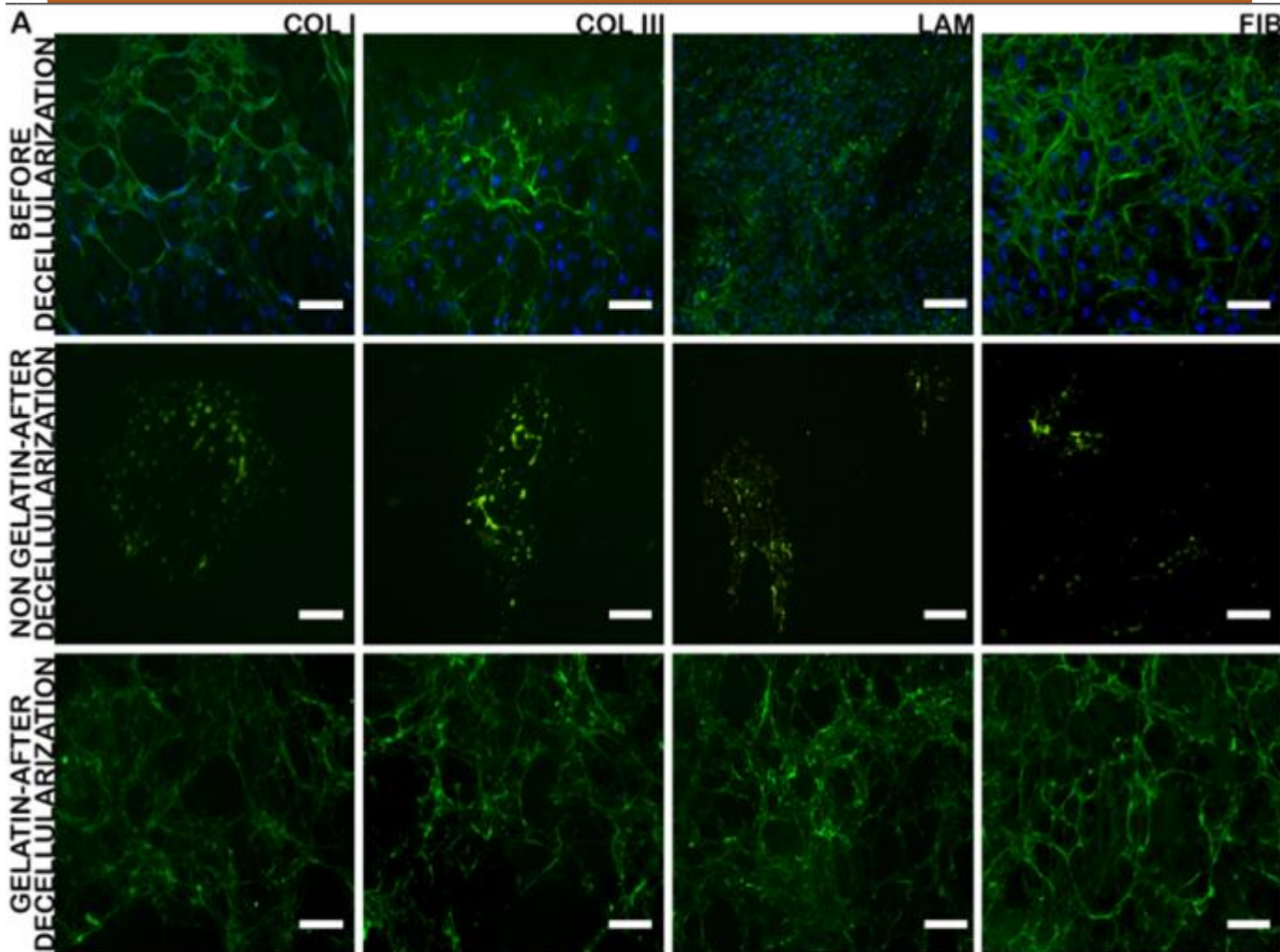
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