BioMatrix: A Double Cross-Linked Self-Healable Hydrogel for Bioprinting Applications

Category
Biomaterial

Novel bioink composed of non-animal derived synthetically cross-linked components for use in2D and 3D cell culture bioprinting applications.

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Background

BioMatrix is a novel bioink which is composed of non-animal derived synthetically cross-linked components and can be used in the fields of 2D and 3D cell culture bioprinting applications. The novel proprietary BioMatrixInk forms a nanofibrous network, mimicking the extracellular matrix, which can support cell growth, signaling, and proliferation. Additionally, it has been developed to offer optimal rheological properties for bioprinting by extrusion-based printing methods ensuring both cell viability and printability.

Technology Overview

BioMatrix Ink is printable at room temperature, is shear-thinning and thixotropic, which can reduce the shear stress experienced by cells during the printing process, hence can be tailored to specific applications, and it has potential as 3D models, in 3D bioprinting, 3D cell cultures, and to entrap and sustain release of different bioactive drugs/cargos.

Hydrogels formed of BioMatrix ink exhibit self-healing properties due to the presence of higher order cross-linking; it can be supplied as a powder, to be rehydrated with the most suitable aqueous based solution including commercial cell culture media. The viscosity of BioMatrix Ink is found to be higher at lower shear rate and decreased at higher shear rate resulting in high printing fidelity.

See Figure 1.

Benefits

• Quick gelation upon the addition of buffer/water/cell culture media with no requirement for extreme temperatures, pH adjustment, UV curing, or addition of reactive crosslinking reagents, which can be detrimental to cells' health.

• Optimized for extrusion-based printing methods.

• Shear-thinning and thixotropic, which can reduce the shear stress experienced by cells during the printing process.

• Proven biocompatibility with various cell types (including human dermal fibroblast, mesenchymal stem cells, osteoblasts).

Patents

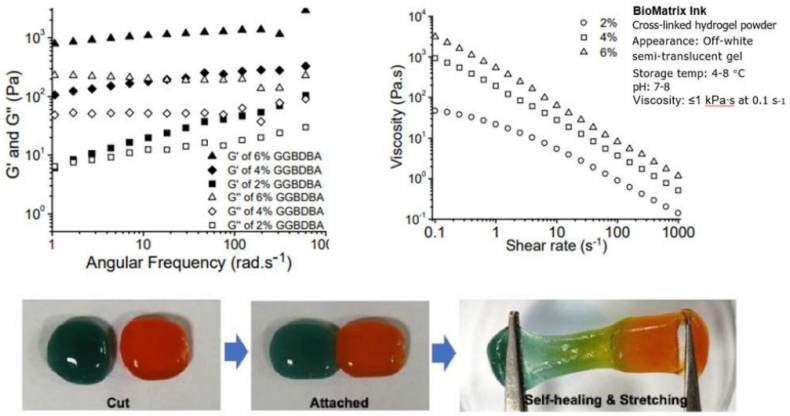
• Patent application No. PCT/GB2023/051891

Seeking

Licensing

IP Status

Patent application submitted



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