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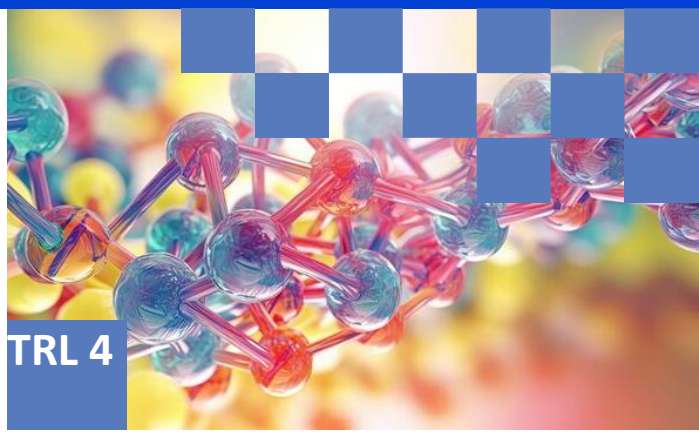
chemistry

Peptide hydrogels for skeletal muscle regeneration



About the invention

The invention comprises bioactive peptide hydrogels based on a self-assembling RADA16-I scaffold, functionalized with fragments of interleukin-4 (IL-4) or stromal cell-derived factor 1 (SDF-1). Eight hydrogel variants contain linkers designed for peptide release in response to matrix metalloproteinases (MMPs).

In vitro studies showed that selected R1-SDF1-X and R4-IL4-Y hydrogels supported differentiation and fusion of myoblasts derived from human induced pluripotent stem cells (iPSCs). Cell migration and responses of fibroblasts and endothelial cells were also investigated.

In mouse studies, R1-SDF1 improved treadmill performance following muscle injury. Beneficial changes in selected regeneration markers were observed in a muscular dystrophy model. The technology remains at the preclinical research stage.

IP protection

European patent application No. **EP25225358.8.**

Technology readiness level

TRL 4 – in vitro validation and preclinical studies in animal models.

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Applications

- Regeneration of injured skeletal muscle,
- Development of muscular dystrophy therapies,
- Scaffolds and carriers for tissue engineering.

Possible cooperation

- Technology licensing,
- Joint R&D and formulation development,
- Preclinical studies and implementation.

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