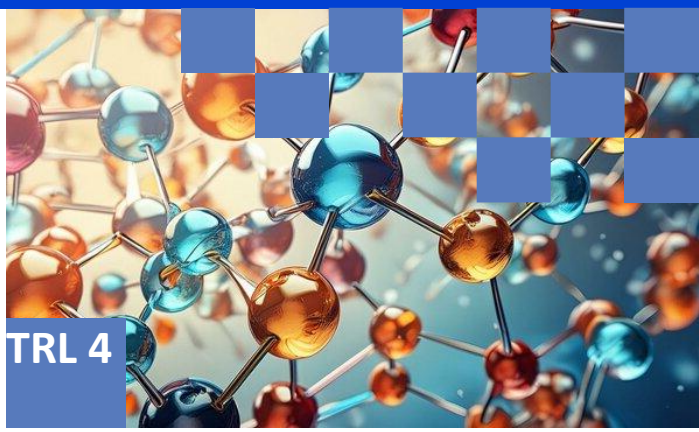
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chemistry

IL-4 and SDF-1 peptides for skeletal muscle regeneration



About the invention

The invention concerns four designed and synthesized bioactive peptides: IL-4-X, IL-4-Y, SDF-1-X and SDF-1-Y, derived from interleukin-4 (IL-4) and stromal cell-derived factor 1 (SDF-1/CXCL12). They are intended as candidates for supporting skeletal muscle repair and as functional components of biomaterials.

Molecular modelling and receptor interaction studies involving IL-4Rα and CXCR4 were complemented by in vitro testing on human skeletal myoblasts, dermal fibroblasts, bone marrow stromal cells and induced pluripotent stem cells.

IL-4-Y and SDF-1-X enhanced human myoblast migration, while IL-4-X improved myogenic differentiation. Effects on proliferation varied by cell type. No induction of chondrogenic or osteogenic differentiation was observed under the tested conditions. The technology is at the in vitro research stage.

IP protection

European patent application No. **EP25225361.2**.

Technology readiness level

TRL 4 – peptide synthesis and in vitro biological validation.

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Applications

- Regeneration of injured skeletal muscle,
- Functionalization of scaffolds and biomaterials,
- Development of regenerative medicine technologies.

Possible cooperation

- Technology licensing,
- Joint R&D on peptides and biomaterials,
- Mechanistic validation and preclinical development.

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