Exploring the roles of chondromodulin-1 (Cnmd) for augmenting cell therapy for OA

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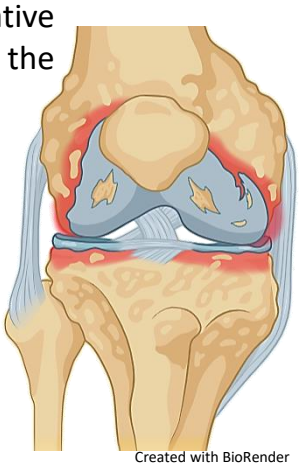
Osteoarthritis

OA is a painful degenerative disease that affects the articular cartilage.

- OA can be categorized into three stages: early, moderate, late;
- The cartilage tissue undergoes complex changes through time;
- Early and moderate OA therapies need to be improved.



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Chondromodulin-1 (Cnmd)

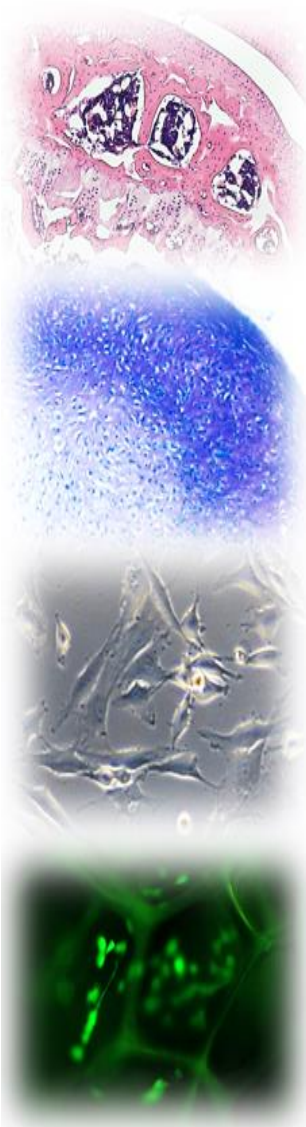
Cnmd gene was discovered in 1991. It encodes a type II transmembrane glycoprotein precursor with cleavable C-terminal domain that is deposited in the extracellular matrix of cartilage.

Some characteristics of Cnmd are:

- It stimulates the proliferation of chondrocytes;
- It acts as an anti-angiogenic agent, because it can inhibit the vascular cells;
- It is correlated to OA, namely, there is a reduced expression of Cnmd with OA progression.

Project design

Main scope



The main goal of this project is to investigate the dual chondro-protective and anti-inflammatory roles of Cnmd, for augmentation of cell therapy for OA.

The leading research questions are:

- Does the lack of Cnmd lead to OA progression during aging?
- Does Cnmd expression change in different biochemical and biomechanical environments?
- Does Cnmd have a direct effect on other OA-related cells types?

Methodologies

A combination of different cell types, 2D and 3D culture models and Cnmd delivery strategies, will be implemented to characterize the promising therapeutic functions of Cnmd in detail.

- Co-culture models;
- Quantitative cell assays;
- q-PCR;
- Immunostainings;
- Protein analyses;
- Cutting-edge imaging techniques.

Collaborations

The plan also includes secondments to OSTASKILLS partner Universities and biotech companies to gain valuable experience, thus adding value to the project as well as establishing collaboration with renowned experts in the field.

Gain of this project

The results of this project may lead to the development of Cnmd-aspired cartilage-specific drugs, as well as innovative ways to augment the resilience of cell transplants for OA therapy.