Extracellular matrix for increase the synthesis and/or deposit of collagen

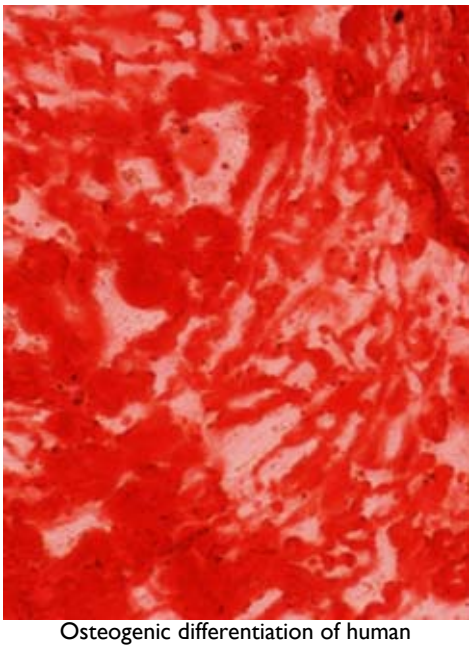
CSIC has developed an extracellular matrix with increased synthesis and/or deposit of collagen that is capable of regulating the differentiation of mesenchymal stem cells.

Industrial partners from the biotechnological industry are being sought to collaborate through a patent licence agreement.

An offer for Patent Licensing

Collagen in vivo

The use of biomaterials in regenerative medicine is an excellent therapeutic strategy for the treatment of damaged tissues or organs. Biomaterials based on the production of extracellular matrix from cell cultures have recognized advantages with respect to synthetic materials. However, the standard culture conditions do not favor the efficient production and deposition of extracellular matrix components (EMC), mainly because the dilution of the cellular microenvironment hinders the extracellular action of certain enzymes necessary for the processing of matrix components, such as the enzyme that catalyzes the conversion of procollagen into collagen, the bone morphogenetic protein type 1 (BMP1), or the one that initiates the formation of covalent crosslinks in mature collagen, lysyl oxidase (LOX). In this invention a method has been developed to promote the formation and deposition of collagen from cell cultures by adding the enzymes LOX and BMP1 to the culture medium. Using this method and through the elimination of collagen-producing cells, matrices have been generated capable of providing the necessary environment for the growth, maintenance and differentiation of mesenchymal stem cells, so this procedure constitutes a methodology of great potential for production of biomaterials in regenerative medicine.



Osteogenic differentiation of human mesenchymal stem cells seeded on decellularized matrices from fibroblasts exposed to LOX/BMP1.

Main innovations and advantages

- The method strongly increases the synthesis and/or deposition of collagen onto matrices endogenously produced by fibroblast cultures and can be potentially adapted to any other matrix-producing cell type.
- The surface onto which the ECM of this invention is deposited may be capable of adhering the cells to be cultured and capable of releasing the cells when the culture process is complete.
- The matrix surfaces produced by this protocol provide the conditions required for the growth and maintenance of mesenchymal stem cells, and have been shown to regulate the osteogenic and adipogenic differentiation of these cells.

Patent Status

Priority patent application filed suitable for international extension

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