differentiation. Lastly, the topography of the scaffold support may also affect the cell responses.

With regard to the last factor, some important scaffold design principles that have been widely accepted may include high surface area, biodegradability and biocompatibility of the material, mechanical integrity to maintain the predesigned tissue structure and enable positive interactions with cells (enhanced cell adhesion, growth, migration, and differentiated function). Several known scaffold fabrication methods, such as phase separation, electro-spinning, micro-topographical effects on micro-beads prepared by gel formation have been proposed to improve the positive interactions. Yet, the problem of random topography achieved and the limited degree of spatial control still persists. Consequently, variation within the fibrous structure of the scaffold makes it difficult to investigate the response of the cells to random surface topography.

Accordingly, there is a need to develop a topographical scaffold for tissue engineering that integrates the selection of cell types and ECM used for coating the nano-topographical scaffold so as to mitigate the limitations discussed above.

There is a need to develop a method that allows for a selective activation and differentiation of cells on various topological surfaces.

Summary

The present disclosure~~According to a first aspect, there is~~ provide~~d~~s a method for promoting stem cell chondrogenesis, comprising the step of culturing a population of stem cells on a plurality of imprints disposed on a substrate, said imprints being configured to selectively promote chondrogenesis of the stem cells.

In a first aspect, there is provided a method for promoting stem cell chondrogenesis, comprising the step of culturing a population of stem cells on a plurality of imprints disposed on a biocompatible polymer substrate, said imprints being configured to selectively promote chondrogenesis of said stem cells.

culturing the population of stem cells on a three-dimensional pellet culture system.

The present disclosure~~According to a second aspect, there is~~ provide~~d~~s a cartilage graft comprising a population of stem cells differentiated chondrocytes disposed on a plurality of imprints on a substrate, said imprints being arranged in an ordered manner and configured to selectively promote chondrogenesis of the stem cells.

In a second aspect, there is provided a cartilage graft comprising a population of stem cells differentiated chondrocytes disposed on a plurality of imprints on a biocompatible polymer substrate, said imprints being arranged in an ordered manner and configured to selectively promote chondrogenesis of said stem cells.

Advantageously, the imprints can be arranged in an ordered manner, in which the imprints are spaced apart from each other according to a defined value, on the cartilage graft, such that it is now possible to predict and clearly define the extent of stem cell chondrogenesis that would occur on the cartilage graft. Hence, this ensures that the extent of stem cell chondrogenesis can be selected and reproducible, leading to greater certainty when fabricating a cartilage graft to have a desired degree of stem cell chondrogenesis.

Definitions

The following words and terms used herein shall have the meaning indicated:

The expression "promoting stem cell chondrogenesis" as used herein, is to be interpreted broadly to refer to an increase in the differentiation of stem cells, such as mesenchymal stem cells, into chondrocytes. This enables increased cartilage formation, enhanced production of cartilage matrix and/or increased cartilage repair.

The term "stem cells" is to be interpreted broadly to refer to undifferentiated cells that have the potential to differentiate into different cell types. The stem cells are able to self-renew in the sense that they can migrate to areas of injury to generate daughter cells that can undergo terminal differentiation into more than