Articular cartilage is a remarkable tissue. It tolerates a wide range of loads, from continuous to intermittent to sudden impact. It does this by a sophisticated mechanism based on its microscopic structure.

It is the maintenance of the structural properties of the solid phase:
- The collagen fibrils.
- Proteoglycans.
- Glycoproteins.
Those determine its longevity.

This stringent structural requirement, along with the inherent limitations of articular cartilage to repair itself, are the reason that it has been so difficult to cultivate the correct environment for healing of articular cartilage lesions.

The inability of cartilage to repair itself to any significant degree has been extensively studied and repeated by numerous investigators beginning with Hippocartes.

Compared to many other tissues, the chondrocyte to matrix ratio, mitotic activity, and turnover rate are very low. With age, the potential for spontaneous repair decreases further.

Surgeons and scientists have developed various approaches to restore cartilaginous articular surface with the intention of relieving pain and improving mobility for people with traumatic or degenerative damage to their synovial joints.
These approaches can be divided into three categories:
A- Methods intended to stimulate formation of new cartilageneous tissue.
B- Transplantation of osteochondral allografts or autografts.
C- Transplantation of tissue engineered ex. Vivo chondrogenic cells.

Chondrogenesis means new solution for the problem of articular cartilage, injuries. The recent work with bioreactors holds promise that large number of cells can be grown efficiently and quickly pushing cell transplantation to the forefront of the problem.

However, many questions remain before tissue engineering techniques can be used to mass produce cartilage replacements. Further studies must be conducted to find an optimal polymer for use in the scaffold. Also the type of cells (differentiated or progenitor) that are best for this application has yet to be decided. It is the interaction of these two parameters (material and cells), along with the possible addition of growth factors and/or mechanical stimulation to influence cellular development, which will determine the ultimate success of the implant.

As chondrogenesis, long term results are out of concern:
- No current experimental strategy has succeeded in consistently producing cartilage that shows no signs of degeneration after one year.
- Structure at these times (late times) points is also extremely important.
- None of the studies reviewed in this assay have created a tissue that fully regenerates the natural zonal organization of articular cartilage. Even after several months in vivo.

A final hurdle to full cartilage regeneration is the integration of any newly formed tissue with the existing cartilage without this integration
SUMMARY AND CONCLUSION

Forces that occur at the interface could have deleterious long term effects to the replacement tissue.

Despite considerable work that must be done to optimize parameters for formation of tissue engineered cartilage, because this tissue is not vascularized and incorporates only one cell type it is likely one of the best tissues after skin to be successfully regenerated.

Further development of techniques for chondrocyte transplantation would be an incredible advance in the field, providing hope for many patients that must endure chronic joint pain due to failure of conventional methods to restore cartilage function.