



## DNA Therapy to Enhance Cartilage Repair

### Principal Investigator:

Paul DiCesare, M.D.

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### Background:

Over the past decade the number of operations performed on knees has risen dramatically and currently account for almost half of all orthopedic procedures, approximately 648,000 annually. Whether articular cartilage is damaged from trauma or congenital anomalies, its successful clinical regeneration is poor at best. The inability of adult articular cartilage for self repair has been well recognized and has stimulated much interest. Current modes of therapy, including cell transplantation (including stem cells) and the administration of peptide growth and differentiation factors have proven to be ineffective or impractical. Gene therapy for arthritis has focused on the use of viral vectors to introduce the desired gene. However, concerns have been voiced regarding the use of retroviruses, including the risk of insertional mutagenesis, the difficulty in targeting specific tissues, and immunogenicity to viral particles. A need still exists for less costly, efficient and effective methods and therapies for the repair and regeneration of cartilage.

### Description of Project:

Dr. DiCesare has developed a new therapeutic approach to repairing damaged cartilage. Proof of principle was established in studies of rabbit knees with full-thickness articular cartilage defects. A genetically engineered construct (naked plasmid DNA) capable of expressing a bioactive agent for stimulating and otherwise facilitating the repair and regeneration of cartilage (in this case a peptide growth factor) was implanted in a vehicle (a polymer sponge) and then transferred to the injury site. The early repair cells that populate a full-thickness articular cartilage defect incorporated the implanted naked plasmid DNA and, once transfected, served as local bioreactors, transiently producing the bioactive agent, which stimulated hyaline-like articular cartilage repair.

### Applications:

Repair of damaged cartilage.

### Patent Status:

Non-provisional US patent application and PCT have been filed.

### For further Information please contact:

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