

Development of Novel Bioartificial Ligament Using Autologous Biological Scaffold and Cells

...an innovative regenerative medicine-based solution for ligament & tendon repair

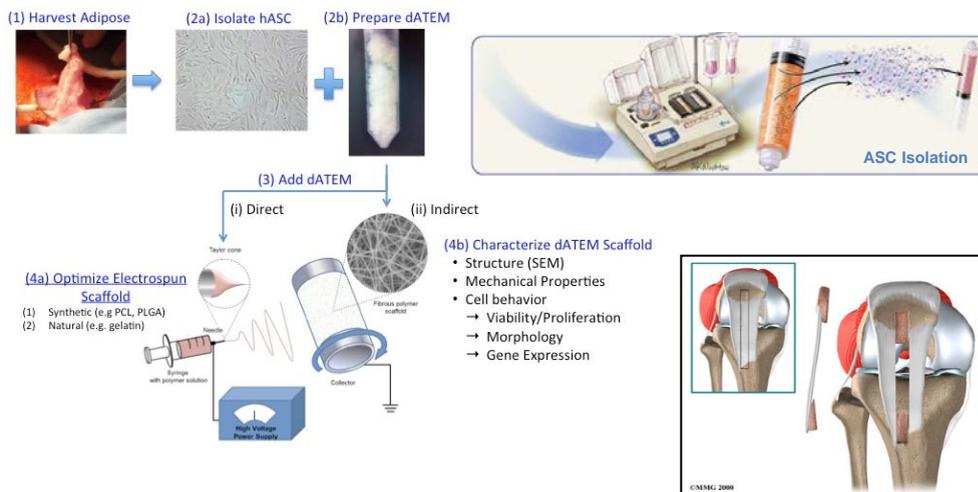
Regenerating patellar ligament graft site following anterior cruciate ligament reconstruction for complete joint repair

In orthopedic regenerative medicine, one of the most arduous challenges is to develop a viable replacement tissue graft for anterior cruciate ligament (ACL) reconstruction. Given the limitation of current technologies, creating a clinically viable biological ACL graft replacement in the near term with comparable composition and mechanical properties to those of the native ACL tissue is not realistic. Tissue engineering and regenerative medicine can provide a more clinically viable and preferred solution for complete joint repair.

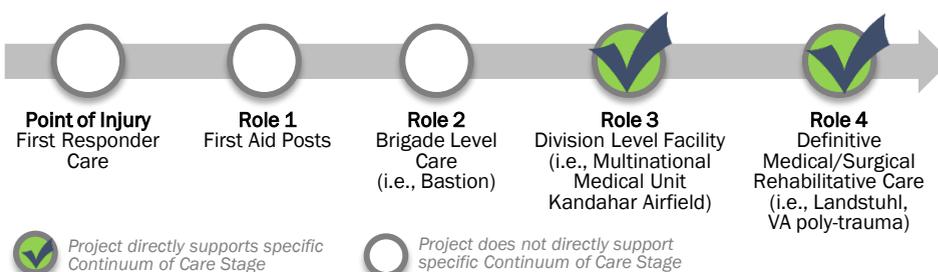
As a logical step towards the ultimate goal of an ACL graft replacement, the project targets prevalent donor site morbidity in the patellar ligament following tissue grafting. By utilizing a biological scaffold material, cell engraftment and cell signaling is significantly improved. The combination of appropriate bio-scaffold material and adipose derived regenerative cells is designed to enhance and accelerate repair. Minimizing morbidity and accelerating repair will improve surgical outcomes, improve quality of life for the patient and ultimately reduce health care costs.

Key Features

- Autograft ACL reconstruction leads to donor site pain and morbidity, and is frequently associated with numerous complications and secondary disability
- Bioartificial ligament is fabricated by combining extracellular matrix-based scaffold and stem cells from adipose tissue.
- Adipose stem cells are isolated using the Tissue Genesis Icellator Cell Isolation System®
- Adipose tissue-derived extracellular matrix is isolated and electrospun along with natural and synthetic polymers to form a scaffold for a bioartificial ligament



Supporting the Continuum of Care



This project is managed by the **Pacific Joint Information Technology Center**, which focuses on rapidly researching, testing, and developing warfighter medical solutions and products, through pilots or prototypes in support of the DOD.