Extended Abstract

The Use of an Acellular Connective Tissue Matrix in Hindfoot and Ankle Fusions: Understanding the Cellular Bench Top Data with a Consecutive Patient Series: A Pilot Study

Brigido SA[1*], Scott Carrington[1], Protzman NM[2], Yong Mao[3], Thomas Pashuck E[3], Joachim Kohn[3] and Mohit Bhatia[4]

[1]Department of Foot and Ankle Surgery, Coordinated Health, Bethlehem, United States

[2]Department of Clinical Integration, Coordinated Health, Allentown, Pennsylvania, United States

[3]New Jersey Center for Biomaterials, Rutgers University, Piscataway, New Jersey, United States

[4]Research Consultant, Celularity, Yardley,

Abstract

Biomaterials are often used to support the healing and regeneration of bone tissue [1,2]. One of the key requirements for biomaterials/ scaffolds to be considered for bone tissue engineering is the biocompatibility and degradability of such biomaterials [3].

Placental connective tissue matrix (CTM) is a decellularized placental tissue matrix, which has minimal immunogenicity and retains the fundamental structure and functional characteristics of an intact excellular matrix. This means that CTM has the ability to provide a cell friendly environment, while allowing for the formation of endothelial channels and ultimately vascular penetration. Cellular migration and endothelial formation will ultimately cause a release of the appropriate growth factors for healing and allow the CTM to transition into functional tissue. CTM has been successfully used in clinical practices to promote wound healing and soft tissue reconstruction of the extremity and trunk

In order to explore the feasibility of CTM in bone repair and regeneration applications, the biocompatibility CTM with bone-forming cells has to be established. Osteoblasts are the bone-forming cells in bone tissue and play a critical role in bone tissue development and bone regeneration [7,8]. In this study, the adhesion and proliferation of human osteoblasts on CTM were evaluated. A consecutive clinical series of hindfoot and ankle fusions was performed to understand the clinical efficacy of CTM when mixed with cancellous autograft. It was hypothesized that using CTM as a scaffold would augment the already cell friendly environment of autograft bone and accelerate healing.