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ADIPOSE-DERIVED EXTRACELLULAR MATRIX AS A BIOLOGICAL SCAFFOLD MATERIAL FOR WOUND HEALING

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Biomaterials that induce wound regeneration and adipogenesis may ultimately serve as alternatives to traditional tissue reconstruction and regeneration technologies. In addition, these materials can provide environments for studying factors that regulate wound healing and adipogenesis.

In this article, we hypothesized that human adipose tissue contains many and much proteins as well as adipose derived stromal cells. So we investigated the potential of adipose-derived extracellular matrix to induce tissue regeneration for wound and adipogenesis. Adipose tissue derived extracellular matrix (ADECM) containing basement membrane (BM) proteins and growth factors were extracted from human subcutaneous adipose tissue. We conducted initial analysis of ADECM to identify their components which could be responsible for adipose tissue induced tissue regeneration and found that ADECM contain a complex mix of proteins, and Western blots and ELISAs revealed the presence of important BM constituents including laminin α 4, collagen IV, nidogen and fibronectin, etc. And to confirm the possibility of ADECM as a biological scaffold material, we manufactured ADECM gel form by controlling the temperature and pH and evaluated for their effects on human adipocytes. Theses ADECM appear to provide a positive environment for preadipocyte differentiation in vitro and the seeded preadipocytes on ADECM matrices have aggregated and formed large, lipid-loaded colonies.

In conclusion, this study suggests ADECM may lead to a new material for tissue repairment and providing an environment for studying cell-matrix interactions in adipose tissue engineering technologies.