

Cell-derived and enzyme-based decellularized extracellular matrix exhibit compositional and structural differences that are relevant for its use as a biomaterial

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Abstract

Due to its availability and minimal invasive harvesting human adipose tissue-derived extracellular matrix (dECM) is often used as a biomaterial in various tissue engineering and healthcare applications. Next to dECM, cell-derived ECM (cdECM) can be generated by and isolated from in vitro cultured cells. So far both types of ECM were investigated extensively towards their application as (bio)material in tissue engineering and healthcare. However, a systematic characterization and comparison of soft tissue dECM and cdECM is still missing. In this study, we characterized dECM from human adipose tissue, as well as cdECM from human adipose-derived stem cells (ASCs), towards their molecular composition, structural characteristics, and biological purity. The dECM was found to exhibit higher levels of collagens and lower levels of sulfated glycosaminoglycans (sGAGs) compared to cdECMs. Structural characteristics revealed an immature state of the fibrous part of cdECM samples. By the identified differences, we aim to support researchers in the selection of a suitable ECM-based biomaterial for their specific application and the interpretation of obtained results.

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