



Macrophage phenotypes correspond with remodeling outcomes of various acellular dermal matrices

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ABSTRACT

Macrophages have recently been characterized as having an M1 or M2 phenotype based on receptor expression, mechanism of activation and function. The effects of macrophage phenotype upon tissue remodeling following implantation of an acellular dermal matrix (ADM) is largely unknown. The purpose of this study was to compare the macrophage phenotype and tissue remodeling elicited by four different ADMs (DermaMatrix, AlloDerm, Integra and Der mACELL). ADM samples were wrapped around the inferior epigastric vessels of a rat and were harvested on 7, 14, 21 and 42 days post implantation. Immunohistologic methods were used to identify macrophage surface markers CD68 (pan macrophage), CCR7 (M1 profile), and CD206 (M2 profile). All human derived ADMs showed a bell shaped curve for distribution of CD68+ macrophages with peaks for DermaMatrix occurring at day 14 and peak influx for AlloDerm occurring on day 21. In contrast, bovine derived Integra showed an increasing trend of macrophages with time. DermACELL had the highest influx of macrophages while Integra had the lowest. A quantitative analysis of phenotype of macrophages in AlloDerm showed that the cells were predominantly M1 at 7, 14, 21 and 42 days post implantation. In contrast, Integra showed a mixed M1/M2 population of macrophages at all time points. The histopathologic evaluation showed that a predominantly M1 macrophage response was associated with a more inflammatory type tissue remodeling outcome in AlloDerm while a mixed M1/M2 macrophage response was associated with a more constructive tissue remodeling response seen in the other substrates.

KEYWORDS

Acellular Dermal Matrix; Derma Matrix; AlloDerm; Integra; Derm Acell

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