Cell-matrix Interactions During En Masse Cell Migration
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ABSTRACT
Extended wound care, including prolonged treatment of burn injuries, acute and chronic wounds, is a significant source of patient discomfort and financial burden to public healthcare programs. Both accelerated healing and prevention of scar formation are highly desired but remain to be challenging to achieve. This is primary due to limited understanding of interactions between cells and the surrounding extracellular matrix (ECM) during wound healing. Particularly, collective migration of fibroblasts through provisional matrix, so called en masse migration, is one of these interactions that play a critical role in later stages of granulation tissue formation and wound closure. In addition to biochemical cues, mechanical properties of the tissue are recently being considered to play a significant role during these processes. In particular, both stiffness of ECM is suggested as important factors for single cell migration. However, it is still not clear how these mechanical factors affect bi-directional interactions between a group of fibroblasts and the ECM. In order to address this question, we performed measurements of fibroblast migration on collagen matrices where matrix stiffness was independently varied by controlling collagen concentrations. (Expected results) It was found that the extent of fibroblast migration increased as stiffness of substrate increased. The results of this study are useful to understand the mechanical interactions between cells and ECM during wound healing and have implications to development of new wound dressings for improved wound healing outcomes.

KEYWORDS
Collective cell migration, Biomechanics, Wound healing process