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The Dendritic Cells' Immunological Behaviors Modulated by the Spatial Confinements of Deposited Fibrin Matrix

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Abstract: The responses of dendritic cells (DCs) to the mechanical microenvironment caused by implanted materials are highly correlated to the host immune responses and largely determines the outcome of tissue regeneration [1,2]. In the early stage of the inflammations following injury or implantation, a large amount of fibrin would deposit around the implanted materials and form a microporous fibrous-liked network structure, which can provide mechanical microenvironment with different spatial confinement in dimensions for following recruited DCs. Herein, we have established a useful model by salmon fibrin to mimic the deposited fibrin matrix and found that DCs cultured on or in fibrin hydrogels exhibit various morphological features (e.g. shapes and dendritic branch). The spatial confinements cause the reorganizations of DCs' cytoskeleton and generate mechanical stimuli to DCs, leading to significant impacts on the biomechanical characteristics and the immune functions of DCs. Thus, the mechanical stimuli deriving from the spatial confinements of deposited fibrin matrix is an important mechanical factor to modulate the biological behaviors of DCs. It is significant for further understanding the effects of the remolded mechanical microenvironment caused by inflammations on DCs' immunologic behaviors.

Keywords: Dendritic cells; fibrin matrix; spatial confinement; mechanical stimuli; immune functions

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