

Differentiation pathways of monocyte-derived phagocytes in Peyer's patches

To detect pathogens of contaminated food or drink, the mammal small intestine possesses specific sentinel sites marked by the presence of lymphoid follicles. Peyer's patches (PPs) are the most important of these immune inductive sites. They are constituted of clustered domes formed by B cell follicles, interspersed with T cell zones termed interfollicular regions. PP-induced immune responses rely on the sampling, processing and efficient presentation of antigens by phagocytes. The specialized monocyte-derived phagocytes termed LysoDC are hallmarks of Peyer's patch subepithelial dome where their main function is to sample pathogens. Here, we used single-cell RNA sequencing to study their differentiation pathway. We identified four main differentiation states. We built their differentiation trajectories and fate diversity in correlation with their location. We showed that one of the LysoDC differentiation state is located in the follicle in a CXCR5-independent manner whereas the others reside in the subepithelial dome and mature as they get closer to the epithelium. Immature subepithelial LysoDC display proliferative activities whereas mature subepithelial LysoDC acquire a specific gene signature shared with conventional dendritic cells underlying their ability to gain dendritic cell functions while differentiating.

Keywords : Mucosal immunity, Peyer's patch, phagocytes, dendritic cells, monocytes

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