

TRACKING HUMAN INTESTINAL MONOCYTE DIFFERENTIATION THROUGH SINGLE CELL RNA SEQUENCING

Mononuclear phagocytes are proposed to have important functions regulating both homeostasis and inflammatory diseases of the gut though their exact roles have not yet been clarified. In mice intestinal macrophages have been shown to differentiate from circulating blood monocytes. To investigate the intestinal human compartment of mononuclear phagocytes we have used an unbiased approach in the form of single cell RNA sequencing. The sequenced material was obtained from two patient resection samples, where lamina propria was isolated from submucosa and gut associated lymphoid tissue. The sequenced and preprocessed data was analyzed with different bioinformatic approaches including trajectory analysis and inference of RNA dynamics to assess monocyte differentiation and heterogeneity of the myeloid cells.

The analyses suggest that circulating peripheral blood monocytes can give rise to macrophages through intermediate stages in the intestines of humans. The analyses also suggest that monocytes can differentiate into a subset of cells with expression pattern similar to profiles from classical dendritic cell 2 (cDC2). Additionally, we find a cluster of cells which share expression patterns with both macrophages and cDC2, the identity of these cells is still unresolved.

These results were used to design an antibody panel, which enables us to identify the proposed differentiation of monocytes to macrophages with flow cytometry and compare the occurrence of distinct mononuclear phagocyte subsets in colon and ileum human samples.

Keywords : monocyte, macrophage, dendritic cell, differentiation, scRNA-seq, mononuclear phagocyte, human

Authors :

References : , , ,

Authors

Line Wulff 1, Thomas Fenton 1, José Gonzalez-Izarzugaza 1, William Agace 1,

1. Health Technologies, Technical University of Denmark, Kongens Lyngby, DENMARK