

Human Dendritic Cells: From Development to Functions

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Dendritic cells (DCs) are professional antigen-presenting cells that mediate immune responses. Important questions on the origins and differentiation paths of human DC populations remain unanswered. First, we combined two high-dimension techniques, single-cell mRNA sequencing and Cytometry by Time of Flight mass spectrometry to define and characterize human DC precursors (pre-DC) present in adult bone marrow and blood and revealed that pre-DC comprises distinct lineage-committed sub-populations. We also characterized the human fetal DC lineage and show that similar DC subpopulations can be identified in fetal tissues and are related to adult populations. However, fetal DC strongly promoted regulatory T-cell induction and inhibiting T-cell tumour-necrosis factor- α production through arginase-2 activity, indicating that they mediate homeostatic immune-suppressive responses during gestation. Altogether, we show that the DC lineage shares common development pathways from early fetal development to adulthood. However, DC functions differ drastically depending on the environment in which they are immersed.