Developmental trajectory of liver stem/progenitor cells at single-cell resolution

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The differentiation and maturation trajectories of fetal liver stem/progenitor cells (LSPCs) are not fully understood at single-cell resolution. Considering that a priori knowledge of limited biomarkers could restrict trajectory tracking, we employed marker-free single-cell RNA-Seq to characterize comprehensive transcriptional profiles of ~800 mouse fetal liver single cells from eight embryonic stages. For the first time, we reconstructed the dynamic developmental trajectories of LSPCs based on their transcriptional profiles at single-cell resolution, which exhibited contiguous but discrete genetic control through transcription factors and signaling pathways. We further analyzed the single-cell transcriptomic profiles of cholangiocytes, which exhibit distinct transcriptional programs compared with hepatoblasts. In general, our data provide not only a valuable resource but also novel insights into the fate decision and transcriptional control of self-renewal, differentiation and maturation of LSPCs.

This work is supported in part by the China National Key Projects for Infectious Disease (2012ZX10002012-008 and 2013ZX10002010-006), the National Natural Science Foundation of China (81472621, 81272271 and 81402329), Shanghai Sailing Program (15YF1405800), Start Funding for Young Teachers of SJTU (14X100040063) and Medical and Engineering Crossover Fund of SJTU (YG2014QN14).