

**Cell atlas of the fetal human heart and implications for autoimmune-mediated congenital
heart block**

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Supplementary material

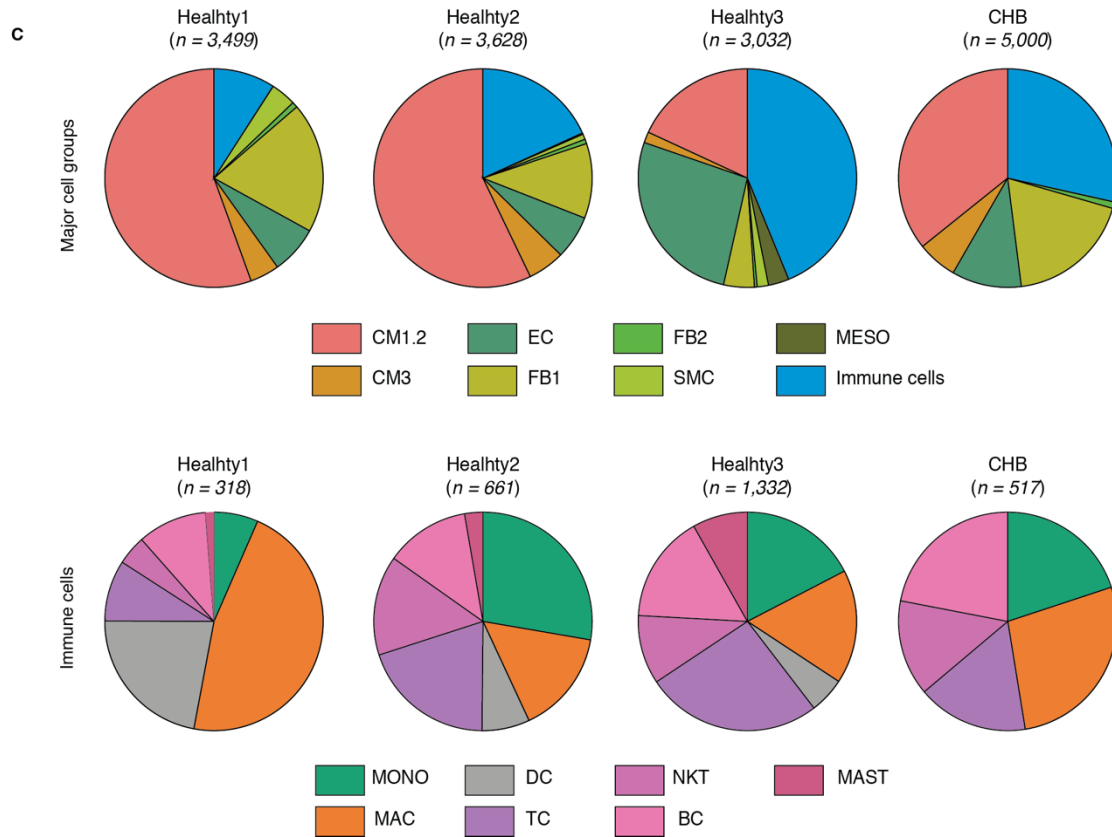
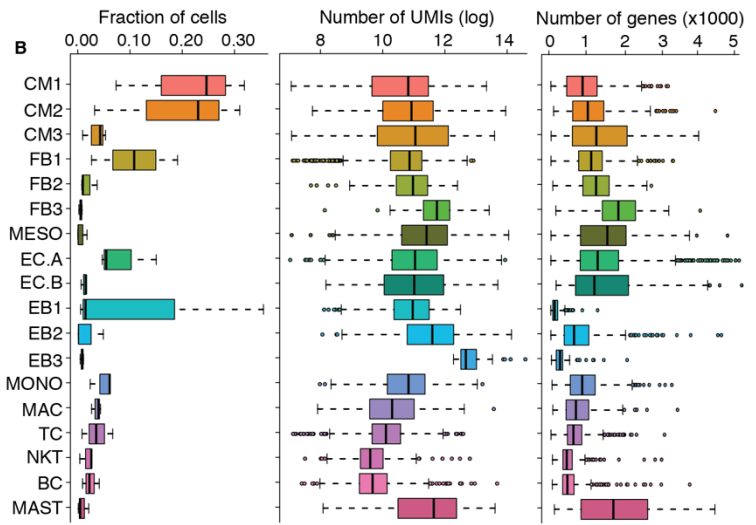
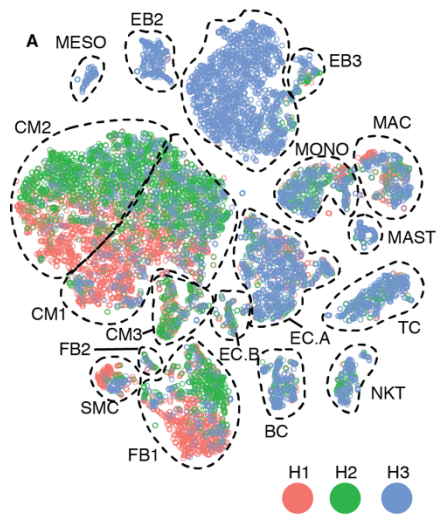


Figure S1. (A) t-SNE-visualization of 12,461 cells obtained from three healthy samples colored by sample identity. (B) Box plots (from left to right) highlighting the contribution of individual samples ($n=3$) to each cell cluster, number of UMIs (log), and number of genes detected by cells in each cluster. (C) Contribution of individual samples to each cell type. (top and bottom) Each pie chart shows sample contribution of each detected cluster and major cell groups (color-coded legend) for healthy and CHB samples respectively. Number of cells is marked above each pie chart. EBs were excluded from calculating cellular proportions.

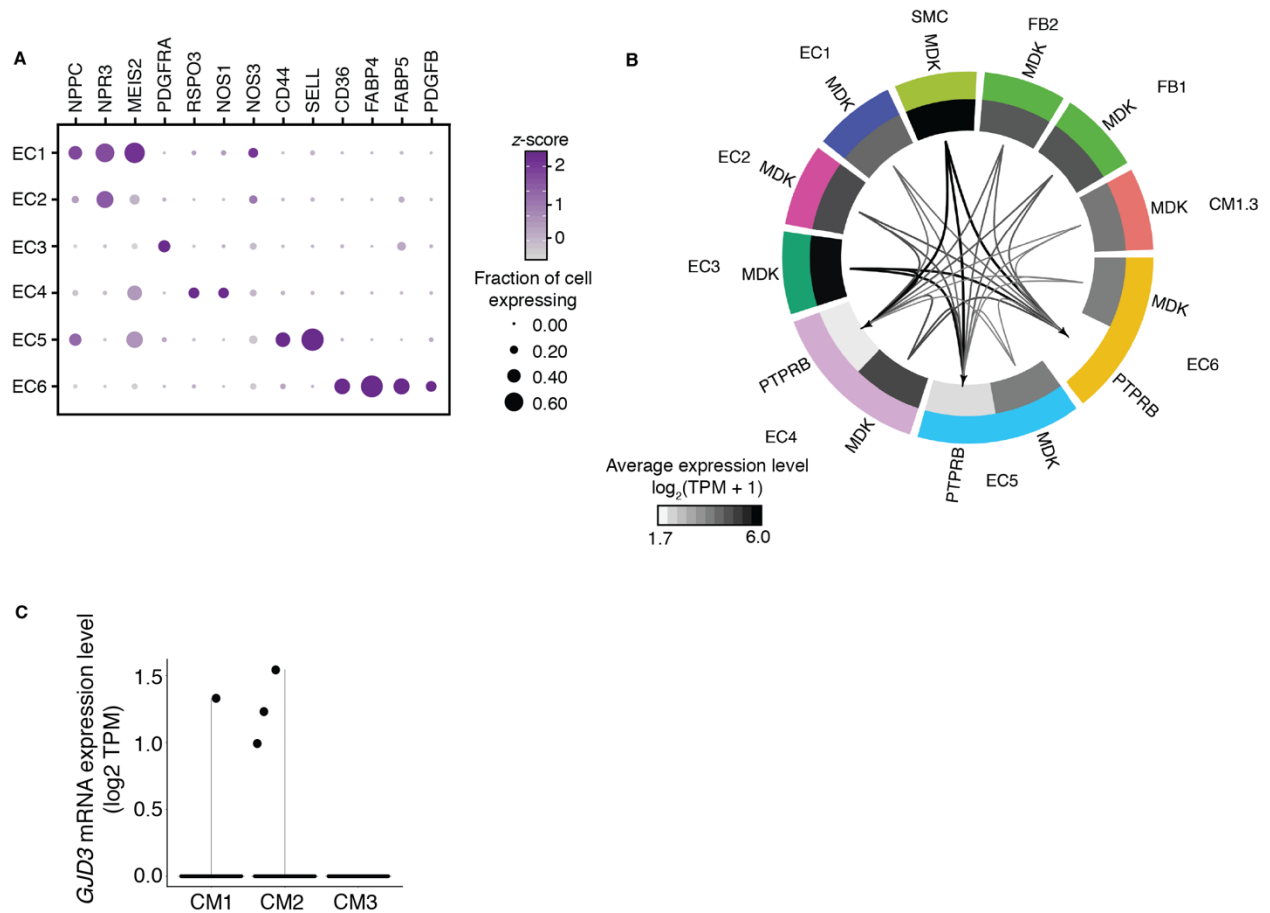


Figure S2. (A) Dot plots showing expression of other important genes in EC subclusters. (B) Putative MDK-PTPRB signaling within fetal heart cell types with size of the arrow stem proportionate to expression levels of the ligands. All the arrows are pointing to the receptors. Only ligands with >5 TPM and receptors with >1.8 TPM average expression were used for interaction analysis display. (C) Violin plot showing expression of *GJD3*, an AV node cell marker, in the cardiomyocyte population. Each dot represents an individual cell.

Figure S3. Identification of cell types in CHB human fetal heart. (A) Cell clusters assigned for 5,286 cells from the CHB sample based on established markers and visualized using t-SNE. (B) Dot plots showing expression of known lineage markers and co-expressed lineage-specific genes. (C) Dot plots showing expression of EC lineage markers and other selected genes by EC subpopulation. The subcluster numbers correspond to the subcluster type identified in the healthy samples. Note that EC5 subgroup in the healthy hearts was not detected in subgroups of CHB EC.

Sample ID	Gestational age (weeks)	Disease state	Number of raw reads (in million)	Cells passing QC
Healthy1	19	Normal	204	3540
Healthy2	22	Normal	161	3726
Healthy3	22	Normal	155	5195
CHB	21	anti-Ro associated congenital heart block	205	5286

Table S1. Sample information on healthy and CHB heart samples