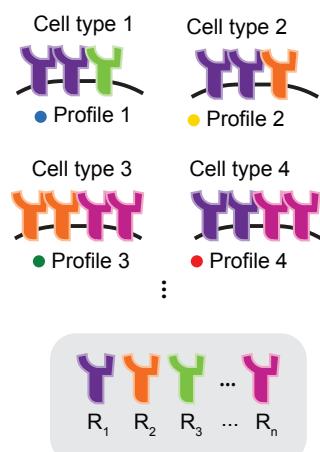


**Figure 1: Pathway expression profiles could recur across diverse cell types**

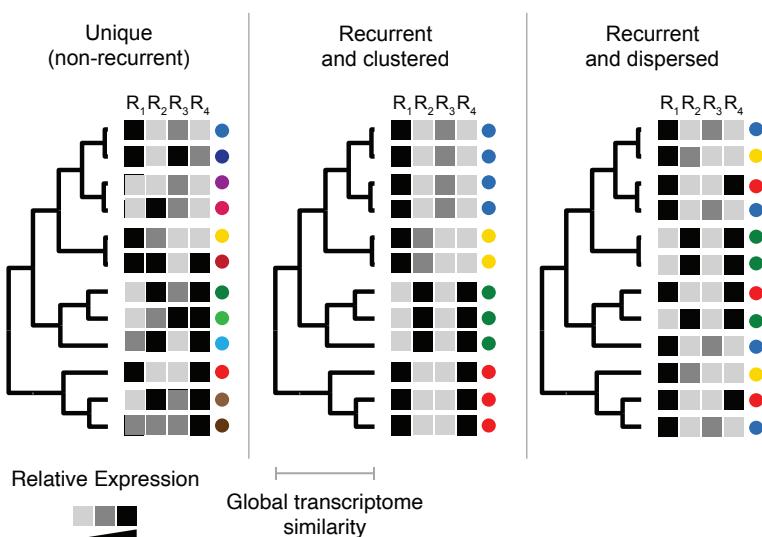
**A**

Receptor expression profiles



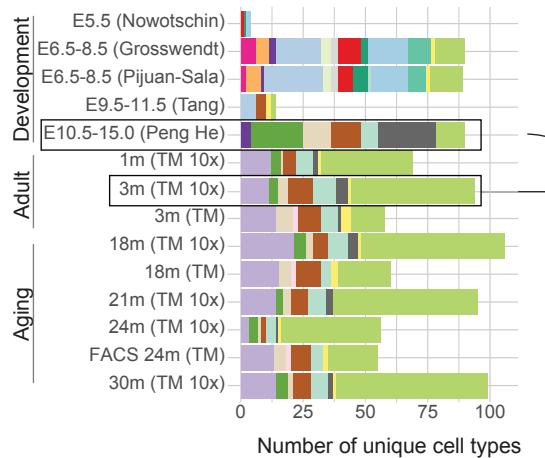
**B**

Pathway profiles could be...



**C**

Multiple mouse cell atlas datasets



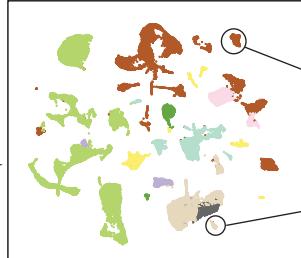
**D**

Individual cell atlases

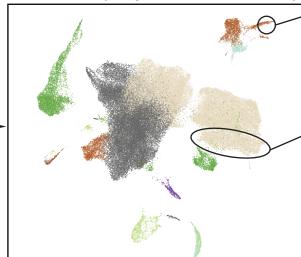
Single-cell transcriptome profiles

1 dot = 1 cell

Tabula muris (3 month old mouse)



Forelimb (Days E10.5 - E15.0)

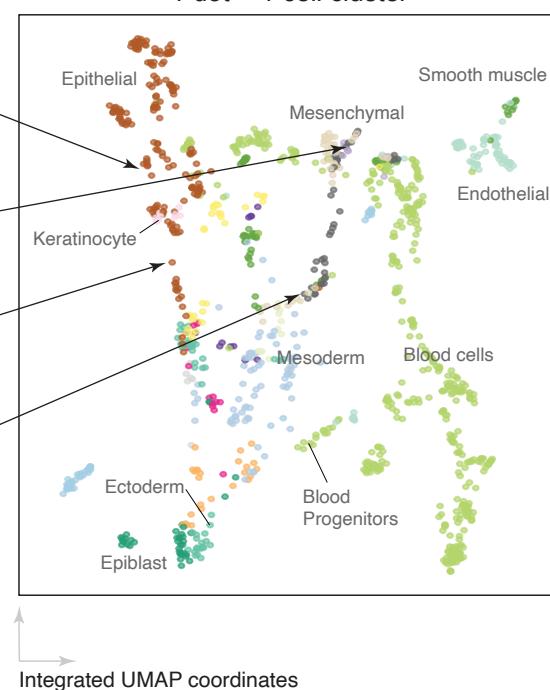


Integrated cell state atlas

Global cluster-averaged profiles

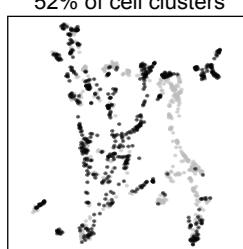
All data sets in (C)

1 dot = 1 cell cluster

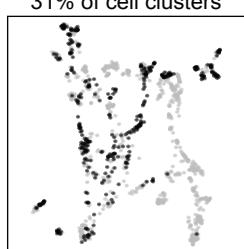


**E**

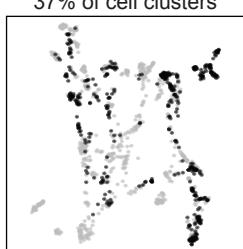
TGF- $\beta$   
52% of cell clusters



Wnt  
31% of cell clusters



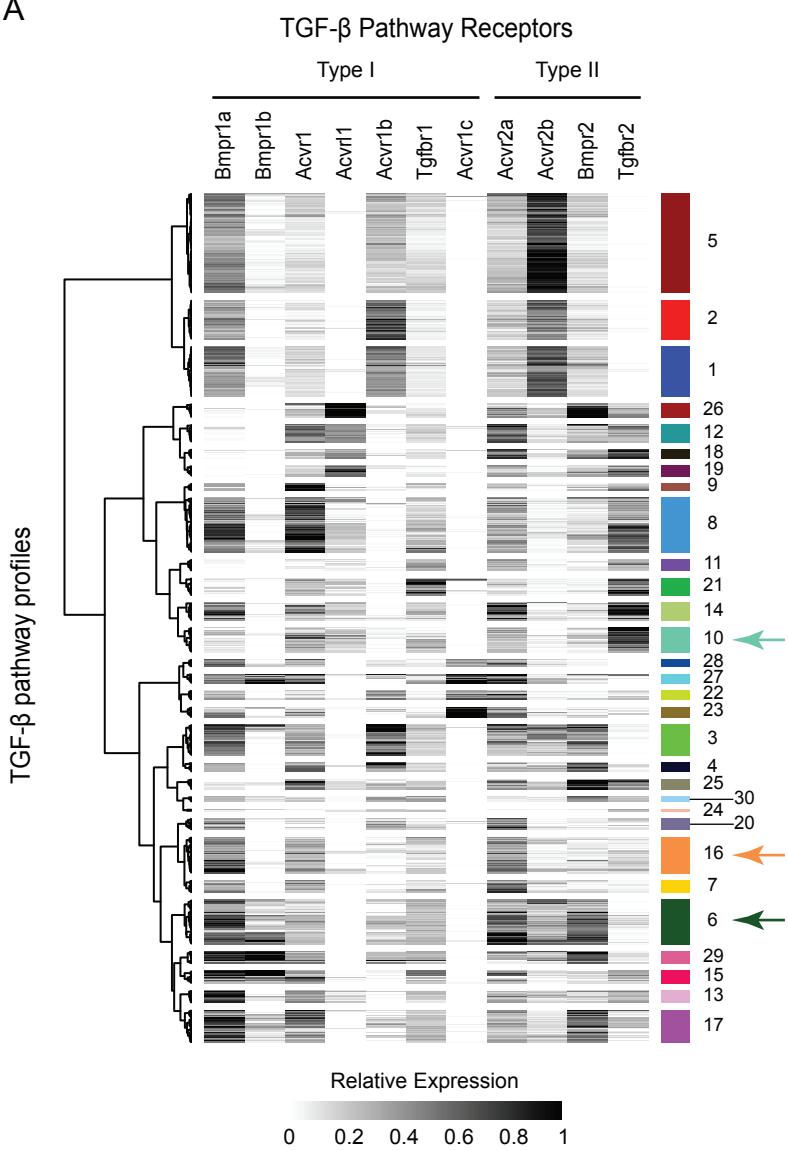
Notch  
37% of cell clusters



Dataset UMAP coordinates

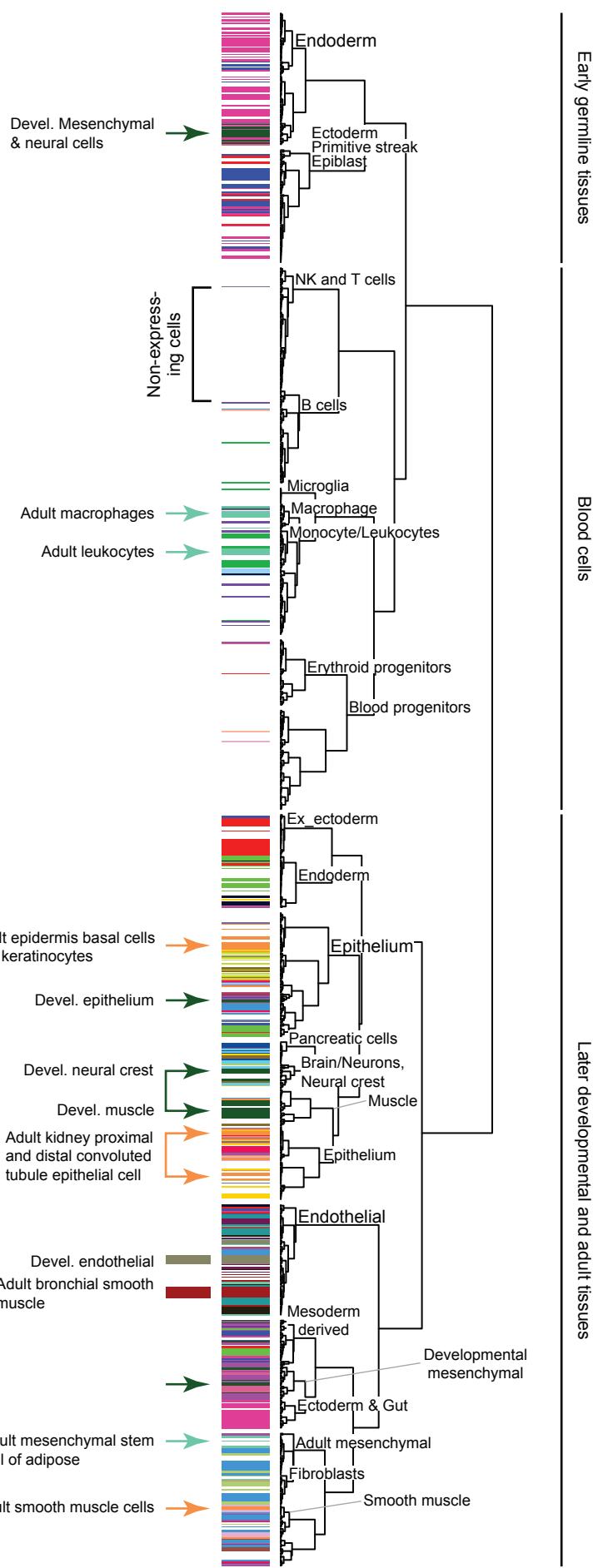
Figure 2: TGF- $\beta$  Receptors exhibit distinct and recurrent pathway expression profiles

A



C

Global distribution of pathway profiles



B

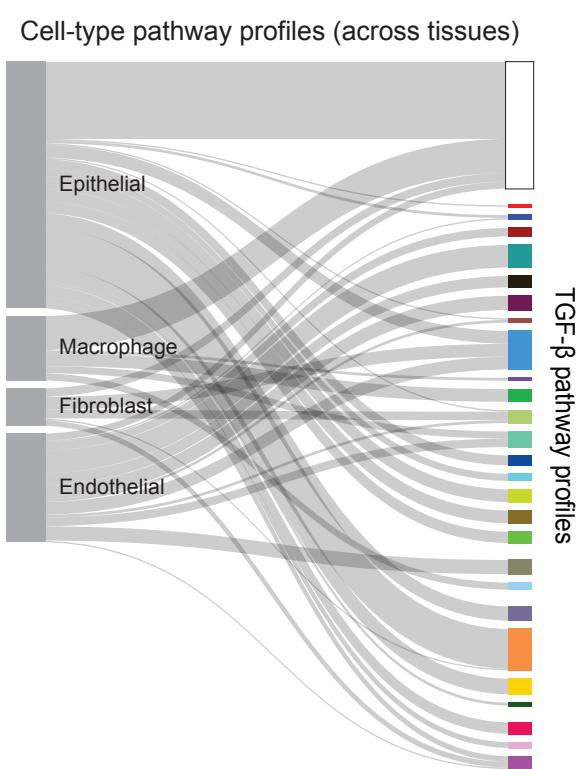
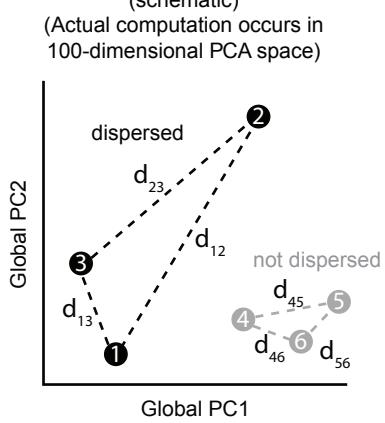
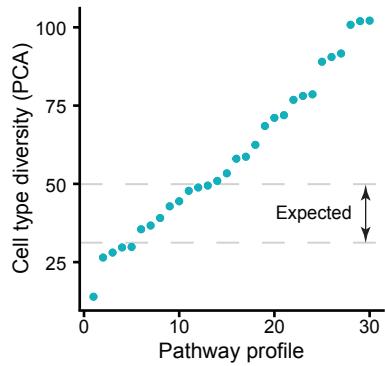


Figure 3: TGF- $\beta$  expression motifs are dispersed across cell types and organs

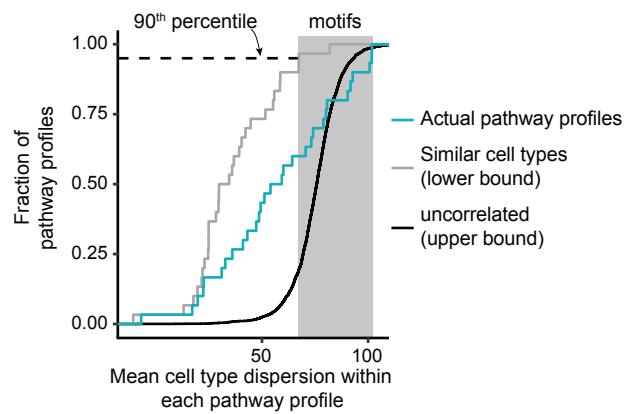
**A** Pairwise distance computation (schematic)  
(Actual computation occurs in 100-dimensional PCA space)



Number of cell types with TGF- $\beta$  profile

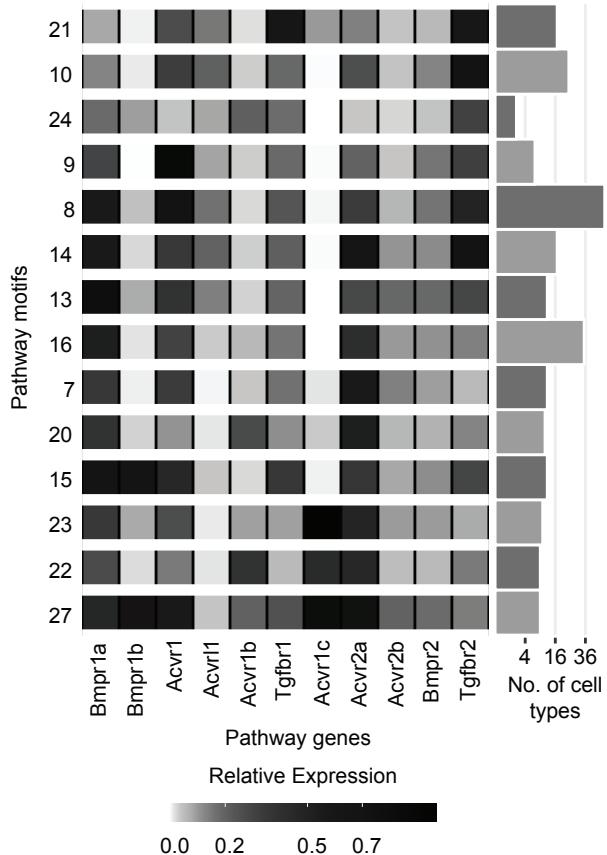


**B**



**D**

Broadly Dispersed TGF- $\beta$  Motifs



**E**

Broadly Dispersed TGF- $\beta$  Motifs

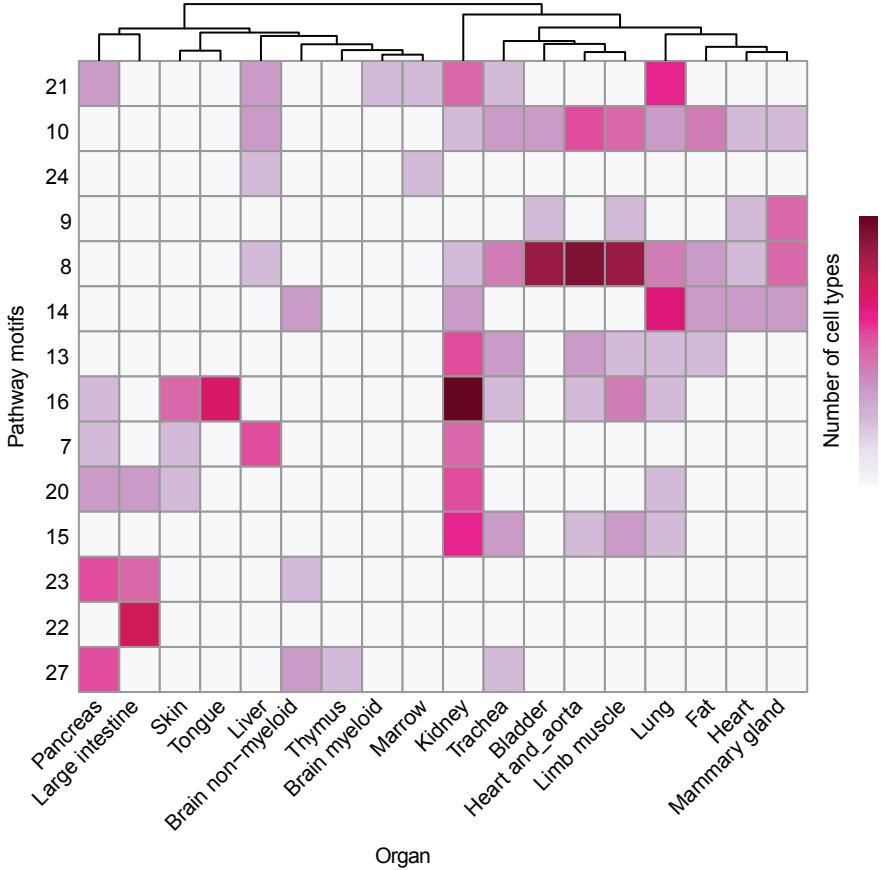
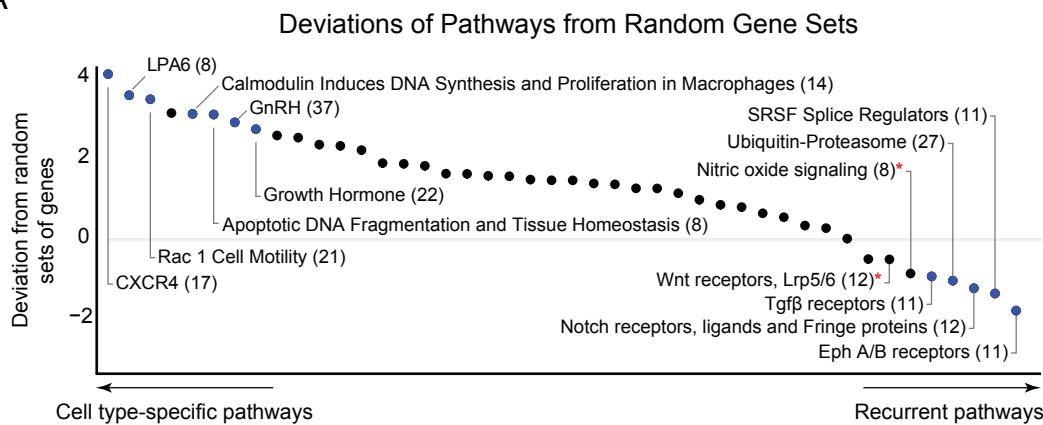
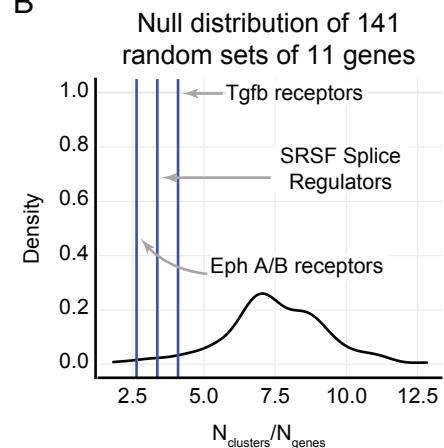


Figure 4: Wnt and Notch also show broadly dispersed recurrent pathway expression motifs

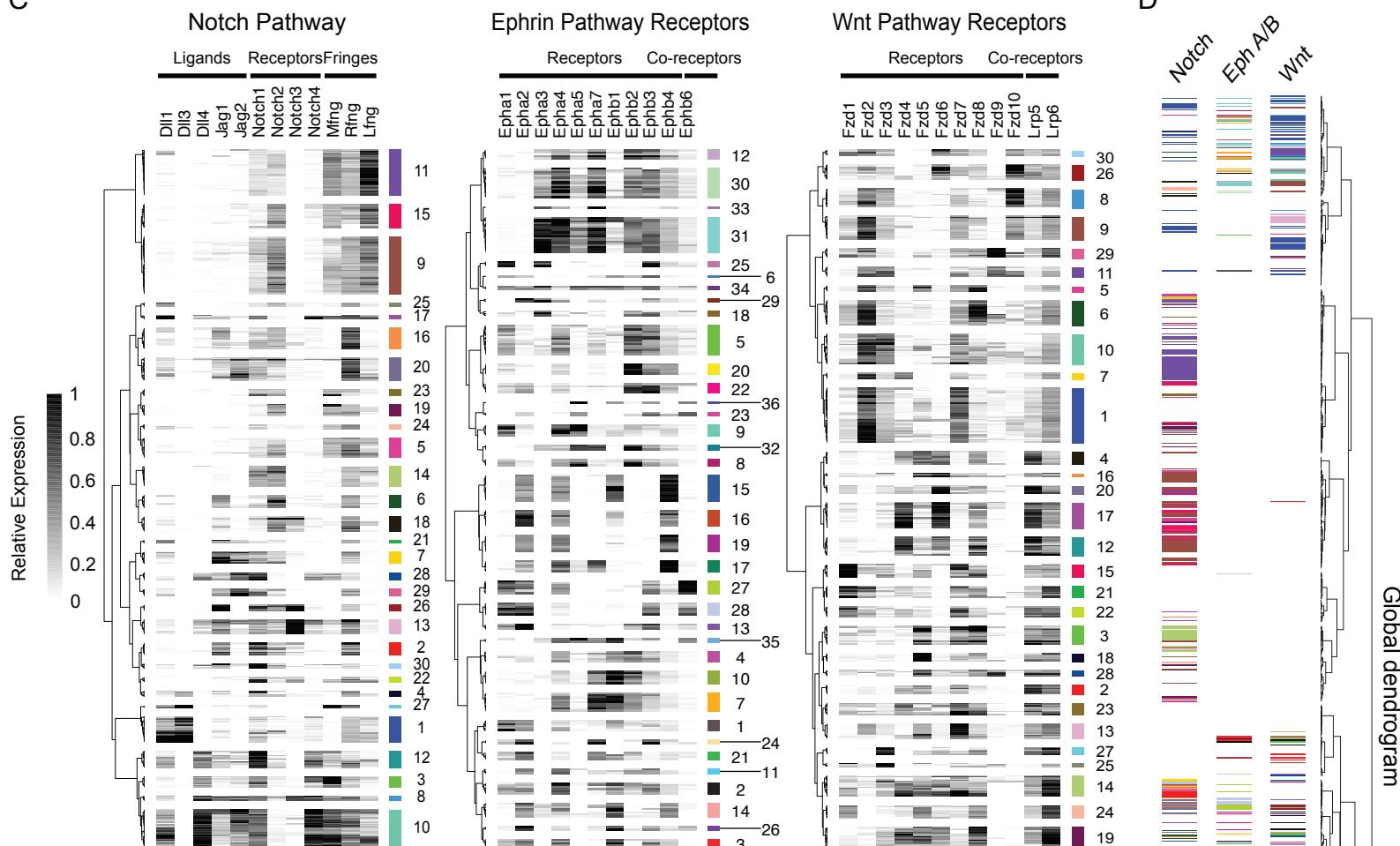
A



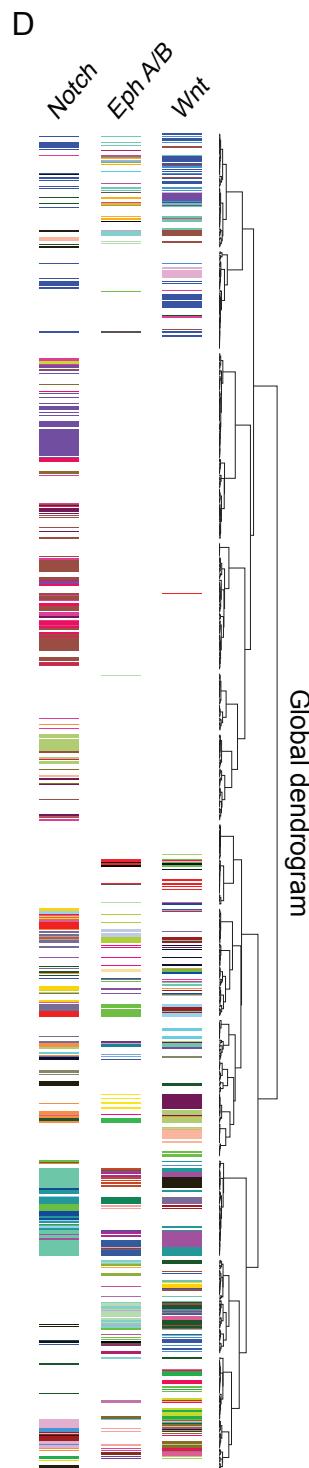
B



C



D



F

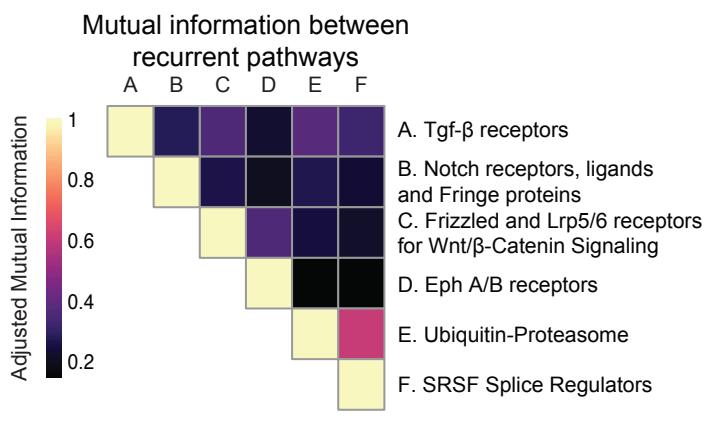
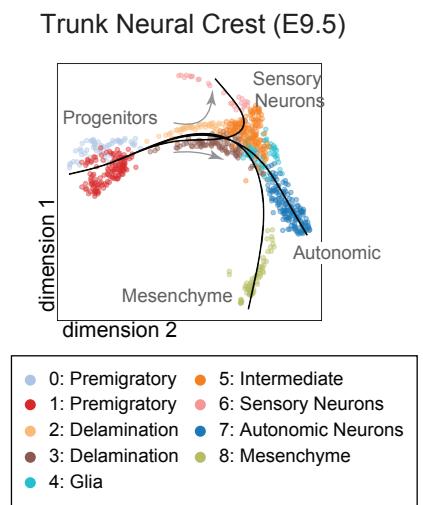


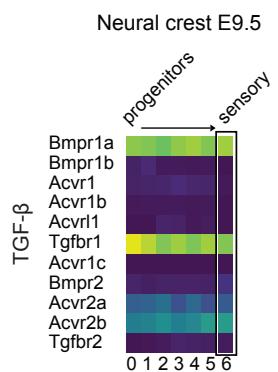
Figure 5:

### TGF- $\beta$ and Notch show distinct dynamics in neural crest differentiation

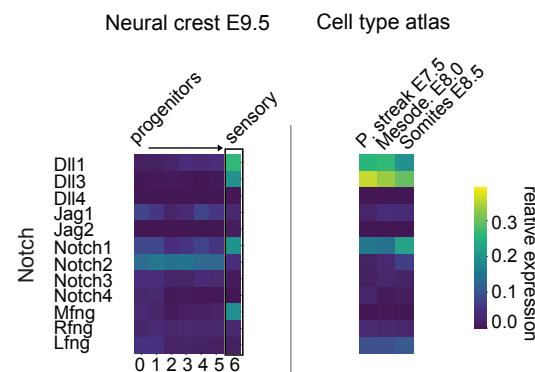
A



B



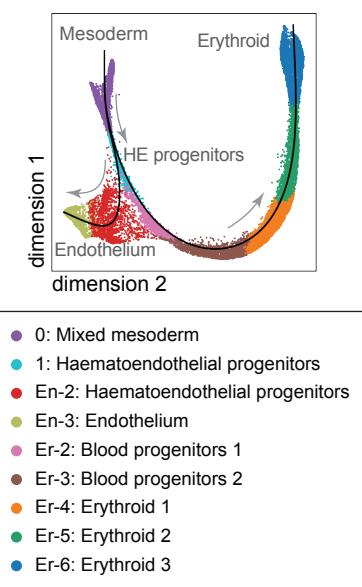
C



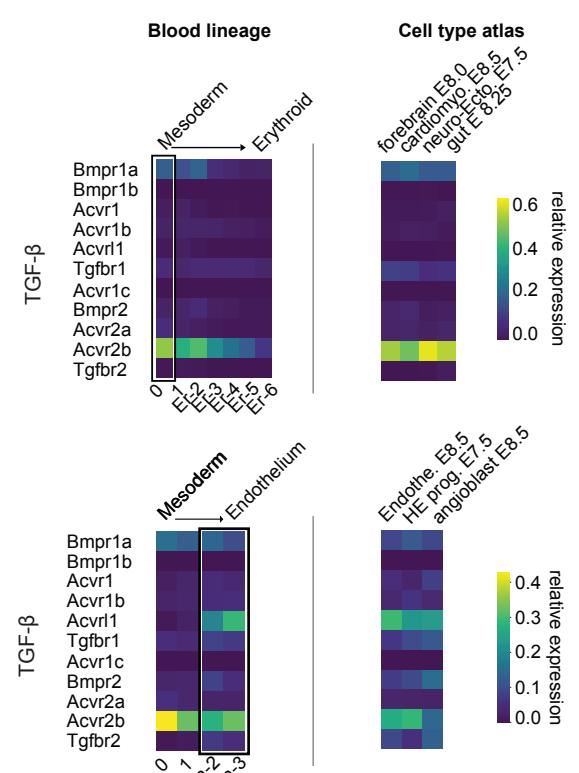
### TGF- $\beta$ shows fate-dependent dynamics in vascular differentiation

D

#### Early vascular differentiation

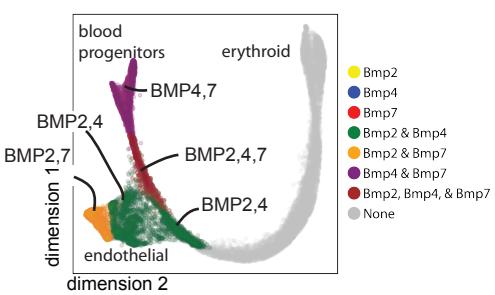


E



G

#### Early vascular differentiation



H

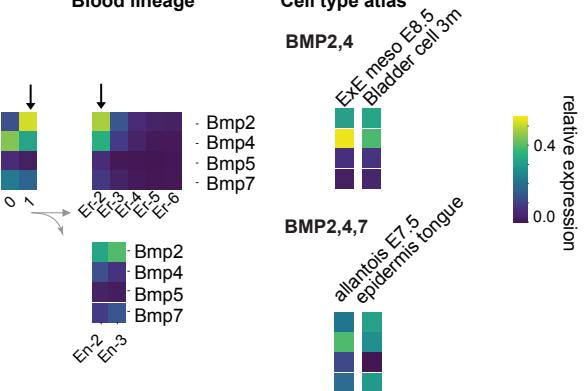
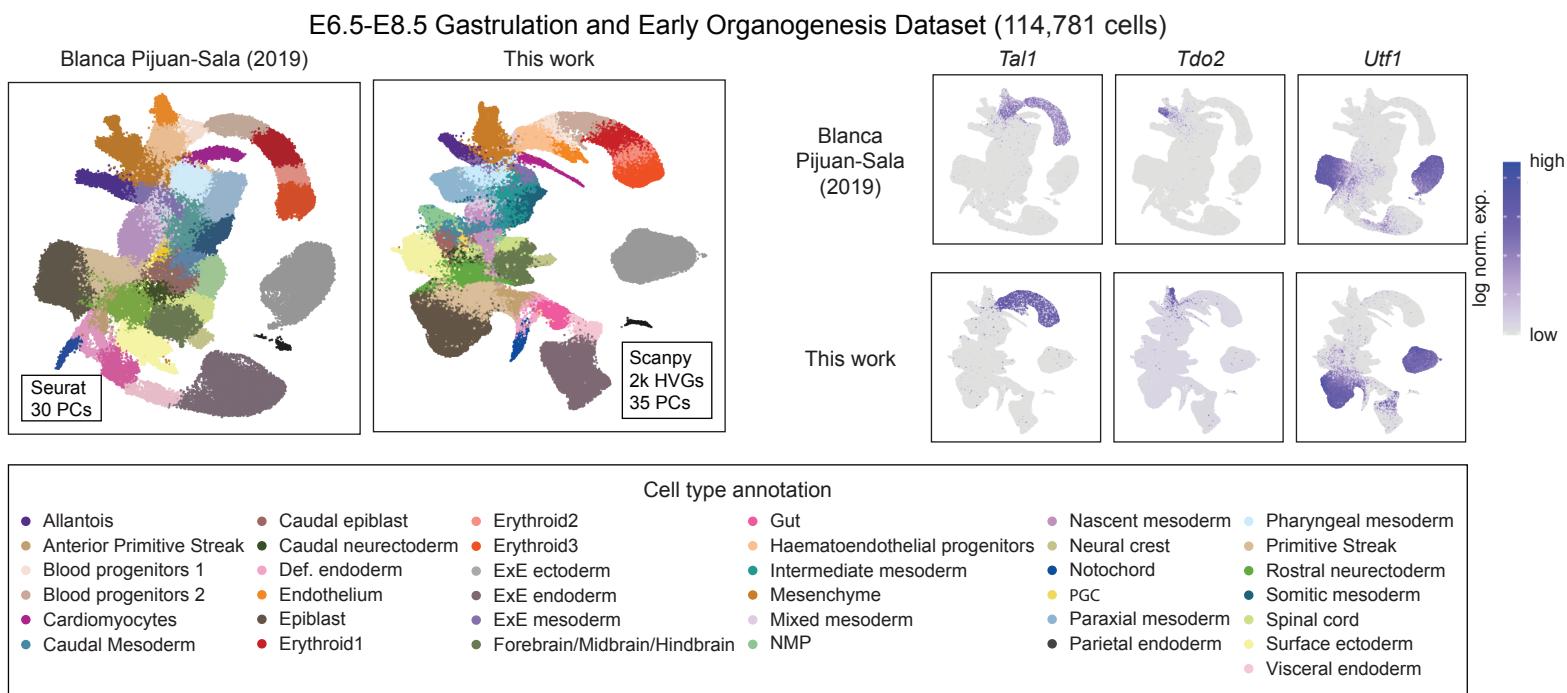


Figure 1, Supplement 1

A



B

Distance to centroid within adult cell types (Euclidean distance in 30 PCs)

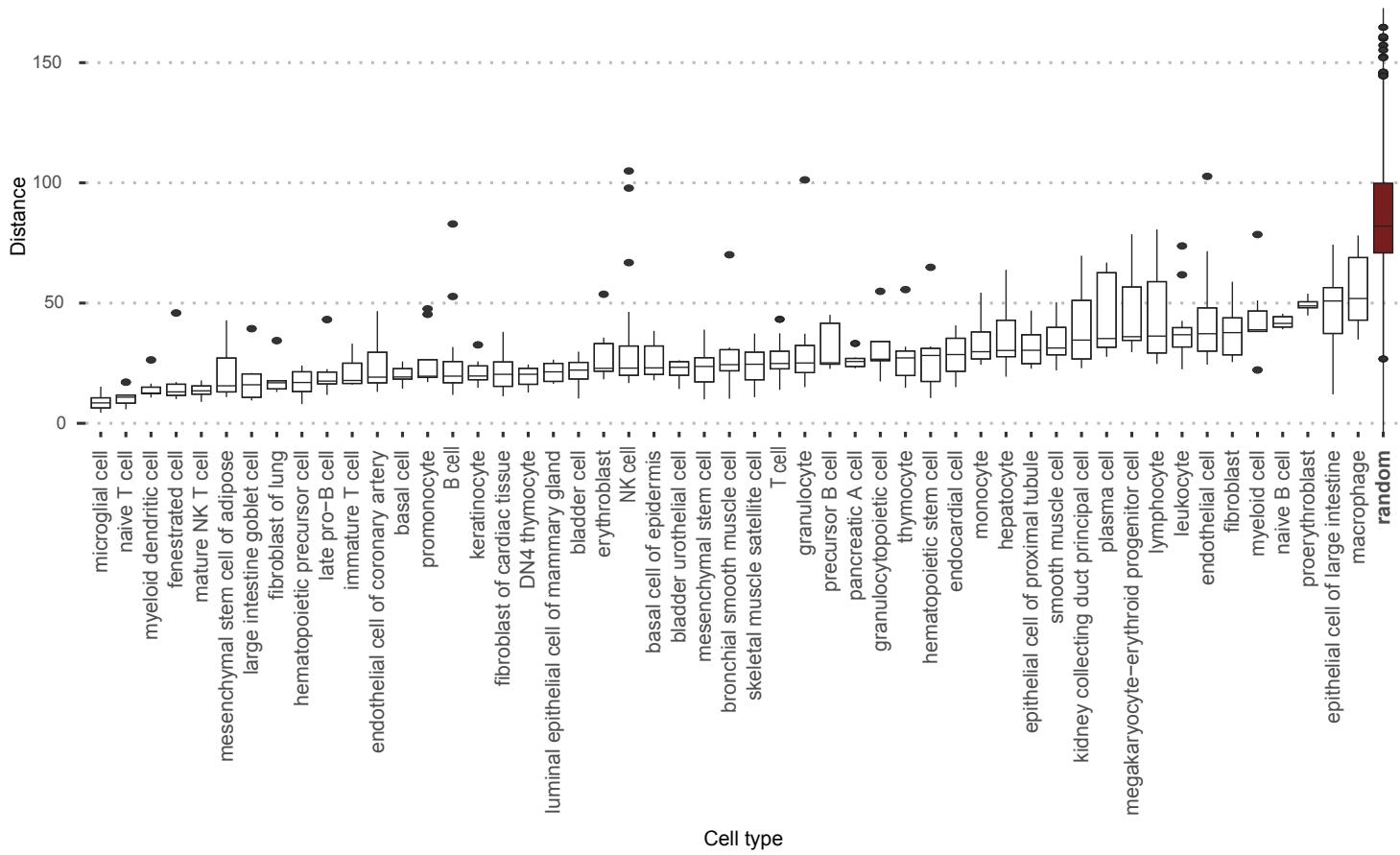
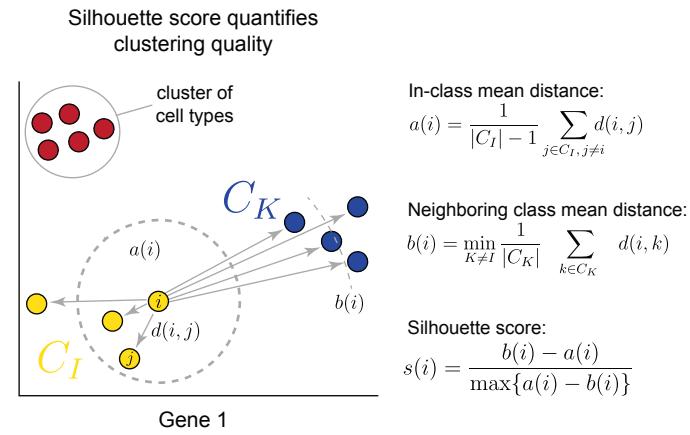


Figure 2, Supplement 1

A



B

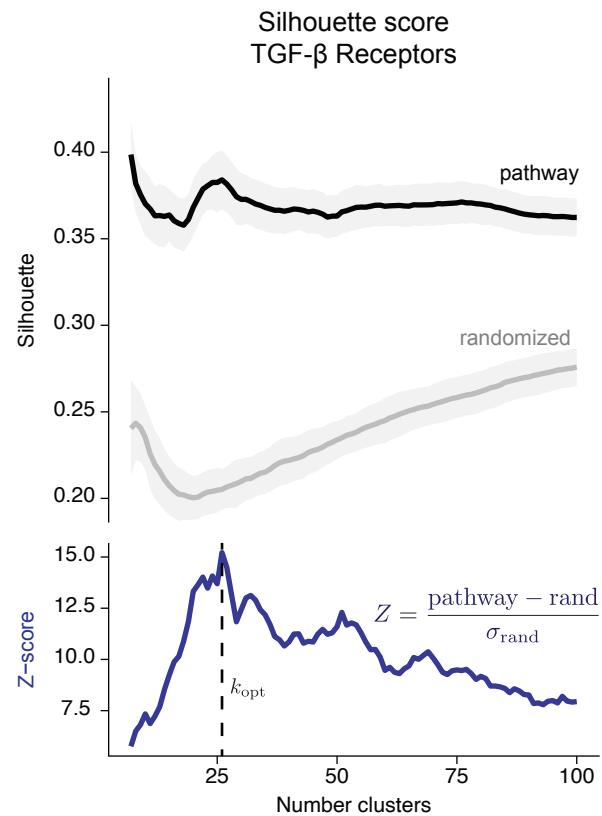
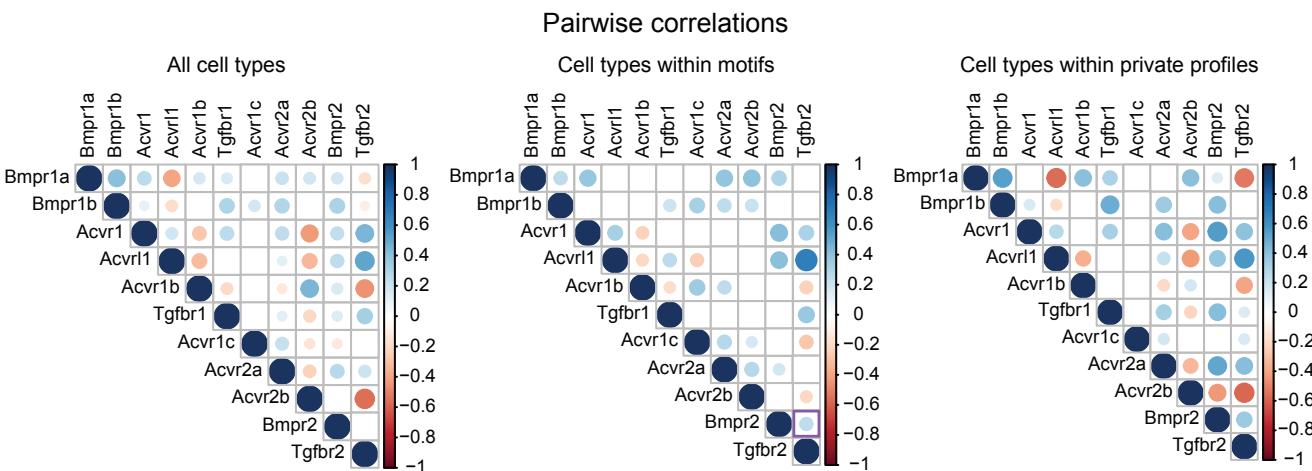


Figure 3 Supplement 1

A



B

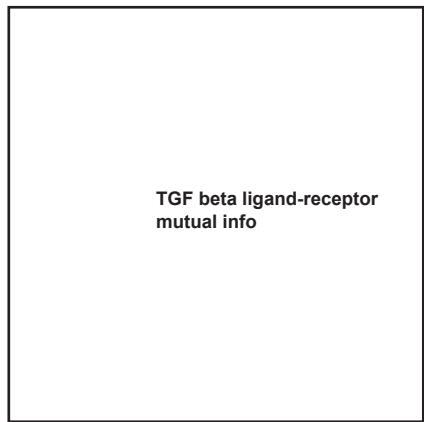
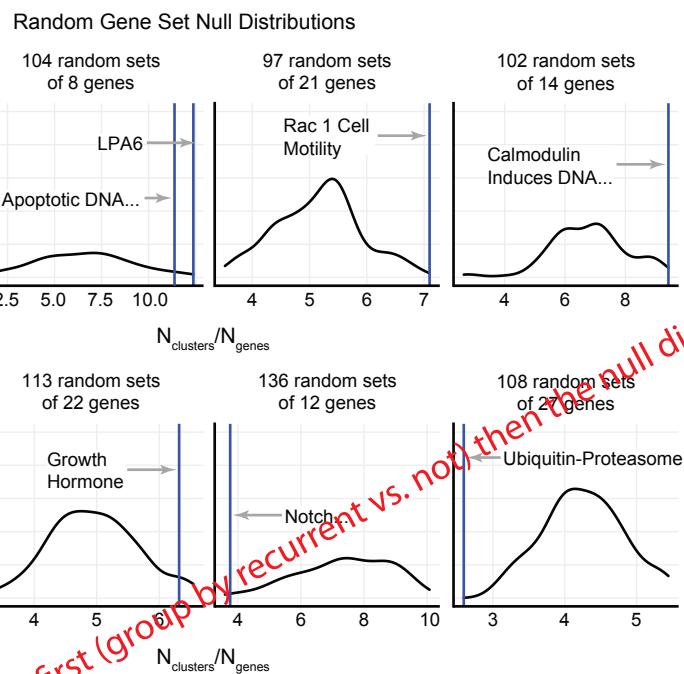
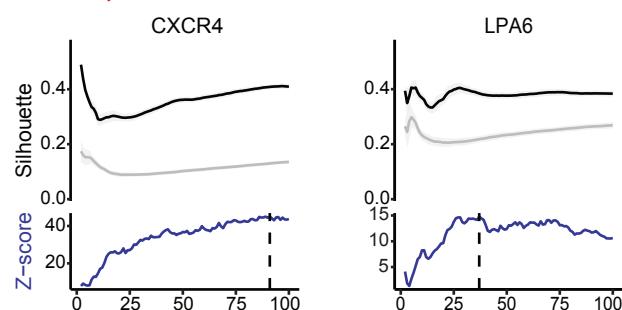


Figure 4 Supplement 1

B



A



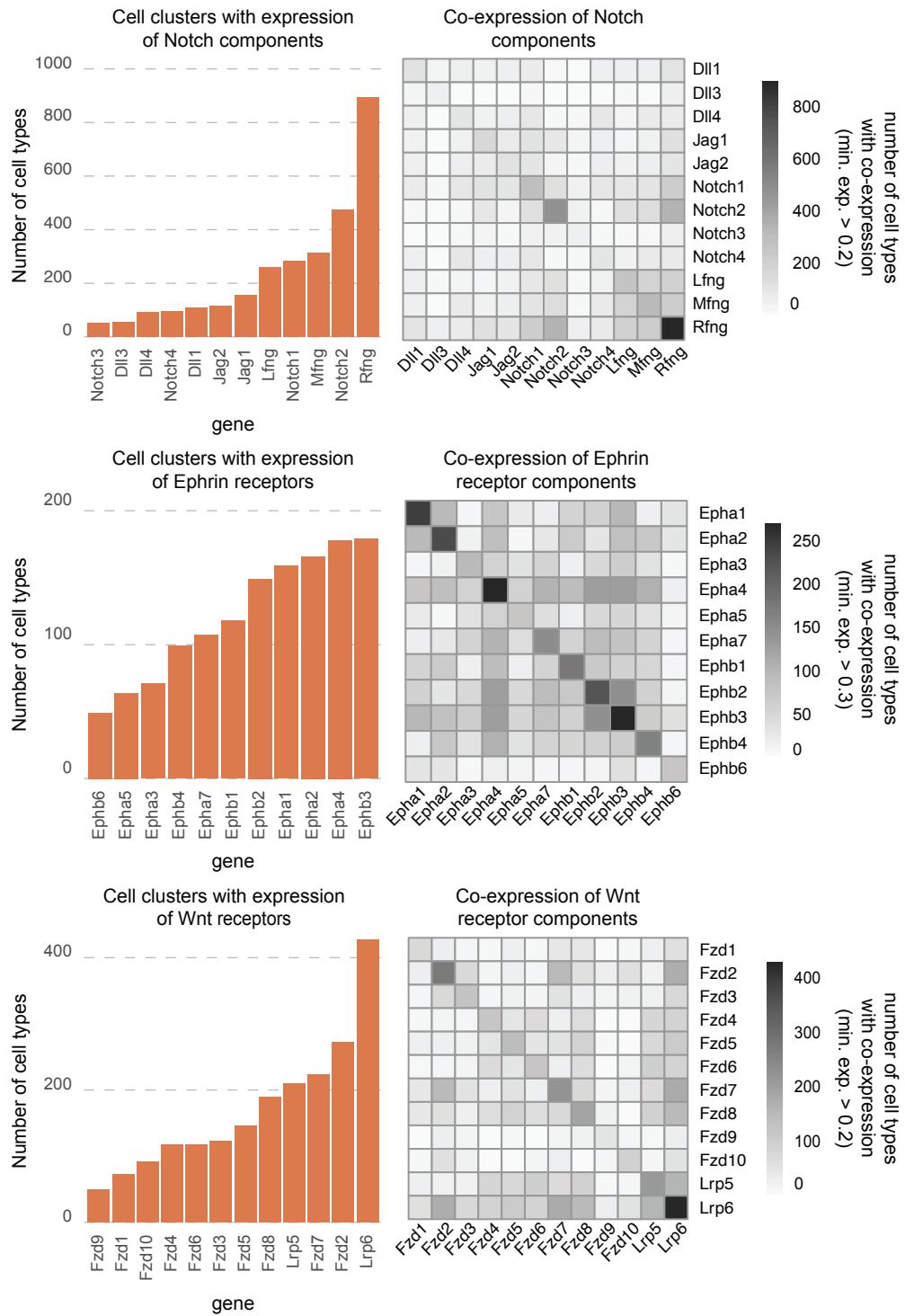
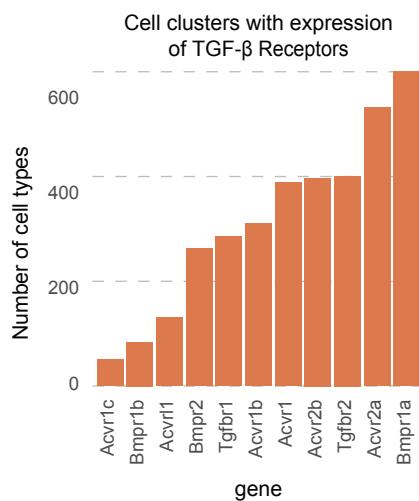
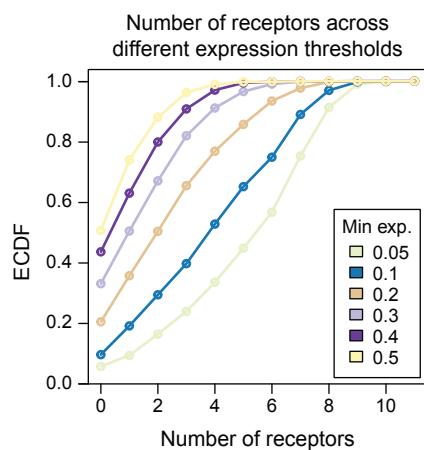


Figure 2, Supplement 2

A



B



C

