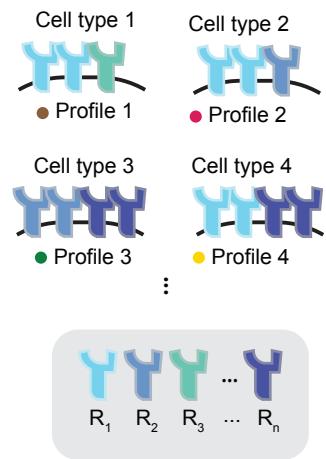


Figure 1: Pathway expression profiles could recur across diverse cell types

A

Receptor expression profiles



B

Pathway profiles could be...

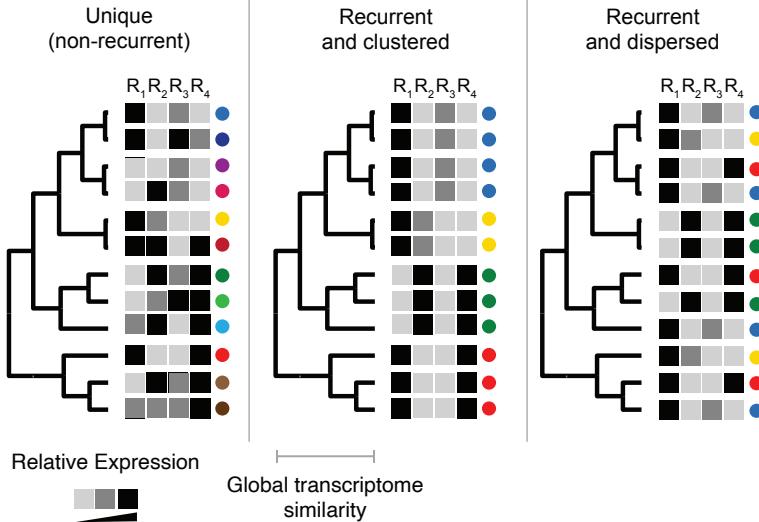
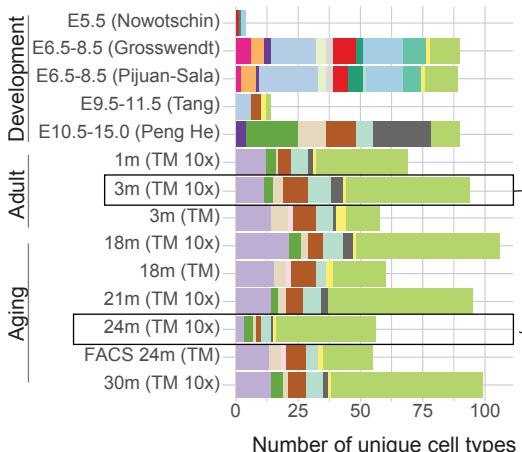


Figure 2: Pathway expression profiles could recur across diverse cell types

A

Multiple mouse cell atlas datasets



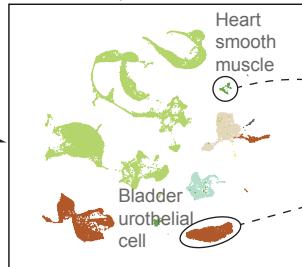
Cell type class

Blood	Epiblast	Mesenchymal
Brain/Neurons	Epithelium	Mesoderm
Connective	Ex Ectoderm	Muscle
Ectoderm	Gut	Neural crest
Endoderm	Heart	Organ specific
Endothelial	Keratinocyte	Primal streak
		Spinal cord

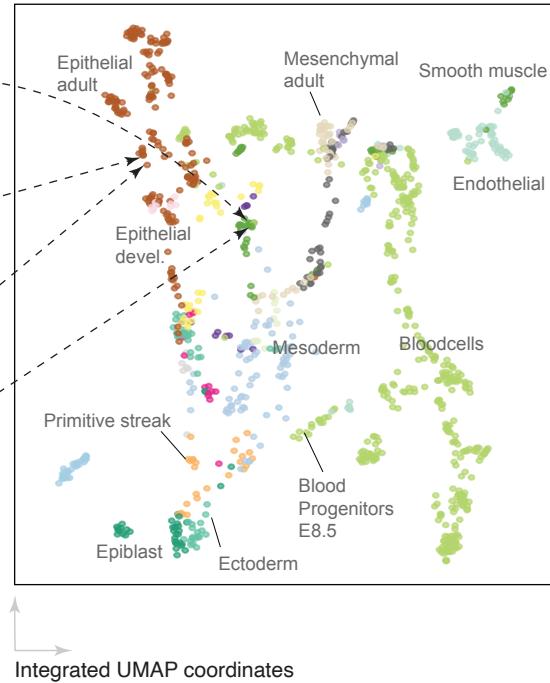
B

Individual cell atlases
Single-cell transcriptome profiles
1 dot = 1 cell

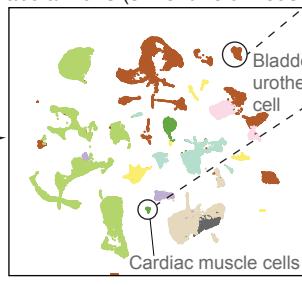
Tabula senis (24 month old mouse)



Integrated cell state atlas
Global cluster-averaged profiles
All data sets in (C)
1 dot = 1 cell cluster



Tabula muris (3 month old mouse)

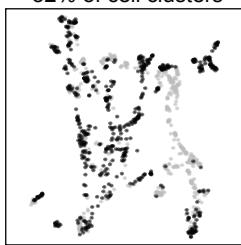


Dataset UMAP coordinates

Integrated UMAP coordinates

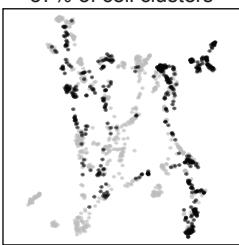
C

TGF-β
52% of cell clusters



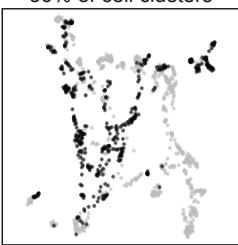
Min. # of genes exp: 2
Threshold for exp.: 0.2

Notch
37% of cell clusters



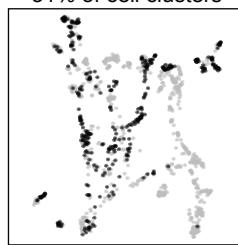
Min. # of genes exp: 2
Threshold for exp.: 0.2

Eph-ephrin
36% of cell clusters



Min. # of genes exp: 2
Threshold for exp.: 0.3

Wnt
31% of cell clusters

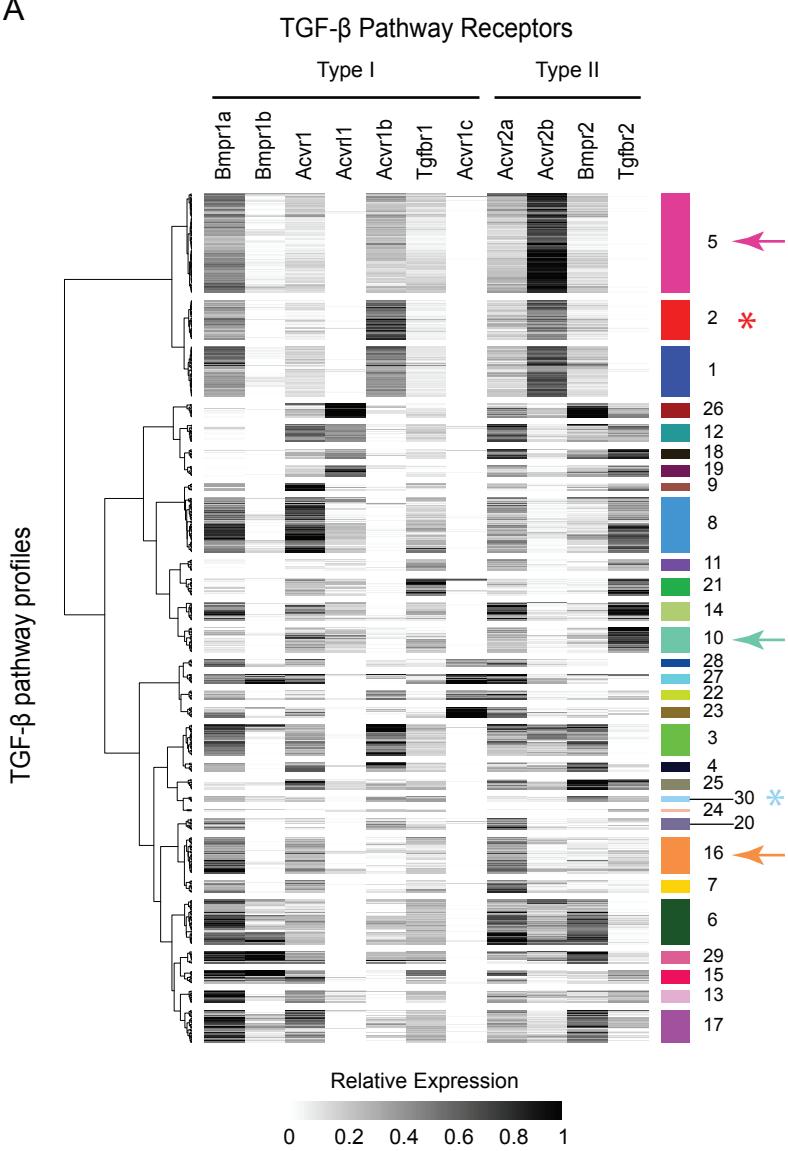


Min. # of genes exp: 2
Threshold for exp.: 0.3

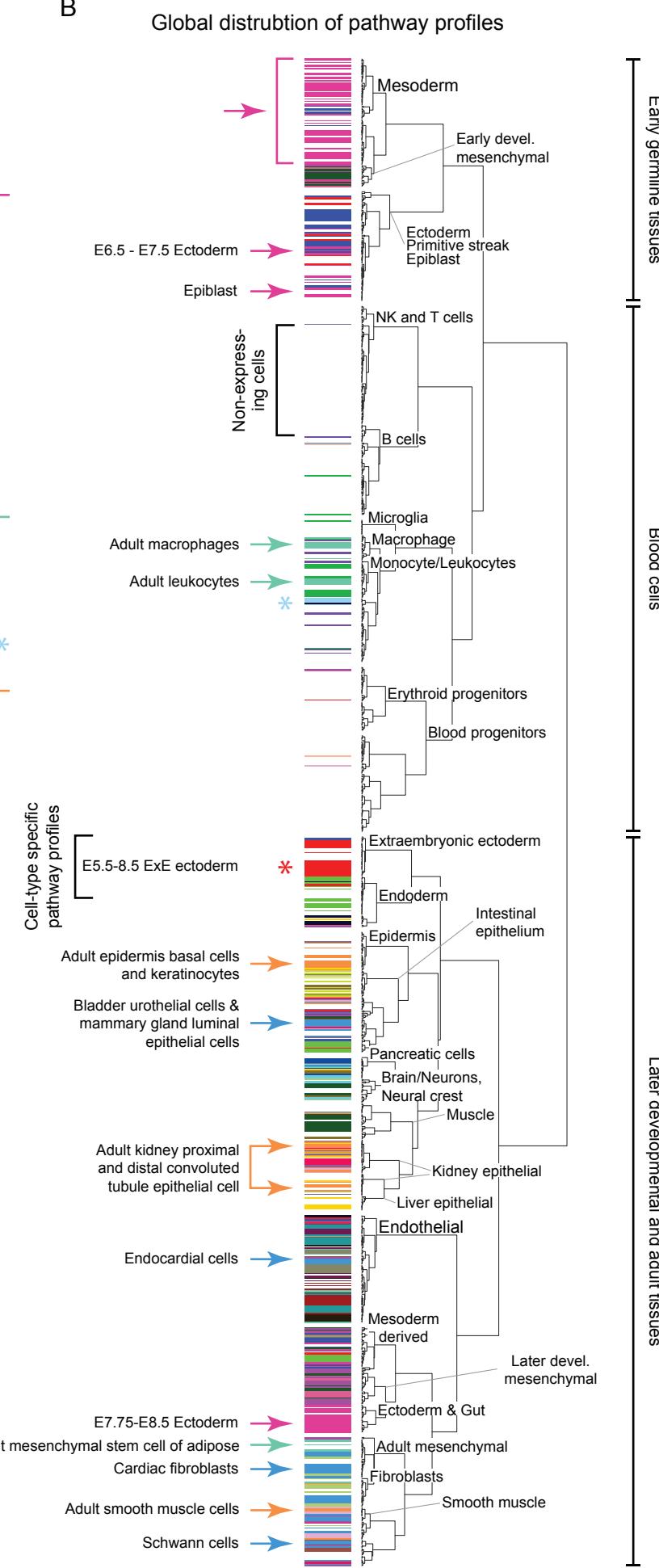
Dataset UMAP coordinates

Figure 3: TGF- β Receptors exhibit distinct and recurrent pathway expression profiles

A



B



C

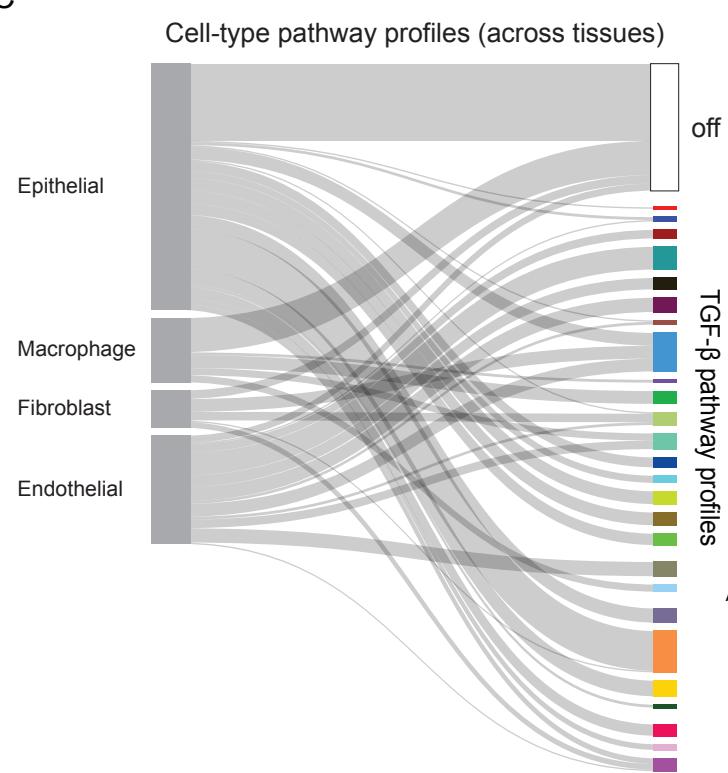


Figure 4: TGF- β expression motifs are dispersed across cell types and organs

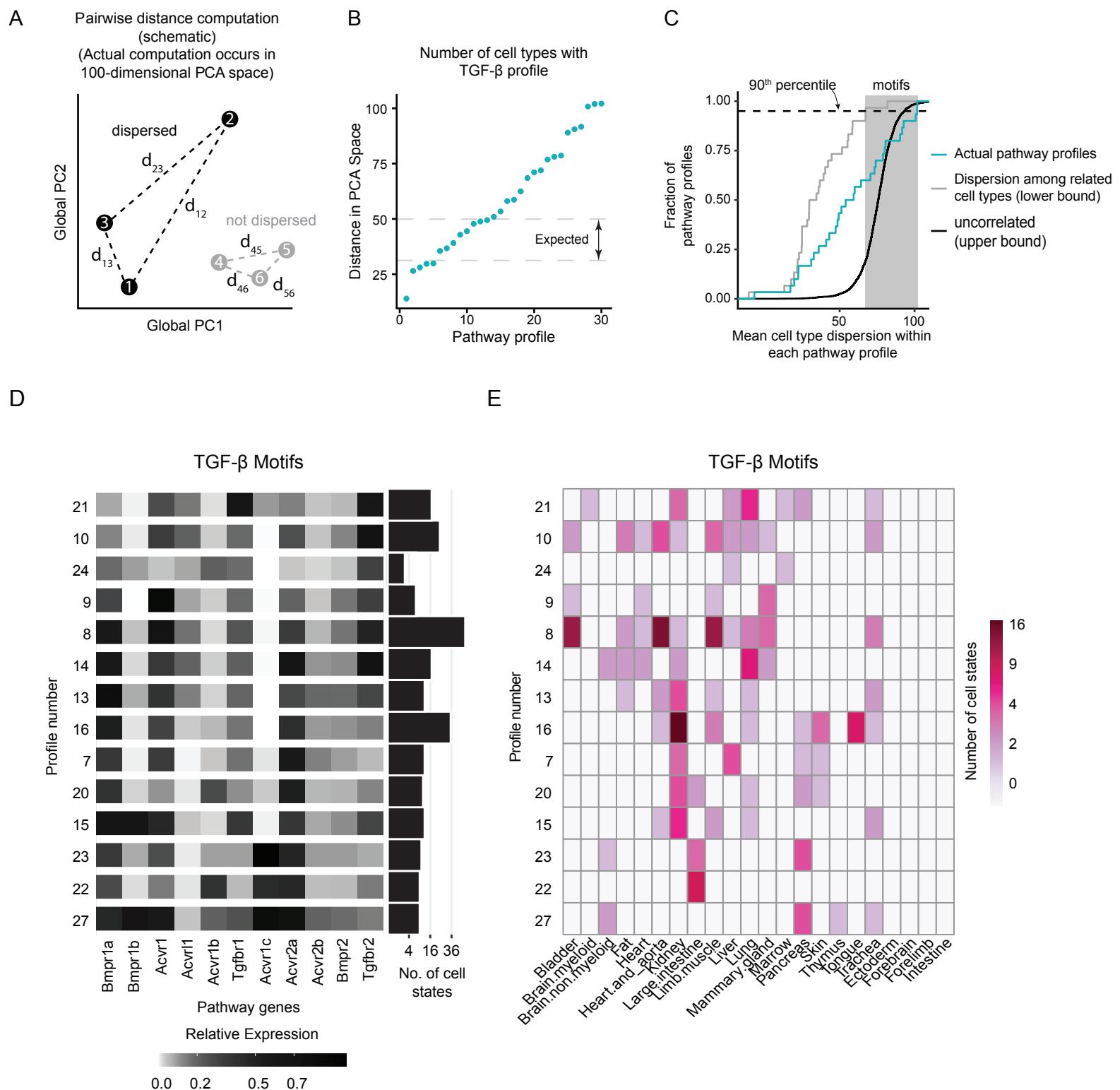
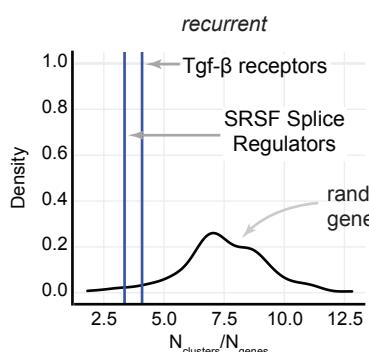
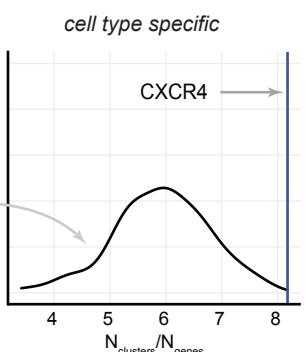


Figure 5: Other signaling pathways also exhibit pathway expression motifs

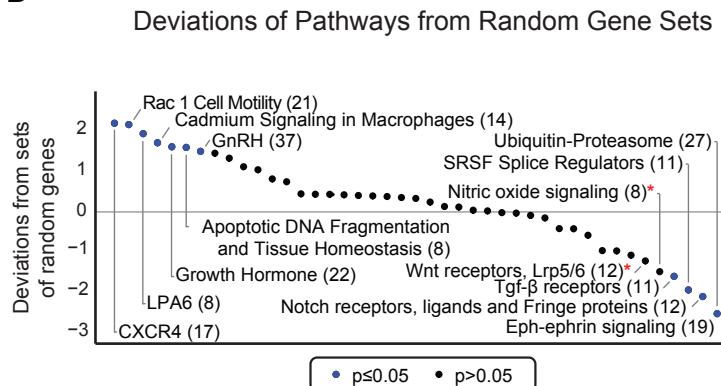
A Null distribution of 141 random sets of 11 genes



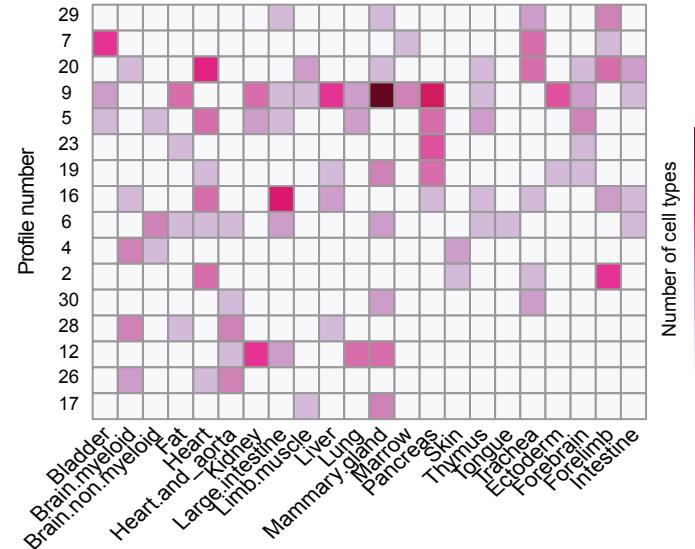
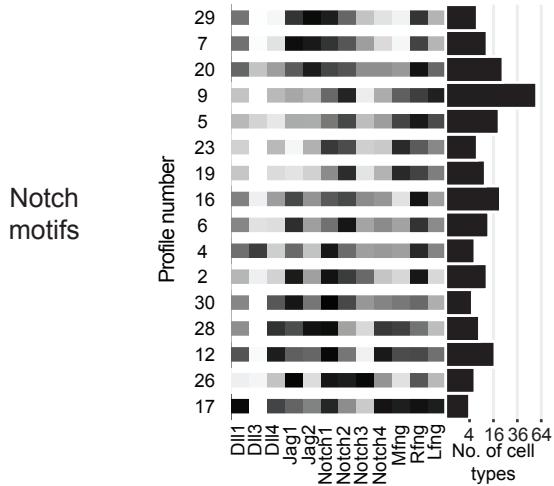
Null distribution of 99 random sets of 37 genes



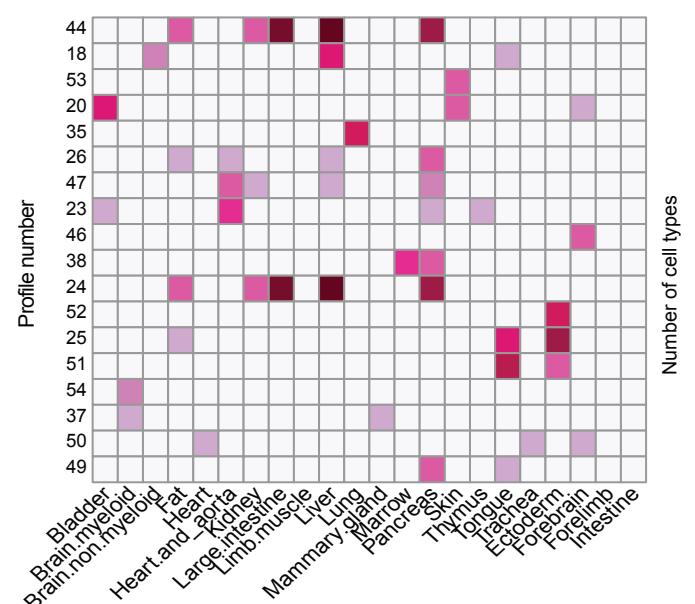
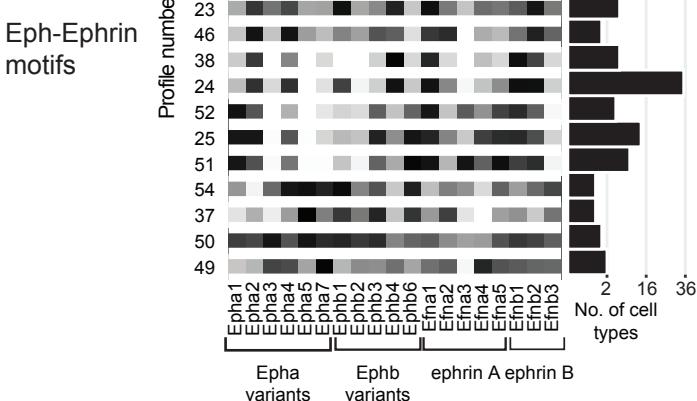
B



C



D



E

Mutual information between recurrent pathways

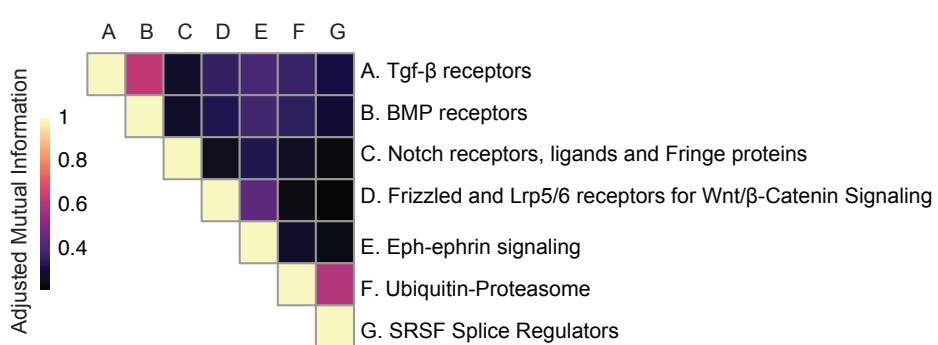
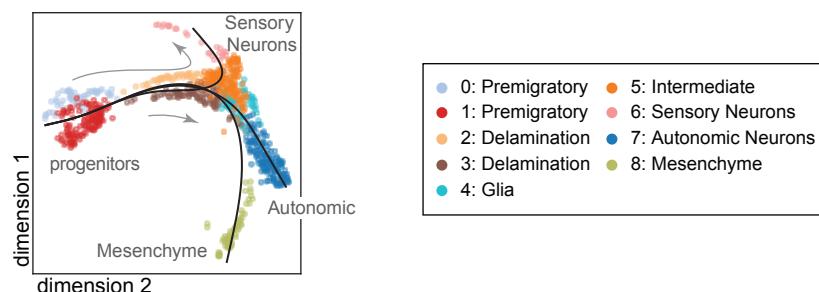
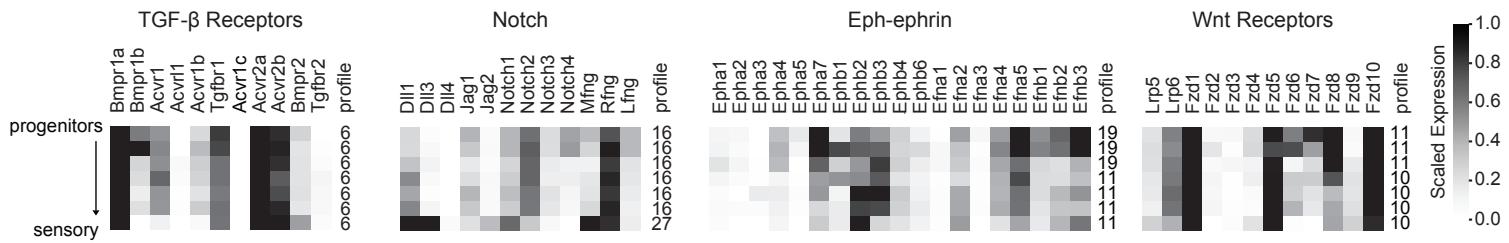


Figure 6: Title

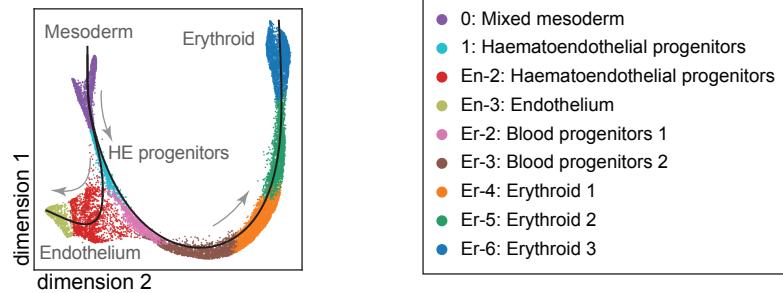
A Trunk Neural Crest (E9.5)



B



C Early vascular differentiation



D

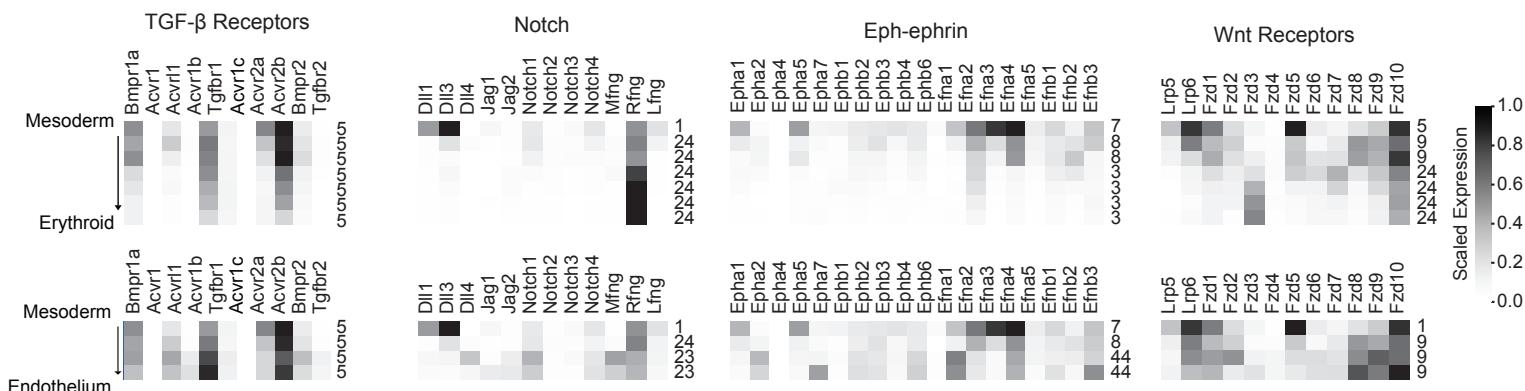
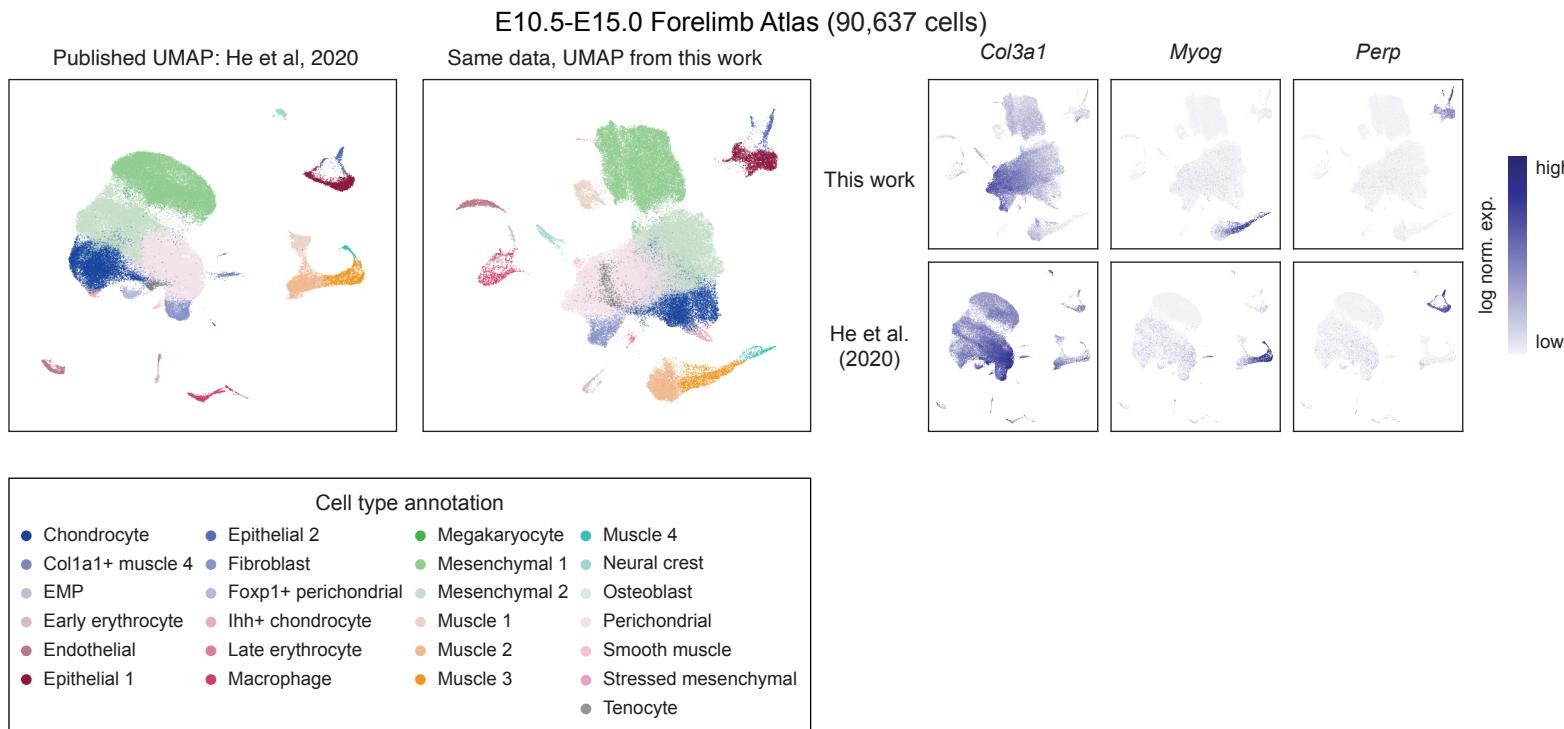
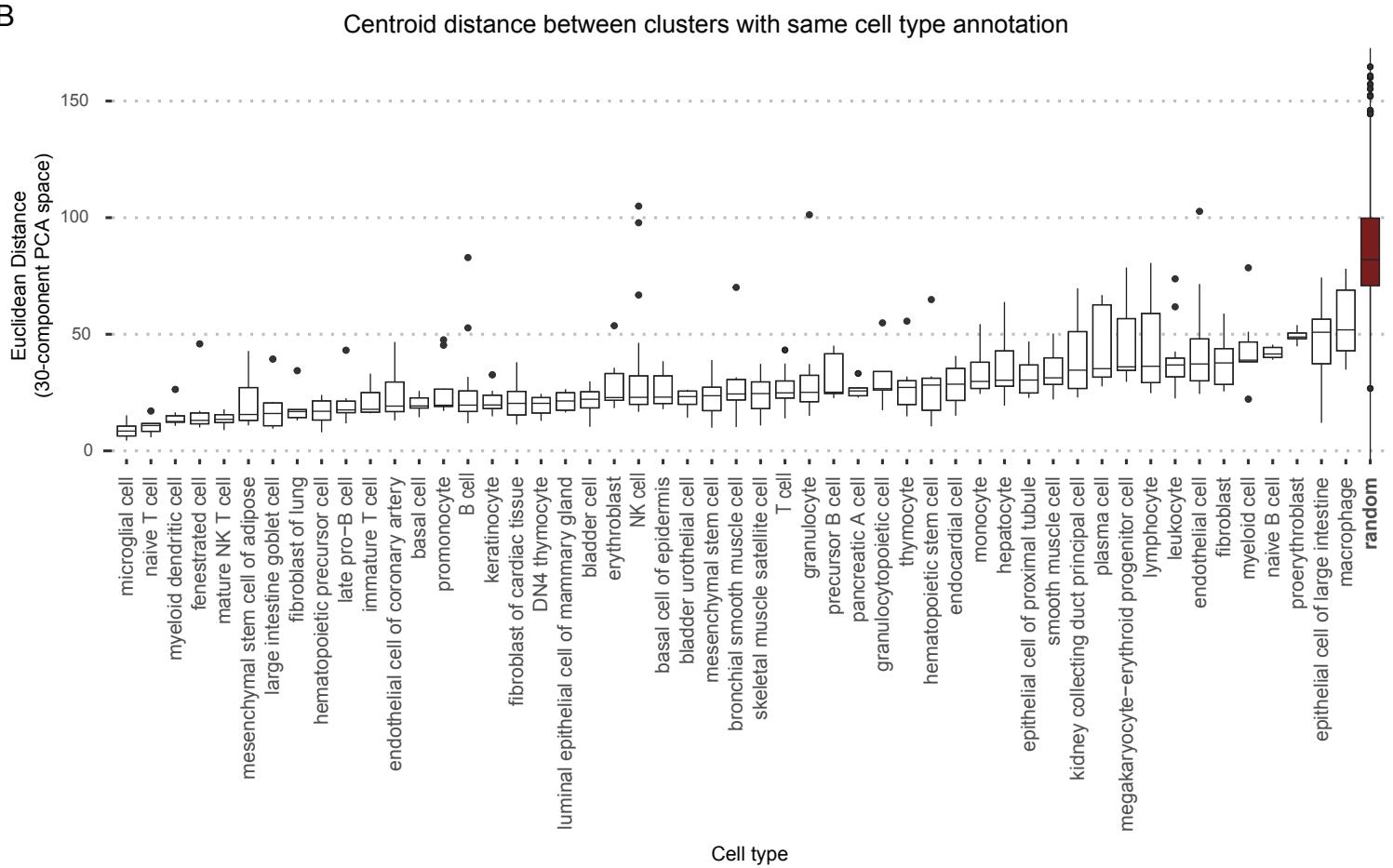


Figure 2, Supplement 1

A



B



C

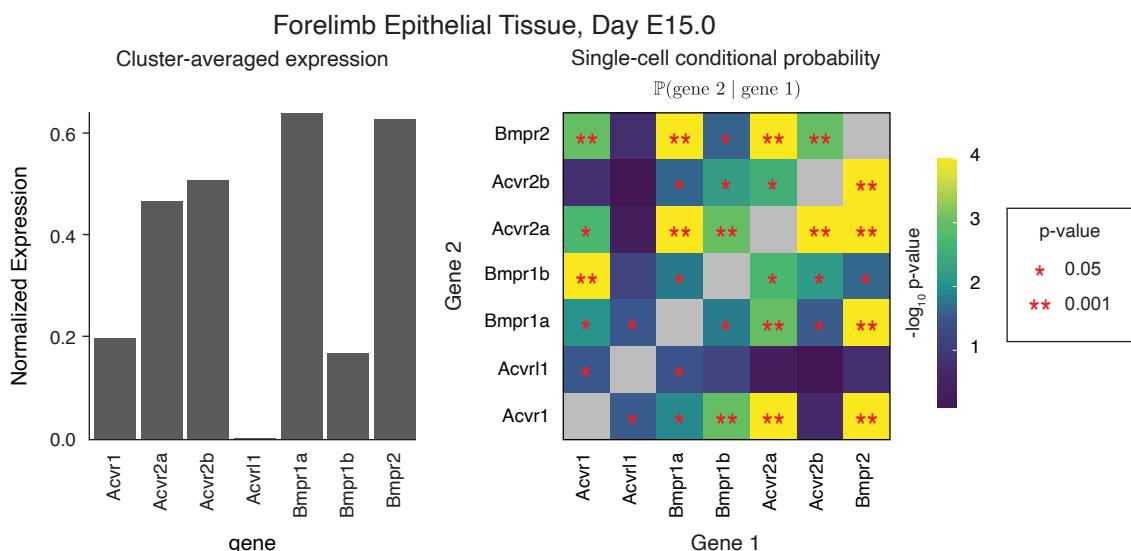
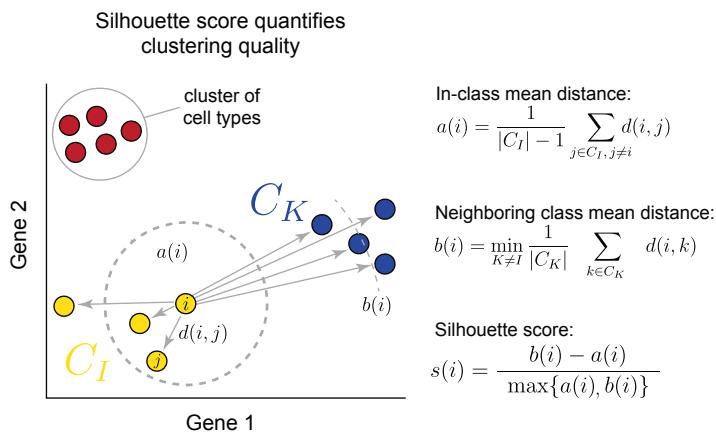


Figure 3-figure supplement 2

A



B

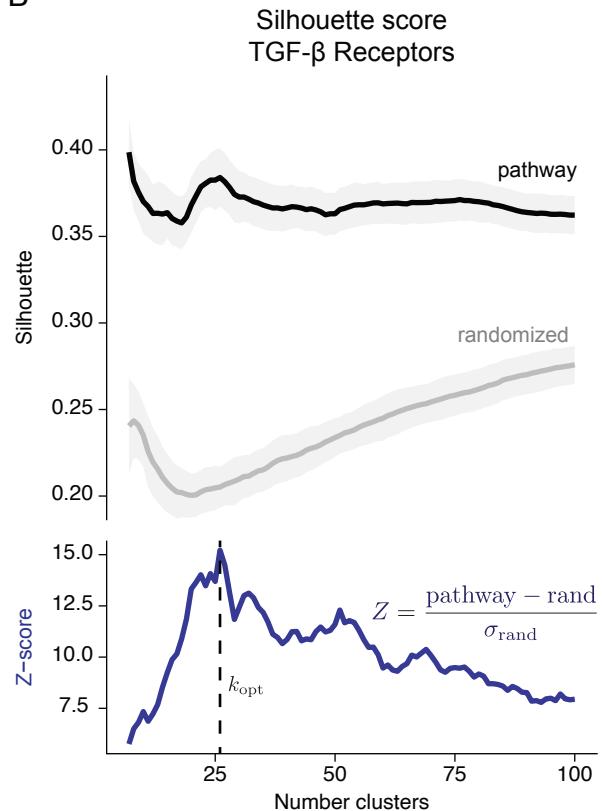
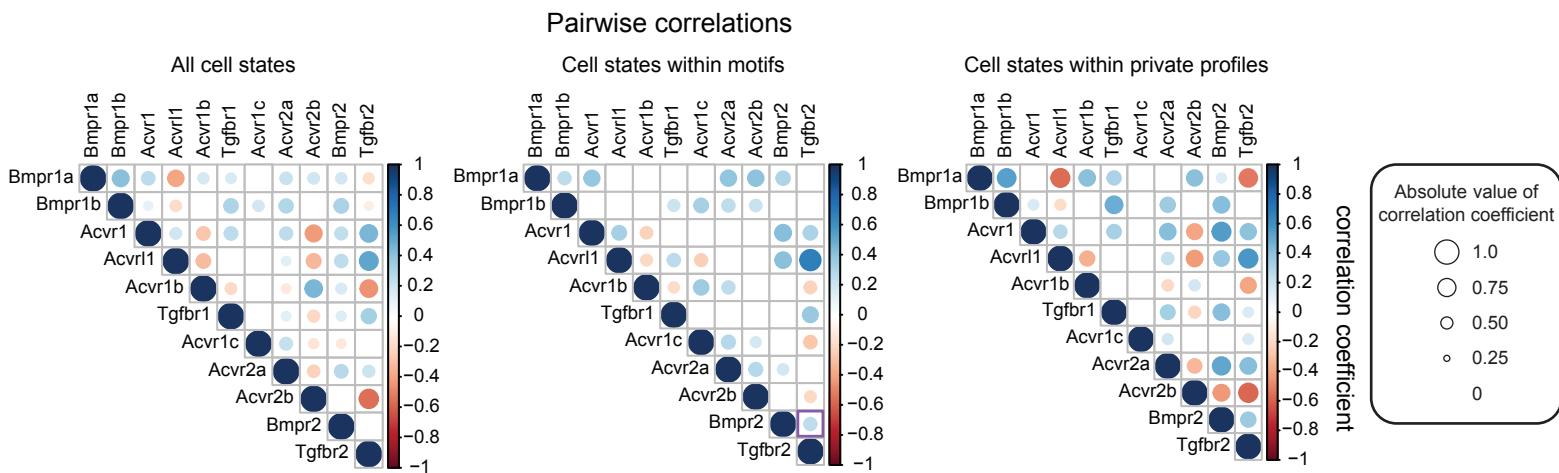


Figure 4, Supplement 1

A



B

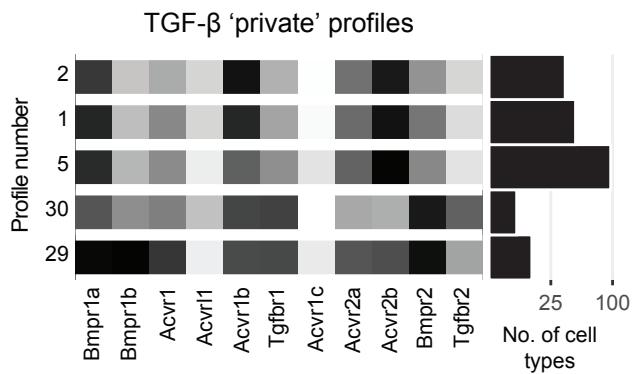
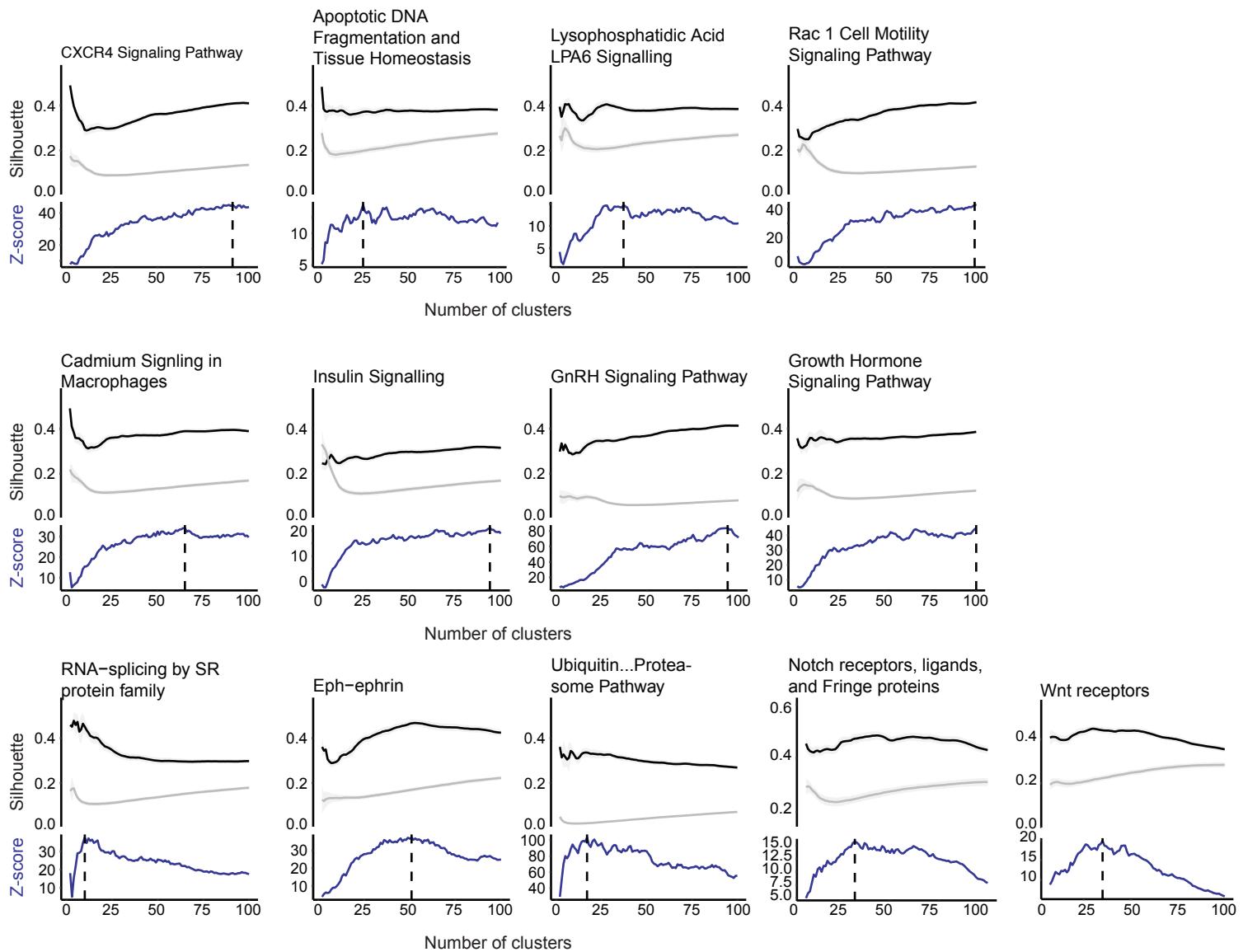


Figure 5—figure supplement 1

A



B

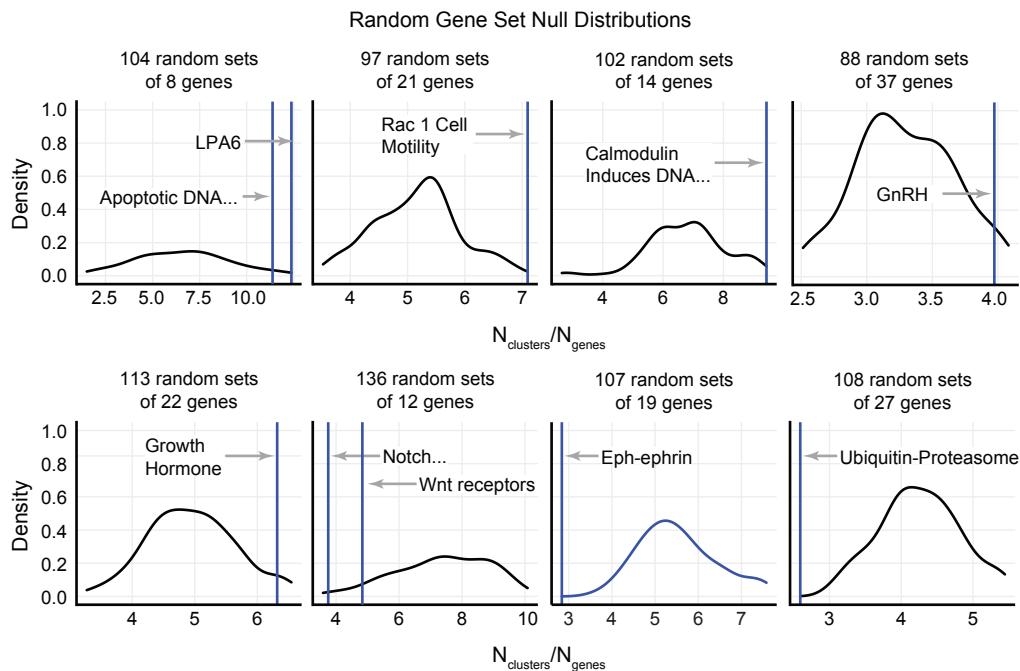
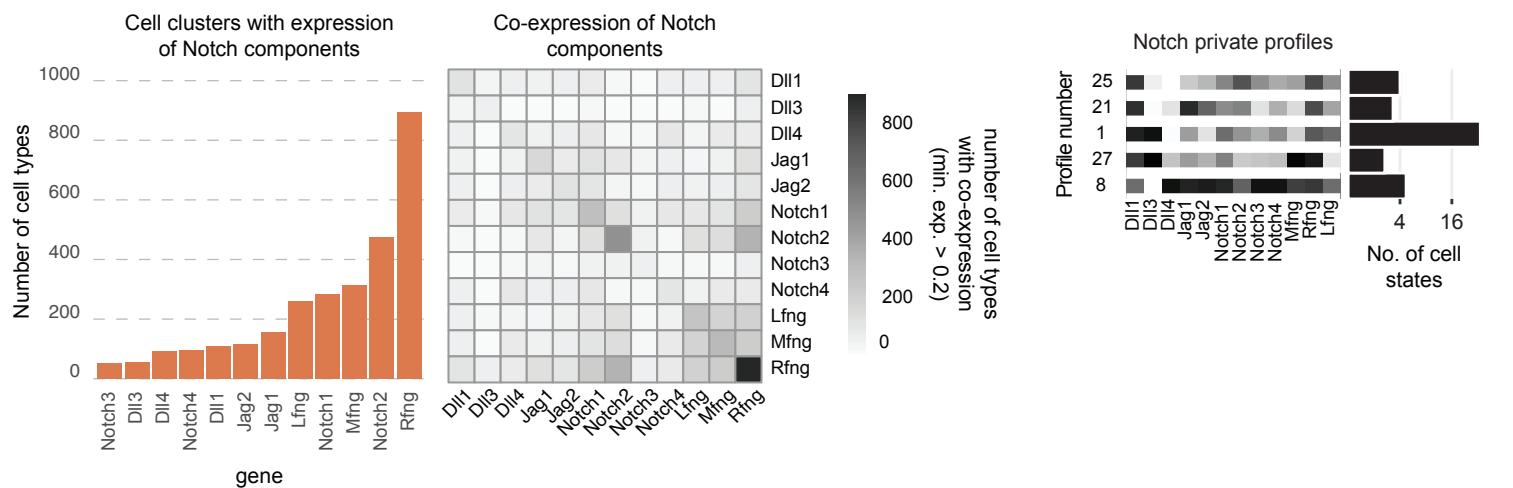
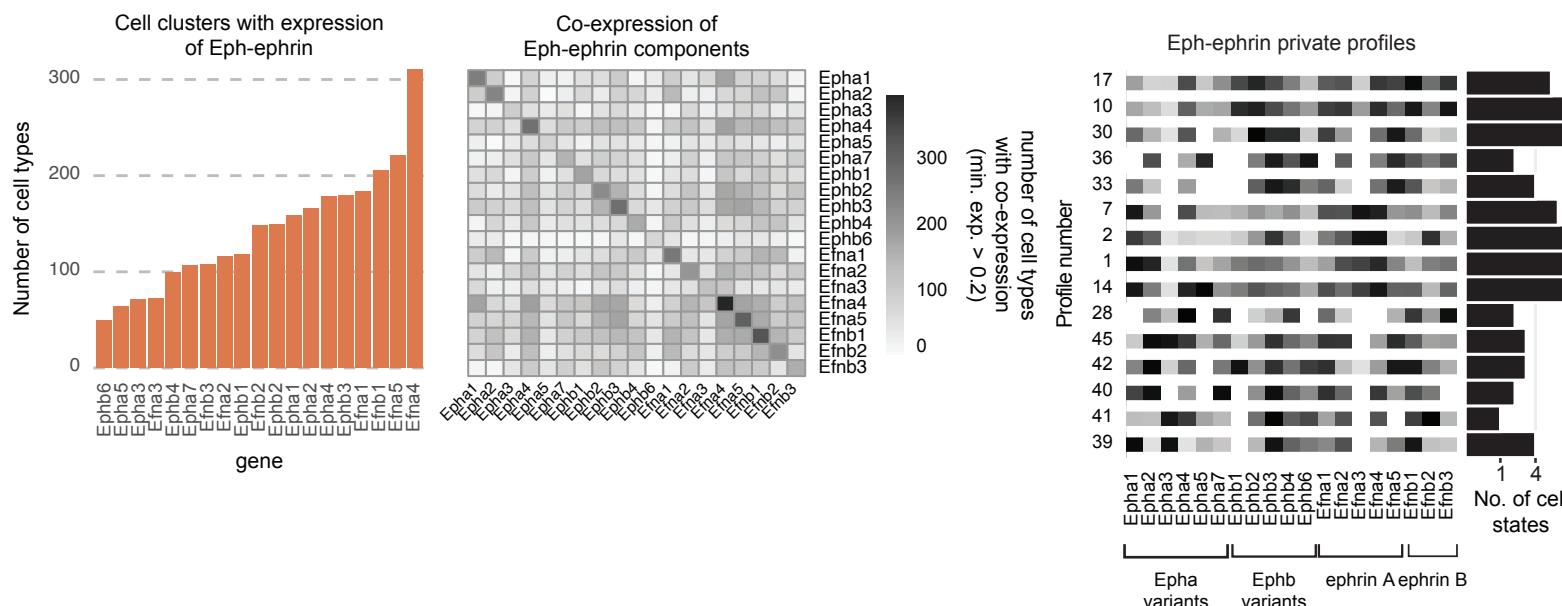


Figure 5–figure supplement 3

A



B



C

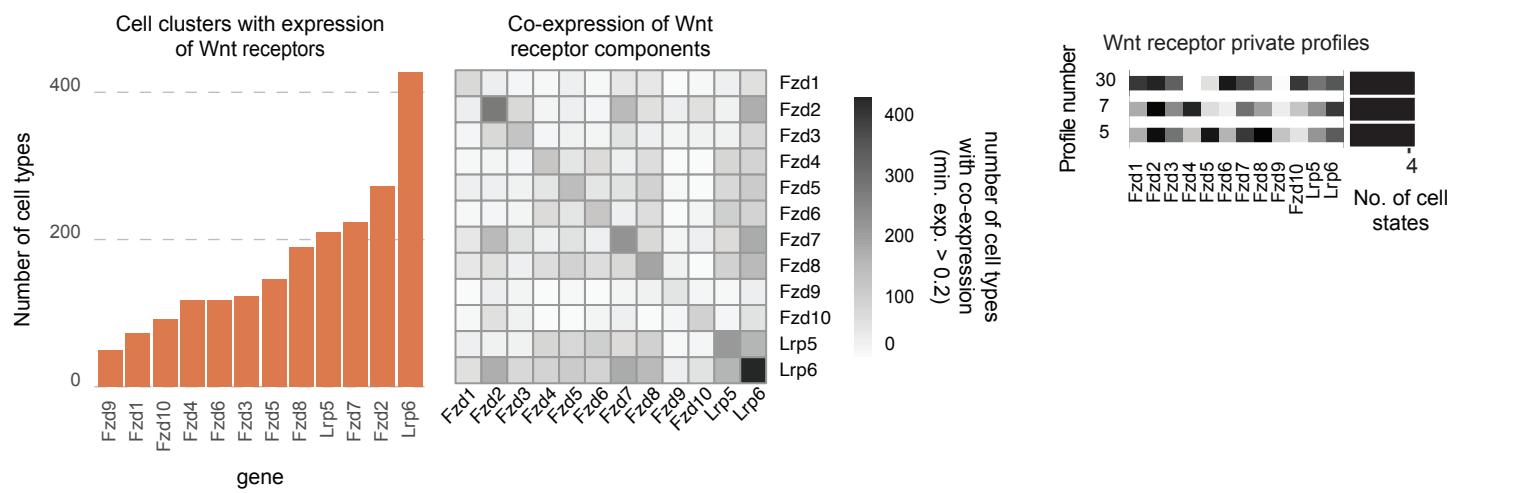


Figure 3, Supplement 1

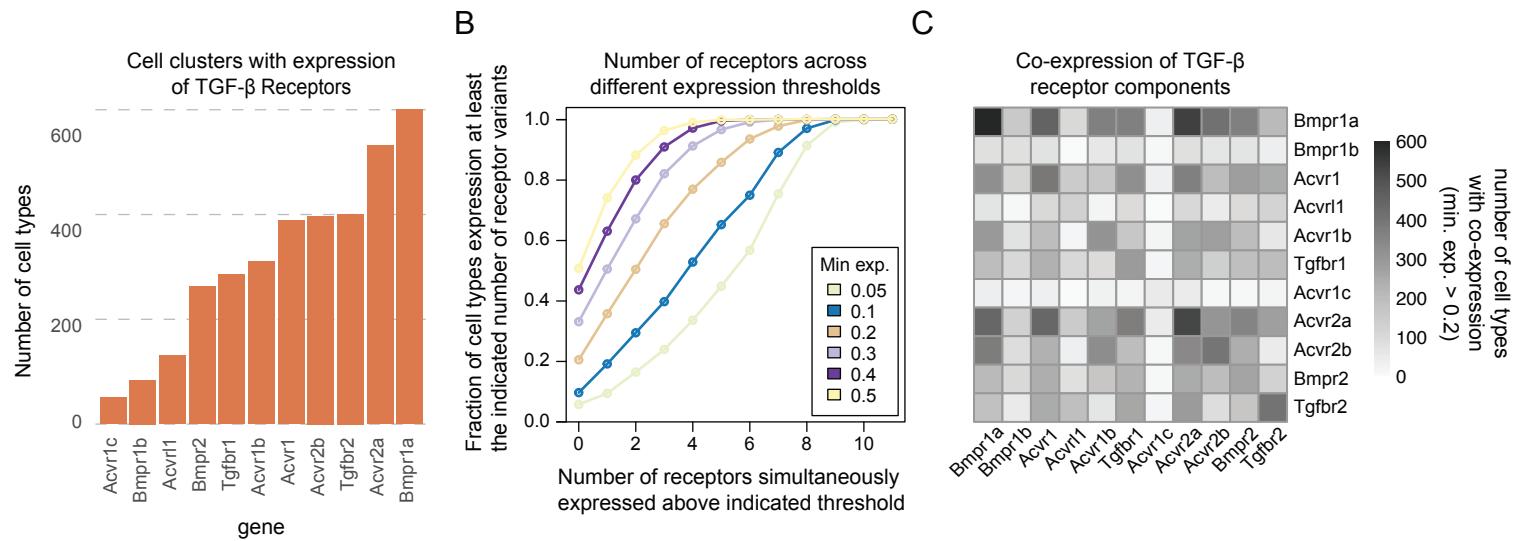
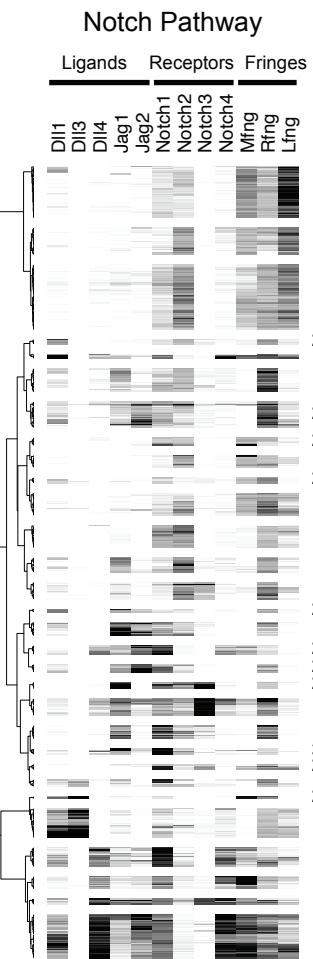
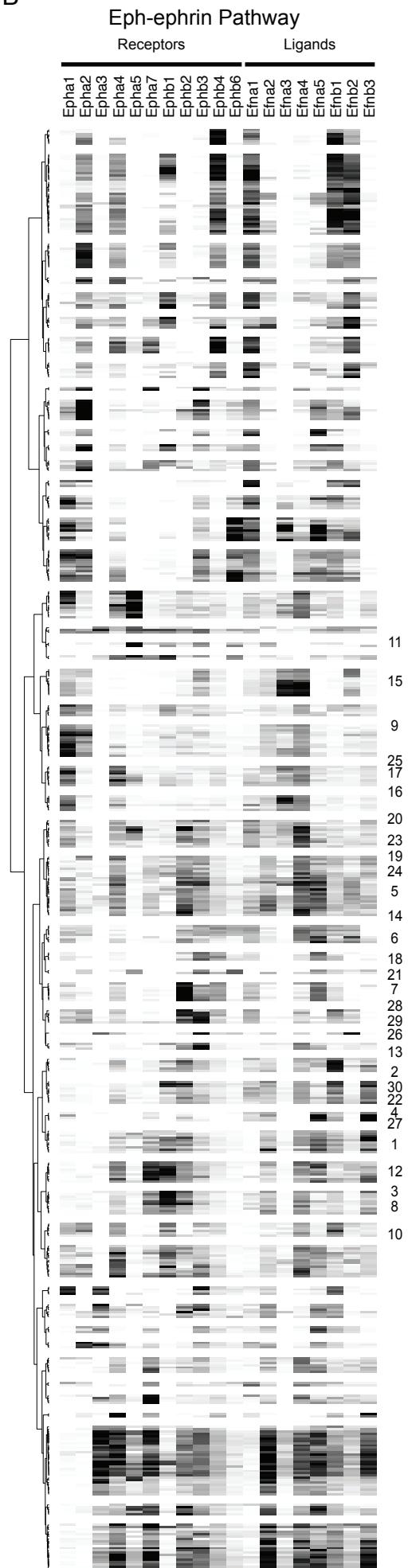


Figure 5—figure supplement 2

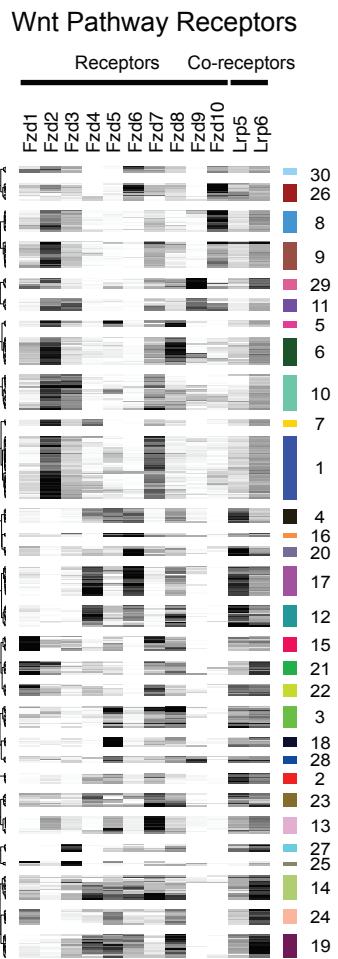
A



B



C



Motif usage

	Cell type 1	Cell type 2	Cell type 3	...
Pathway				
TGF- β	3	12	3	
Notch	7	5	6	
Eph-ephrin	30	2	15	
Wnt	1	9	4	
...				

0
1
Er-2
Er-3
Er-4
Er-5
Er-6