# Appendix C

Additional information to Chapter 4

This Appendix contains supplementary figures for Chapter 4.

C.1 Supplementary Figures

A

GTEx (human) tissue-specific genes

tau >= 0.5 (no shared genes identified)

B

ENCODE (mouse) tissue-specific genes

tau >= 0.5 (no shared genes identified)
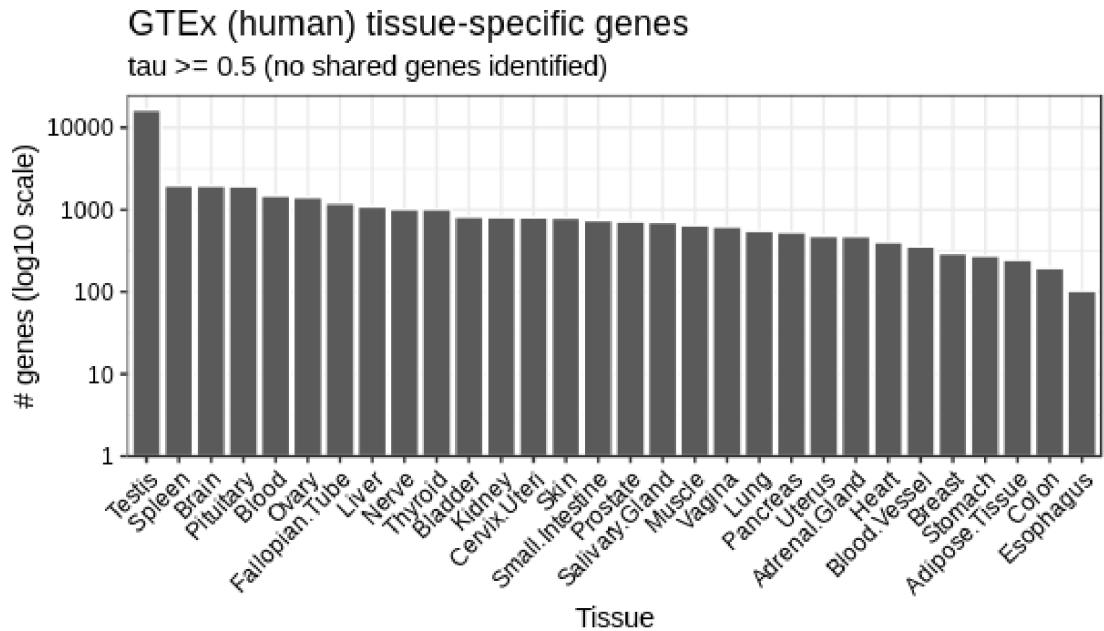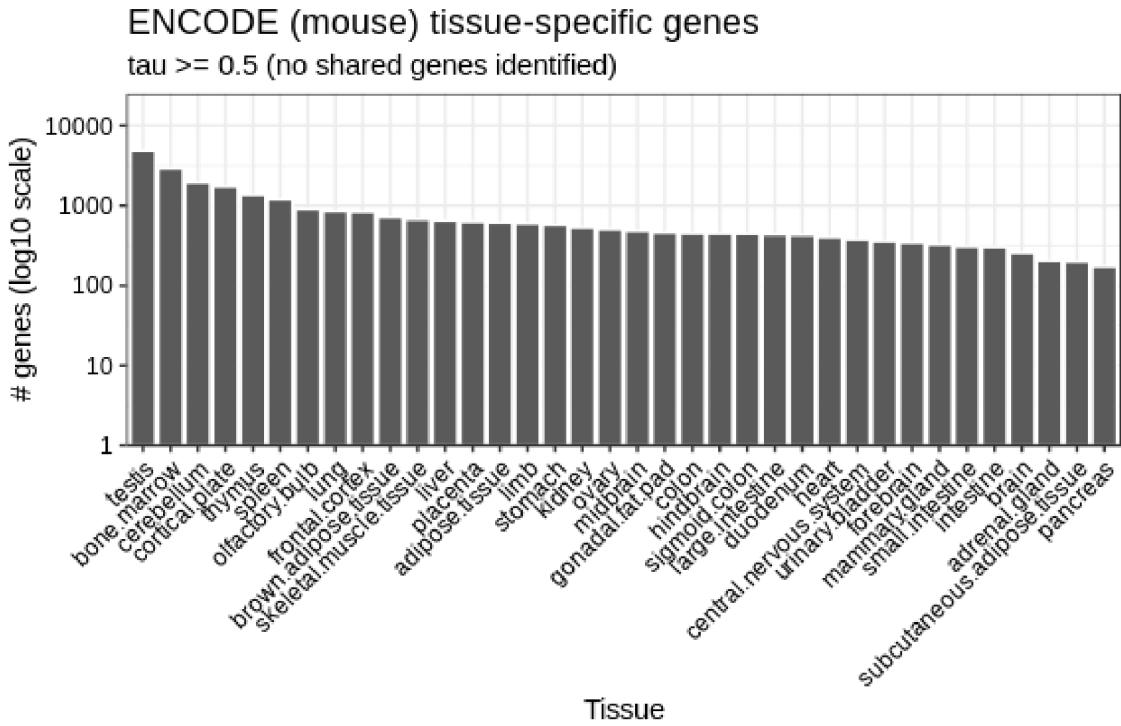
Fig. C.1: **Number of tissue-specific genes determined per tissue for human (A) and mouse (B))**
Tissue specific genes were determined by calculating tau (see Section 4.4.2) and keeping only those with a value greater than 0.5. No genes shared between tissues were found.
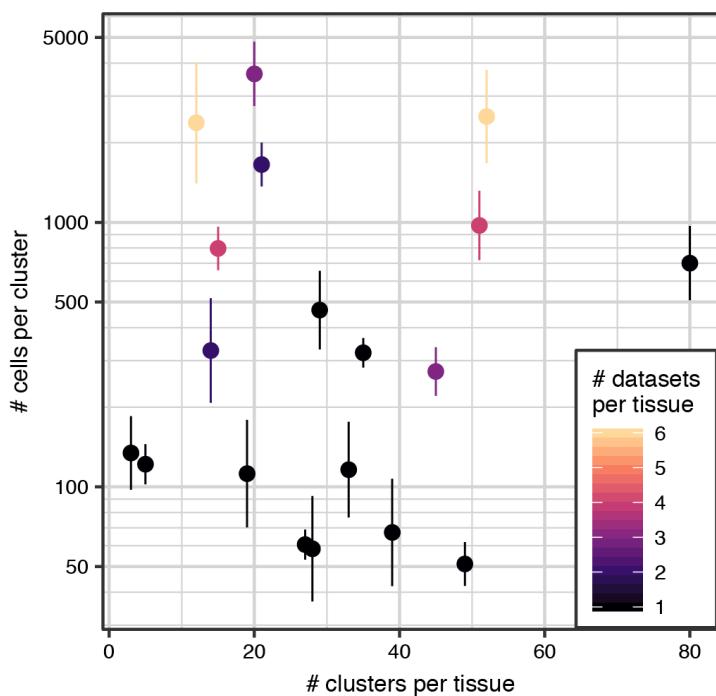
Fig. C.2: **Relating number of per-tissue clusters and number of cells (Related to Figure 3.7A)**
Scatter plot showing the variation of number of clusters per tissue with the number of cells, as well as number of datasets collected for each tissue (colour).
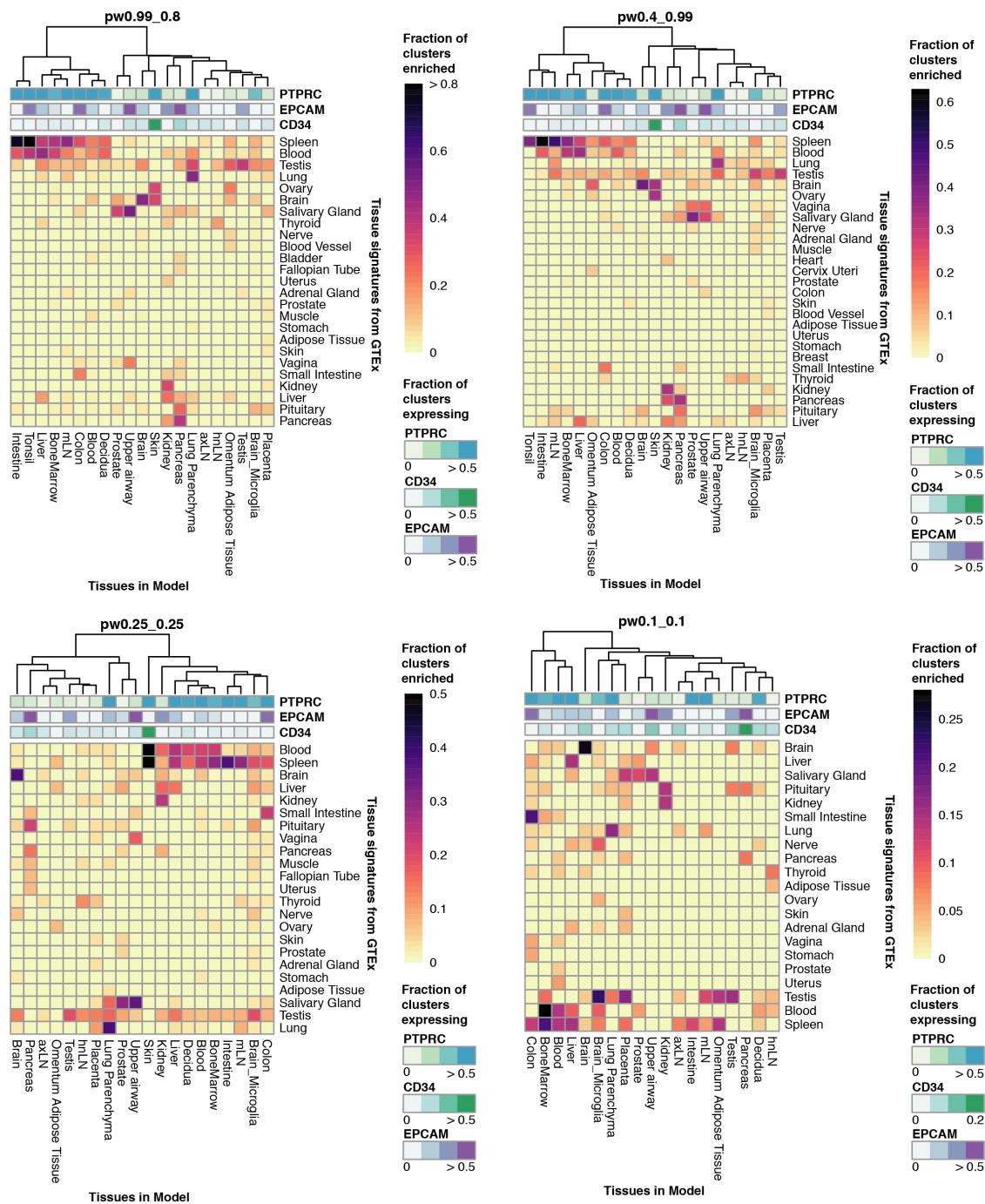
Fig. C.3: **Enrichment of tissue gene modules in other *CellTypist* models (Related to Figure 4.3)**
Heatmaps showing the fraction of clusters in each tissue (x-axis) with an enrichment for tissue-specific gene programmes (y-axis) determined from GTEx data. Each heatmap represents a different set of clusters per tissue, resulting from using different parameters in the *CellTypist* pipeline. Plot for thr1 = 0.99, thr2 = 0.8 is identical to Figure 4.3B.
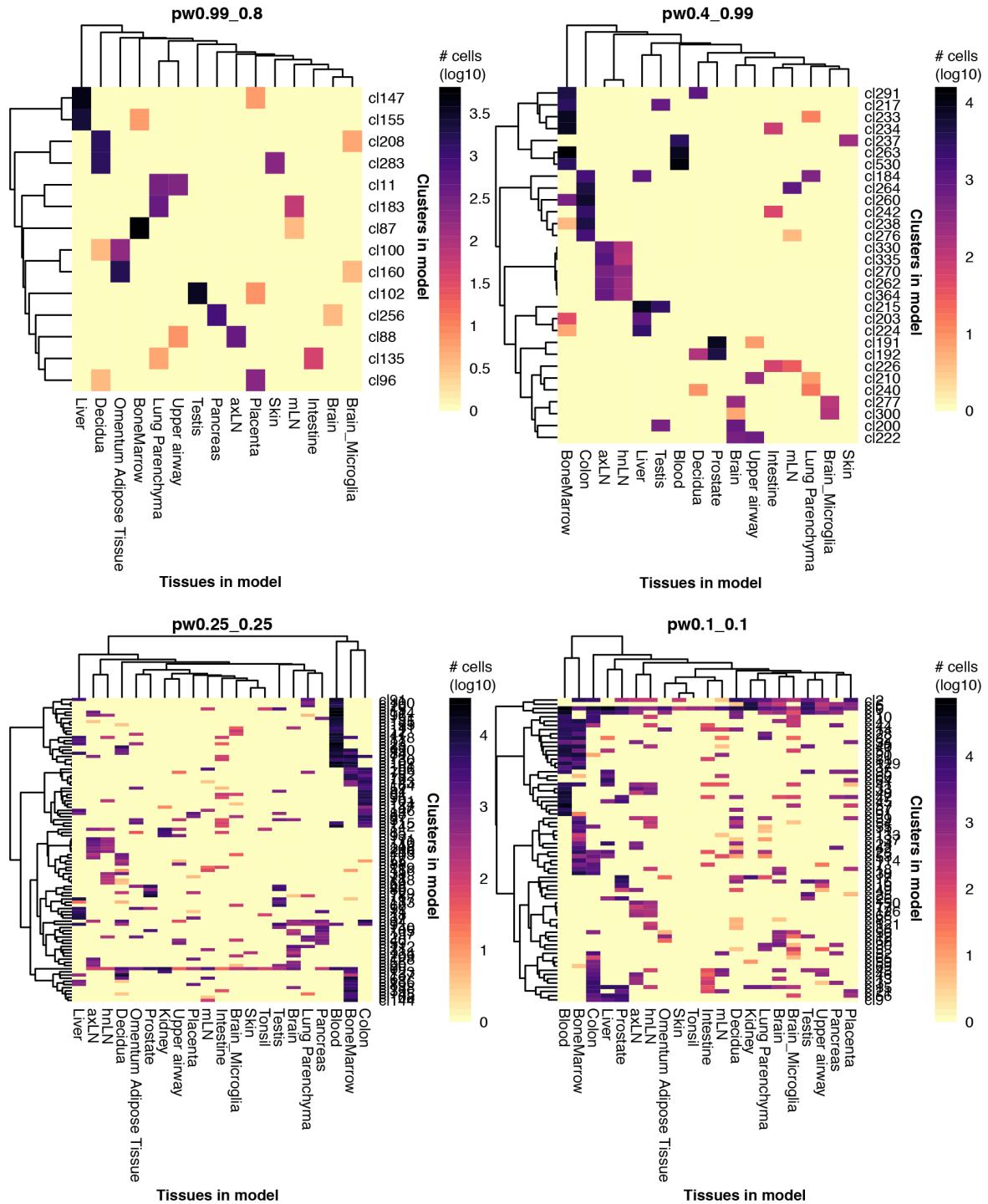
Fig. C.4: **Clusters merged across tissues in the different models (Related to Figure 4.3)**
Heatmaps showing the number of cells contributed by each tissue into cross-tissue clusters for each model.
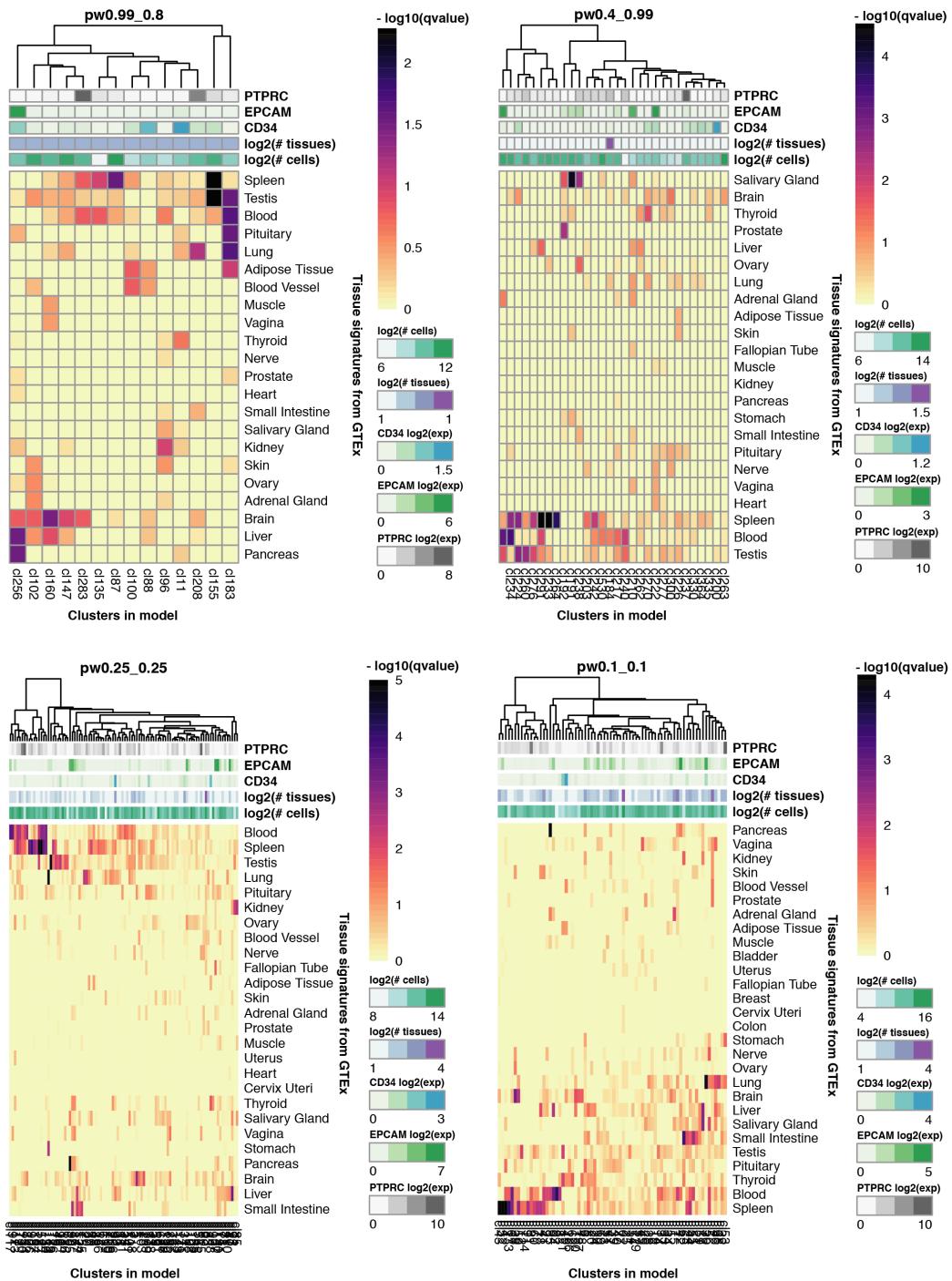
Fig. C.5: **Enrichment of tissue gene modules in merged clusters of different *Cell-Typist* models (Related to Figure 4.3)**
Heatmaps showing the -log10(q-value) of each merged cluster (x-axis) for the enrichment of tissue-specific gene programmes (y-axis) in their top 500 genes output by the model. Each heatmap represents a different set of merged clusters, resulting from using different parameters in the *CellTypist* pipeline.
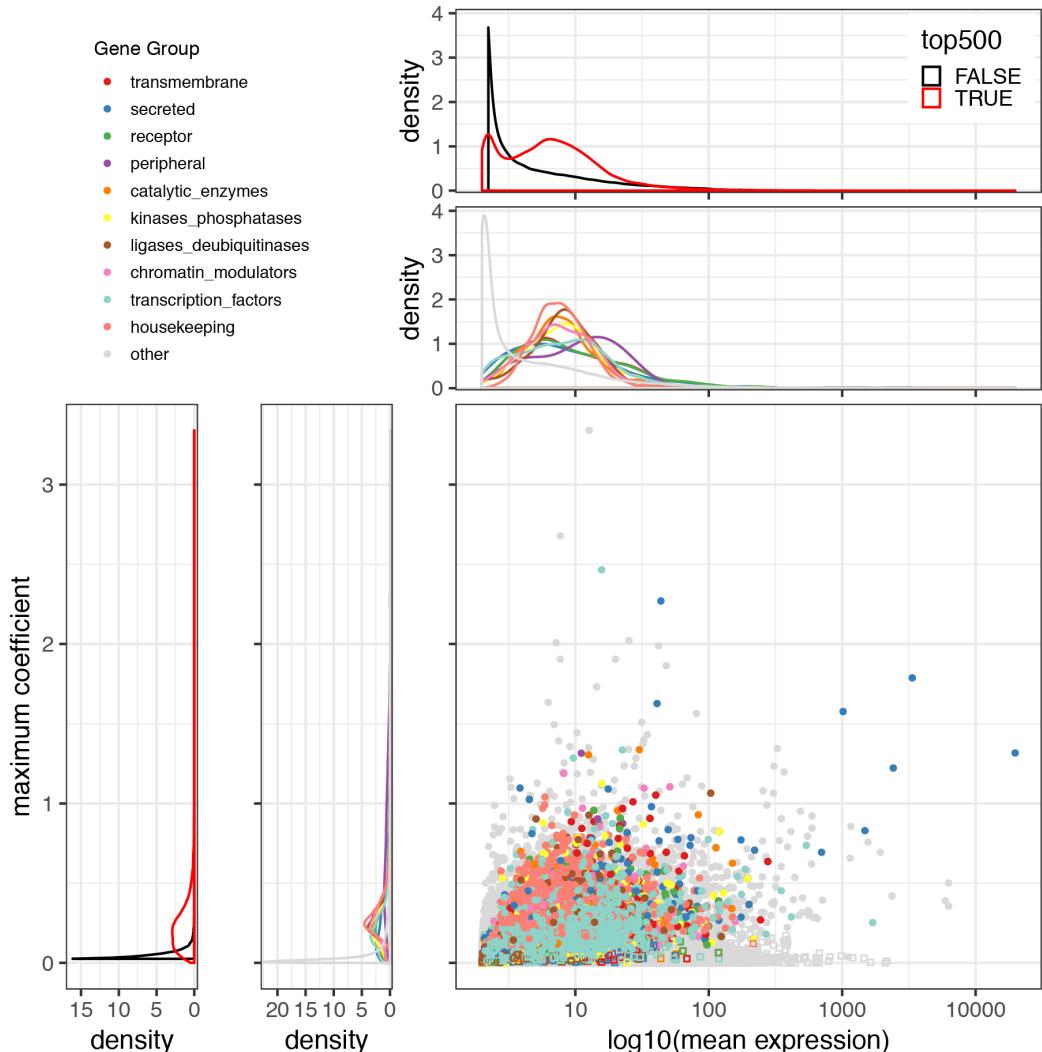
Fig. C.6: **Correlation between gene expression and importance in the human *CellTypist* model (Related to Figure 4.4)**
Scatterplot shows the relationship between mean expression across all cells and the maximum coefficient for each gene across all labels. Density plots show distribution of gene groups, and distribution of genes included in the top 500 coefficients of any label, along the mean expression (top) or maximum coefficient (left) range. Spearman correlation coefficient = 0.56, p-value < 0.01.
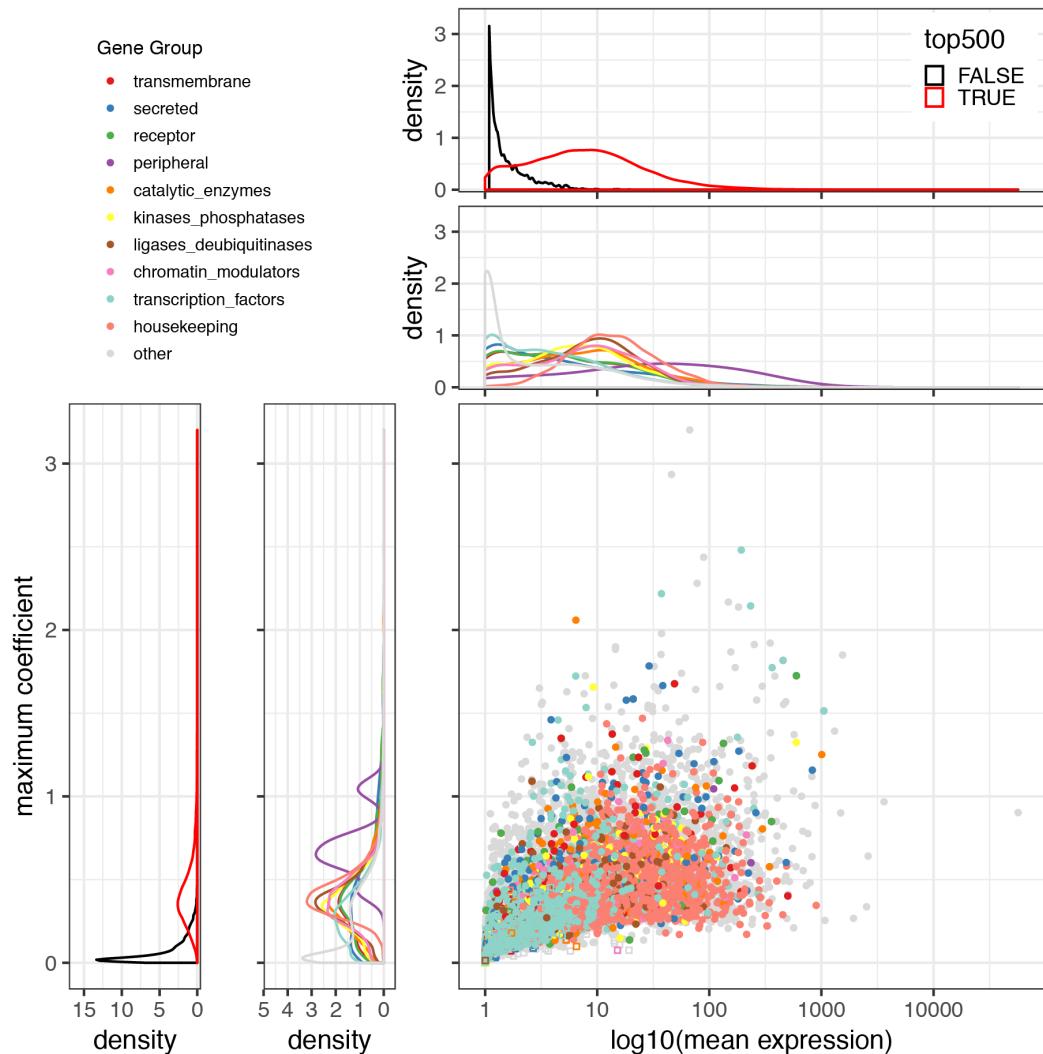
Fig. C.7: **Correlation between gene expression and importance in the *Tabula Muris CellTypist* model (Related to Figure 4.5)**
Scatterplot shows the relationship between mean expression across all cells and the maximum coefficient for each gene across all labels. Density plots show distribution of gene groups, and distribution of genes included in the top 500 coefficients of any label, along the mean expression (top) or maximum coefficient (left) range. Spearman correlation coefficient = 0.86, p-value < 0.01.
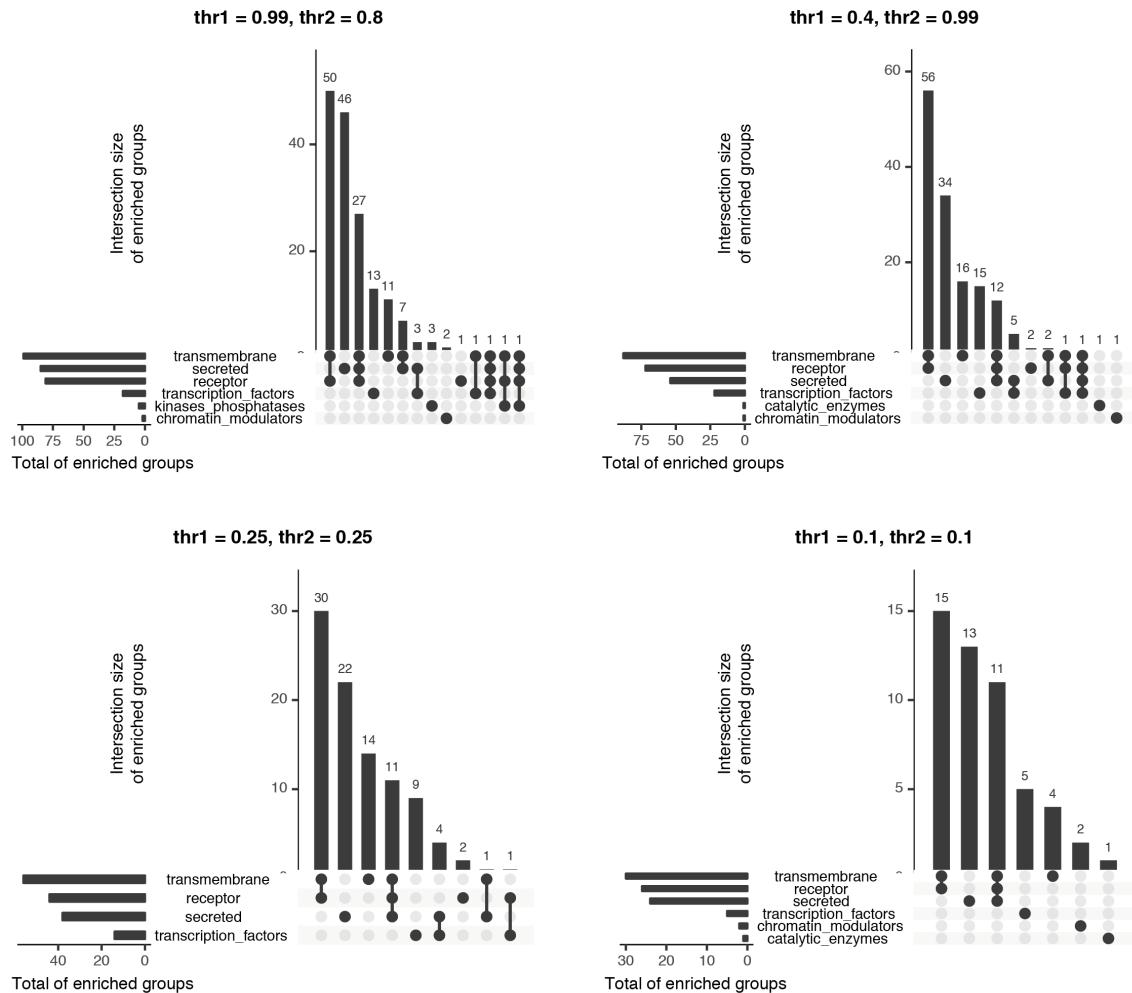
Fig. C.8: **Gene upset plots of different *CellTypist* models (Related to Figure 4.4)** Upset plots counting the number of clusters enriched for a specific group of genes in each model. The gene groups tested were "transcription factors", "transmembrane", "secreted", "receptors", "membrane peripheral proteins", "kinases and phosphatases", "chromatin modulators", "catalytic enzymes", "housekeeping genes". Only the terms enriched in at least one cluster were shown. The plot for thr1 = 0.99, thr2 = 0.8 is identical to Figure 4.4B.
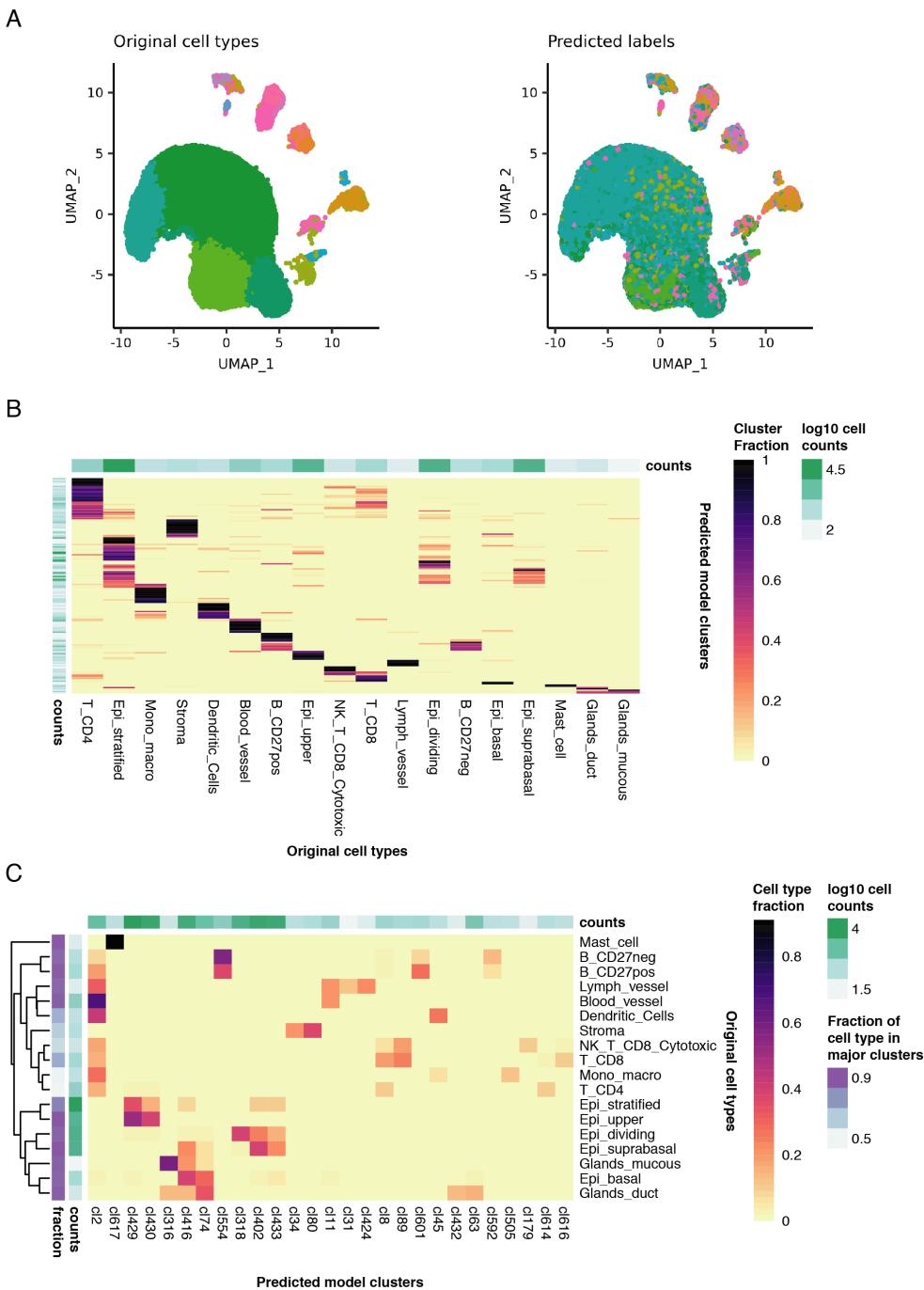
Fig. C.9: *CellTypist* **predictions for oesophagus data from (Madissoon et al., 2019) (Related to Figure 4.1)**
(A) UMAP projections coloured by the original cell type annotations (left) and those predicted by *CellTypist* (right) using thr1 = 0.99 and thr2 = 0.8. **(B)** Proportion of clusters (rows) matching each annotated cell type (columns). **(C)** Proportion of annotated cell types (rows) included in each cluster (columns). Only clusters including at least 10% of a given cell type were included.
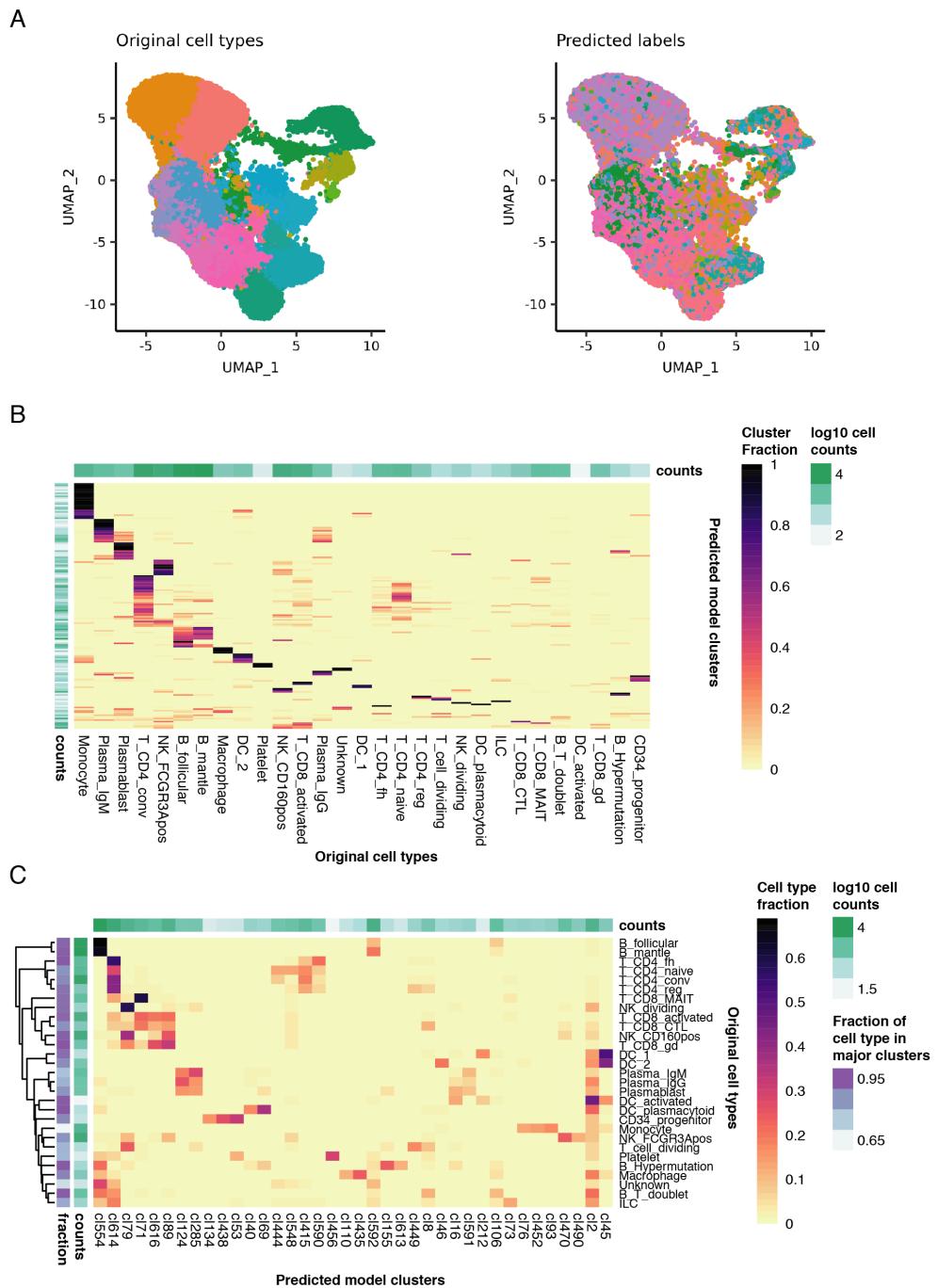
Fig. C.10: *CellTypist* **predictions for spleen data from (Madissoon et al., 2019) (Related to Figure 4.1)**

(A) UMAP projections coloured by the original cell type annotations (left) and those predicted by *CellTypist* (right) using thr1 = 0.99 and thr2 = 0.8. **(B)** Proportion of clusters (rows) matching each annotated cell type (columns). **(C)** Proportion of annotated cell types (rows) included in each cluster (columns). Only clusters including at least 10% of a given cell type were included.
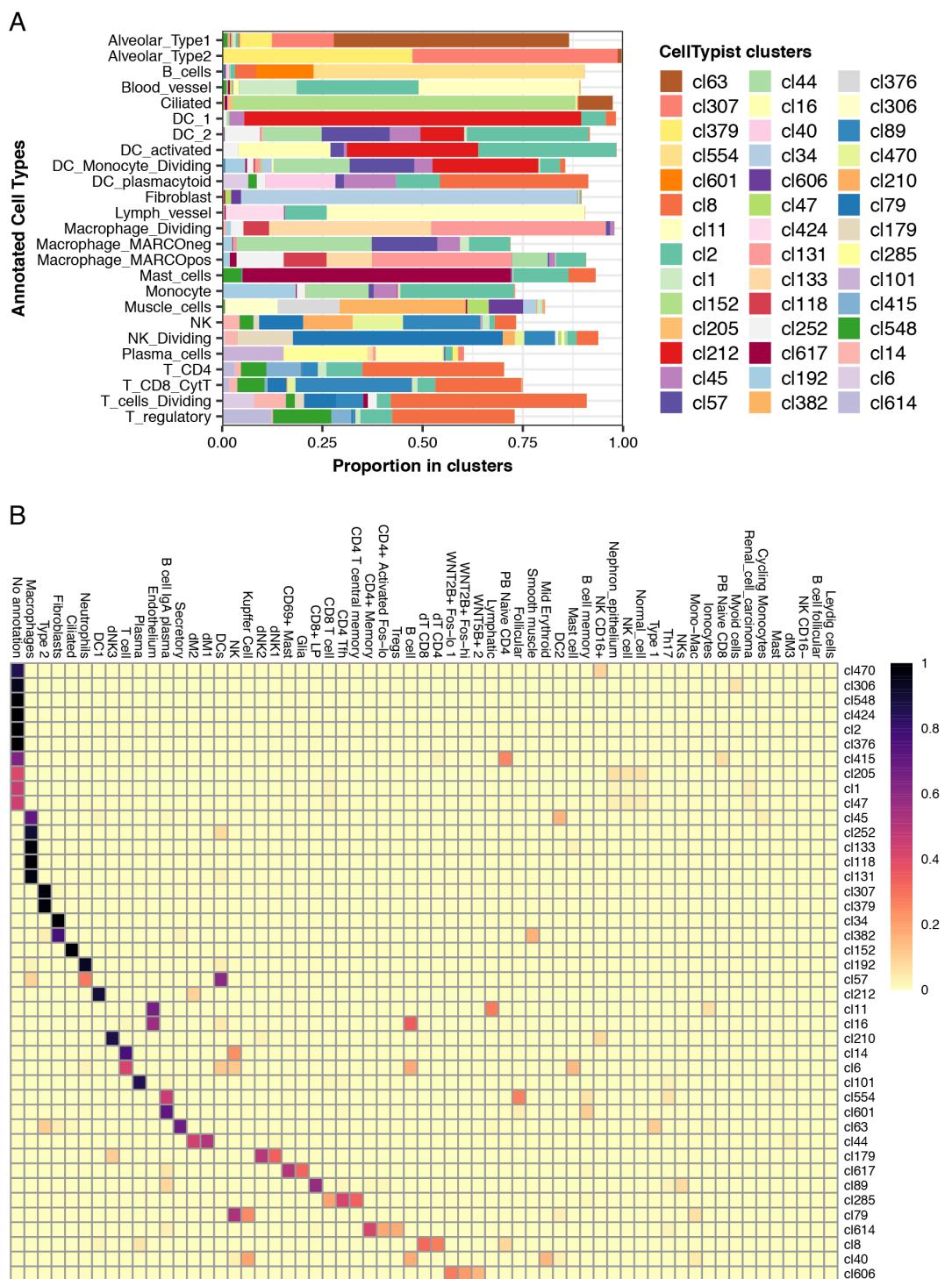
Fig. C.11: **Matching *CellTypist* predictions in lung with annotations in the data collection (Related to Figure 4.1)**
(A) *CellTypist* clusters (thr1 = 0.99, thr2 = 0.8) matched to each original cell type annotation. Only the top 3 clusters per cell type were selected. **(B)** Proportion of cell type annotations (columns) represented in the *CellTypist* clusters matched to lung.
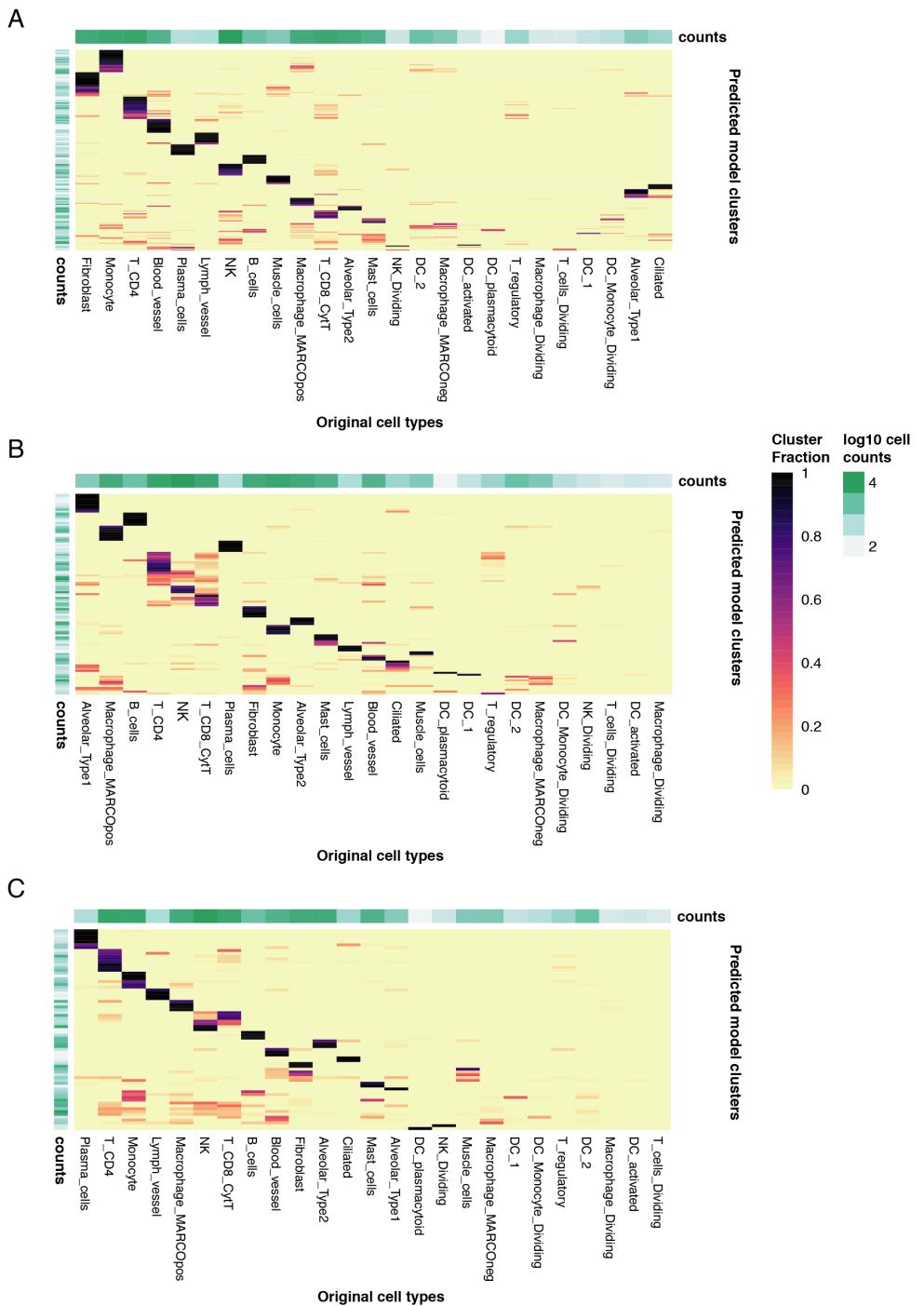
Fig. C.12: **Clusters matching lung annotated cell types in other *CellTypist* models (Related to Figure 4.1B)**
Proportion of clusters (rows) matching each annotated cell type (columns) in the models thr1 = 0.4, thr2 = 0.99 **(A)**, thr1 = 0.25, thr2 = 0.25 **(A)**, and thr1 = 0.1, thr2 = 0.1 **(C)**.
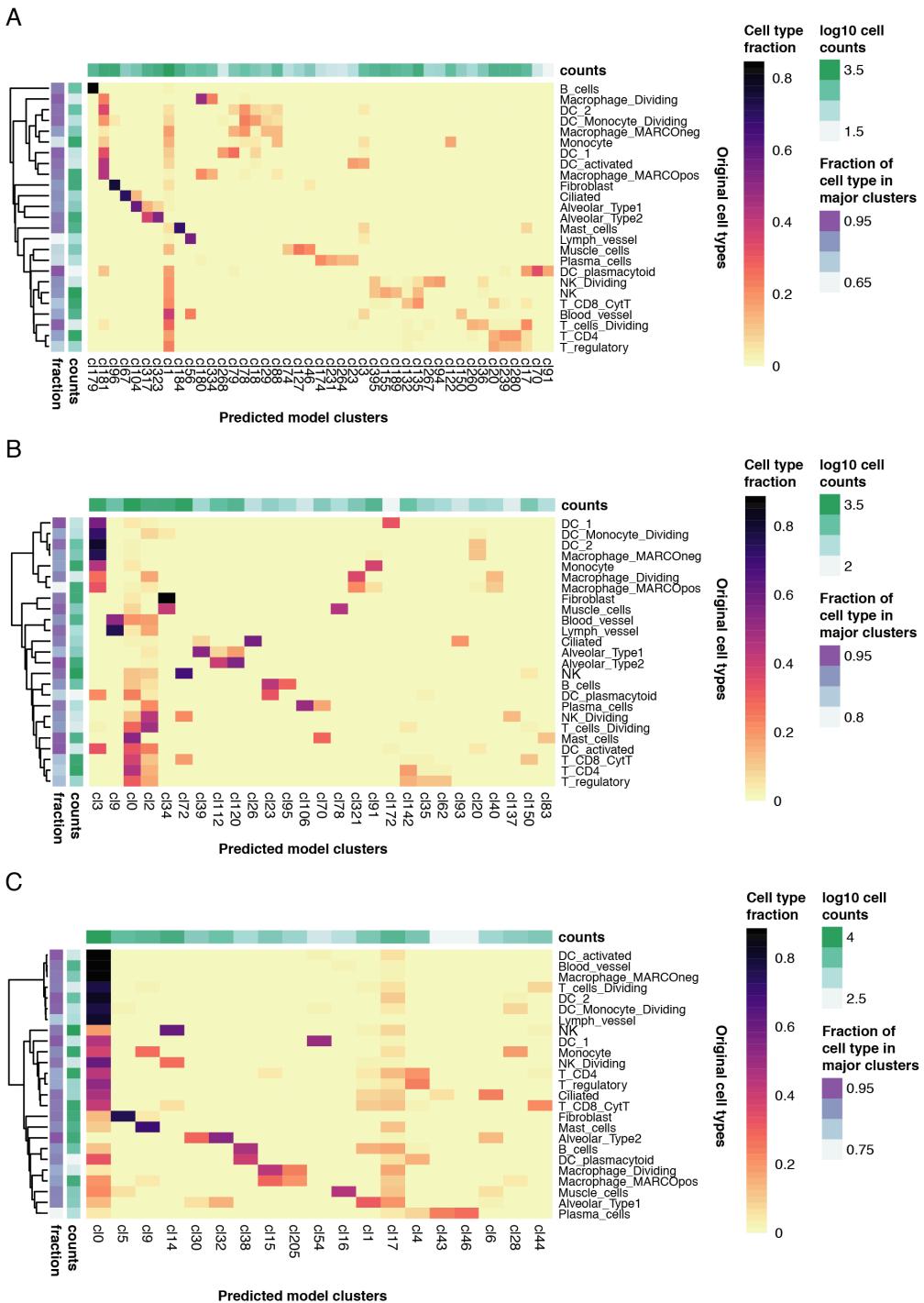
Fig. C.13: **Lung annotated cell types matching clusters in other *CellTypist* models (Related to Figure 4.1C)**
Proportion of annotated cell types (rows) included in each cluster (columns) in the models thr1 = 0.4, thr2 = 0.99 **(A)**, thr1 = 0.25, thr2 = 0.25 **(A)**, and thr1 = 0.1, thr2 = 0.1 **(C)**. Only clusters including at least 10% of a given cell type were included.

C.2   Supplementary Tables

Table C.1: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters

Cluster	Tissue	Cell types
cl430	Lung	Alveolar_Type1
cl430	Oesophagus	Epi_upper,Epi_stratified
cl433	Lung	Alveolar_Type2
cl433	Spleen	Plasmablast,DC_1,Monocyte,NK_dividing,Plasma_IgG
cl429	Lung	Alveolar_Type1
cl39	Lung	T_CD4,T_cells_Dividing,T_regulatory
cl39	Spleen	T_CD4_fh,T_CD4_conv,T_CD4_reg,T_CD8_MAIT,T_CD4_naive
cl39	Oesophagus	T_CD8,T_CD4,NK_T_CD8_Cytotoxic,Mast_cell,Lymph_vessel
cl402	Lung	Alveolar_Type2,Alveolar_Type1
cl402	Oesophagus	Epi_suprabasal
cl318	Lung	T_cells_Dividing,NK_Dividing,DC_Monocyte_Dividing,Macrophage_Dividing,Alveolar_Type1
cl318	Spleen	NK_dividing,T_cell_dividing,B_Hypermutation,Plasmablast,CD34_progenitor
cl318	Oesophagus	Epi_dividing
cl416	Lung	Alveolar_Type1,Alveolar_Type2,Ciliated,Lymph_vessel
cl416	Oesophagus	Glands_mucous,Epi_basal,Glands_duct,Epi_suprabasal
cl263	Lung	Alveolar_Type1,Alveolar_Type2,Ciliated
cl263	Oesophagus	Epi_stratified,Epi_basal,Glands_duct
cl2	Lung	DC_2,DC_activated,Lymph_vessel,DC_Monocyte_Dividing,DC_1
cl2	Spleen	DC_1,DC_activated,DC_2,DC_plasmacytoid,T_CD8_gd
cl2	Oesophagus	Blood_vessel,NK_T_CD8_Cytotoxic,Mast_cell,T_CD8,Dendritic_Cells
cl1	Lung	Blood_vessel
cl1	Oesophagus	Blood_vessel,Mast_cell,Dendritic_Cells,Stroma,NK_T_CD8_Cytotoxic
cl548	Spleen	T_CD8_CTL,T_CD8_MAIT,T_CD4_conv
cl548	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic
cl80	Lung	Fibroblast,Muscle_cells,Lymph_vessel,Blood_vessel
cl80	Spleen	T_CD8_MAIT,T_CD8_CTL
cl80	Oesophagus	Stroma,Epi_basal,Lymph_vessel,Glands_duct,Epi_suprabasal
cl6	Lung	T_cells_Dividing,DC_Monocyte_Dividing,DC_1,DC_activated,DC_plasmacytoid
cl6	Spleen	T_cell_dividing,DC_plasmacytoid,T_CD8_CTL,B_Hypermutation,NK_dividing
cl6	Oesophagus	Dendritic_Cells,NK_T_CD8_Cytotoxic,T_CD8,T_CD4,Mast_cell
cl614	Lung	T_CD4,T_regulatory,T_cells_Dividing
cl614	Spleen	T_CD4_fh,T_CD4_reg,T_CD4_conv,T_CD4_naive
cl614	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic
cl262	Lung	Alveolar_Type1,DC_1,DC_2,DC_activated
cl262	Oesophagus	Epi_stratified
cl63	Lung	Alveolar_Type1,Alveolar_Type2,Ciliated,Blood_vessel,Lymph_vessel
cl63	Spleen	DC_activated,DC_1,CD34_progenitor,DC_2,T_CD8_MAIT
cl63	Oesophagus	Glands_duct,Epi_basal,Glands_mucous,Epi_suprabasal,Lymph_vessel
cl513	Lung	T_CD4,T_cells_Dividing,T_regulatory,Mast_cells
cl513	Spleen	T_CD4_reg,T_CD8_MAIT,T_CD4_conv,T_CD4_fh,T_cell_dividing
cl513	Oesophagus	Mast_cell,T_CD4,NK_T_CD8_Cytotoxic,T_CD8
cl89	Lung	NK_Dividing,T_CD8_CytT,DC_plasmacytoid,DC_activated,NK
cl89	Spleen	T_CD8_activated,T_CD8_gd,T_CD8_MAIT,NK_CD160pos,T_CD8_CTL
cl89	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8,T_CD4,B_CD27pos,Mast_cell
cl377	Lung	Alveolar_Type2,Alveolar_Type1
cl11	Lung	Blood_vessel,Lymph_vessel,Muscle_cells,Fibroblast,Alveolar_Type2
cl11	Spleen	B_mantle,T_cell_dividing,NK_dividing
cl11	Oesophagus	Blood_vessel,Lymph_vessel,Stroma,Epi_basal
cl424	Lung	Lymph_vessel,Blood_vessel,Fibroblast
cl424	Oesophagus	Lymph_vessel,Blood_vessel
cl329	Lung	Ciliated,Mast_cells,T_CD4,Alveolar_Type1,T_CD8_CytT
cl329	Spleen	T_CD8_gd,DC_activated
cl329	Oesophagus	T_CD4,T_CD8,Glands_duct,NK_T_CD8_Cytotoxic,B_CD27pos
cl128	Lung	Alveolar_Type1,Alveolar_Type2
cl128	Oesophagus	Glands_mucous,Epi_stratified
cl31	Lung	Lymph_vessel,Fibroblast,Alveolar_Type1
cl31	Spleen	DC_activated,T_CD4_naive
cl31	Oesophagus	Lymph_vessel,Epi_basal
cl8	Lung	T_cells_Dividing,T_CD4,T_CD8_CytT,T_regulatory,DC_plasmacytoid
cl8	Spleen	T_CD4_reg,T_CD4_conv,T_CD8_activated,T_cell_dividing,T_CD8_CTL
cl8	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic,Mast_cell,B_CD27neg

Table C.2: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters (continued 1)

Cluster	Tissue	Cell types
cl554	Lung	B_cells,DC_plasmacytoid,DC_activated,T_cells_Dividing
cl554	Spleen	B_follicular,B_mantle,B_Hypermutation
cl554	Oesophagus	B_CD27pos,B_CD27neg,T_CD4,Dendritic_Cells,NK_T_CD8_Cytotoxic
cl425	Lung	Lymph_vessel,Blood_vessel,Muscle_cells,Fibroblast
cl425	Spleen	DC_1
cl425	Oesophagus	Lymph_vessel,Blood_vessel,Stroma,Epi_basal,Glands_duct
cl210	Lung	NK_Dividing,NK,T_cells_Dividing,DC_plasmacytoid,DC_1
cl210	Spleen	NK_CD160pos,NK_FCGR3Apos,T_CD8_gd,NK_dividing,T_CD8_MAIT
cl210	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8,T_CD4,Dendritic_Cells,B_CD27pos
cl87	Lung	T_CD4
cl87	Spleen	T_CD8_MAIT,Monocyte
cl87	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic,Mast_cell
cl47	Lung	Fibroblast,Muscle_cells,NK_Dividing,Blood_vessel,Lymph_vessel
cl47	Oesophagus	Stroma,Blood_vessel,Epi_basal,Lymph_vessel
cl222	Lung	Lymph_vessel,Blood_vessel,Fibroblast
cl222	Oesophagus	Lymph_vessel,Blood_vessel,Stroma
cl88	Lung	Blood_vessel,Lymph_vessel,Alveolar_Type1,DC_activated,Muscle_cells
cl88	Spleen	T_CD8_MAIT,T_CD4_conv,T_CD4_naive,DC_activated
cl88	Oesophagus	Blood_vessel,Lymph_vessel,Epi_basal,Glands_duct,Stroma
cl73	Lung	T_cells_Dividing,T_CD4,T_regulatory,DC_activated
cl73	Spleen	T_CD4_reg,T_CD8_MAIT,ILC,T_CD4_fh,T_CD4_conv
cl73	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic,Mast_cell,B_CD27pos
cl606	Lung	Fibroblast,Muscle_cells,DC_activated,Macrophage_MARCOpos,Macrophage_MARCOneg
cl606	Spleen	Monocyte,DC_1,DC_2,Macrophage
cl606	Oesophagus	Stroma,Mast_cell,Epi_suprabasal,Mono_macro,Lymph_vessel
cl449	Spleen	T_cell_dividing,T_CD4_conv,T_CD4_fh,B_Hypermutation,CD34_progenitor
cl449	Oesophagus	Lymph_vessel,Blood_vessel,Glands_duct
cl58	Lung	T_regulatory,T_cells_Dividing,T_CD4,T_CD8_CytT,Mast_cells
cl58	Spleen	NK_CD160pos,T_CD4_reg,T_CD8_gd,T_CD8_MAIT,T_CD8_CTL
cl58	Oesophagus	T_CD8,T_CD4,NK_T_CD8_Cytotoxic,Mast_cell,Dendritic_Cells
cl74	Lung	Alveolar_Type1
cl74	Oesophagus	Epi_basal,Glands_duct
cl147	Spleen	CD34_progenitor
cl71	Lung	T_CD8_CytT
cl71	Spleen	T_CD8_MAIT,T_CD8_activated,T_CD8_CTL,T_CD8_gd
cl71	Oesophagus	T_CD4,T_CD8
cl616	Lung	T_CD8_CytT,NK_Dividing,NK,T_regulatory,T_cells_Dividing
cl616	Spleen	T_CD8_activated,T_CD8_MAIT,T_CD8_gd,NK_CD160pos,T_CD4_fh
cl616	Oesophagus	T_CD8,NK_T_CD8_Cytotoxic,T_CD4
cl179	Lung	NK_Dividing,NK,T_cells_Dividing
cl179	Spleen	NK_dividing,NK_CD160pos,T_CD8_gd,NK_FCGR3Apos,ILC
cl179	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8,Epi_dividing,T_CD4,Mast_cell
cl34	Lung	Fibroblast,Muscle_cells,Monocyte
cl34	Spleen	Monocyte,T_CD8_CTL
cl34	Oesophagus	Stroma,Lymph_vessel,Dendritic_Cells,Epi_basal,Mono_macro
cl271	Lung	Fibroblast,Muscle_cells,Lymph_vessel,Blood_vessel
cl271	Oesophagus	Stroma,Lymph_vessel,Epi_basal,Blood_vessel,Epi_suprabasal
cl172	Lung	Lymph_vessel,Blood_vessel,Fibroblast
cl172	Oesophagus	Lymph_vessel,Blood_vessel,Stroma,Epi_basal,Epi_suprabasal
cl435	Lung	Macrophage_MARCOneg,Macrophage_MARCOpos
cl435	Spleen	Macrophage,DC_2,Monocyte
cl79	Lung	NK_Dividing,NK,T_CD8_CytT,T_cells_Dividing,T_regulatory
cl79	Spleen	T_CD8_activated,NK_dividing,T_CD8_gd,T_CD8_CTL,NK_CD160pos
cl79	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8,T_CD4,Epi_dividing,Mono_macro
cl36	Lung	Blood_vessel,DC_activated,DC_Monocyte_Dividing,DC_plasmacytoid,Macrophage_MARCOpos
cl36	Spleen	DC_2,DC_activated,DC_1,B_follicular,Macrophage
cl36	Oesophagus	Blood_vessel,Dendritic_Cells,Mono_macro,B_CD27pos,B_CD27neg
cl505	Spleen	Monocyte
cl404	Lung	Muscle_cells,Fibroblast
cl404	Oesophagus	Epi_suprabasal

Table C.3: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters (continued 2)

Cluster	Tissue	Cell types
cl464	Lung	Macrophage_MARCOneg
cl464	Spleen	CD34_progenitor,DC_2
cl464	Oesophagus	Dendritic_Cells
cl596	Lung	T_CD4,T_cells_Dividing,T_regulatory,Mast_cells,B_cells
cl596	Spleen	T_CD8_MAIT,T_CD4_conv,T_CD4_fh,T_CD4_reg,T_CD4_naive
cl596	Oesophagus	T_CD8,NK_T_CD8_Cytotoxic,T_CD4,Dendritic_Cells,B_CD27pos
cl45	Lung	DC_2,Macrophage_MARCOneg,DC_1,DC_Monocyte_Dividing,DC_plasmacytoid
cl45	Spleen	DC_2,DC_1,DC_activated,DC_plasmacytoid,Monocyte
cl45	Oesophagus	Dendritic_Cells,Mono_macro,B_CD27pos,B_CD27neg,Blood_vessel
cl51	Lung	DC_2,Macrophage_MARCOneg,DC_1,DC_activated,DC_Monocyte_Dividing
cl51	Spleen	DC_2,DC_1,DC_activated,Monocyte,Macrophage
cl51	Oesophagus	Dendritic_Cells,Mono_macro,T_CD4,B_CD27pos,B_CD27neg
cl441	Spleen	T_CD4_naive
cl432	Lung	Alveolar_Type1,Ciliated,Alveolar_Type2
cl432	Spleen	B_mantle
cl432	Oesophagus	Glands_duct,Glands_mucous,Epi_basal
cl617	Lung	DC_2,Mast_cells,Muscle_cells
cl617	Spleen	Monocyte,T_CD8_MAIT
cl617	Oesophagus	Mast_cell,Dendritic_Cells,Epi_basal,B_CD27pos,Mono_macro
cl260	Lung	DC_plasmacytoid,Alveolar_Type1,Ciliated,Monocyte,DC_activated
cl260	Spleen	CD34_progenitor
cl260	Oesophagus	Blood_vessel,Epi_suprabasal
cl452	Lung	Monocyte
cl452	Spleen	Monocyte
cl27	Lung	Blood_vessel,Lymph_vessel,Muscle_cells
cl27	Oesophagus	Blood_vessel,Lymph_vessel,Stroma
cl64	Lung	Blood_vessel,Lymph_vessel,Fibroblast,Muscle_cells
cl64	Spleen	T_CD4_conv
cl64	Oesophagus	Blood_vessel,Lymph_vessel,Stroma,Epi_basal
cl205	Lung	T_CD8_CytT
cl205	Spleen	T_CD8_gd,T_CD8_CTL
cl252	Lung	Macrophage_MARCOpos,Macrophage_Dividing,DC_activated,DC_Monocyte_Dividing,DC_2
cl252	Spleen	DC_2,DC_1,NK_dividing,DC_activated,CD34_progenitor
cl252	Oesophagus	NK_T_CD8_Cytotoxic,T_CD4,Mast_cell,Mono_macro,T_CD8
cl76	Spleen	Monocyte
cl508	Lung	T_CD8_CytT,T_CD4,T_regulatory,NK,NK_Dividing
cl508	Spleen	T_CD8_CTL,T_CD8_MAIT,T_CD8_activated,T_CD8_gd,T_CD4_fh
cl508	Oesophagus	T_CD8,T_CD4,NK_T_CD8_Cytotoxic
cl621	Lung	T_cells_Dividing,T_CD4,T_regulatory,DC_activated
cl621	Spleen	T_CD8_MAIT,T_CD4_reg,T_cell_dividing,Monocyte,T_CD4_conv
cl621	Oesophagus	T_CD4,T_CD8,Dendritic_Cells,NK_T_CD8_Cytotoxic,Mast_cell
cl512	Lung	Monocyte,Macrophage_MARCOneg,Macrophage_MARCOpos,DC_1,DC_2
cl512	Spleen	Monocyte,DC_2,Macrophage,DC_activated,DC_1
cl512	Oesophagus	Mono_macro,Dendritic_Cells,B_CD27pos,B_CD27neg,T_CD4
cl70	Lung	DC_Monocyte_Dividing,DC_1,Macrophage_Dividing,DC_activated,Macrophage_MARCOpos
cl70	Spleen	DC_1,DC_2,DC_activated,B_follicular,B_mantle
cl70	Oesophagus	Dendritic_Cells,Blood_vessel,Mono_macro,B_CD27pos,B_CD27neg
cl568	Lung	Ciliated
cl340	Lung	Fibroblast,Lymph_vessel
cl340	Spleen	DC_plasmacytoid
cl340	Oesophagus	Glands_mucous,Stroma,Epi_basal,Lymph_vessel
cl57	Lung	Macrophage_MARCOneg,DC_2,DC_Monocyte_Dividing,DC_activated,DC_1
cl57	Spleen	DC_2,Monocyte,DC_1,DC_activated,DC_plasmacytoid
cl57	Oesophagus	Dendritic_Cells,Mono_macro,Lymph_vessel,Mast_cell,Blood_vessel
cl491	Lung	Macrophage_Dividing,DC_Monocyte_Dividing,Macrophage_MARCOpos,DC_activated,DC_2
cl491	Spleen	DC_2,DC_1,Monocyte,Macrophage,DC_activated
cl491	Oesophagus	Dendritic_Cells,Mono_macro,B_CD27neg,T_CD4,B_CD27pos

Table C.4: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters (continued 3)

Cluster	Tissue	Cell types
cl100	Lung	Blood_vessel,DC_plasmacytoid,Lymph_vessel,Muscle_cells,DC_2
cl100	Spleen	DC_plasmacytoid,DC_2,B_follicular,B_mantle,DC_1
cl100	Oesophagus	Blood_vessel,Dendritic_Cells,Lymph_vessel,Stroma,Mono_macro
cl46	Lung	DC_activated,DC_1,DC_Monocyte_Dividing,Macrophage_MARCOneg,Macrophage_MARCOpos
cl46	Spleen	DC_activated,DC_2,DC_1,B_follicular,B_Hypermutation
cl46	Oesophagus	Dendritic_Cells,Blood_vessel,Mono_macro,B_CD27neg,B_CD27pos
cl44	Lung	DC_2,Macrophage_MARCOneg,DC_Monocyte_Dividing,Macrophage_MARCOpos,Monocyte
cl44	Spleen	Monocyte,DC_2,DC_activated,Macrophage,T_CD4_conv
cl44	Oesophagus	Mono_macro,Dendritic_Cells,T_CD8,B_CD27neg,NK_T_CD8_Cytotoxic
cl503	Lung	DC_2,Macrophage_MARCOneg,Monocyte,DC_activated
cl503	Spleen	Monocyte,Macrophage
cl503	Oesophagus	Epi_basal,Blood_vessel,Mono_macro,Glands_duct
cl25	Lung	Macrophage_MARCOneg,Macrophage_MARCOpos, DC_2,Macrophage_Dividing,DC_Monocyte_Dividing
cl25	Spleen	DC_2,Monocyte,Macrophage,DC_1,DC_plasmacytoid
cl25	Oesophagus	Mono_macro,Dendritic_Cells,Mast_cell,Glands_duct,Lymph_vessel
cl93	Lung	Monocyte,Macrophage_MARCOpos
cl93	Spleen	Monocyte
cl485	Lung	Plasma_cells,DC_1
cl485	Spleen	Plasma_IgG,Plasma_IgM,Monocyte
cl577	Lung	Alveolar_Type2,Alveolar_Type1
cl577	Spleen	B_follicular
cl577	Oesophagus	Epi_upper
cl316	Lung	Alveolar_Type1
cl316	Oesophagus	Glands_mucous,Glands_duct,Epi_upper,Epi_basal
cl220	Lung	Ciliated
cl611	Lung	T_CD4,T_regulatory,DC_activated,T_cells_Dividing,DC_2
cl611	Spleen	T_CD8_MAIT,T_CD4_conv,ILC,T_CD4_fh,T_cell_dividing
cl611	Oesophagus	NK_T_CD8_Cytotoxic,T_CD4,T_CD8
cl242	Lung	Fibroblast
cl242	Oesophagus	Stroma,Epi_basal
cl458	Lung	NK_Dividing,NK,T_CD8_CytT
cl458	Spleen	T_CD8_CTL,NK_FCGR3Apos,NK_CD160pos,NK_dividing,T_CD8_MAIT
cl458	Oesophagus	T_CD8,NK_T_CD8_Cytotoxic,T_CD4
cl417	Lung	Lymph_vessel,Alveolar_Type1
cl417	Spleen	DC_1
cl417	Oesophagus	Glands_duct,Glands_mucous
cl401	Lung	DC_2,DC_activated
cl401	Oesophagus	Glands_mucous,Glands_duct
cl581	Lung	Alveolar_Type2,Alveolar_Type1,Ciliated
cl581	Oesophagus	Epi_basal
cl592	Lung	DC_plasmacytoid
cl592	Spleen	B_follicular,B_mantle
cl592	Oesophagus	B_CD27pos,B_CD27neg
cl376	Lung	Muscle_cells,Fibroblast,Ciliated
cl376	Oesophagus	Stroma,Lymph_vessel,Mast_cell
cl519	Lung	T_regulatory,T_CD4,T_cells_Dividing
cl519	Spleen	T_CD8_MAIT,T_CD4_fh,T_CD4_conv,T_CD4_reg
cl519	Oesophagus	T_CD4,NK_T_CD8_Cytotoxic,T_CD8,Mast_cell
cl35	Lung	Macrophage_MARCOpos,DC_Monocyte_Dividing,DC_1, Macrophage_Dividing,Macrophage_MARCOneg
cl35	Spleen	DC_1,DC_2,DC_activated,Monocyte,B_mantle
cl35	Oesophagus	Mono_macro,Dendritic_Cells,B_CD27neg,Glands_duct,B_CD27pos
cl446	Lung	T_CD4,T_CD8_CytT,T_regulatory
cl446	Spleen	T_CD4_fh,T_CD4_reg,T_CD8_MAIT,T_CD4_naive
cl446	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic
cl219	Lung	Blood_vessel,Muscle_cells,Lymph_vessel,Alveolar_Type1,Fibroblast
cl219	Oesophagus	Blood_vessel,Lymph_vessel,Stroma,Epi_basal

Table C.5: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters (continued 4)

Cluster	Tissue	Cell types
cl496	Lung	T_CD4
cl496	Spleen	T_CD4_conv,T_CD4_naive
cl69	Lung	DC_plasmacytoid,Plasma_cells,B_cells,DC_1,Macrophage_MARCOneg
cl69	Spleen	B_follicular,Plasma_IgM,DC_plasmacytoid,Plasmablast,B_mantle
cl69	Oesophagus	B_CD27neg,B_CD27pos,Blood_vessel,Glands_duct,Dendritic_Cells
cl134	Spleen	CD34_progenitor
cl28	Lung	T_cells_Dividing,NK_Dividing
cl28	Spleen	NK_dividing,T_cell_dividing
cl14	Lung	T_cells_Dividing,T_regulatory,T_CD4,T_CD8_CytT,NK_Dividing
cl14	Spleen	T_CD8_CTL,T_CD4_reg,T_CD4_fh,T_cell_dividing,T_CD4_conv
cl14	Oesophagus	T_CD8,T_CD4,NK_T_CD8_Cytotoxic,Dendritic_Cells,B_CD27pos
cl40	Lung	DC_plasmacytoid,B_cells,DC_1,DC_activated,DC_2
cl40	Spleen	B_follicular,B_mantle,DC_plasmacytoid,DC_activated
cl40	Oesophagus	B_CD27neg,B_CD27pos,Dendritic_Cells
cl509	Lung	DC_1,DC_2,Macrophage_MARCOneg
cl509	Spleen	B_follicular,B_mantle
cl509	Oesophagus	Mono_macro,B_CD27pos,Dendritic_Cells,B_CD27neg
cl113	Lung	DC_plasmacytoid,DC_activated
cl113	Spleen	B_mantle,B_follicular
cl507	Lung	T_regulatory,Ciliated
cl507	Spleen	T_CD4_naive,T_CD4_conv
cl102	Lung	Fibroblast,Muscle_cells,Lymph_vessel
cl102	Oesophagus	Stroma,Epi_basal,Blood_vessel,Lymph_vessel
cl590	Lung	T_CD4,T_cells_Dividing,T_regulatory
cl590	Spleen	T_CD4_fh,T_CD4_reg,T_CD4_naive,T_CD4_conv
cl590	Oesophagus	NK_T_CD8_Cytotoxic,T_CD4
cl422	Lung	Macrophage_MARCOneg,DC_2,DC_Monocyte_Dividing, Macrophage_MARCOpos,Macrophage_Dividing
cl422	Spleen	DC_2,CD34_progenitor,Unknown,NK_FCGR3Apos,Monocyte
cl422	Oesophagus	Dendritic_Cells,B_CD27neg,NK_T_CD8_Cytotoxic,Mono_macro,T_CD8
cl106	Lung	DC_1,B_cells,DC_activated,DC_2
cl106	Spleen	B_follicular,B_mantle,B_Hypermutation
cl106	Oesophagus	B_CD27pos,B_CD27neg,Dendritic_Cells,Blood_vessel,T_CD4
cl183	Lung	Mast_cells,T_CD4,DC_Monocyte_Dividing,T_cells_Dividing,DC_plasmacytoid
cl183	Spleen	T_CD8_MAIT,Monocyte,T_CD4_reg,CD34_progenitor,B_follicular
cl183	Oesophagus	Mast_cell,Dendritic_Cells,NK_T_CD8_Cytotoxic,T_CD8,T_CD4
cl68	Lung	T_CD4,T_cells_Dividing,T_regulatory,DC_1,Mast_cells
cl68	Spleen	T_CD4_naive,T_CD4_fh,T_CD4_conv,ILC,T_CD4_reg
cl68	Oesophagus	T_CD4,NK_T_CD8_Cytotoxic,T_CD8,Dendritic_Cells,B_CD27pos
cl192	Lung	Monocyte,Macrophage_MARCOpos,DC_2,DC_Monocyte_Dividing,Macrophage_MARCOneg
cl192	Spleen	Monocyte,DC_2,Macrophage
cl192	Oesophagus	Mono_macro,Dendritic_Cells,Mast_cell,B_CD27pos,T_CD4
cl16	Lung	DC_activated,Blood_vessel,Plasma_cells,DC_1,DC_Monocyte_Dividing
cl16	Spleen	Plasma_IgG,Plasmablast,Plasma_IgM,B_follicular,B_mantle
cl16	Oesophagus	Blood_vessel,B_CD27neg,B_CD27pos,Lymph_vessel,Dendritic_Cells
cl608	Lung	DC_Monocyte_Dividing,T_cells_Dividing,NK_Dividing,DC_activated,DC_1
cl608	Spleen	B_Hypermutation,T_cell_dividing,B_follicular,DC_2,NK_dividing
cl608	Oesophagus	B_CD27pos,B_CD27neg,T_CD4,Epi_dividing,T_CD8
cl470	Lung	NK_Dividing,NK,T_CD8_CytT
cl470	Spleen	NK_FCGR3Apos,T_CD8_CTL,T_CD8_MAIT,NK_dividing,NK_CD160pos
cl470	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8
cl53	Spleen	Platelet,CD34_progenitor
cl479	Oesophagus	B_CD27neg
cl124	Lung	Plasma_cells
cl124	Spleen	Plasma_IgM,Plasma_IgG,Plasmablast
cl124	Oesophagus	B_CD27pos
cl131	Lung	Macrophage_MARCOpos,Macrophage_Dividing,Macrophage_MARCOneg, DC_2,DC_Monocyte_Dividing
cl131	Spleen	Monocyte,DC_2,DC_1,Macrophage,B_follicular
cl131	Oesophagus	Mono_macro,Glands_duct,Dendritic_Cells,B_CD27pos,Blood_vessel

Table C.6: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters (continued 5)

Cluster	Tissue	Cell types
cl152	Lung	Ciliated,Alveolar_Type1,Alveolar_Type2
cl152	Oesophagus	Glands_mucous,Glands_duct
cl306	Lung	Muscle_cells,Blood_vessel,Fibroblast,Lymph_vessel,Alveolar_Type1
cl306	Oesophagus	Stroma,Blood_vessel,Epi_basal,Lymph_vessel,Epi_suprabasal
cl115	Lung	Monocyte,Macrophage_Dividing,Macrophage_MARCOpos,DC_Monocyte_Dividing
cl115	Spleen	Monocyte,NK_CD160pos,T_CD8_CTL
cl115	Oesophagus	Mono_macro,Dendritic_Cells,T_CD8,NK_T_CD8_Cytotoxic,Mast_cell
cl601	Lung	B_cells,DC_1,DC_2,DC_plasmacytoid,DC_activated
cl601	Spleen	B_follicular,B_mantle,DC_activated,T_CD8_gd
cl601	Oesophagus	B_CD27pos,B_CD27neg,Dendritic_Cells,Mono_macro,T_CD4
cl307	Lung	Alveolar_Type2,Alveolar_Type1,DC_activated,Ciliated,Monocyte
cl307	Spleen	Plasmablast,DC_activated,DC_1,Plasma_IgG,Plasma_IgM
cl307	Oesophagus	Mast_cell
cl426	Lung	Lymph_vessel,Blood_vessel,DC_activated,Fibroblast
cl426	Spleen	T_cell_dividing,DC_1,DC_activated
cl426	Oesophagus	Lymph_vessel,Blood_vessel,Stroma
cl428	Lung	Fibroblast,Muscle_cells,Lymph_vessel,Blood_vessel,Alveolar_Type2
cl428	Spleen	T_CD4_fh
cl428	Oesophagus	Stroma,Lymph_vessel,Epi_suprabasal,Blood_vessel,Epi_basal
cl212	Lung	DC_1,DC_Monocyte_Dividing,DC_2,DC_activated,T_cells_Dividing
cl212	Spleen	DC_1,DC_2,DC_activated,B_follicular,NK_dividing
cl212	Oesophagus	Dendritic_Cells,B_CD27pos,B_CD27neg,Mono_macro,NK_T_CD8_Cytotoxic
cl85	Lung	Muscle_cells,Blood_vessel,Fibroblast,Lymph_vessel,Alveolar_Type1
cl85	Spleen	B_follicular,T_CD4_conv,B_mantle
cl85	Oesophagus	Blood_vessel,Stroma,Lymph_vessel,Epi_basal,Epi_suprabasal
cl133	Lung	Macrophage_MARCOpos,Macrophage_Dividing,Mast_cells,Alveolar_Type1,Alveolar_Type2
cl133	Oesophagus	Dendritic_Cells,Glands_duct,Mono_macro,Epi_basal
cl414	Lung	DC_Monocyte_Dividing,T_cells_Dividing,NK_Dividing,DC_1,DC_2
cl414	Spleen	NK_dividing,T_cell_dividing,B_Hypermutation,DC_1,DC_2
cl414	Oesophagus	Epi_dividing,Dendritic_Cells,Mono_macro,B_CD27pos,NK_T_CD8_Cytotoxic
cl516	Lung	T_regulatory,T_CD4
cl516	Spleen	T_CD4_reg,T_CD4_naive,T_CD4_fh,T_CD4_conv
cl516	Oesophagus	T_CD4,NK_T_CD8_Cytotoxic,T_CD8
cl379	Lung	Alveolar_Type2,Alveolar_Type1,Macrophage_MARCOneg, Macrophage_Dividing,Macrophage_MARCOpos
cl379	Spleen	Macrophage
cl379	Oesophagus	Dendritic_Cells,Mono_macro,Glands_duct
cl83	Lung	Fibroblast,Lymph_vessel,Blood_vessel
cl83	Oesophagus	Stroma,Lymph_vessel,Blood_vessel
cl412	Lung	Macrophage_MARCOneg,DC_2,DC_1,DC_Monocyte_Dividing,DC_plasmacytoid
cl412	Spleen	DC_2,DC_1,Monocyte,DC_plasmacytoid,B_follicular
cl412	Oesophagus	Dendritic_Cells,Mono_macro,NK_T_CD8_Cytotoxic,B_CD27neg,T_CD4
cl285	Lung	T_cells_Dividing,DC_plasmacytoid,Plasma_cells
cl285	Spleen	DC_activated,Plasmablast,DC_plasmacytoid,DC_1
cl285	Oesophagus	T_CD8,T_CD4,NK_T_CD8_Cytotoxic,B_CD27pos
cl281	Lung	Fibroblast,Lymph_vessel,Muscle_cells,Macrophage_MARCOpos,Blood_vessel
cl281	Spleen	DC_1
cl281	Oesophagus	Epi_basal,Stroma,Glands_duct,Blood_vessel,Lymph_vessel
cl382	Lung	Muscle_cells,Fibroblast,Alveolar_Type1,Lymph_vessel,Blood_vessel
cl382	Spleen	T_CD8_CTL,T_cell_dividing,NK_dividing,T_CD8_activated,T_CD4_reg
cl382	Oesophagus	Stroma,Glands_duct,Epi_basal,Epi_suprabasal,Blood_vessel
cl97	Lung	Muscle_cells,Fibroblast,DC_Monocyte_Dividing,T_cells_Dividing,Blood_vessel
cl97	Spleen	T_cell_dividing,NK_dividing,B_Hypermutation,Plasmablast
cl97	Oesophagus	Stroma,Epi_dividing,Epi_upper,Epi_suprabasal
cl595	Lung	DC_plasmacytoid,Mast_cells,DC_2,DC_activated,T_cells_Dividing
cl595	Spleen	T_CD8_gd,Plasma_IgG,Plasma_IgM
cl595	Oesophagus	Mast_cell,T_CD4,NK_T_CD8_Cytotoxic,Glands_mucous,B_CD27pos

Table C.7: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters (continued 6)

Cluster	Tissue	Cell types
cl75	Lung	Plasma_cells,B_cells
cl75	Spleen	Plasma_IgG,Plasma_IgM,Plasmablast
cl75	Oesophagus	B_CD27pos
cl268	Lung	Fibroblast,Muscle_cells
cl268	Oesophagus	Stroma
cl620	Spleen	Plasmablast
cl273	Lung	NK_Dividing,T_CD8_CytT,T_cells_Dividing,NK,T_CD4
cl273	Spleen	T_CD8_gd,NK_CD160pos,T_CD8_MAIT,T_CD8_activated,T_CD8_CTL
cl273	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8,T_CD4,Dendritic_Cells,B_CD27neg
cl543	Lung	Plasma_cells
cl543	Spleen	Plasma_IgM,Plasma_IgG
cl13	Lung	Muscle_cells,Fibroblast,DC_activated,DC_1,Blood_vessel
cl13	Spleen	T_CD8_gd
cl13	Oesophagus	Stroma,Glands_duct,Blood_vessel,Lymph_vessel,Glands_mucous
cl546	Lung	B_cells,DC_plasmacytoid,DC_1,Macrophage_MARCOneg,Plasma_cells
cl546	Spleen	B_mantle,B_follicular,DC_activated
cl546	Oesophagus	B_CD27neg,B_CD27pos,Dendritic_Cells,Mono_macro,Blood_vessel
cl23	Lung	DC_2,Monocyte,DC_1,DC_activated,DC_Monocyte_Dividing
cl23	Spleen	DC_2,Monocyte,DC_1,DC_activated,B_mantle
cl23	Oesophagus	Dendritic_Cells,Mono_macro,B_CD27pos,B_CD27neg,T_CD4
cl490	Lung	NK,NK_Dividing,Ciliated
cl490	Spleen	NK_FCGR3Apos,NK_CD160pos,NK_dividing
cl490	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8
cl497	Lung	DC_2,DC_activated,Macrophage_MARCOneg,DC_1,DC_plasmacytoid
cl497	Spleen	B_follicular,DC_activated
cl497	Oesophagus	Dendritic_Cells,Mono_macro,Blood_vessel,Glands_duct
cl438	Lung	DC_1,DC_Monocyte_Dividing,T_CD4,DC_2,Macrophage_MARCOneg
cl438	Spleen	CD34_progenitor,DC_1,DC_plasmacytoid,ILC,B_Hypermutation
cl438	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic,B_CD27neg,B_CD27pos
cl495	Lung	NK_Dividing,T_cells_Dividing
cl495	Oesophagus	Epi_dividing
cl110	Lung	Macrophage_MARCOpos,Macrophage_MARCOneg,Lymph_vessel, Mast_cells,Macrophage_Dividing
cl110	Spleen	Macrophage,Monocyte,DC_plasmacytoid,DC_2,T_CD4_conv
cl110	Oesophagus	Mono_macro,Stroma,Glands_duct,Lymph_vessel,Mast_cell
cl269	Lung	T_cells_Dividing,T_CD4,T_CD8_CytT,NK_Dividing,NK
cl269	Spleen	T_CD8_CTL,T_CD8_MAIT,T_CD8_activated,T_CD8_gd,NK_CD160pos
cl269	Oesophagus	T_CD8,NK_T_CD8_Cytotoxic,T_CD4,Dendritic_Cells,Mast_cell
cl127	Lung	Macrophage_MARCOpos,Macrophage_Dividing,DC_2,Monocyte,Macrophage_MARCOneg
cl127	Spleen	Macrophage,DC_2,Monocyte,B_follicular,DC_1
cl127	Oesophagus	Mono_macro,Dendritic_Cells,B_CD27neg,B_CD27pos,Blood_vessel
cl311	Lung	Muscle_cells,Fibroblast,Blood_vessel,Lymph_vessel,Alveolar_Type1
cl311	Spleen	T_CD8_CTL,T_CD4_fh,T_CD8_activated,T_CD4_reg,T_CD4_conv
cl311	Oesophagus	Stroma,Lymph_vessel,Blood_vessel,Epi_suprabasal,Epi_basal
cl118	Lung	Macrophage_MARCOpos,Macrophage_Dividing,Macrophage_MARCOneg,DC_2,Monocyte
cl118	Spleen	Monocyte,DC_2,Macrophage
cl118	Oesophagus	Mono_macro,Dendritic_Cells
cl77	Lung	DC_plasmacytoid,DC_activated
cl77	Spleen	DC_plasmacytoid,B_follicular,DC_activated
cl77	Oesophagus	B_CD27pos,Dendritic_Cells,Blood_vessel
cl472	Lung	NK_Dividing,NK,T_CD8_CytT
cl472	Spleen	T_CD8_CTL,NK_FCGR3Apos,T_CD8_MAIT,NK_CD160pos,T_CD8_activated
cl610	Lung	T_CD4,T_cells_Dividing,T_regulatory
cl610	Spleen	T_CD4_fh,T_CD4_reg,T_CD4_conv,T_CD4_naive,T_CD8_activated
cl610	Oesophagus	T_CD8,T_CD4,NK_T_CD8_Cytotoxic
cl180	Lung	Lymph_vessel,Blood_vessel,Fibroblast
cl180	Oesophagus	Lymph_vessel,Blood_vessel,Stroma,Glands_duct,Epi_basal
cl251	Lung	DC_1,Plasma_cells,Monocyte,DC_activated
cl251	Spleen	Plasma_IgM,B_follicular,Plasma_IgG
cl251	Oesophagus	T_CD8,T_CD4,B_CD27neg

Table C.8: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters (continued 7)

Cluster	Tissue	Cell types
cl380	Lung	Fibroblast,DC_2,DC_1
cl380	Spleen	Monocyte
cl380	Oesophagus	Stroma,NK_T_CD8_Cytotoxic,Epi_basal,Lymph_vessel,Glands_duct
cl591	Lung	Plasma_cells
cl591	Spleen	Plasma_IgM,Plasma_IgG,Plasmablast
cl591	Oesophagus	B_CD27pos
cl266	Lung	Monocyte,DC_2,Macrophage_MARCOneg,DC_1,DC_activated
cl266	Spleen	Monocyte,DC_2,DC_plasmacytoid,DC_1,Macrophage
cl266	Oesophagus	Dendritic_Cells,Mono_macro,B_CD27pos,NK_T_CD8_Cytotoxic,T_CD4
cl510	Lung	Macrophage_Dividing,DC_Monocyte_Dividing
cl510	Spleen	Monocyte
cl510	Oesophagus	Mono_macro
cl101	Lung	DC_plasmacytoid,DC_activated,Mast_cells,T_cells_Dividing,Plasma_cells
cl101	Spleen	B_follicular,DC_activated,Plasmablast,T_CD8_activated,T_CD8_gd
cl101	Oesophagus	Dendritic_Cells,B_CD27pos,Blood_vessel,Glands_duct,B_CD27neg
cl24	Lung	Macrophage_MARCOneg,DC_Monocyte_Dividing,DC_2,Monocyte,Macrophage_MARCOpos
cl24	Spleen	Monocyte,DC_2,DC_1,Macrophage,B_mantle
cl24	Oesophagus	Dendritic_Cells,Mono_macro,T_CD4,B_CD27pos,B_CD27neg
cl473	Lung	T_CD4,T_regulatory,T_cells_Dividing,T_CD8_CytT,DC_activated
cl473	Spleen	T_CD8_MAIT,T_CD8_CTL,T_CD4_conv,T_CD4_naive,T_CD4_fh
cl473	Oesophagus	T_CD8,T_CD4,NK_T_CD8_Cytotoxic
cl7	Lung	Muscle_cells,Fibroblast,Lymph_vessel,Blood_vessel,Alveolar_Type1
cl7	Spleen	T_CD8_CTL
cl7	Oesophagus	Stroma,Blood_vessel,Lymph_vessel,Glands_duct,Epi_basal
cl618	Lung	T_cells_Dividing,T_regulatory,T_CD4,B_cells,DC_Monocyte_Dividing
cl618	Spleen	Plasmablast
cl618	Oesophagus	B_CD27pos,T_CD8,NK_T_CD8_Cytotoxic,B_CD27neg
cl155	Lung	T_cells_Dividing,DC_Monocyte_Dividing,NK_Dividing,Macrophage_Dividing,B_cells
cl155	Spleen	T_cell_dividing,B_Hypermutation,Plasmablast,NK_dividing,B_follicular
cl155	Oesophagus	Epi_dividing,B_CD27pos,B_CD27neg
cl67	Lung	Lymph_vessel,Blood_vessel,Fibroblast,Muscle_cells,DC_Monocyte_Dividing
cl67	Spleen	DC_1,NK_dividing,T_cell_dividing,B_Hypermutation,DC_2
cl67	Oesophagus	Lymph_vessel,Blood_vessel,Stroma,Glands_duct,Epi_basal
cl0	Lung	Blood_vessel,DC_Monocyte_Dividing,Lymph_vessel,DC_1,DC_plasmacytoid
cl0	Spleen	NK_dividing,B_Hypermutation,T_cell_dividing,CD34_progenitor,DC_1
cl0	Oesophagus	Blood_vessel,Lymph_vessel,Dendritic_Cells,Mono_macro,B_CD27pos
cl524	Lung	NK_Dividing,T_cells_Dividing,DC_Monocyte_Dividing,NK,Macrophage_Dividing
cl524	Spleen	NK_dividing,T_cell_dividing,NK_CD160pos,B_Hypermutation,NK_FCGR3Apos
cl524	Oesophagus	Epi_dividing,NK_T_CD8_Cytotoxic,T_CD8,T_CD4
cl514	Lung	T_CD8_CytT,T_cells_Dividing,T_CD4,T_regulatory
cl514	Spleen	T_CD8_activated,T_CD8_gd,T_CD8_MAIT,T_CD8_CTL,T_CD4_reg
cl514	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic
cl474	Lung	Mast_cells,DC_1
cl474	Spleen	CD34_progenitor
cl474	Oesophagus	Mast_cell,Mono_macro,Dendritic_Cells,NK_T_CD8_Cytotoxic,T_CD8
cl619	Lung	T_cells_Dividing,T_CD4,Monocyte,T_regulatory,Mast_cells
cl619	Spleen	T_CD8_MAIT,T_CD4_reg,T_CD4_fh,T_CD4_conv,ILC
cl619	Oesophagus	NK_T_CD8_Cytotoxic,T_CD4,T_CD8,Dendritic_Cells,Mast_cell
cl486	Lung	Monocyte,Macrophage_MARCOneg,DC_2,Macrophage_MARCOpos,T_CD4
cl486	Spleen	Monocyte,DC_2
cl486	Oesophagus	Mono_macro,Dendritic_Cells,B_CD27neg,NK_T_CD8_Cytotoxic,B_CD27pos
cl502	Lung	T_CD8_CytT,T_cells_Dividing,NK_Dividing,NK
cl502	Spleen	T_CD8_CTL,T_CD8_activated,T_CD8_MAIT,T_CD8_gd,T_CD4_reg
cl502	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic
cl501	Lung	NK,NK_Dividing
cl501	Spleen	NK_CD160pos,NK_FCGR3Apos,NK_dividing,T_CD8_gd
cl501	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8
cl55	Lung	Alveolar_Type1,Lymph_vessel,Blood_vessel
cl55	Oesophagus	Epi_basal,Glands_duct,Epi_suprabasal,Glands_mucous,Blood_vessel

Table C.9: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters (continued 8)

Cluster	Tissue	Cell types
cl529	Lung	T_CD8_CytT,NK,NK_Dividing,Monocyte,T_CD4
cl529	Spleen	T_CD8_CTL,T_CD8_MAIT,T_CD8_activated,NK_FCGR3Apos,NK_CD160pos
cl529	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8,T_CD4,Dendritic_Cells,Mono_macro
cl26	Lung	Fibroblast,Muscle_cells
cl26	Oesophagus	Stroma,Epi_suprabasal
cl60	Lung	NK_Dividing,NK,T_CD8_CytT,Macrophage_MARCOpos,DC_Monocyte_Dividing
cl60	Spleen	T_CD8_CTL,NK_FCGR3Apos,NK_CD160pos,T_CD8_gd,T_CD8_MAIT
cl60	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8,T_CD4,Dendritic_Cells,Mono_macro
cl236	Lung	Alveolar_Type1,Alveolar_Type2,Ciliated,Muscle_cells,Lymph_vessel
cl236	Spleen	T_CD4_conv,T_CD8_MAIT,T_cell_dividing,NK_dividing,T_CD8_CTL
cl236	Oesophagus	Epi_upper,Glands_duct,Epi_basal,Glands_mucous,Epi_stratified
cl538	Lung	NK_Dividing,T_cells_Dividing
cl538	Spleen	Unknown,NK_dividing
cl538	Oesophagus	Epi_dividing
cl238	Lung	Mast_cells,T_cells_Dividing,DC_plasmacytoid,T_CD4,T_regulatory
cl238	Spleen	Plasma_IgM,T_CD4_reg,T_CD8_MAIT
cl238	Oesophagus	T_CD4,T_CD8,Dendritic_Cells,NK_T_CD8_Cytotoxic,Glands_mucous
cl439	Spleen	B_mantle
cl465	Lung	Alveolar_Type2
cl465	Spleen	T_cell_dividing,Unknown,B_Hypermutation
cl447	Lung	T_CD4
cl447	Spleen	Unknown
cl283	Lung	T_regulatory,T_CD4,T_cells_Dividing,T_CD8_CytT,DC_plasmacytoid
cl283	Spleen	T_CD4_reg,T_CD4_conv,T_CD8_MAIT,T_CD8_activated,T_CD4_fh
cl283	Oesophagus	T_CD4,T_CD8
cl52	Lung	Fibroblast,Muscle_cells,Lymph_vessel,Blood_vessel,Alveolar_Type1
cl52	Spleen	T_CD8_gd,T_CD8_CTL,T_CD4_conv,T_CD8_MAIT
cl52	Oesophagus	Stroma,Lymph_vessel,Epi_basal,Blood_vessel,Epi_suprabasal
cl615	Lung	T_regulatory,T_CD4,T_cells_Dividing,T_CD8_CytT
cl615	Spleen	T_CD4_fh,T_CD4_reg,T_CD8_activated,T_CD8_gd
cl615	Oesophagus	T_CD4,T_CD8,NK_T_CD8_Cytotoxic,B_CD27neg
cl237	Lung	Plasma_cells,DC_activated,T_regulatory,Mast_cells
cl237	Spleen	Plasma_IgM,Plasma_IgG,B_follicular
cl237	Oesophagus	T_CD8
cl443	Lung	Monocyte,DC_2,DC_Monocyte_Dividing,DC_1,DC_activated
cl443	Spleen	Macrophage,T_CD8_gd,Monocyte,DC_activated,NK_CD160pos
cl443	Oesophagus	Mono_macro,Dendritic_Cells,NK_T_CD8_Cytotoxic,B_CD27neg,T_CD4
cl626	Lung	Plasma_cells,DC_2
cl626	Spleen	Plasma_IgM,T_CD8_gd,Plasmablast
cl547	Lung	Plasma_cells,Alveolar_Type2,Fibroblast,DC_Monocyte_Dividing,DC_plasmacytoid
cl547	Spleen	Plasma_IgM,Plasma_IgG,Plasmablast,DC_plasmacytoid,B_follicular
cl547	Oesophagus	Glands_mucous,B_CD27pos,Dendritic_Cells,T_CD8
cl275	Lung	Blood_vessel,Muscle_cells,Lymph_vessel,Fibroblast
cl275	Spleen	B_follicular,CD34_progenitor
cl275	Oesophagus	Blood_vessel,Lymph_vessel,Stroma,Epi_basal,Epi_suprabasal
cl185	Lung	T_cells_Dividing,T_CD4,T_regulatory
cl185	Spleen	T_CD4_reg,T_CD4_conv,T_CD8_activated,T_CD8_MAIT,T_CD4_fh
cl185	Oesophagus	T_CD8,T_CD4,NK_T_CD8_Cytotoxic
cl515	Lung	Monocyte,Macrophage_MARCOpos
cl515	Spleen	Monocyte,Macrophage,DC_2,T_CD8_MAIT,NK_CD160pos
cl515	Oesophagus	Glands_duct,Mono_macro
cl148	Lung	Lymph_vessel,Blood_vessel,Fibroblast,Muscle_cells,Alveolar_Type1
cl148	Spleen	T_CD8_gd,DC_1
cl148	Oesophagus	Lymph_vessel,Stroma,Blood_vessel,Epi_basal,Glands_mucous
cl569	Lung	Plasma_cells,B_cells,Alveolar_Type2
cl569	Spleen	Plasma_IgM,Plasma_IgG,Plasmablast,B_follicular
cl569	Oesophagus	B_CD27pos,Glands_mucous,B_CD27neg
cl282	Lung	Muscle_cells,Fibroblast,Blood_vessel,Lymph_vessel,Alveolar_Type1
cl282	Oesophagus	Stroma,Blood_vessel,Lymph_vessel,Epi_basal,Epi_suprabasal

Table C.10: Cell types from (Madissoon et al., 2019) with expression programmes enriched in *CellTypist* clusters (continued 9)

Cluster	Tissue	Cell types
cl314	Lung	Fibroblast,Muscle_cells,Lymph_vessel
cl314	Spleen	DC_1,DC_2,DC_activated
cl314	Oesophagus	Epi_suprabasal,Stroma
cl378	Lung	Fibroblast,Alveolar_Type1
cl378	Oesophagus	Stroma,Epi_basal,Epi_suprabasal
cl20	Lung	DC_2,DC_1,Monocyte,DC_Monocyte_Dividing,DC_activated
cl20	Spleen	DC_2,DC_1,Monocyte,DC_activated,CD34_progenitor
cl20	Oesophagus	Dendritic_Cells,Mono_macro,T_CD4,T_CD8,Mast_cell
cl168	Lung	T_cells_Dividing,T_CD4,T_regulatory,T_CD8_CytT,DC_Monocyte_Dividing
cl168	Spleen	T_cell_dividing,T_CD8_MAIT,T_CD4_fh,T_CD4_conv,NK_dividing
cl168	Oesophagus	NK_T_CD8_Cytotoxic,T_CD4,T_CD8,Dendritic_Cells
cl308	Lung	Alveolar_Type2,Alveolar_Type1
cl308	Oesophagus	Glands_mucous
cl304	Lung	Blood_vessel
cl304	Spleen	DC_1,NK_dividing
cl537	Lung	T_cells_Dividing,NK_Dividing,DC_Monocyte_Dividing,T_CD4,T_regulatory
cl537	Spleen	T_cell_dividing,NK_dividing,T_CD4_reg,B_Hypermutation,T_CD8_MAIT
cl537	Oesophagus	Epi_dividing,T_CD4,T_CD8,NK_T_CD8_Cytotoxic,B_CD27pos
cl613	Lung	B_cells,DC_plasmacytoid,DC_1,DC_Monocyte_Dividing,DC_activated
cl613	Spleen	B_follicular,B_mantle,B_Hypermutation
cl613	Oesophagus	B_CD27pos,B_CD27neg,Mono_macro,Dendritic_Cells
cl574	Lung	Plasma_cells
cl574	Spleen	Plasmablast,Plasma_IgM,Plasma_IgG
cl493	Spleen	Platelet
cl550	Lung	B_cells,T_CD4,T_regulatory,T_CD8_CytT,DC_activated
cl550	Spleen	T_CD8_CTL,B_follicular,B_mantle,T_CD8_MAIT,T_CD8_activated
cl550	Oesophagus	T_CD4,B_CD27neg,B_CD27pos,NK_T_CD8_Cytotoxic,T_CD8
cl492	Lung	T_cells_Dividing,NK_Dividing,DC_Monocyte_Dividing,Macrophage_Dividing,T_CD4
cl492	Spleen	NK_dividing,B_Hypermutation,CD34_progenitor,T_cell_dividing,Plasmablast
cl492	Oesophagus	Epi_dividing,B_CD27pos,B_CD27neg,NK_T_CD8_Cytotoxic
cl265	Lung	Plasma_cells
cl265	Spleen	Plasma_IgM,Plasma_IgG,Plasmablast,B_follicular,NK_dividing
cl265	Oesophagus	Glands_mucous
cl310	Lung	Plasma_cells,DC_activated,DC_1,T_regulatory,Mast_cells
cl310	Spleen	Plasma_IgG,Plasma_IgM,Plasmablast,DC_plasmacytoid,T_cell_dividing
cl310	Oesophagus	B_CD27pos,Glands_mucous,B_CD27neg,NK_T_CD8_Cytotoxic,T_CD8
cl500	Spleen	NK_FCGR3Apos,T_CD8_CTL
cl576	Lung	Alveolar_Type1,Alveolar_Type2,Macrophage_MARCOneg
cl576	Spleen	T_CD8_activated,T_CD8_CTL
cl403	Lung	DC_Monocyte_Dividing,T_cells_Dividing,NK_Dividing,Mast_cells,Monocyte
cl403	Spleen	NK_dividing,T_cell_dividing,Plasmablast,Platelet,B_Hypermutation
cl403	Oesophagus	Epi_dividing,Mast_cell,Dendritic_Cells,Lymph_vessel
cl240	Lung	NK_Dividing,DC_Monocyte_Dividing,NK,Macrophage_Dividing,T_CD8_CytT
cl240	Spleen	NK_dividing,NK_CD160pos,T_CD8_gd,NK_FCGR3Apos,B_Hypermutation
cl240	Oesophagus	NK_T_CD8_Cytotoxic,T_CD8,T_CD4,Mast_cell,Mono_macro
cl230	Lung	T_regulatory
cl549	Lung	Mast_cells