Integration 10x Hive

Joan Abinet

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Contents

Load Packages

```
suppressMessages(library(dplyr))
suppressMessages(library(Seurat))
suppressMessages(library(patchwork))
suppressMessages(library(ggplot2))
```

Loading Hive Data

```
Cell_HiveAnnotate <- readRDS("../Hive-2-Annotation_cells/BAL_hive.annotated_noDB.rds")

col <- c("#E2B80C", "#998025", "#AE8052", "#e6641e",
    "red", "#0F8140", "#4F2569", "#ABD6E4", "#1CB7D5",
    "#6B7BBA", "#FFC0CB", "#BDBCBC", "#DF15AE")
DimPlot(Cell_HiveAnnotate, group.by = "Annotation",
    cols = col)
```

Loading 10X data

```
Cell_10xAnnotate <- readRDS("../10x-2-Annotation_cells/BAL_10x.annotated_noDB.rds")

col <- c("#E2B80C", "#998025", "#AE8052", "#0F8140",
    "#4F2569", "#ABD6E4", "#1CB7D5", "#6B7BBA", "#2D368B",
    "#DF15AE", "#BDBCBC")

DimPlot(Cell_10xAnnotate, group.by = "Annotation",
```

```
    cols = col) + theme(legend.text = element_text(size = 15)) +
    labs(title = NULL)
```

```
Cell_10xAnnotate$Annotation10x <- Cell_10xAnnotate$Annotation
Cell_HiveAnnotate$AnnotationHive <- Cell_HiveAnnotate$Annotation
```

Integration by CCA

```
list_sample <- c(Cell_10xAnnotate, Cell_HiveAnnotate)

list_sample <- lapply(list_sample, function(x) {
    x <- FindVariableFeatures(x, selection.method = "vst",
        nfeatures = 2000)
})

features <- SelectIntegrationFeatures(list_sample)

list_sample <- lapply(list_sample, function(x) {
    x <- ScaleData(x, features = features)
    x <- RunPCA(x, features = features)
})


BAL.anchors <- FindIntegrationAnchors(object.list = list_sample,
    anchor.features = features, reduction = "rpca")
BAL_integrated <- IntegrateData(anchorset = BAL.anchors)
```
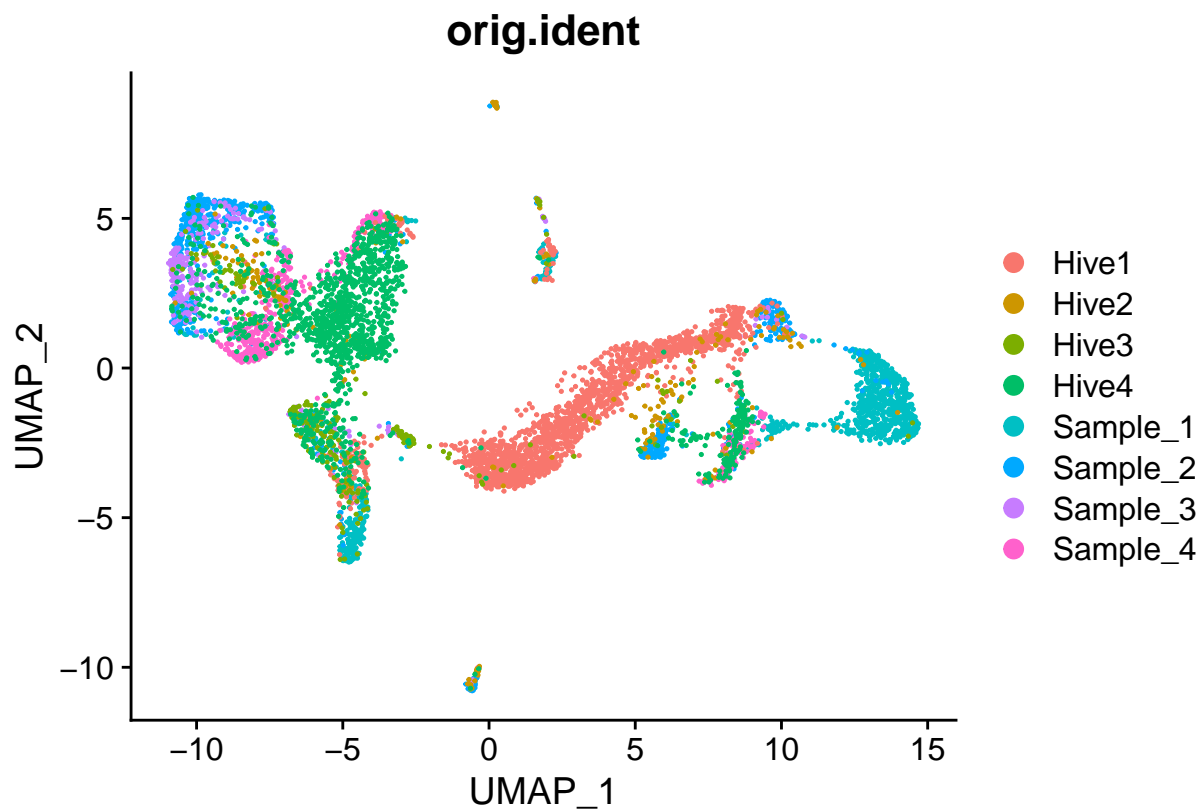
Perform an integrated analysis

```
DefaultAssay(BAL_integrated) <- "integrated"

# Run the standard workflow for visualization and
# clustering
BAL_integrated <- ScaleData(BAL_integrated, verbose = FALSE)
BAL_integrated <- RunPCA(BAL_integrated, npcs = 30,
    verbose = FALSE)
BAL_integrated <- RunUMAP(BAL_integrated, reduction = "pca",
    dims = 1:15)
BAL_integrated <- FindNeighbors(BAL_integrated, reduction = "pca",
    dims = 1:15)
BAL_integrated <- FindClusters(BAL_integrated, resolution = 0.5)
```
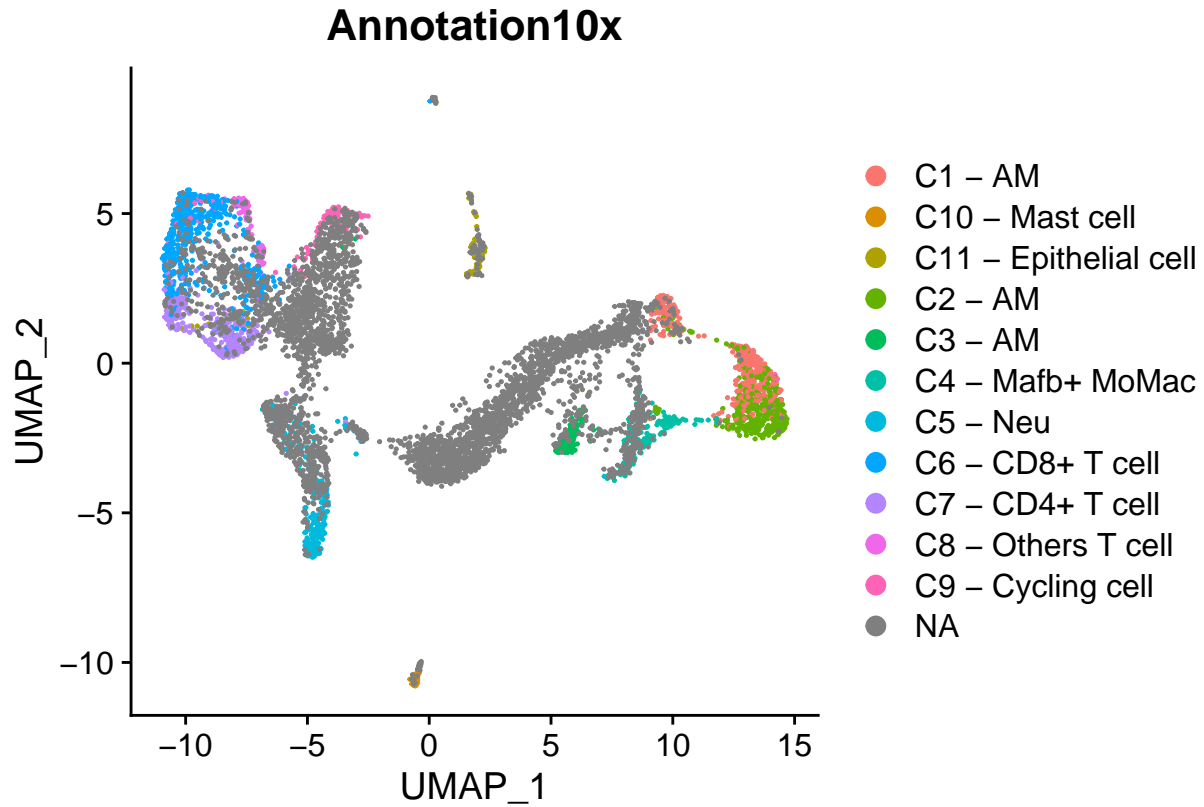
```
BAL_integrated <- readRDS("BAL_integrated.rds")
```

```
DimPlot(BAL_integrated, reduction = "umap", group.by = "orig.ident")
```
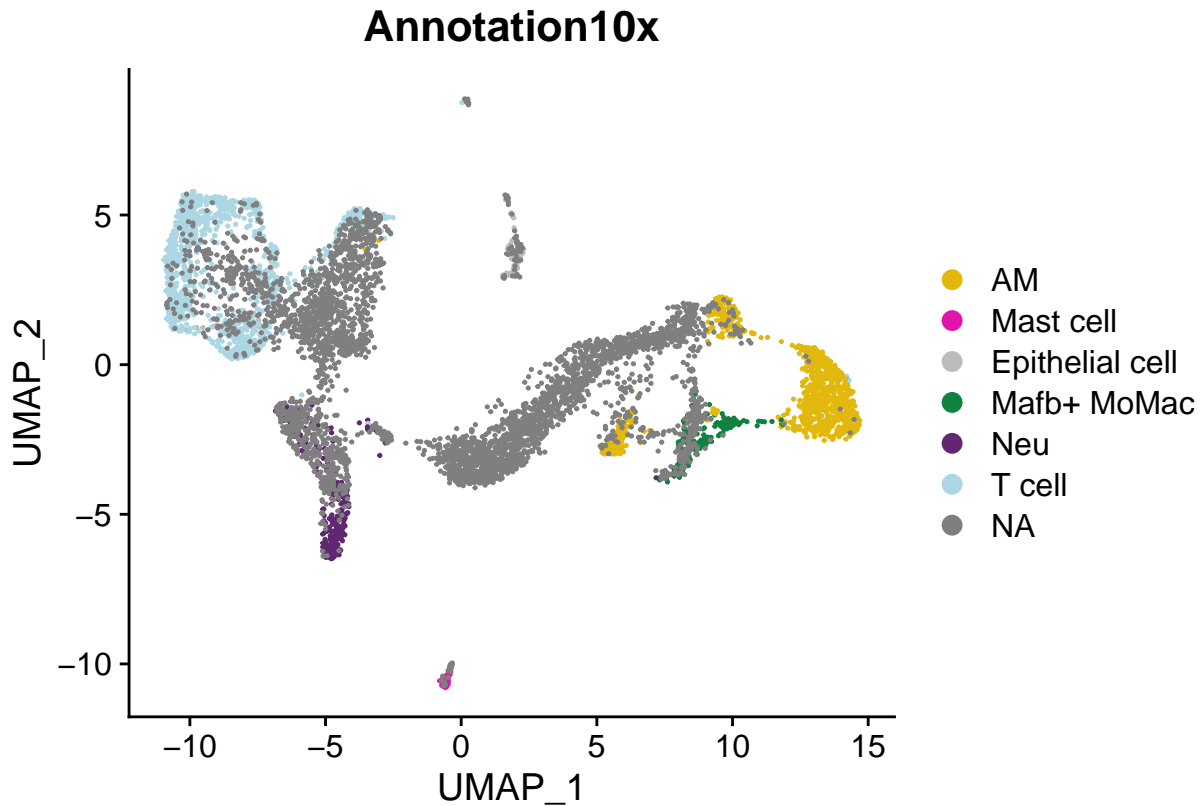
orig.ident


```
DimPlot(BAL_integrated, reduction = "umap", group.by = "Annotation10x")
```

Annotation10x

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```r
# DimPlot(BAL_integrated, reduction = 'umap',
# group.by = 'Annotation10x')
BAL_integrated$Annotation10x <- as.factor(BAL_integrated$Annotation10x)
levels(BAL_integrated$Annotation10x) <- c("AM", "Mast cell",
    "Epithelial cell", "AM", "AM", "Mafb+ MoMac", "Neu",
    "T cell", "T cell", "T cell", "T cell")

colors <- c("#E2B80C", "#DF15AE", "#BDBCBC", "#0F8140",
    "#612773", "#ABD6E4")
DimPlot(BAL_integrated, reduction = "umap", group.by = "Annotation10x",
    cols = colors)
```
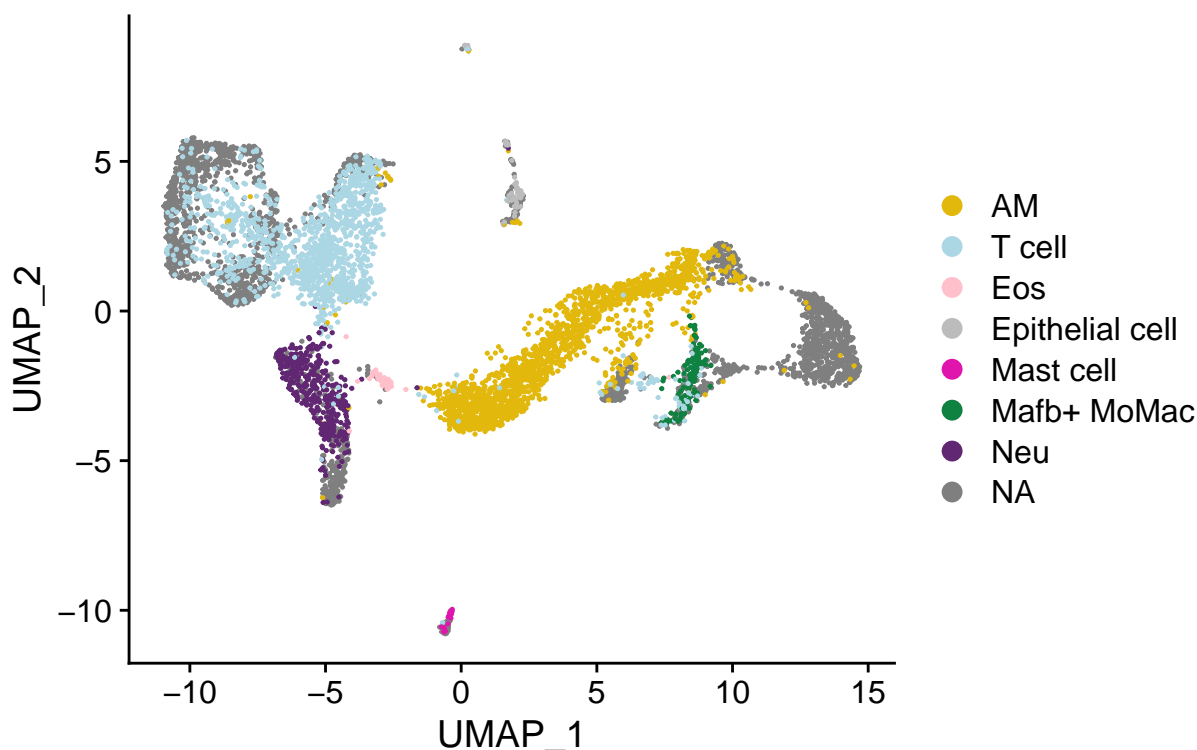


```r
# ggsave('umap_Annotation10x.pdf', width = 8,
# height = 4)
```

```r
# DimPlot(BAL_integrated, reduction = 'umap',
# group.by = 'AnnotationHive')
BAL_integrated$AnnotationHive <- as.factor(BAL_integrated$AnnotationHive)
levels(BAL_integrated$AnnotationHive) <- c("AM", "T cell",
    "Eos", "Epithelial cell", "Mast cell", "AM", "AM",
    "AM", "AM", "Mafb+ MoMac", "Neu", "T cell", "T cell")

colors <- c("#E2B80C", "#ABD6E4", "#FFC0CB", "#BDBCBC",
    "#DF15AE", "#0F8140", "#612773")

DimPlot(BAL_integrated, reduction = "umap", group.by = "AnnotationHive",
    cols = colors)
```

AnnotationHive


```
# ggsave('umap_AnnotationHive.pdf', width = 8,
# height = 4)
```

```
sessionInfo()
```

```
## R version 4.3.3 (2024-02-29)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Ubuntu 22.04.4 LTS
##
## Matrix products: default
## BLAS:   /usr/lib/x86_64-linux-gnu/openblas-pthread/libblas.so.3
## LAPACK: /usr/lib/x86_64-linux-gnu/openblas-pthread/libopenblasp-r0.3.20.so;  LAPACK version 3.10.0
##
## locale:
##  [1] LC_CTYPE=en_US.UTF-8       LC_NUMERIC=C
##  [3] LC_TIME=fr_BE.UTF-8        LC_COLLATE=en_US.UTF-8
##  [5] LC_MONETARY=fr_BE.UTF-8    LC_MESSAGES=en_US.UTF-8
##  [7] LC_PAPER=fr_BE.UTF-8       LC_NAME=C
##  [9] LC_ADDRESS=C               LC_TELEPHONE=C
## [11] LC_MEASUREMENT=fr_BE.UTF-8 LC_IDENTIFICATION=C
##
## time zone: Europe/Brussels
## tzcode source: system (glibc)
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
## [1] ggplot2_3.4.2      patchwork_1.1.2    SeuratObject_4.1.3 Seurat_4.3.0
```

```
## [5] dplyr_1.1.2
##
## loaded via a namespace (and not attached):
##   [1] deldir_1.0-9           pbapply_1.7-2          gridExtra_2.3
##   [4] formatR_1.14           rlang_1.1.1            magrittr_2.0.3
##   [7] RcppAnnoy_0.0.21       spatstat.geom_3.2-4    matrixStats_1.0.0
##  [10] ggridges_0.5.4         compiler_4.3.3         png_0.1-8
##  [13] vctrs_0.6.3            reshape2_1.4.4         stringr_1.5.0
##  [16] pkgconfig_2.0.3        fastmap_1.1.1          ellipsis_0.3.2
##  [19] labeling_0.4.2         utf8_1.2.3             promises_1.2.0.1
##  [22] rmarkdown_2.23         purrr_1.0.1            xfun_0.39
##  [25] jsonlite_1.8.7         goftest_1.2-3          highr_0.10
##  [28] later_1.3.1            spatstat.utils_3.0-3   irlba_2.3.5.1
##  [31] parallel_4.3.3         cluster_2.1.6          R6_2.5.1
##  [34] ica_1.0-3              spatstat.data_3.0-1    stringi_1.7.12
##  [37] RColorBrewer_1.1-3     reticulate_1.30        parallelly_1.36.0
##  [40] lmtest_0.9-40          scattermore_1.2        Rcpp_1.0.11
##  [43] knitr_1.43             tensor_1.5             future.apply_1.11.0
##  [46] zoo_1.8-12             sctransform_0.3.5      httpuv_1.6.11
##  [49] Matrix_1.6-1           splines_4.3.3          igraph_1.5.0.1
##  [52] tidyselect_1.2.0       abind_1.4-5            rstudioapi_0.14
##  [55] yaml_2.3.7             spatstat.random_3.1-5  codetools_0.2-19
##  [58] miniUI_0.1.1.1         spatstat.explore_3.2-1 listenv_0.9.0
##  [61] lattice_0.22-5         tibble_3.2.1           plyr_1.8.8
##  [64] withr_2.5.0            shiny_1.7.4.1          ROCR_1.0-11
##  [67] evaluate_0.21          Rtsne_0.16             future_1.33.0
##  [70] survival_3.5-8         polyclip_1.10-4        fitdistrplus_1.1-11
##  [73] pillar_1.9.0           KernSmooth_2.23-22     plotly_4.10.2
##  [76] generics_0.1.3         sp_2.0-0               munsell_0.5.0
##  [79] scales_1.2.1           globals_0.16.2         xtable_1.8-4
##  [82] glue_1.6.2             lazyeval_0.2.2         tools_4.3.3
##  [85] data.table_1.14.8      RANN_2.6.1             dotCall64_1.0-2
##  [88] leiden_0.4.3           cowplot_1.1.1          grid_4.3.3
##  [91] tidyr_1.3.0            colorspace_2.1-0       nlme_3.1-164
##  [94] cli_3.6.1              spatstat.sparse_3.0-2  spam_2.9-1
##  [97] fansi_1.0.4            viridisLite_0.4.2      uwot_0.1.16
## [100] gtable_0.3.3           digest_0.6.33          progressr_0.13.0
## [103] ggrepel_0.9.3          farver_2.1.1           htmlwidgets_1.6.2
## [106] htmltools_0.5.5        lifecycle_1.0.3        httr_1.4.6
## [109] mime_0.12              MASS_7.3-60.0.1
```