

## Supplementary Figure 1

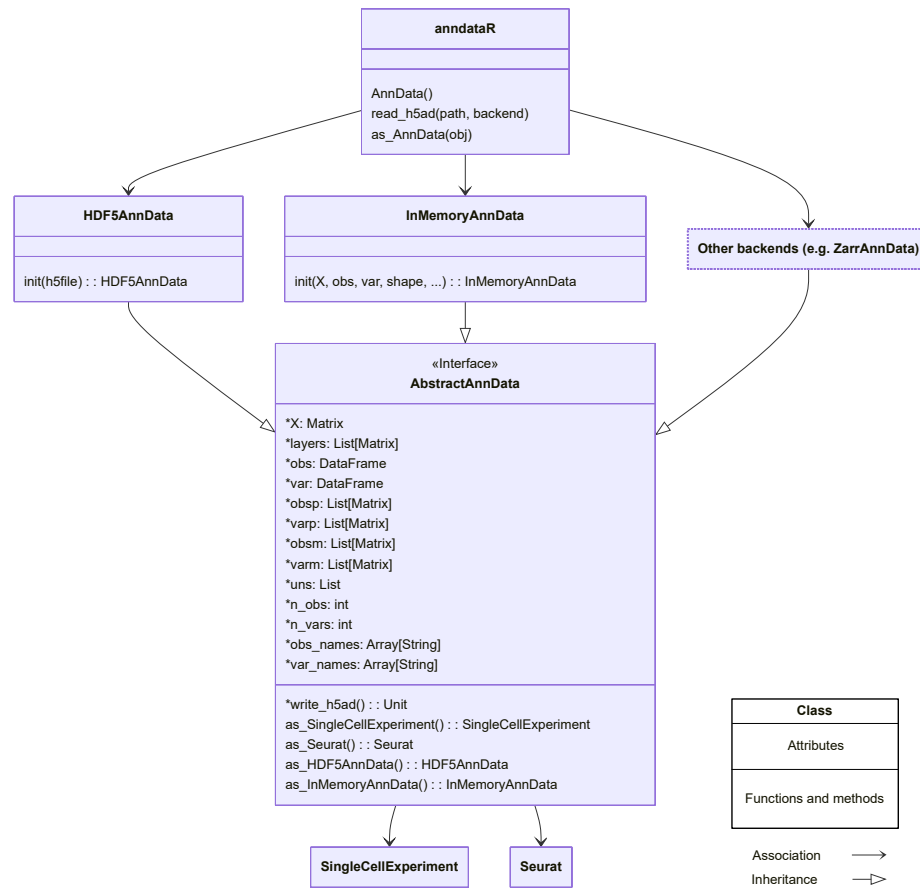


Figure 1: Schematic class diagram of anndataR.

## Supplementary Figure 2

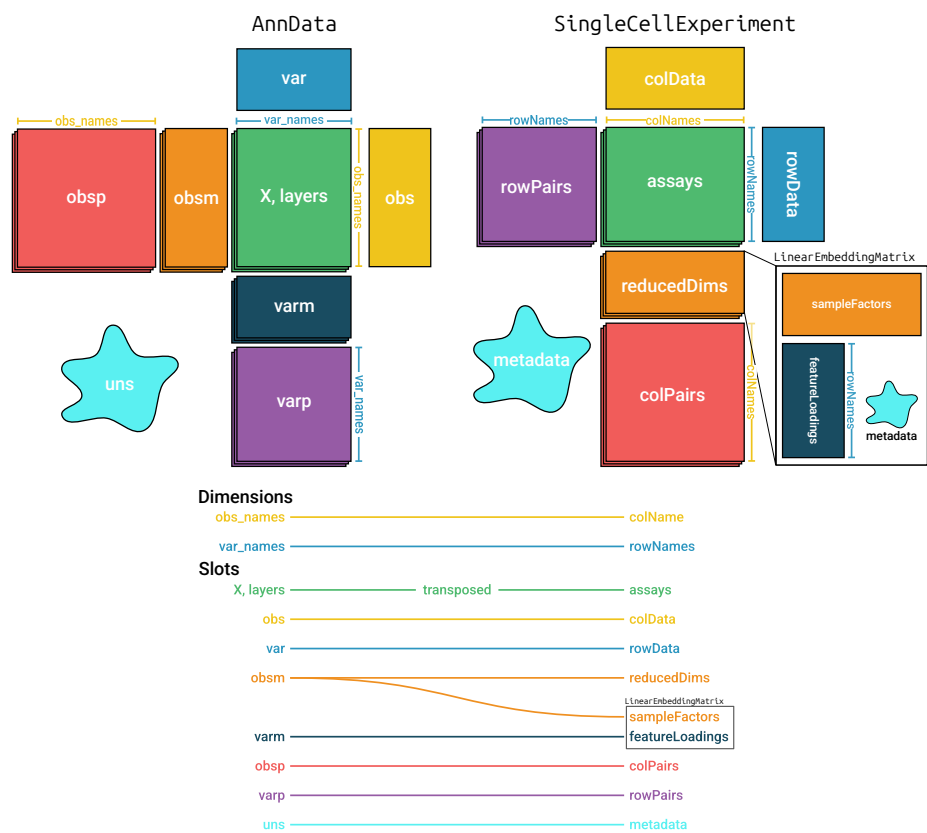


Figure 2: Schematic overview of the default conversion to and from AnnData and SingleCellExperiment objects.

## Supplementary Figure 3

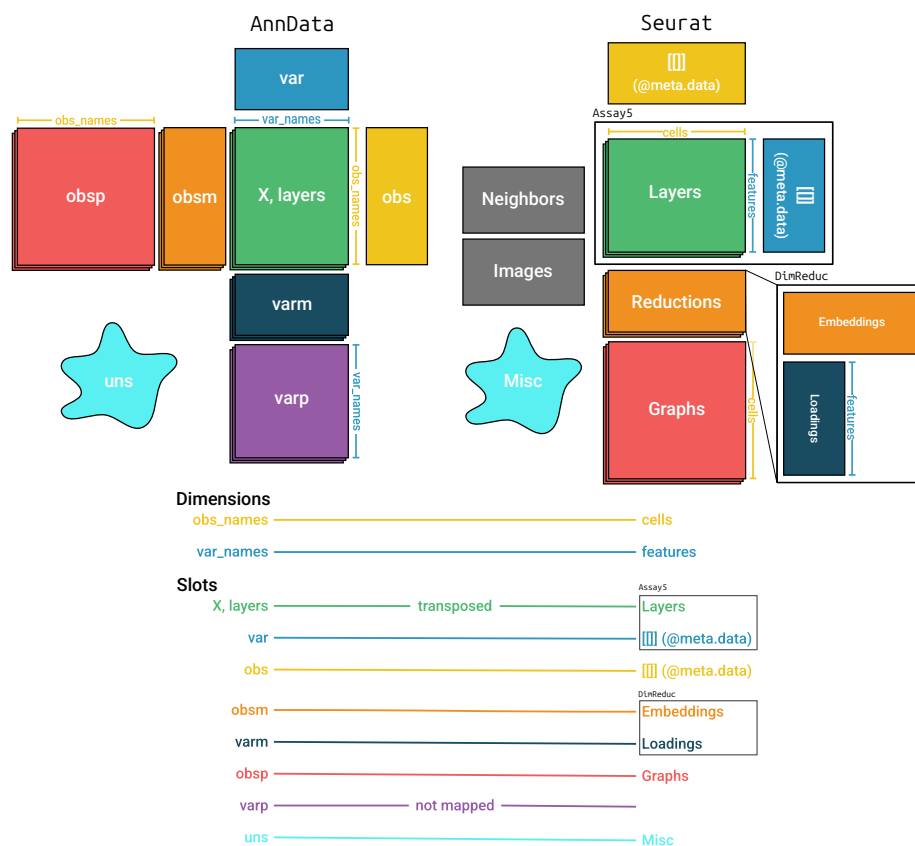


Figure 3: Schematic overview of the default conversion to and from AnnData and Seurat objects. Note that by default, the AnnData `varp` slot will not be converted.

## Supplementary Figure 4

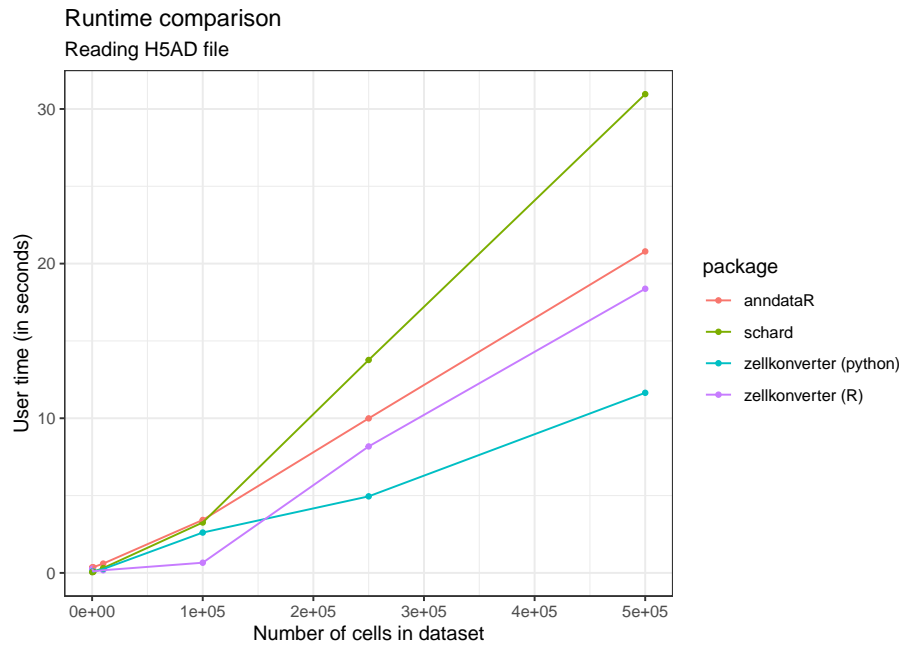


Figure 4: Results of a benchmark performed to compare runtime of reading an H5AD file using anndataR and similar packages, schard and zellkonverter. The benchmark was performed using datasets containing 20 000 genes, and 100, 1000, 10 000, 100 000, 250 000 and 500 000 cells, with a density of 5%.

## Supplementary Table 1

Table 1: This table indicates whether a software tool (anndataR, schard or zellkonverter with the native R reader option) provides certain functionality. For each allowed data type for each AnnData slot, we detail whether the software is capable of 1) representing the data type in R, 2) converting it to an appropriate SingleCellExperiment or Seurat object slot and 3) writing the data type back to an H5AD file.

**Legend:**

x: the software tool can represent, convert, or write this data type

/: the software tool can not represent, convert, or write this data type

-: the specific data type is not supported in a SingleCellExperiment or Seurat object.

slot	datatype	anndataR (this paper)				schard				zellkonverter (native R reader)			
		in R	to SCE	to Seurat	to H5AD	in R	to SCE	to Seurat	to H5AD	in R	to SCE	to Seurat	to H5AD
<b>X</b>	integer_matrix	x	x	x	x	/	x	x	/	/	x	/	/
	integer_csparse	x	x	x	x	/	x	x	/	/	x	/	/
	integer_rsparse	x	x	x	x	/	x	x	/	/	x	/	/
	float_matrix	x	x	x	x	/	x	x	/	/	x	/	/
	float_csparse	x	x	x	x	/	x	x	/	/	x	/	/
	float_rsparse	x	x	x	x	/	x	x	/	/	x	/	/
	float_matrix_nas	x	x	x	x	/	x	x	/	/	x	/	/
	float_csparse_nas	x	x	x	x	/	x	x	/	/	x	/	/
	float_rsparse_nas	x	x	x	x	/	x	x	/	/	x	/	/
<b>layers</b>	integer_matrix	x	x	x	x	/	/	/	/	/	x	/	/
	integer_csparse	x	x	x	x	/	/	/	/	/	x	/	/
	integer_rsparse	x	x	x	x	/	/	/	/	/	x	/	/
	float_matrix	x	x	x	x	/	/	/	/	/	x	/	/
	float_csparse	x	x	x	x	/	/	/	/	/	x	/	/
	float_rsparse	x	x	x	x	/	/	/	/	/	x	/	/
	float_matrix_nas	x	x	x	x	/	/	/	/	/	x	/	/
	float_csparse_nas	x	x	x	x	/	/	/	/	/	x	/	/
	float_rsparse_nas	x	x	x	x	/	/	/	/	/	x	/	/
	float_matrix_3d	x	-	-	x	/	-	-	/	/	-	-	/
	integer_matrix_3d	x	-	-	x	/	-	-	/	/	-	-	/
<b>obs &amp; var</b>	categorical	x	x	x	x	/	/	/	/	/	x	/	/
	categorical_ordered	x	x	x	x	/	/	/	/	/	x	/	/
	categorical_nas	x	x	x	x	/	/	/	/	/	x	/	/
	categorical_ordered_nas	x	x	x	x	/	/	/	/	/	x	/	/
	string_array	x	x	x	x	/	x	x	/	/	x	/	/
	dense_array	x	x	x	x	/	x	x	/	/	x	/	/
	integer_array	x	x	x	x	/	x	x	/	/	x	/	/

	nullable_integer_array	x x x x	/ / / /	/ x / /
	boolean_array	x x x x	/ x x /	/ x / /
	nullable_boolean_array	x x x x	/ / / /	/ x / /
<b>obsm</b>	integer_matrix	x x x x	/ x x /	/ / / /
	integer_csparse	x x x x	/ / / /	/ / / /
	integer_rsparse	x x x x	/ / / /	/ / / /
	float_matrix	x x x x	/ x x /	/ / / /
	float_csparse	x x x x	/ / / /	/ / / /
	float_rsparse	x x x x	/ / / /	/ / / /
	float_matrix_nas	x x x x	/ x x /	/ / / /
	float_csparse_nas	x x x x	/ / / /	/ / / /
	float_rsparse_nas	x x x x	/ / / /	/ / / /
	dataframe	x x - /	/ / - /	/ / - /
	float_matrix_3d	x x - x	/ / - /	/ / - /
	integer_matrix_3d	x x - x	/ / - /	/ / - /
<b>varm</b>	integer_matrix	x x x x	/ / / /	/ x / /
	integer_csparse	x x x x	/ / / /	/ x / /
	integer_rsparse	x x x x	/ / / /	/ x / /
	float_matrix	x x x x	/ / / /	/ x / /
	float_csparse	x x x x	/ / / /	/ x / /
	float_rsparse	x x x x	/ / / /	/ x / /
	float_matrix_nas	x x x x	/ / / /	/ x / /
	float_csparse_nas	x x x x	/ / / /	/ x / /
	float_rsparse_nas	x x x x	/ / / /	/ x / /
	dataframe	x - - /	/ - - /	/ - - /
	float_matrix_3d	x x - x	/ / - /	/ / - /
	integer_matrix_3d	x x - x	/ / - /	/ / - /
<b>obsp</b>	integer_matrix	x x x x	/ / / /	/ / / /
	integer_csparse	x x x x	/ / / /	/ x / /
	integer_rsparse	x x x x	/ / / /	/ x / /
	float_matrix	x x x x	/ / / /	/ / / /
	float_csparse	x x x x	/ / / /	/ x / /
	float_rsparse	x x x x	/ / / /	/ x / /
	float_matrix_nas	x x x x	/ / / /	/ / / /
	float_csparse_nas	x x x x	/ / / /	/ x / /
	float_rsparse_nas	x x x x	/ / / /	/ x / /
	float_matrix_3d	x x - x	/ / - /	/ / - /
	integer_matrix_3d	x x - x	/ / - /	/ / - /
<b>varp</b>	integer_matrix	x x - x	/ / - /	/ / - /
	integer_csparse	x x - x	/ / - /	/ x - /
	integer_rsparse	x x - x	/ / - /	/ x - /
	float_matrix	x x - x	/ / - /	/ / - /
	float_csparse	x x - x	/ / - /	/ x - /
	float_rsparse	x x - x	/ / - /	/ x - /
	float_matrix_nas	x x - x	/ / - /	/ / - /
	float_csparse_nas	x x - x	/ / - /	/ x - /

	float_rsparse_nas	x	x	-	x	/	/	-	/	/	x	-	/
	float_matrix_3d	x	x	-	x	/	/	-	/	/	/	-	/
	integer_matrix_3d	x	x	-	x	/	/	-	/	/	/	-	/
uns	categoricals	x	x	x	x	/	/	/	/	/	x	/	/
	matrices	x	x	x	x	/	/	/	/	/	x	/	/
	scalars	x	x	x	x	/	/	/	/	/	x	/	/
	nested values	x	x	x	x	/	/	/	/	/	x	/	/
	nan	x	x	x	x	/	/	/	/	/	x	/	/
	None	x	x	-	/	/	/	-	/	/	/	-	/