Supplementary information for:

CELL ATLAS OF THE HUMAN FOVEA AND PERIPHERAL RETINA

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Figure S1

tSNE visualization showing contributions to cell types by batch for photoreceptors (a), horizontal cells (b), bipolar cells (c), amacrine cells (d), retinal ganglion cells (e) and non-neuronal cells (f). Each dot represents one cell. Colors distinguish retins by donor and region (F-fovea, P-peripheral). Source of each sample is shown in Table S1. Because photoreceptors were depleted from peripheral samples, most were obtained from fovea (g). Expression of known photoreceptor type marker genes is plotted in h-l.

Figure S2

Violin and superimposed box plots showing expression of *OPN4* in RGC clusters

Figure S3

Heat maps showing expression levels of disease genes by cell classes in the fovea and periphery. Only genes expressed by more than 20% of cells in any individual class in either fovea or peripheral cells are plotted.

Table S1

Information of donors from whom retinas were obtained.

Table S2

Publications on single cell or single nucleus RNA-seq analyses of human retina.

Table S3

Quality matrix of each collection.

Figure S1

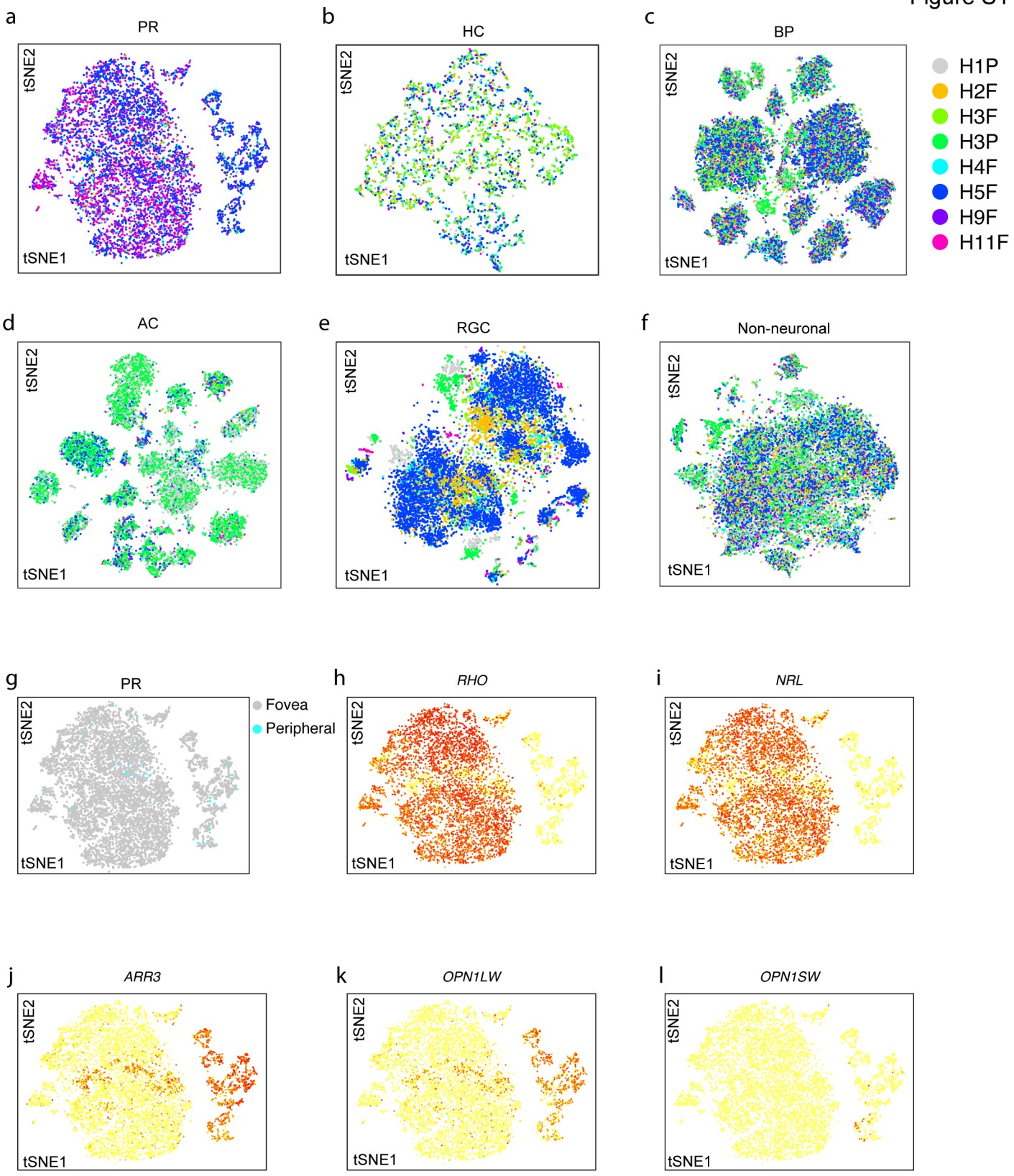

a
PR
b
HC
c
BP
H1P
H2F
H3F
H3P
H4F
H5F
H9F
H11F
d
AC
e
RGC
f
Non-neuronal
tSNE1
tSNE2
g
PR
Fovea
Peripheral
h
RHO
i
NRL
j
ARR3
k
OPN1LW
l
OPN1SW

Figure S2

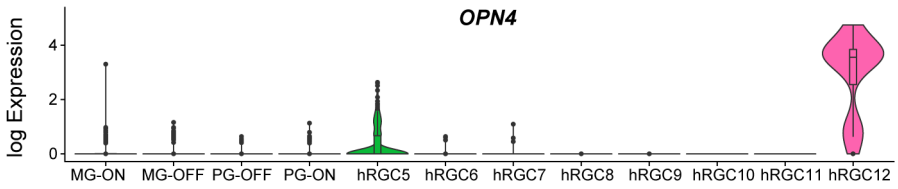
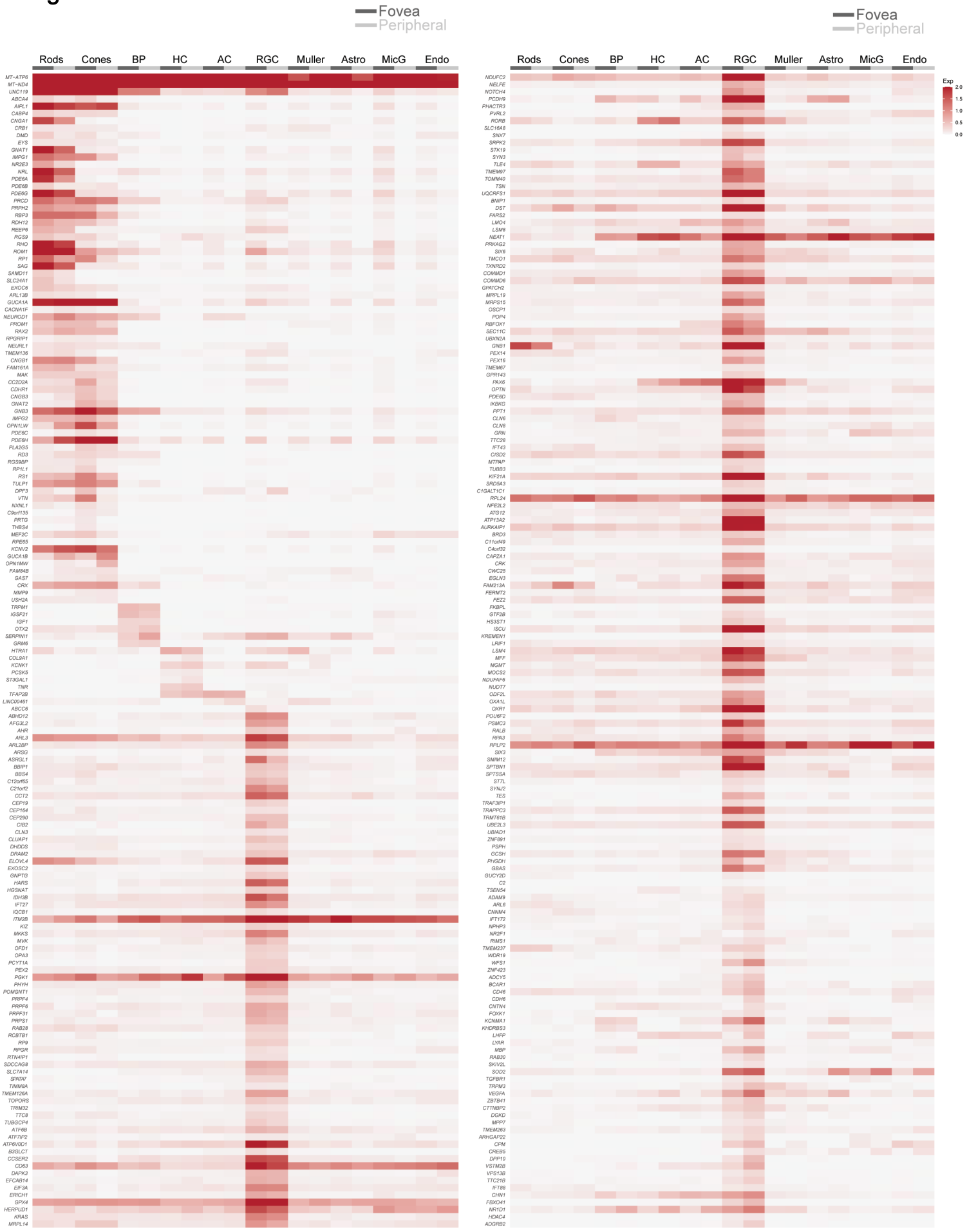

OPN4
log Expression
4
2
0
MG-ON
MG-OFF
PG-OFF
PG-ON
hRGC5
hRGC6
hRGC7
hRGC8
hRGC9
hRGC10
hRGC11
hRGC12

Figure S3


Fovea
Peripheral
Rods
Cones
BP
HC
AC
RGC
Muller
Astro
MicG
Endo
Exp
2.0
1.5
1.0
0.5
0.0

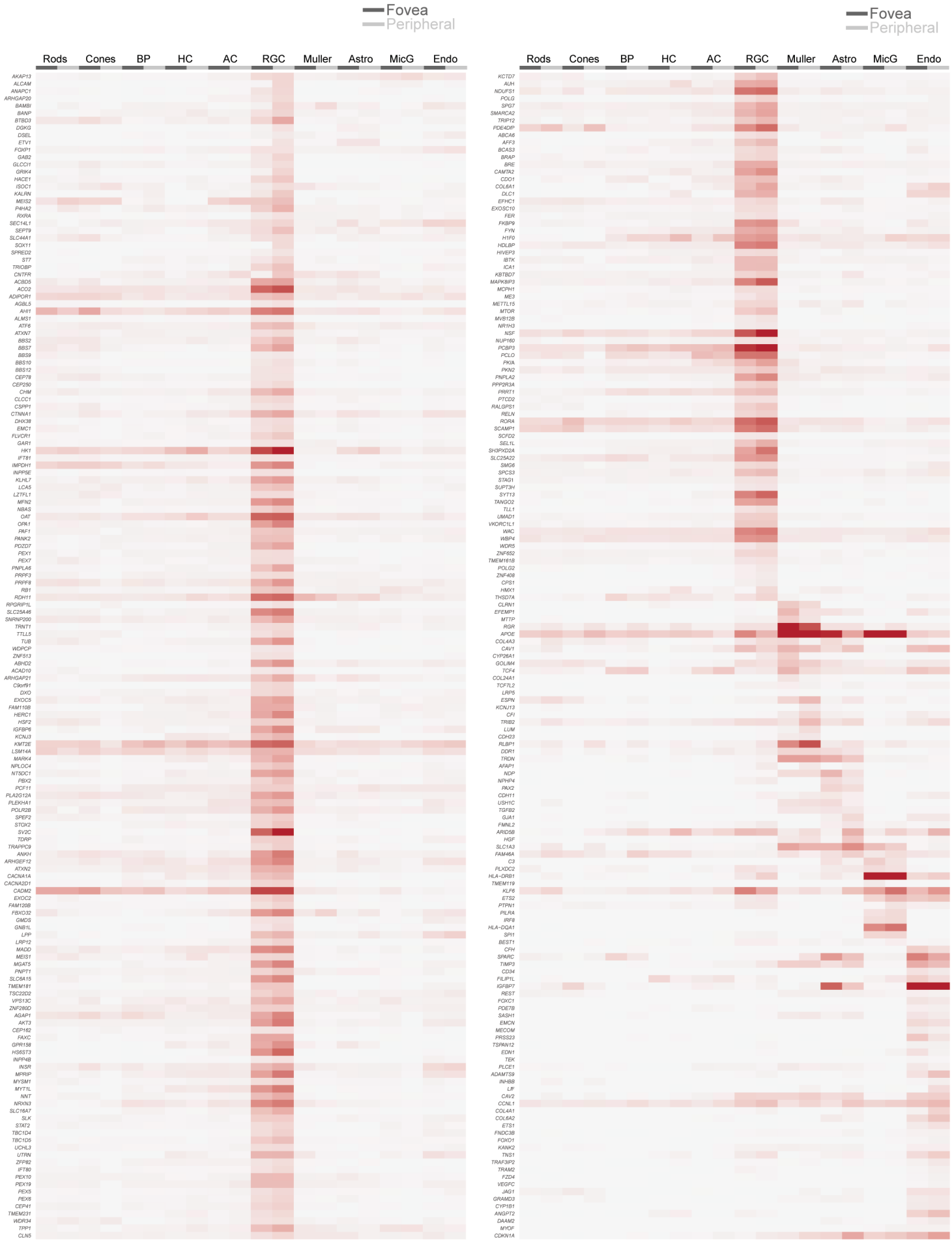

Fovea
Peripheral
Rods
Cones
BP
HC
AC
RGC
Muller
Astro
MicG
Endo
Exp
2.0
1.5
1.0
0.5
0.0

Table S1. Information of donors from whom retinas were obtained.

Donor ID	Retina region(s) sampled	Donor Age	Donor sex	COD	Duration to process after death (h)	10X Kit version
H1	Peripheral retina of left eye	74	Male	Lung Cancer	6	V2
H2	Fovea retina of both eyes	78	Male	Metastatic Melanoma to brain	14	V2
H3	Fovea and peripheral retina of right eye	60	Male	Left tonsillar squamous cell carcinoma metastatic to brain and left orbit	6.5	V2
H4	Fovea retina of left eye	64	Male	Diffuse B cell lymphoma spread to thorax and epigastrum	5	V2
H5	Fovea retina of left eye	69	Male	Metastatic Melanoma to brain, lung, spinal cord	3	V2
H9	Fovea retina of left eye	53	Female	Interstitial Lung Disease	5	V2
H11	Fovea retina of right eye	65	Male	Metastatic Melanoma	3	V3

Table S2. Publications on single cell RNA-seq profile of human retina.

Reference	Platform	Age	#Donors	# cells	Separate fovea/macula and periphery	# clusters	Identify types within classes	Cells or nuclei
[12]Peng et al., 2019	10X, V2	Adult	1	2,383	No	9	Yes	cells
[56]Hu et al., 2019	Modified STRT	Fetal week 5-24 weeks	19 embryos	2,421	No	21	No	cells
[55]Lukowski et al.,2019	10X, V2	Adult	3	20,009	No	17	Yes	cells
[59]Voigt et al., 2019	10X, V3	Adult	3	8,217	Yes	17	Yes	cryopreserved cells
[58]Menon et al., 2019	10X, V3 and Seq-Well	Adult	6	23,432	Yes	9	No	cells
[57]Liang et al., 2019	ICELL8	Adult	3	5,873	Yes	7	No	nuclei
[60]Orozco et al., 2020	10X,V2,V3	Adult	5	100,055	Yes	46	Yes	Nuclei
[61]Sridhar et al., 2020	10X,V1,V2, V3	Fetal	4 embryos	61,164	Yes	10	No	Cells
This study	10X, V2 and V3	Adult	8	85,000	Yes	58	Yes	cells

Table S3. Sample quality matrix of each collection

Library ID	total cells passed initial 600 gene filter	Final number of cells	median_nGene	median_nTranscripts	median_nreads	mito_trans_ratio	Amacrine	Astrocytes	Bipolar	Cones	Endothelium	Horizontal	Microglia	Muller	RGC	Rods
H1CD73dpS1	6614	5883	1435	3085	10880	0.054	11.6	0.5	41.1	0.2	0.8	1.8	2	40.8	0.9	0.4
H1CD90S1	7049	6181	1523	3147	7634	0.052	51.3	0.9	7.1	0	0.1	0.2	0	31.9	8.5	0
H2Fovea1S1	2587	2191	985	1730	4662	0.055	2.5	0	35.3	1.6	0.4	5.1	0.2	25.9	27.8	1.2
H2Fovea2S1	4597	4202	960	1650.5	4526.5	0.035	1	0.1	31	0.8	0.4	4	0.8	40.8	20.6	0.4
H3FoveaS1	3838	3015	909	1749	7373	0.054	3.6	0.2	38.1	1.1	0.3	13.5	0.5	31.4	10.1	1.2
H3FoveaS2	4717	3565	934	1819	8498	0.054	3.2	0	41.9	1.2	0.3	14.2	0.4	27.5	9.2	2.1
H3FoveaS3	34	25	1394	2733	550895	0.036	12	0	52	0	0	12	0	20	4	0
H3CD73dpS1	4447	3955	1306	2772	17497	0.037	9.9	1.4	49.6	0.2	1.1	4.1	3	29.8	0.7	0.3
H3CD73dpS2	4203	3750	1270	2664	13471	0.037	10.6	1.3	47.9	0.2	1.2	3.6	2.8	31.3	0.8	0.4
H3CD90S1	5385	4879	1688	3480	13171	0.044	62.8	9.7	12	0	0.6	0.3	0	7.8	6.8	0
H3CD90S2	5144	4674	1642	3329.5	10239.5	0.043	63.8	9.3	12.3	0	0.8	0.3	0	7.4	6.2	0
H4FoveaS1	5961	4388	1306	2554	5635	0.059	11.8	0.2	27.5	0.9	0.5	5.2	0.4	33.7	11.7	8.1
H5FoveaS1	7998	6856	1342	2526	5212	0.041	5.9	0.2	29.8	4.4	0.3	2.8	0.4	22	26.3	7.9
H5FoveaS2	6426	5603	1323	2493	5151	0.042	6	0.3	30.5	5.1	0.3	2.8	0.4	21.1	24.1	9.4
H5FoveaS3	6411	5550	1293.5	2422	5044.5	0.043	5.3	0.2	31.4	4.9	0.3	3.1	0.5	19.9	25.1	9.4
H5FoveaS4	6524	5661	1313	2457	5223	0.042	6.2	0.2	30.6	4.8	0.4	3.2	0.3	20.7	24	9.6
H5FoveaS5	6385	5511	1331	2495	5768	0.042	5.4	0.2	31.5	5.3	0.2	3.2	0.4	22.2	21.7	10
H9FoveaS1	7943	5480	1220.5	2235.5	4399	0.053	2.5	0.2	27.4	6.3	0.5	1.3	1.3	25.5	3.3	31.6
H11FoveaS1	7798	4884	1395	2863	4062	0.185	5.2	0.4	35.4	0.5	0.3	1.3	2	6.9	4.9	43