Supplementary Data

Conditional Loss of *Spata7* in Photoreceptors Causes Progressive Retinal Degeneration in Mice

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Supplementary Figures:

Suppl. Figure 1. *In vivo* retinal imaging of *Spata7*$^{Flox/-}$; *Crx-Cre* mouse. Live imaging of *Spata7*$^{Flox/-}$; *Crx-Cre* cKO mice by optical coherence tomography (OCT) at (A, B) 3 months, (C, D) 5 months, and (E, F) 7 months of age, reveal consistent, progressive thinning of the ONL compared to the age-matched *Spata7*$^{Flox/+}$ control retinas. The ONL is indicated by a red arrow head. ONL: outer nuclear layer; INL: inner nuclear layer; PR: photoreceptor layer. n=3 for each genotype at each time point.

Suppl. Figure 2. *Spata7* mRNA is expressed in the RPE.

RT-PCR was performed on the RPE and the RPE+choroid isolated from adult wild-type mouse retinas, whole retinas from *Spata7*$^{+/-}$ mice, and *Spata7*$^{-/-}$ adult mice. *Spata7* is expressed in the RPE layer. Water was used as "blank control." GAPDH was used as a loading control. Primers flanking exons 1-5 were used to detect *Spata7* transcript. Two retinas were used for each genotype.

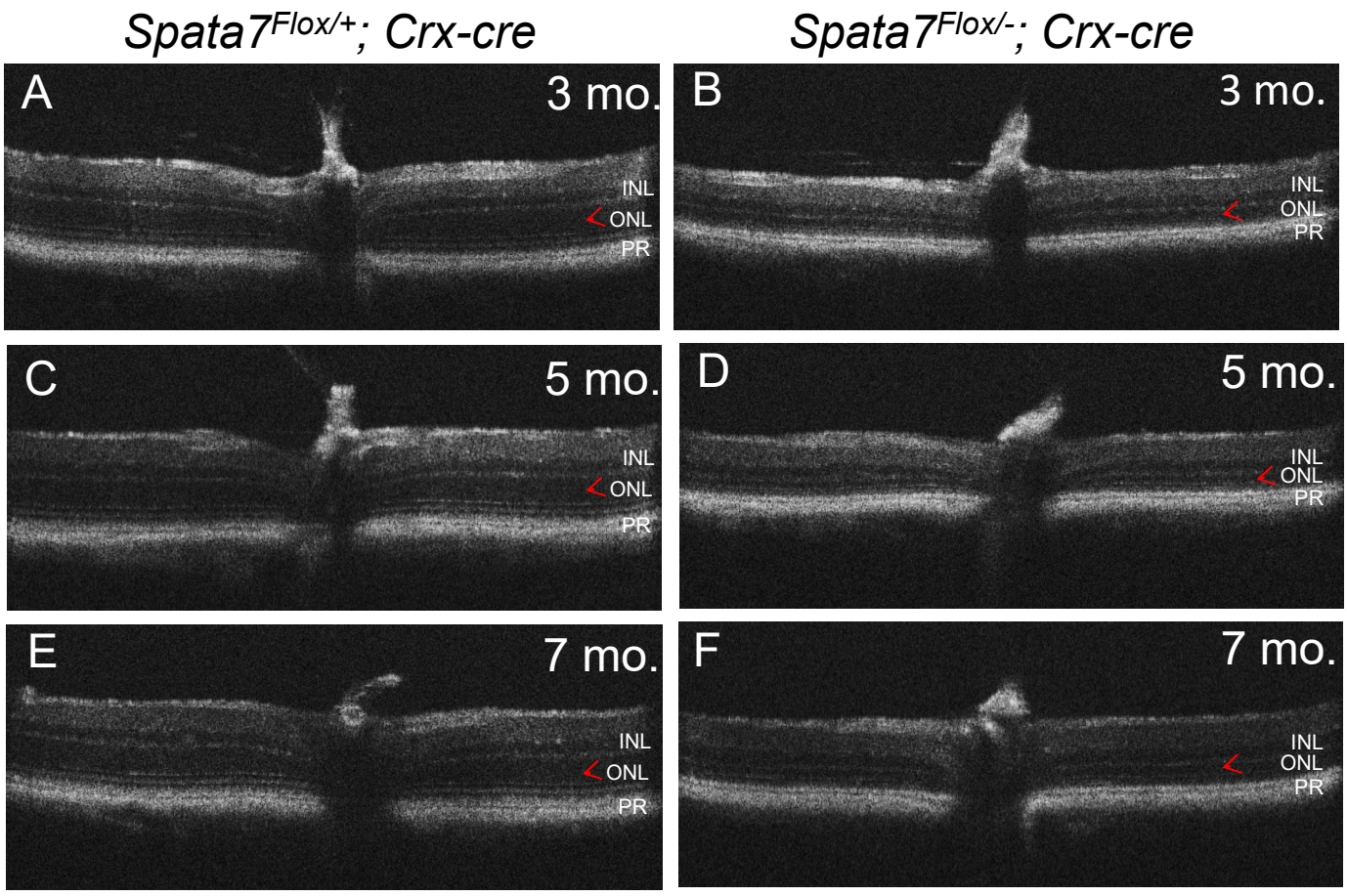
Suppl. Figure 3. Expression of SPATA7 in *Spata7*$^{Flox/-;}$ *Crx-Cre* at postnatal day 6.
Examination of SPATA7 expression by immunostaining shows few SPATA7-positive cells (green) in frozen retinal sections obtained from *Spata7*$^{Flox/-;}$ *Crx-Cre* mice at post-natal day 6 (P6). Arrows indicate SPATA7-positive cells. Nuclei were counterstained with DAPI. Scale bar = 10 µm.

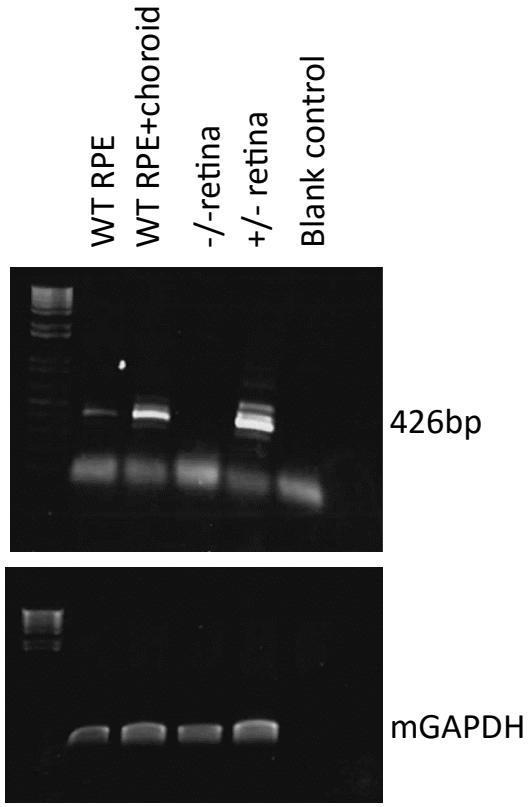
Suppl. Figure 4. Morphology of adult *Spata7* control mice retina. H&E staining of paraffin-embedded retinal sections obtained from adult mice. ONL= outer nuclear layer, INL=inner nuclear layer, GCL= ganglion cell layer. Scale bar = 20µm.

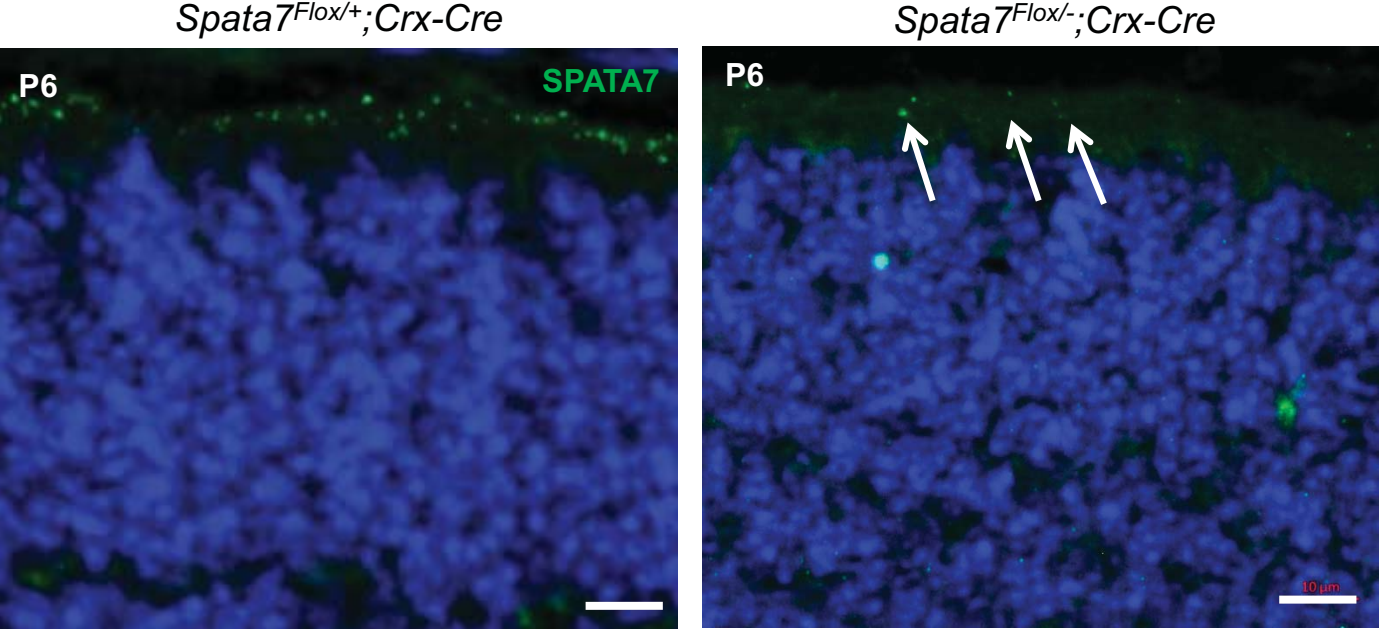
Suppl. Figure 5. Cre immunostaining in *Spata7*$^{Flox/-}$; *Best1-Cre* mouse retina. Paraffin sections from P80 mouse retina from *Spata7*$^{Flox/+}$ control and *Spata7*$^{Flox/-}$; *Best1-Cre* RPE conditional knockout mice shows non-specific Cre staining (green) in the photoreceptor layer

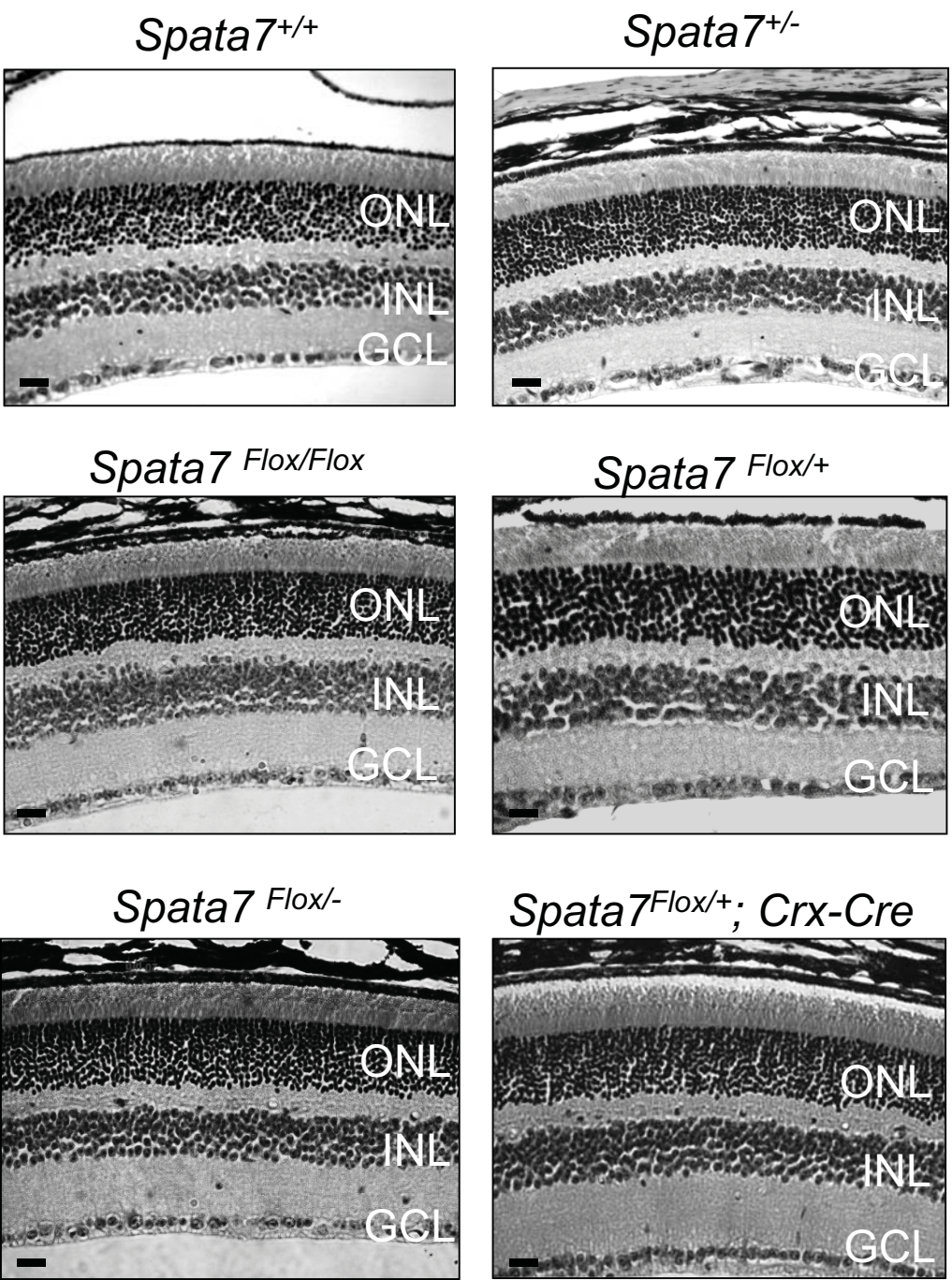
(PR). *Spata7*$^{Flox/+}$ retinal sections lack Cre positive staining in the RPE cells, while *Spata7*$^{Flox/}$*;Best1-Cre* retinal sections have strong Cre positive signal in the RPE specifically (n=3*)*. DAPI was used for nuclear counter-staining (blue). RPE= retinal pigment epithelium, PR= photoreceptor layer, ONL= outer nuclear layer, INL= inner nuclear layer. Scale bar: (A) 20 µm (B) 50 µm.

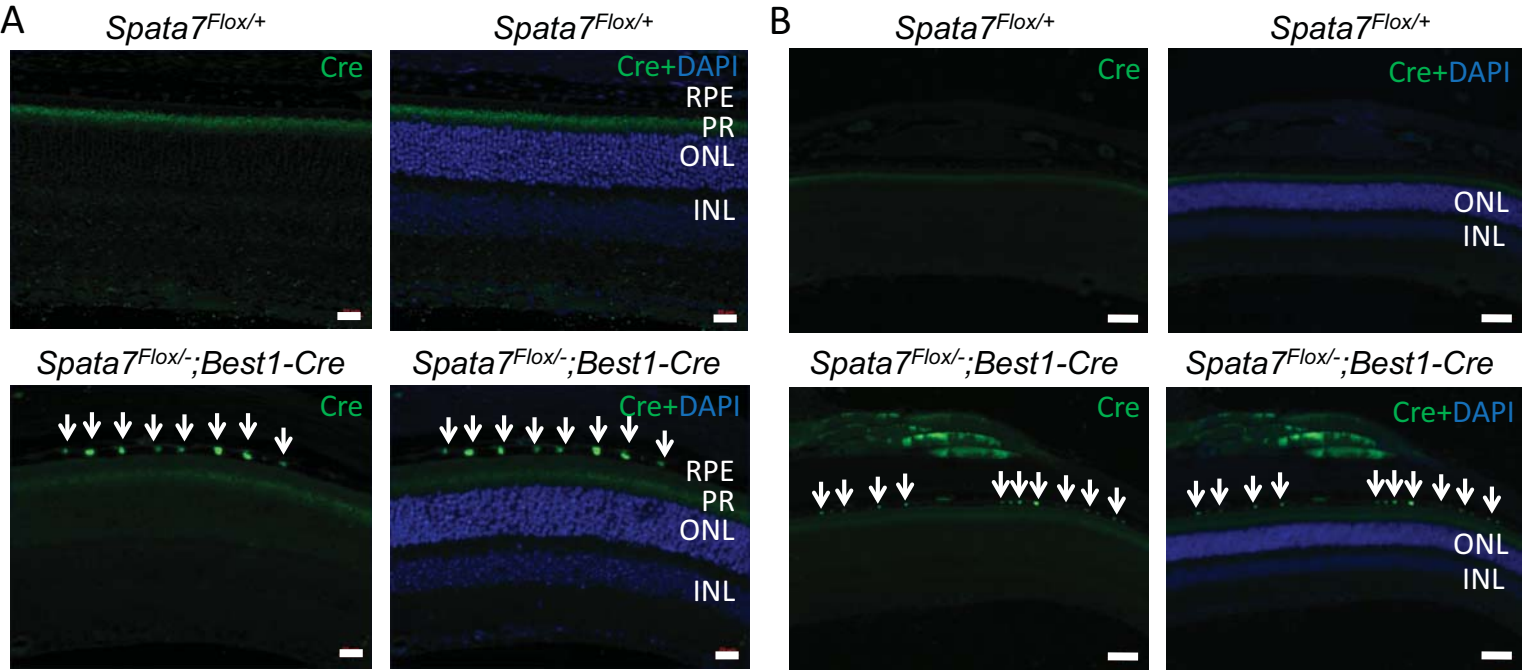
Suppl. Figure 6. RPGRIP1 is mislocalized in *Spata7*$^{Flox/-}$*; Crx-Cre* retina. Low-resolution imaging of RPGRIP1 (green) and acetylated-α tubulin (red) immunostaining depicted in Figure 6. RPGRIP1 mislocalization in the *Spata7*$^{Flox/-}$*; Crx-Cre* retina is detected in the ONL and the photoreceptor synapses (indicated by arrows). DAPI was used for nuclear counter-staining (blue). CC= connecting cilium, ONL= outer nuclear layer, INL= inner nuclear layer. Scale bar: 20 µm.

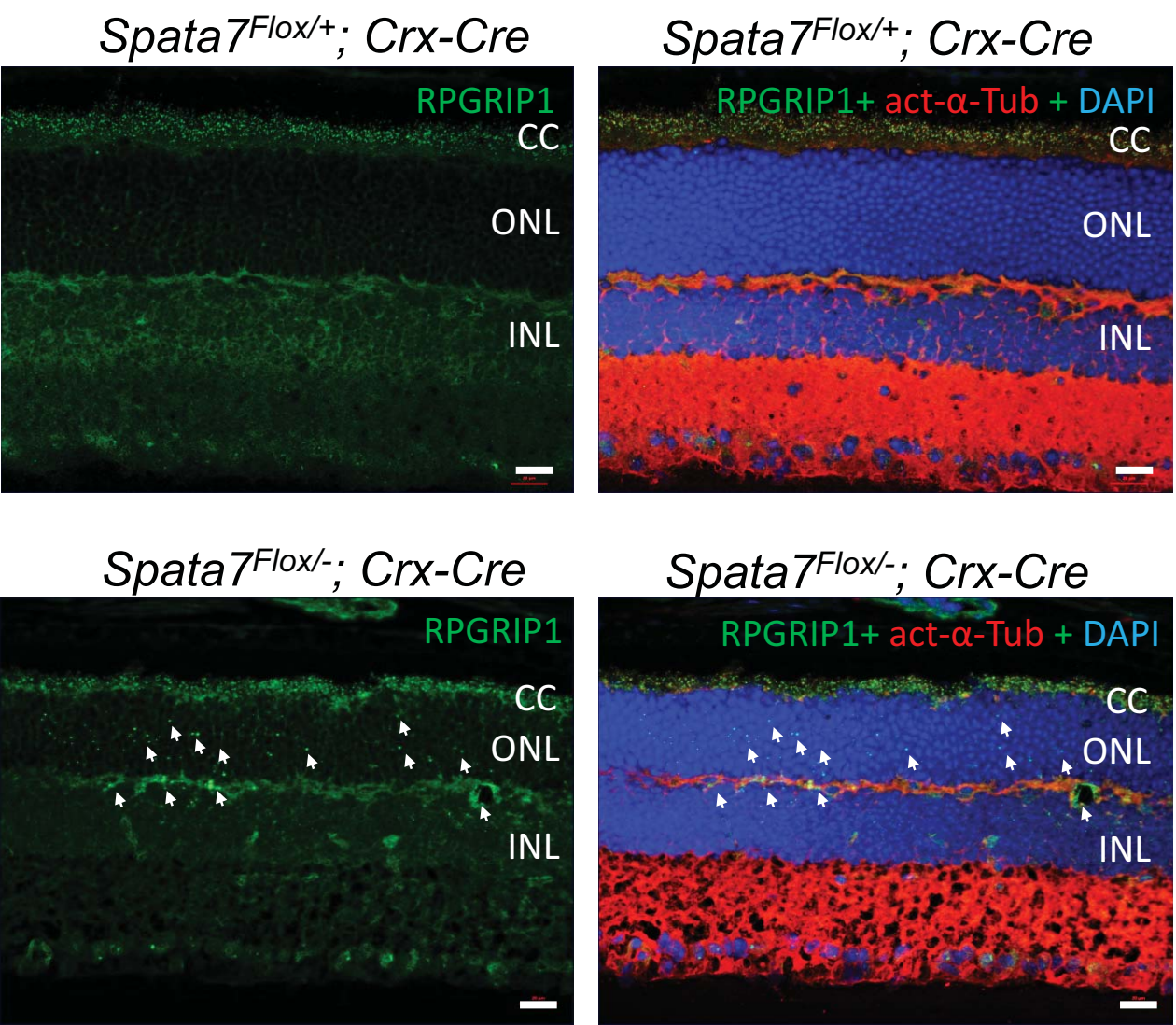

Spata7Flox/+; Crx-cre
Spata7Flox/-; Crx-cre
A
3 mo.
INL
ONL
PR
B
3 mo.
INL
ONL
PR
C
5 mo.
INL
ONL
PR
D
5 mo.
INL
ONL
PR
E
7 mo.
INL
ONL
PR
F
7 mo.
INL
ONL
PR


WT RPE
WT RPE+choroid
-/-retina
+/- retina
Blank control
426bp
mGAPDH


Spata7Flox/+;Crx-Cre
P6
SPATA7
Spata7Flox/-;Crx-Cre
P6
10 µm


Spata7+/+
ONL
INL
GCL
Spata7+/-
ONL
INL
GCL
Spata7 Flox/Flox
ONL
INL
GCL
Spata7 Flox/+
ONL
INL
GCL
Spata7 Flox/-
ONL
INL
GCL
Spata7Flox/+; Crx-Cre
ONL
INL
GCL


A
Spata7Flox/+
Cre
Spata7Flox/+
Cre+DAPI
RPE
PR
ONL
INL
Spata7Flox/-;Best1-Cre
Cre
Spata7Flox/-;Best1-Cre
Cre+DAPI
RPE
PR
ONL
INL
B
Spata7Flox/+
Cre
Spata7Flox/+
Cre+DAPI
ONL
INL
Spata7Flox/-;Best1-Cre
Cre
Spata7Flox/-;Best1-Cre
Cre+DAPI
ONL
INL


Spata7Flox/+; Crx-Cre
RPGRIP1
CC
ONL
INL
Spata7Flox/+; Crx-Cre
RPGRIP1+ act-α-Tub + DAPI
CC
ONL
INL
Spata7Flox/-; Crx-Cre
RPGRIP1
CC
ONL
INL
Spata7Flox/-; Crx-Cre
RPGRIP1+ act-α-Tub + DAPI
CC
ONL
INL