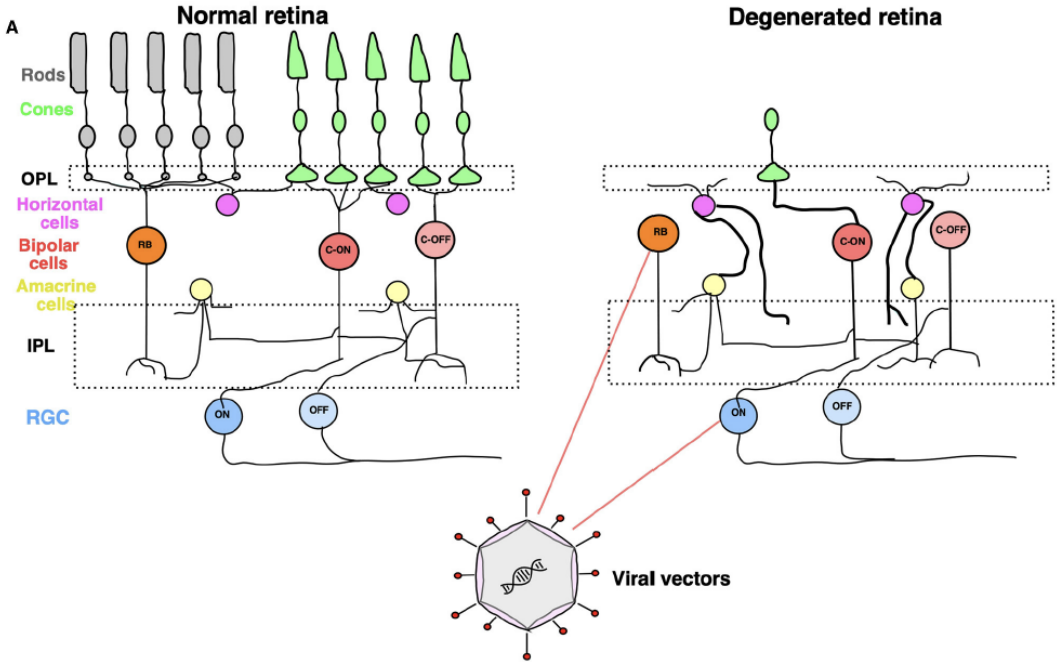
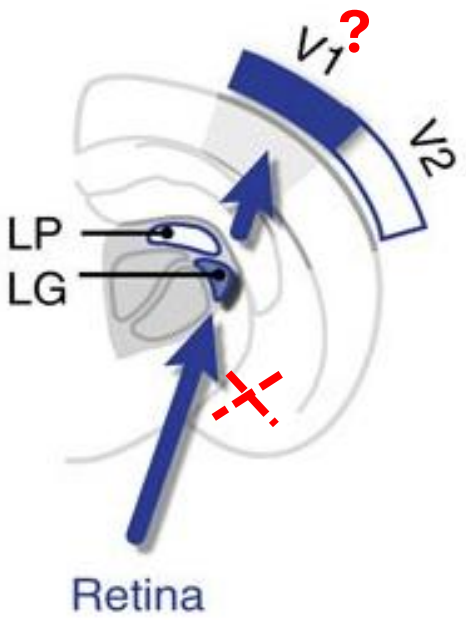
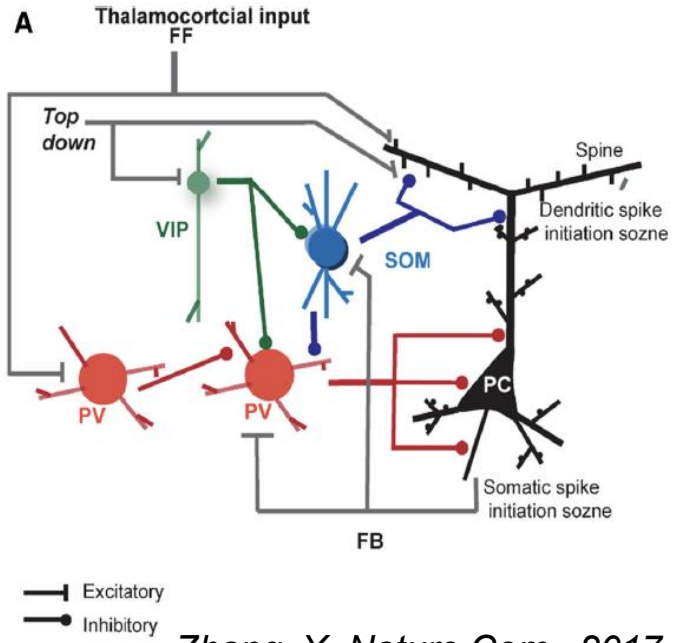
Aim: To understand the implications of Retinal Degeneration on ipRGCs and cortical circuitry





Jabaudon, D., Nature Com, 2017



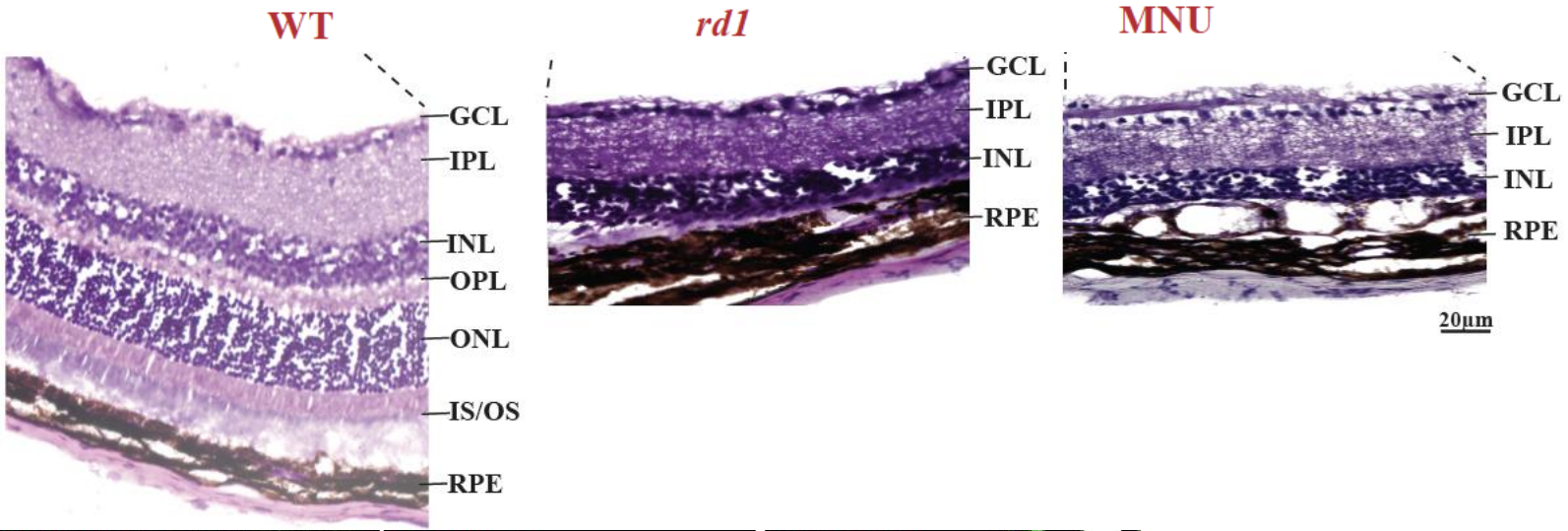
Zhang, X. Nature Com., 2017

LG: lateral geniculate nucleus
V1: primary visual cortex
V2: visual association area

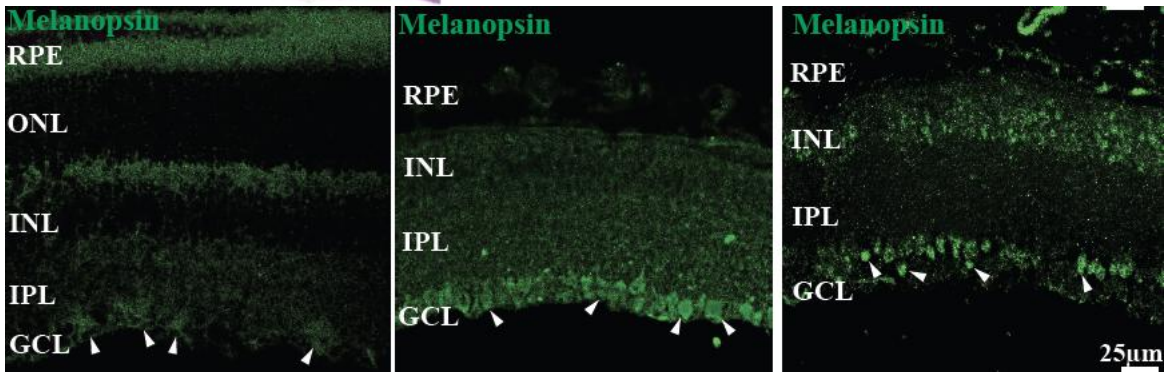
Materials and Methods:

- Eye/Brain extraction,
- Retina and brain sectioning in cryostat
- Immunofluorescence
- Confocal microscopy
- Cell counting
- Physiology: *in vivo* electrophysiology from primary visual cortex (V1)

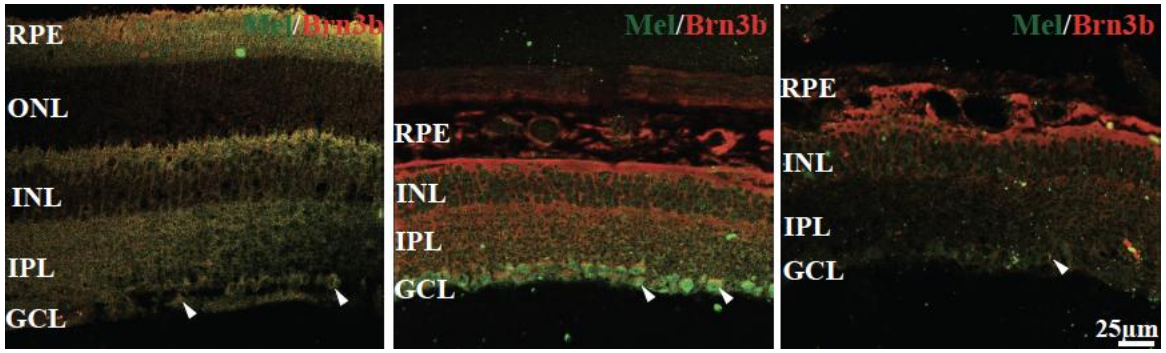
Results: Effects on Retina



- The decrease of the photoreceptor layer in *rd1* and MNU induced mice observed in our study were of a similar magnitude and could closely mimic the natural process of degeneration enabling the reliable use of chemically induced animal models.

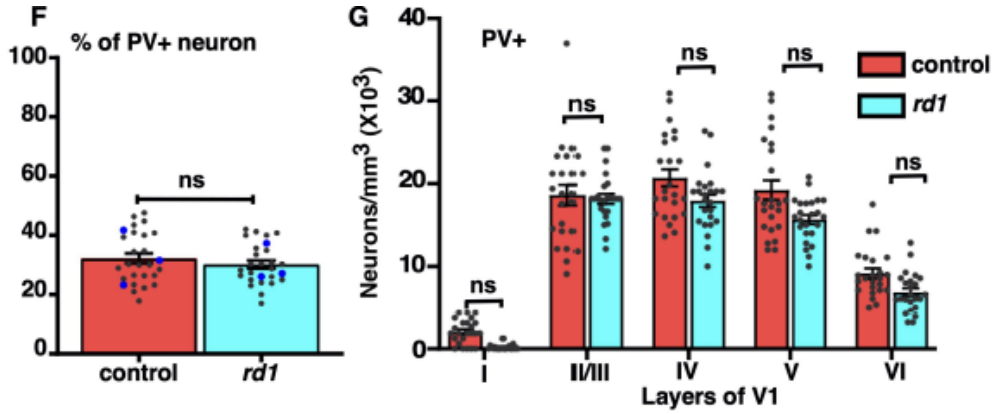


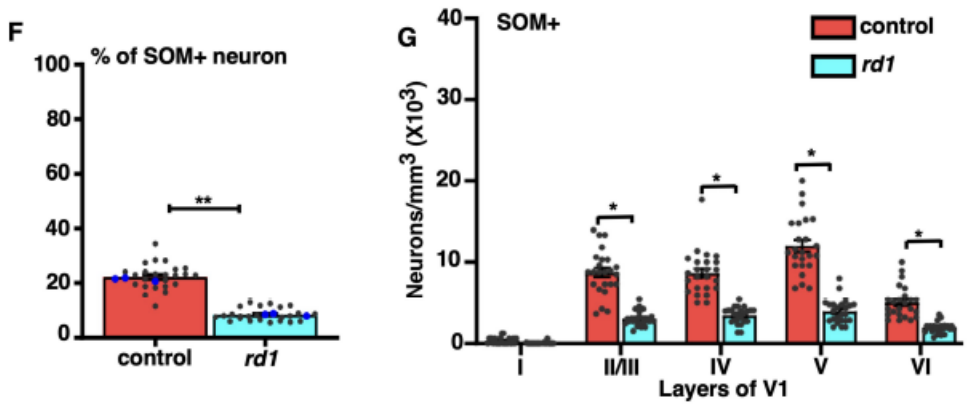
- The ipRGCs are resistant to inherited and chemically induced photoreceptor degeneration thereby retaining the ability to relay light information to the brain.



- Brn3b expressing RGCs are not affected in *rd1* mutants, however, are prone to MNU induced degeneration and undergo decline in cell numbers.

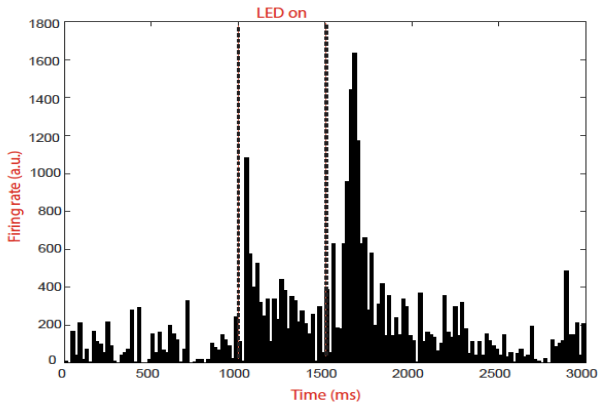
Results: Effects on Primary Visual Cortex (V1)



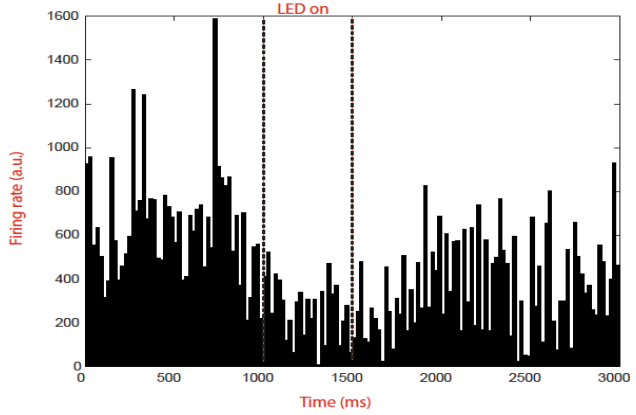


- Early stages of retinal degeneration (RD) perhaps does not affect the density of distribution of Parvalbumin (PV+) neurons in the layers of V1. The total proportion of SST+ neurons in V1 showed a significant decrease in degenerated animals. The unaffected PV neurons could possibly compensate the excitation-inhibition balance and this improve the signal to noise ratio.

WT



rd1



- Our results demonstrate a sustained hyperactivity in the visual cortex and loss if evoked activity in V1 during retinal degeneration.