- **Differential encoding in olivocerebellar modules**

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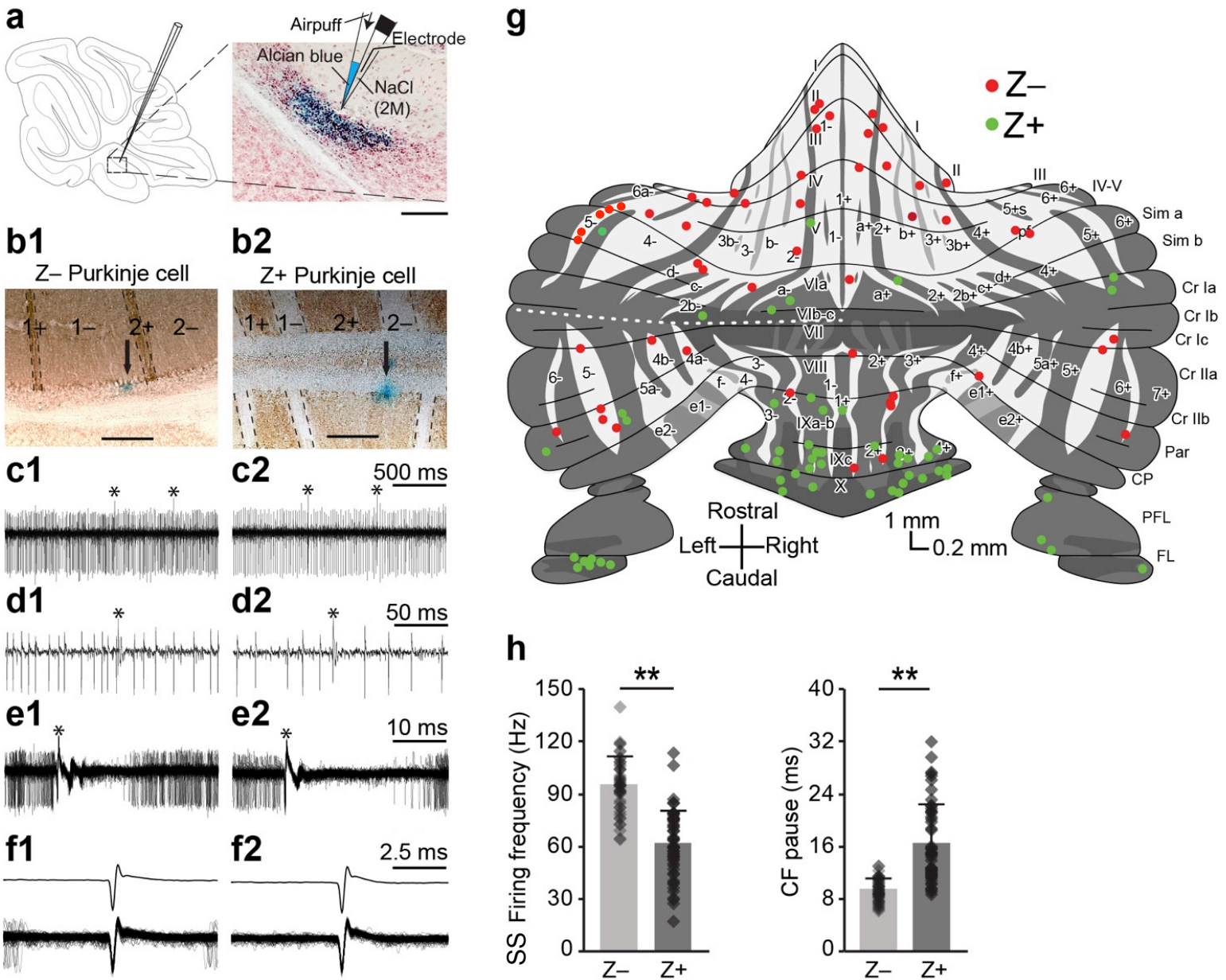
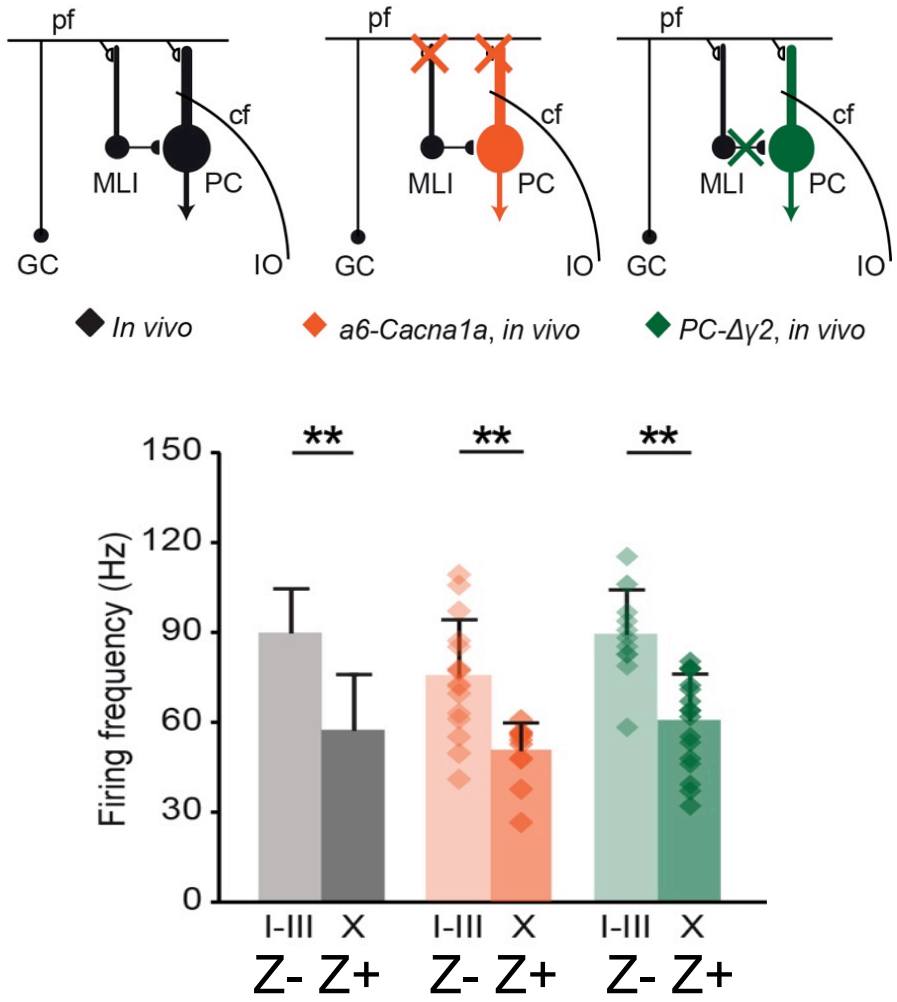
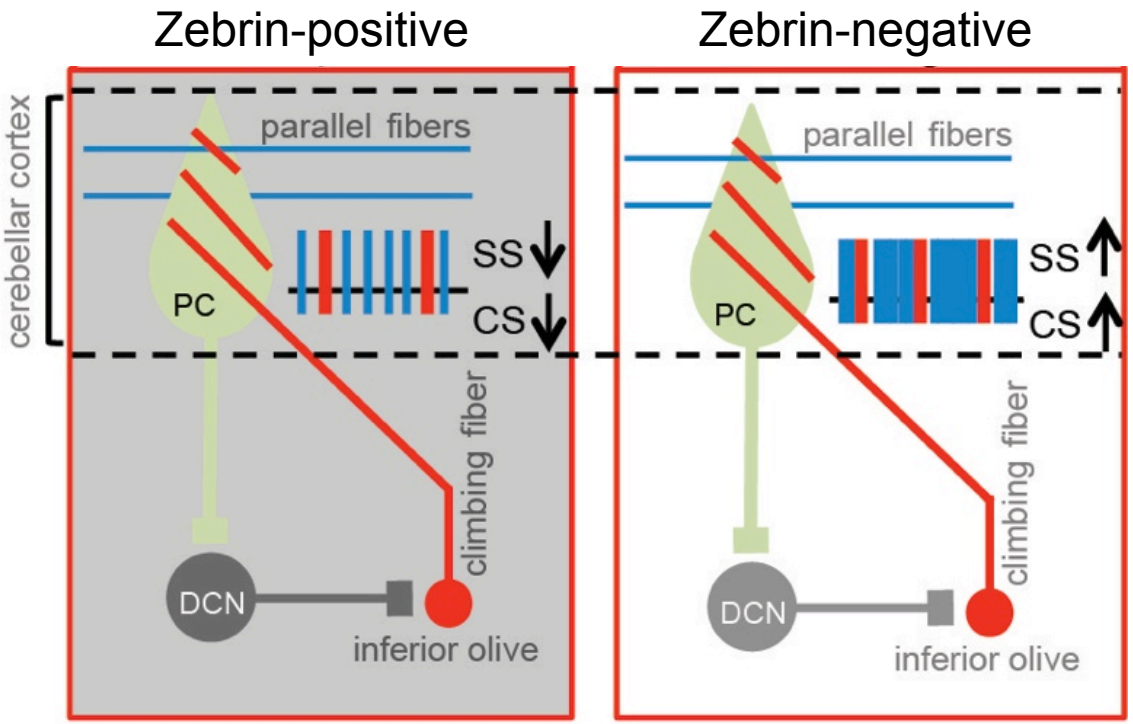


Zhou et al., 2014 Elife


pf
cf
MLI
PC
GC
IO
In vivo
a6-Cacna1a, in vivo
PC-Δγ2, in vivo
**
**
**
150
120
90
60
30
0
Firing frequency (Hz)
I-III
X
Z-
Z+

What is impact of different intrinsic firing frequencies on learning mechanisms?



Potentiation ?

Suppression ?

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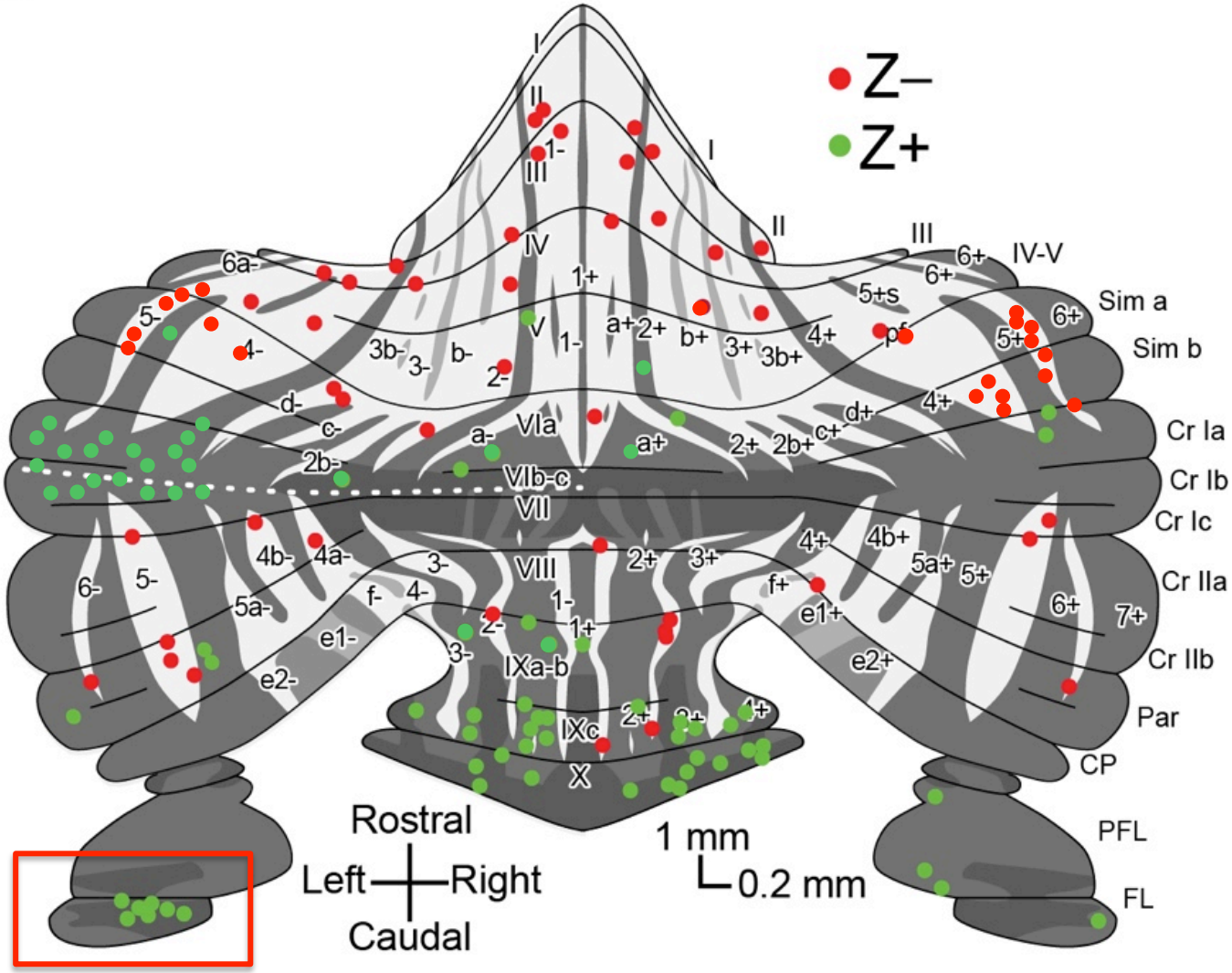
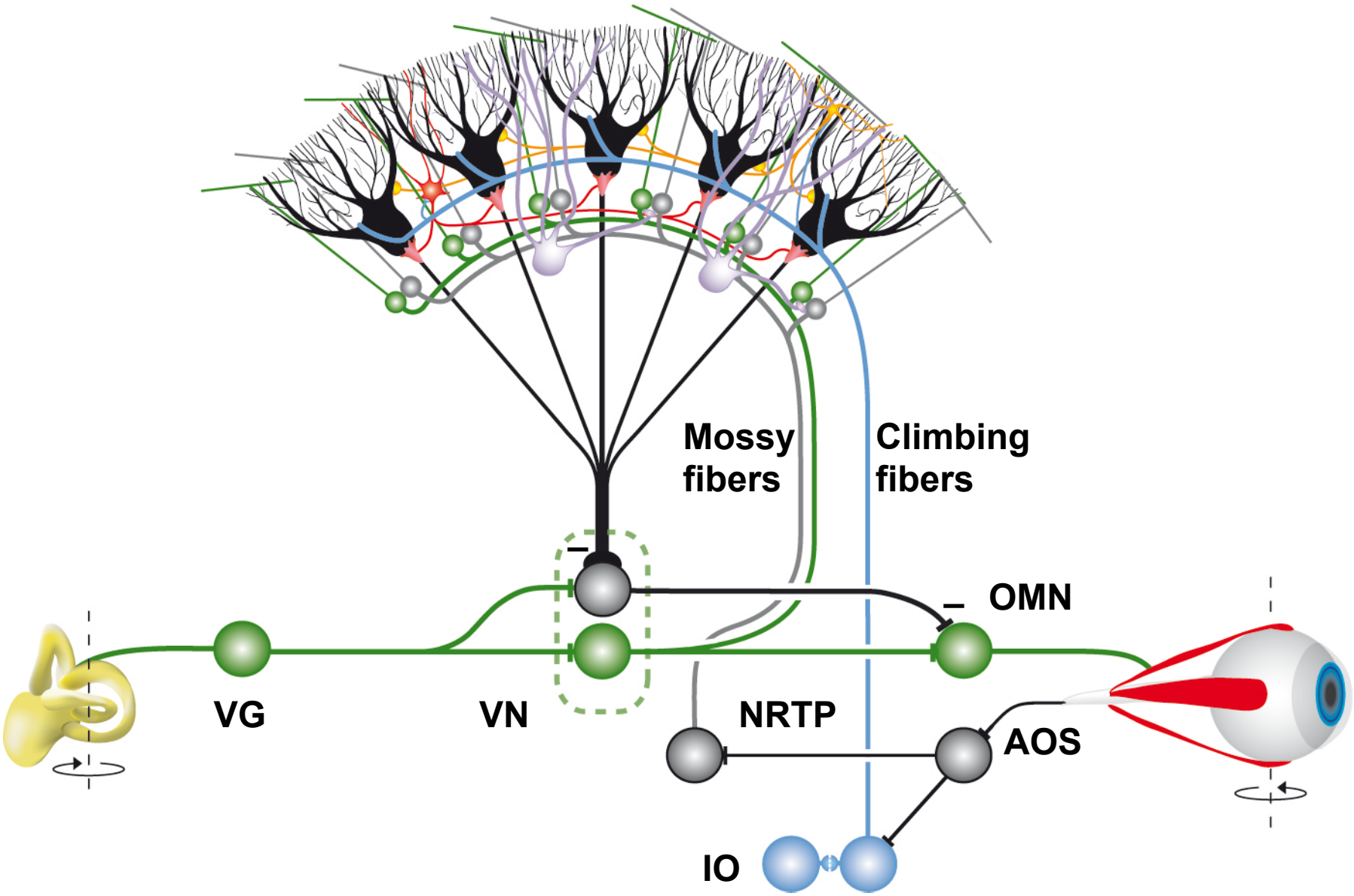
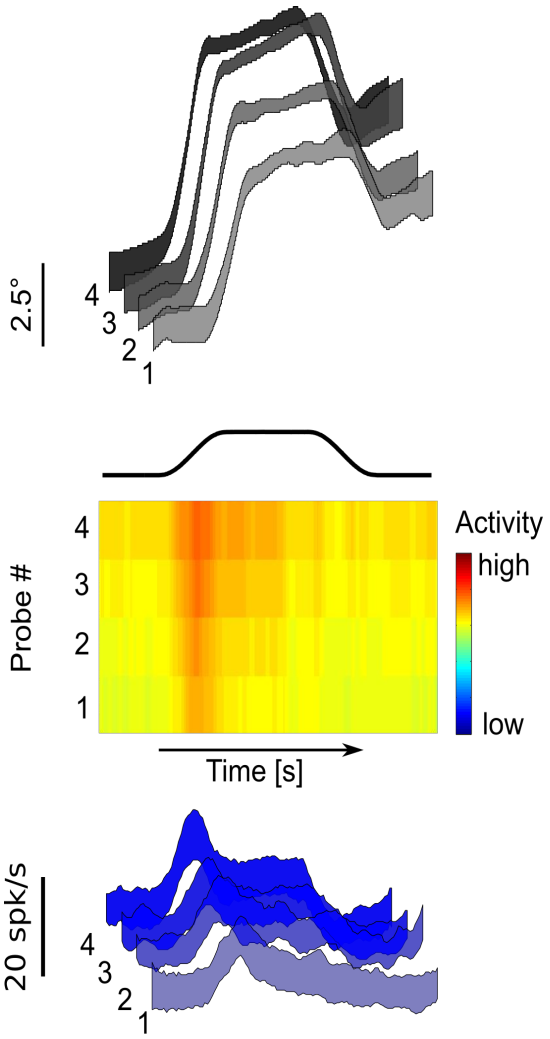
Purkinje cell activity in Z+ zones during vestibular gain-increase learning

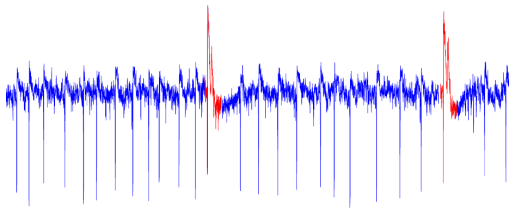



Mossy fibers
Climbing fibers
OMN
VG
VN
NRTP
AOS
IO

Increase

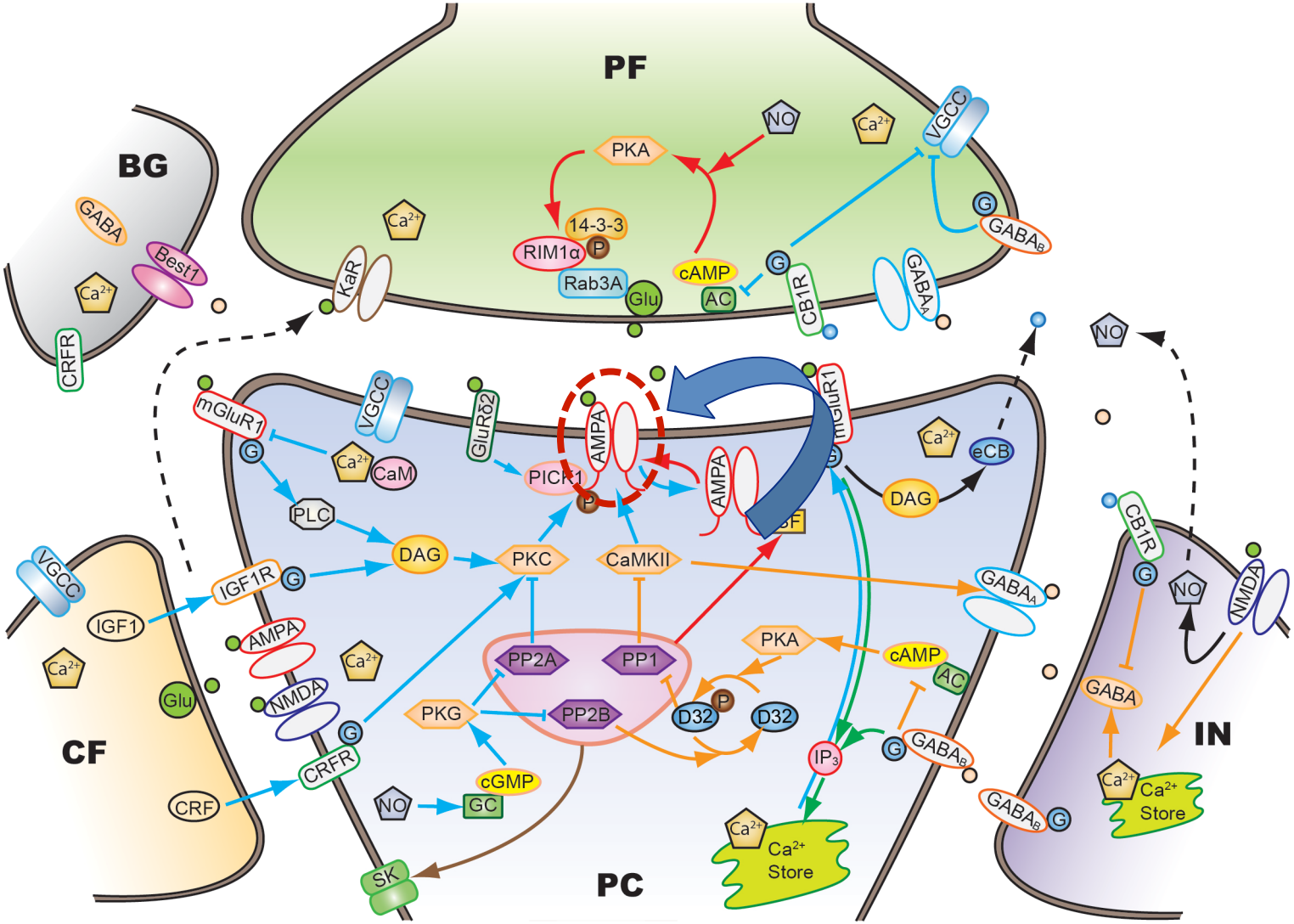


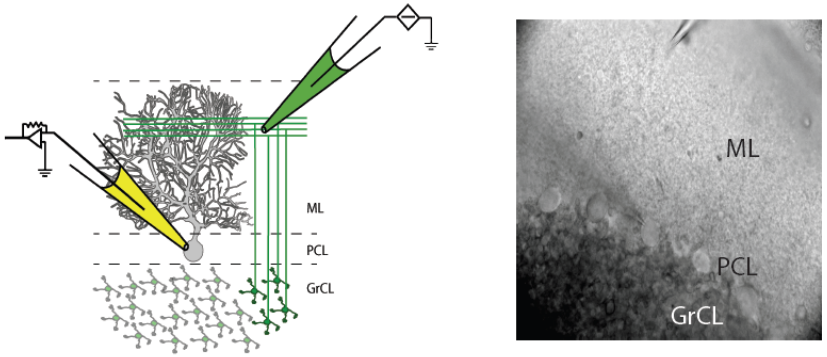
Purkinje cell activity

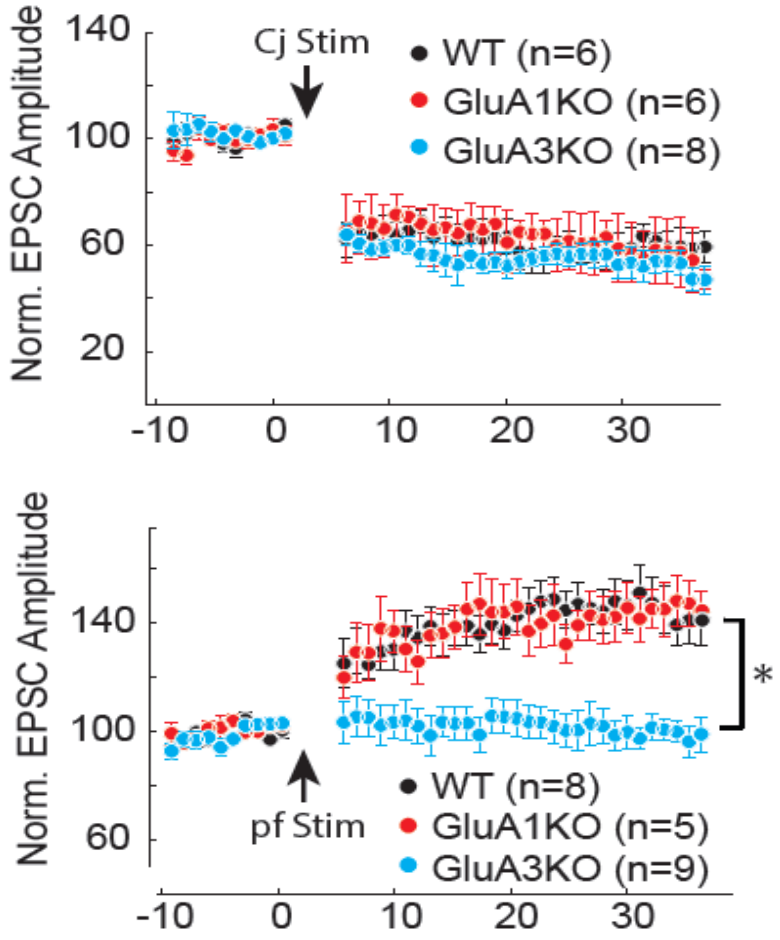


Voges et al., 2017 J.Physiol.

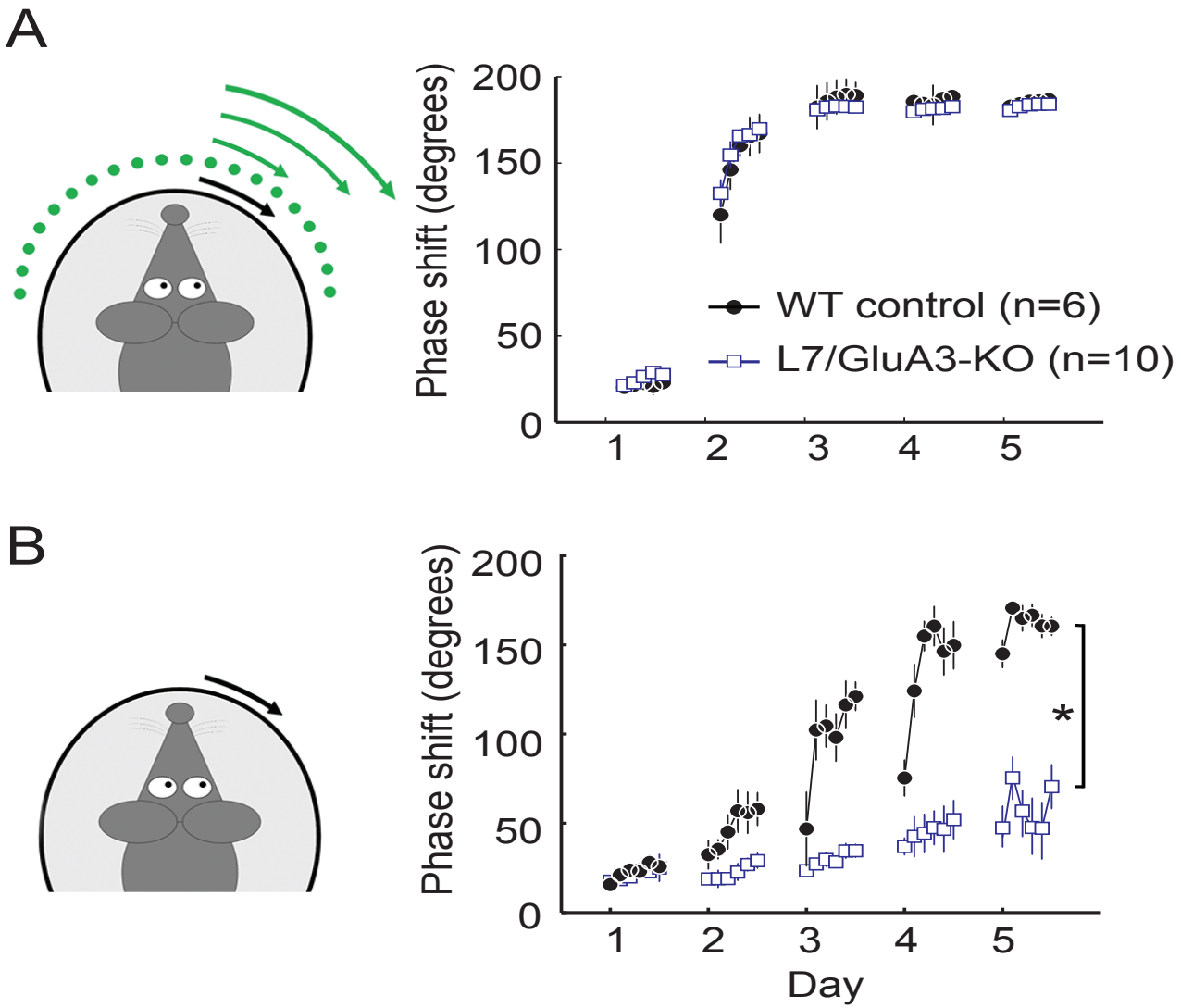
Role of GluR3 in postsynaptic LTP at PF-PC synapse







Gutierrez et al., 2017 Neuron


A
B
Phase shift (degrees)
200
150
100
50
0
1
2
3
4
5
WT control (n=6)
L7/GluA3-KO (n=10)
*
Day

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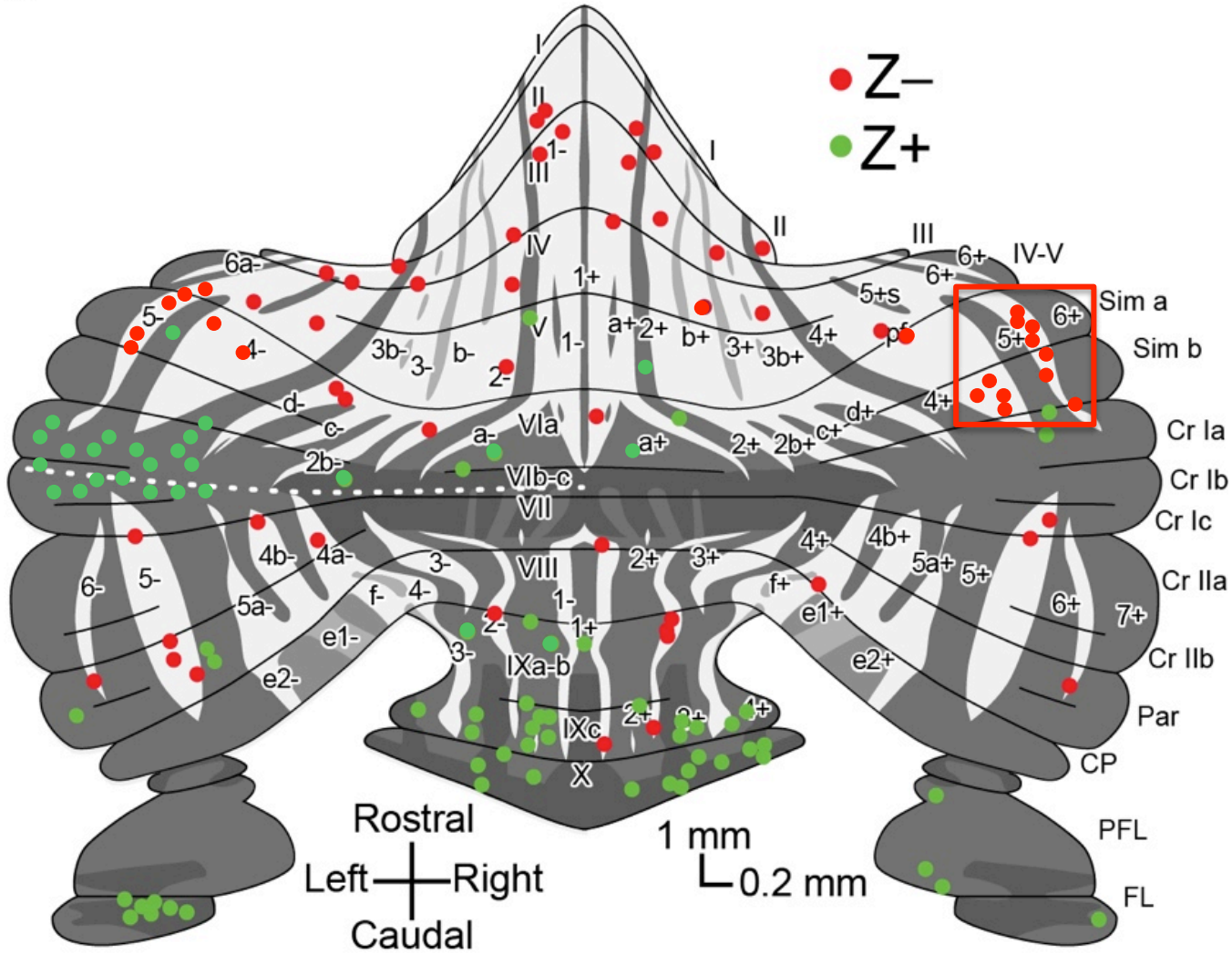
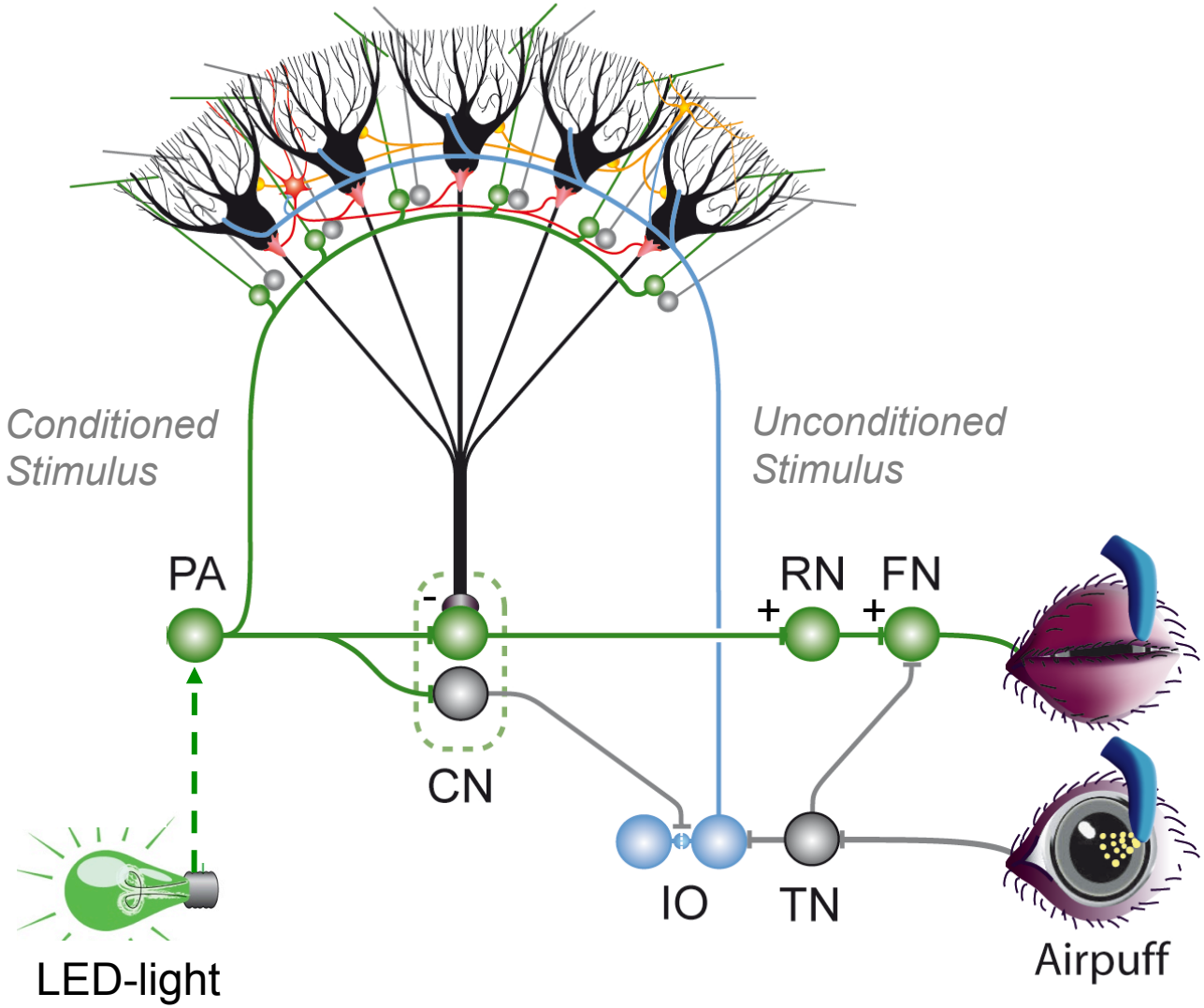
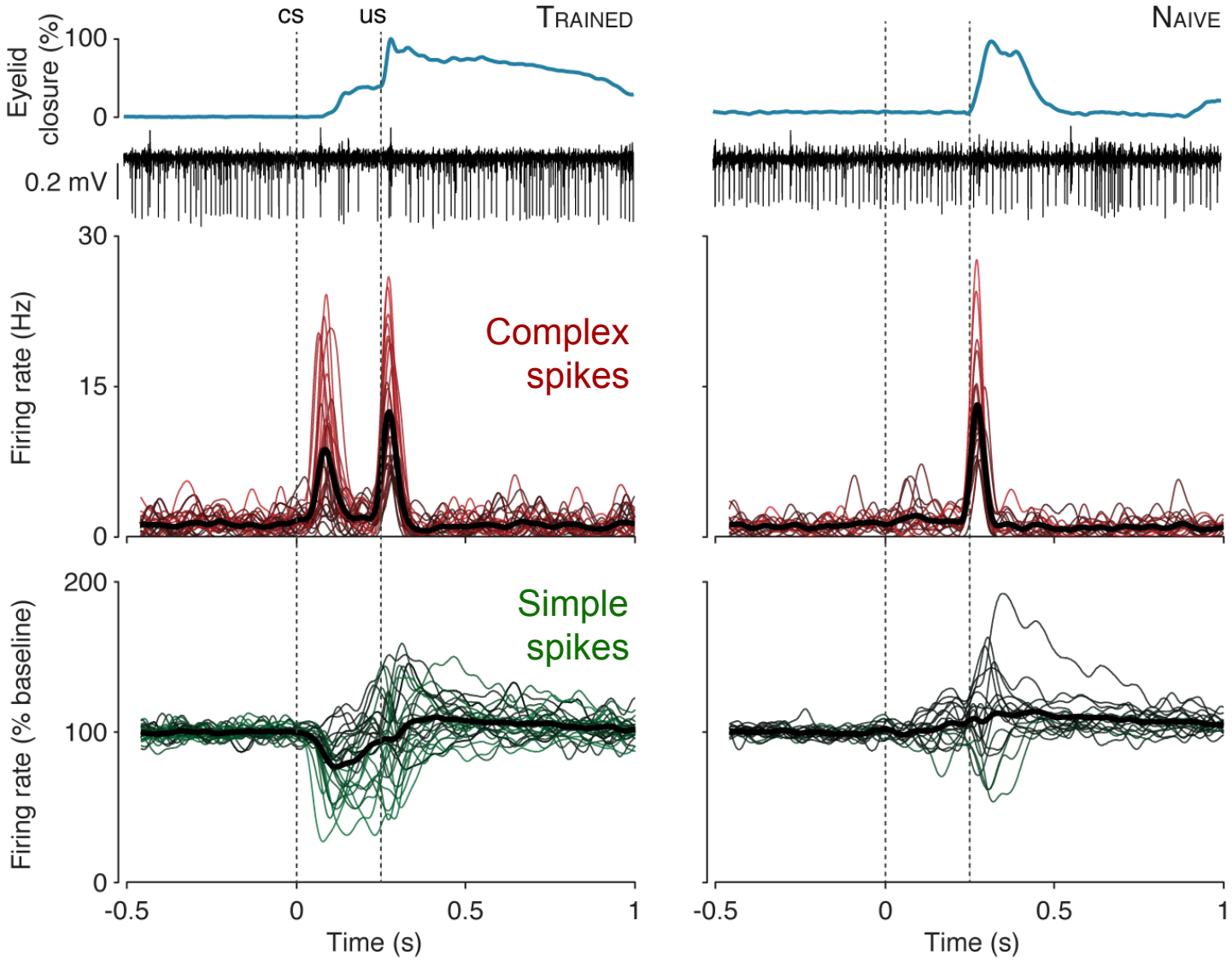
Purkinje cell activity in Z- zones during eyeblink conditioning

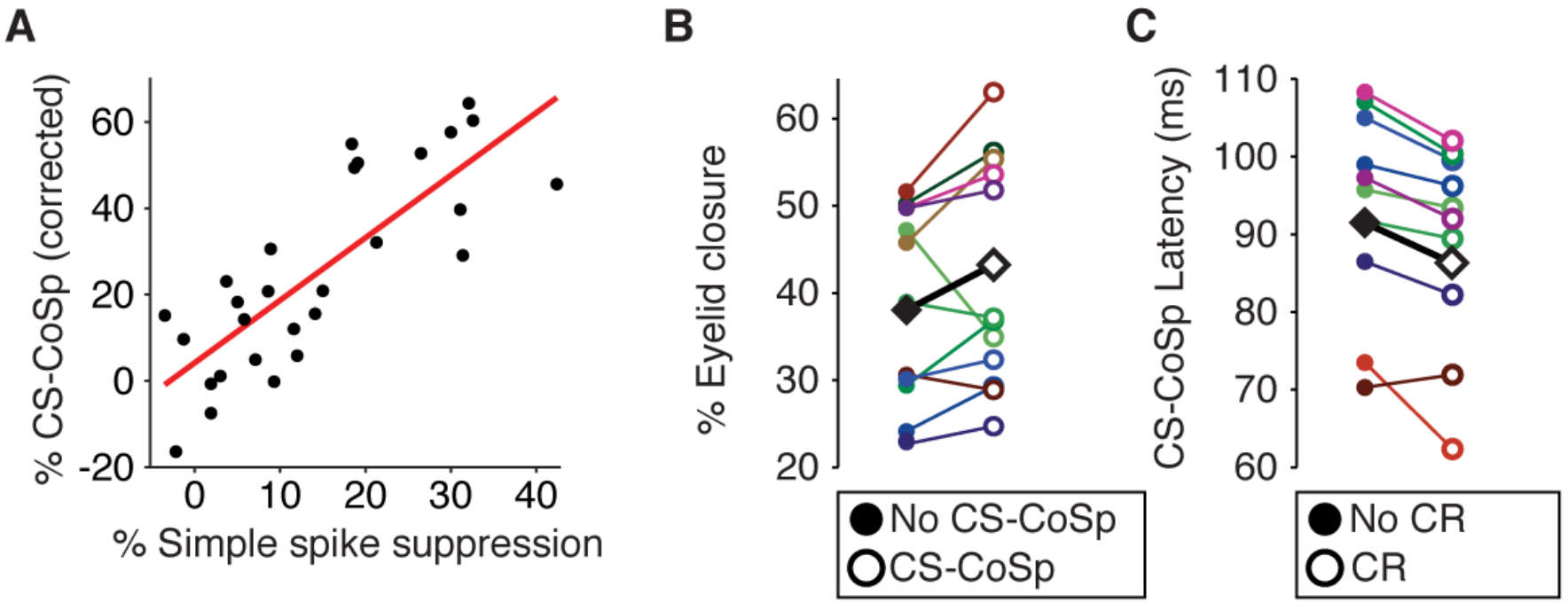



Conditioned
Stimulus
Unconditioned
Stimulus
PA
CN
RN
FN
IO
TN
LED-light
Airpuff

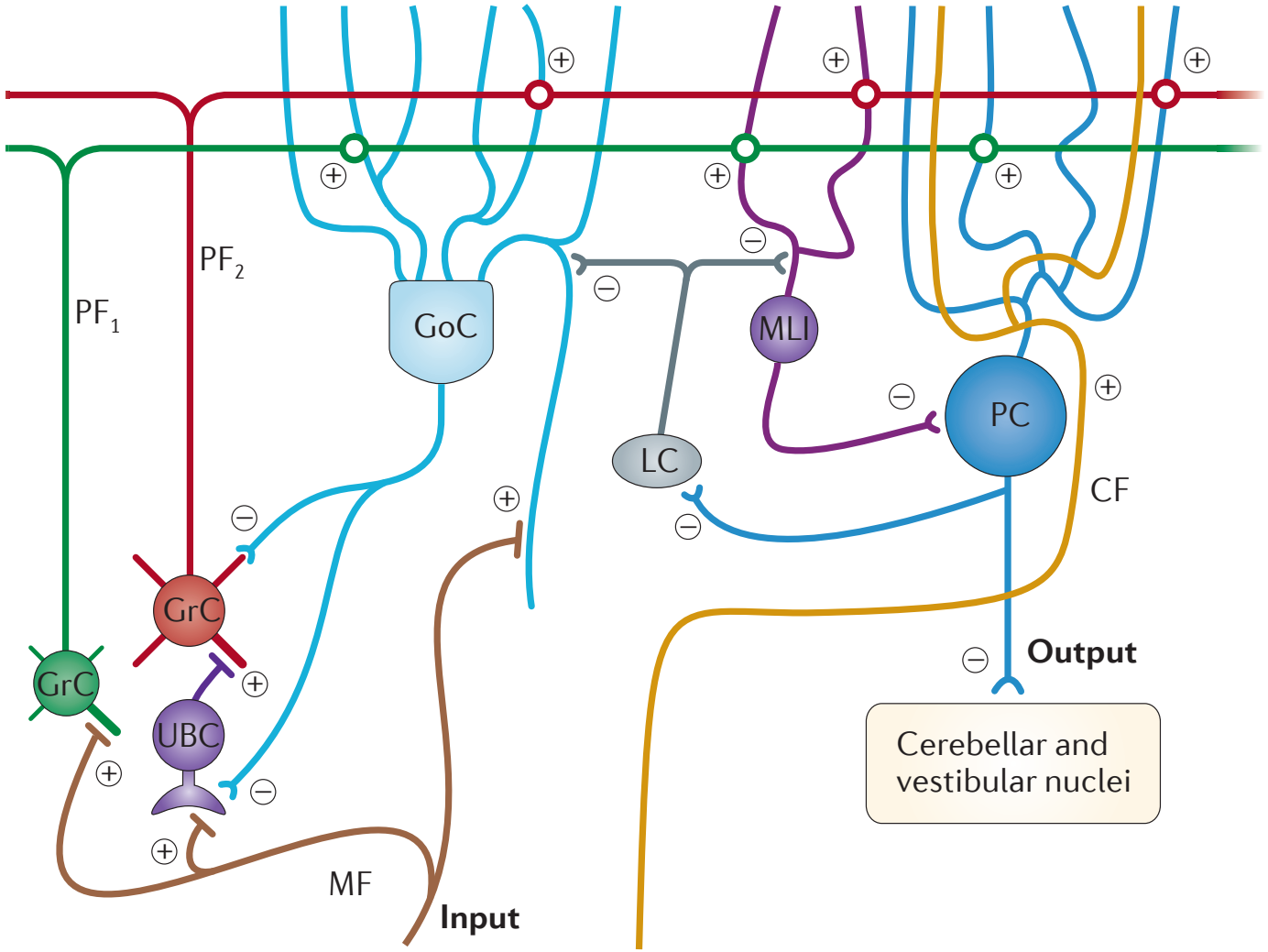
Instead complex spikes are increased at CR onset



Trials with a complex spike show accelerated CRs



Which cellular mechanisms underlie the simple spike suppression?



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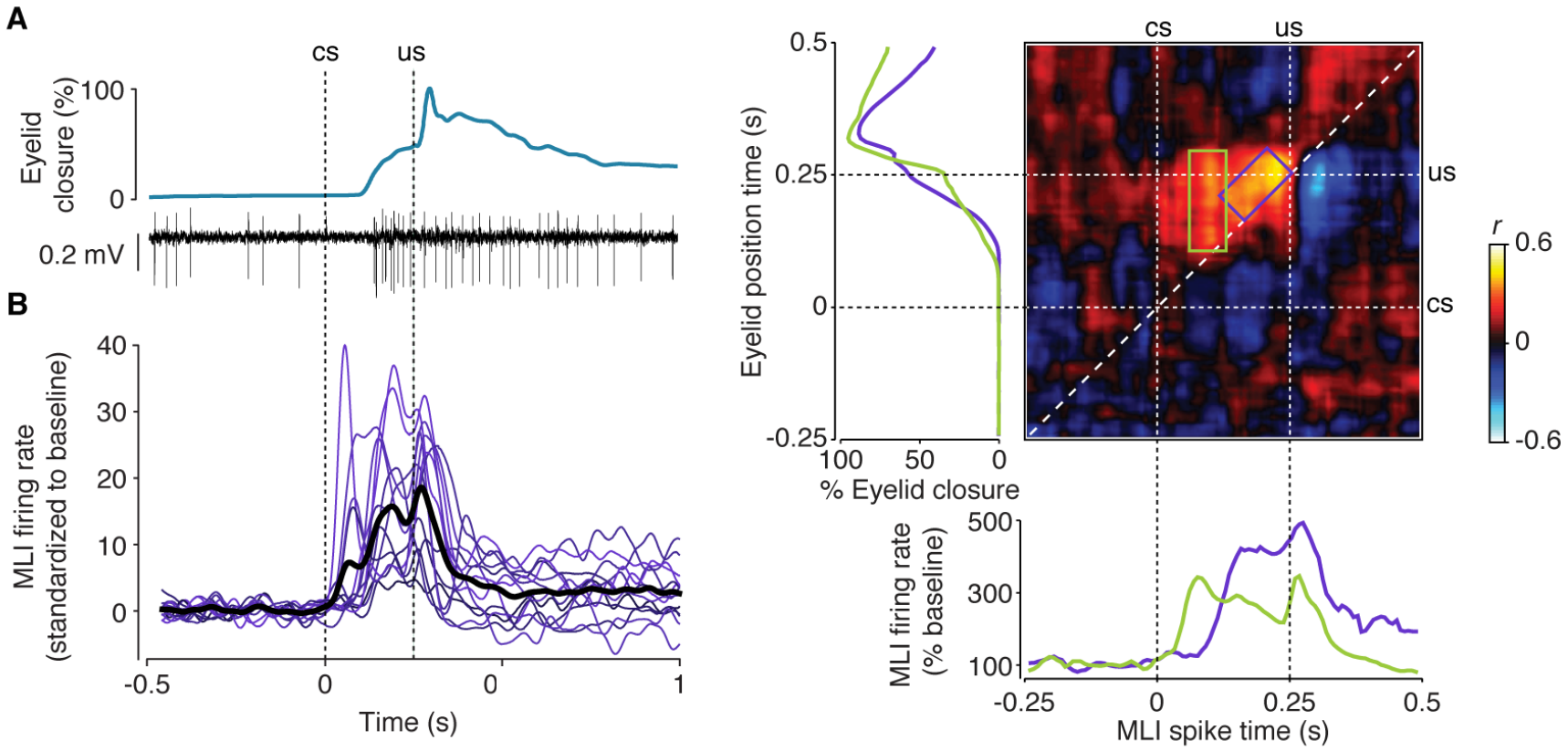
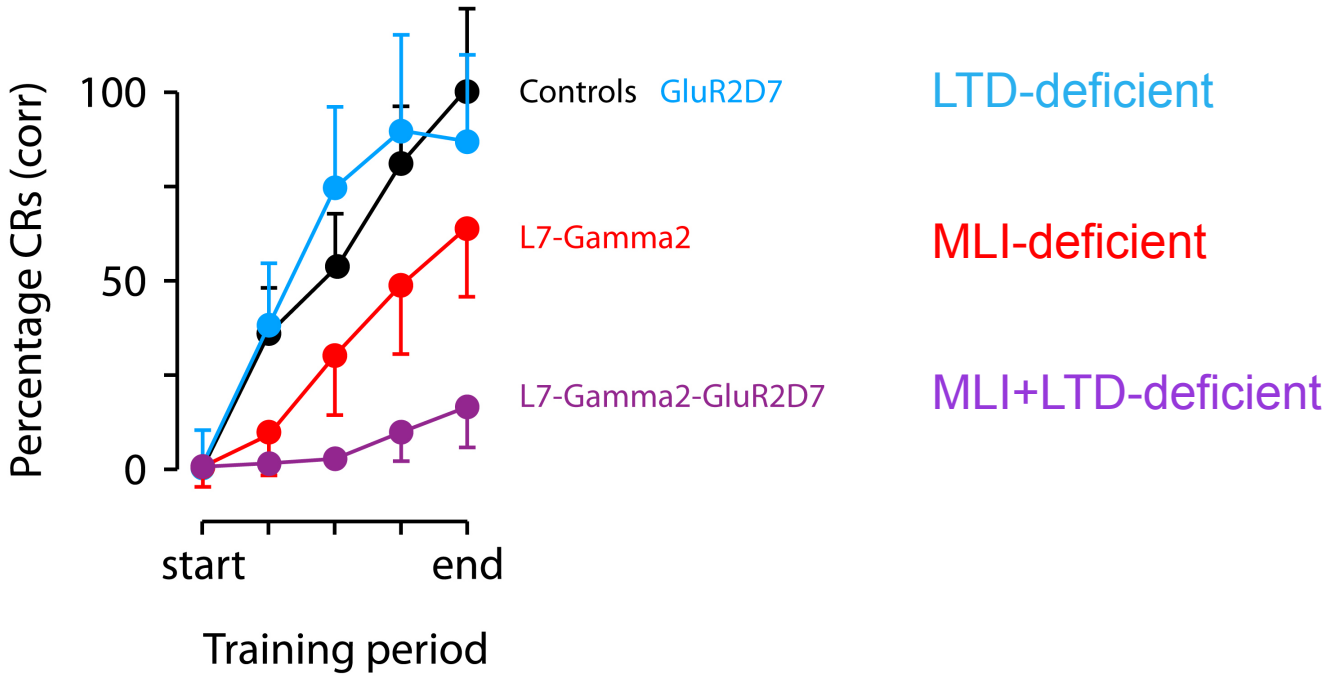
Enhanced activity of MLIs correlates with eyeblink position on a trial-by-trial basis



but LTD does contribute



Boele et al., 2018 Science Adv.

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