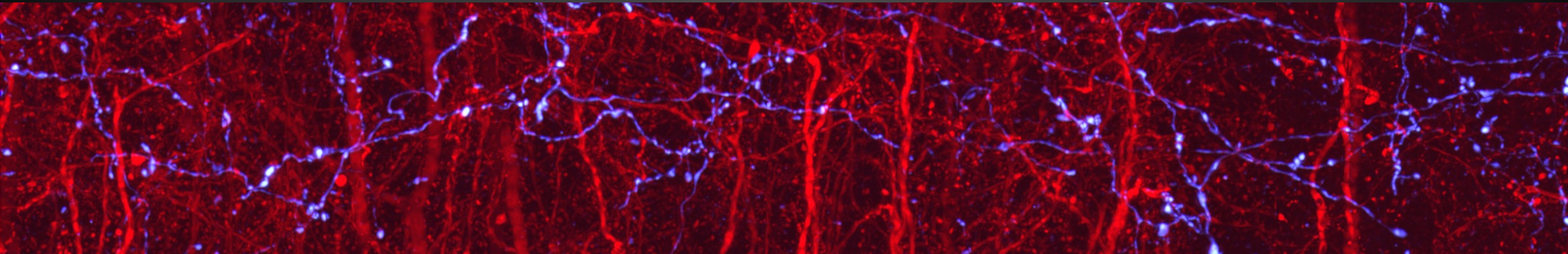


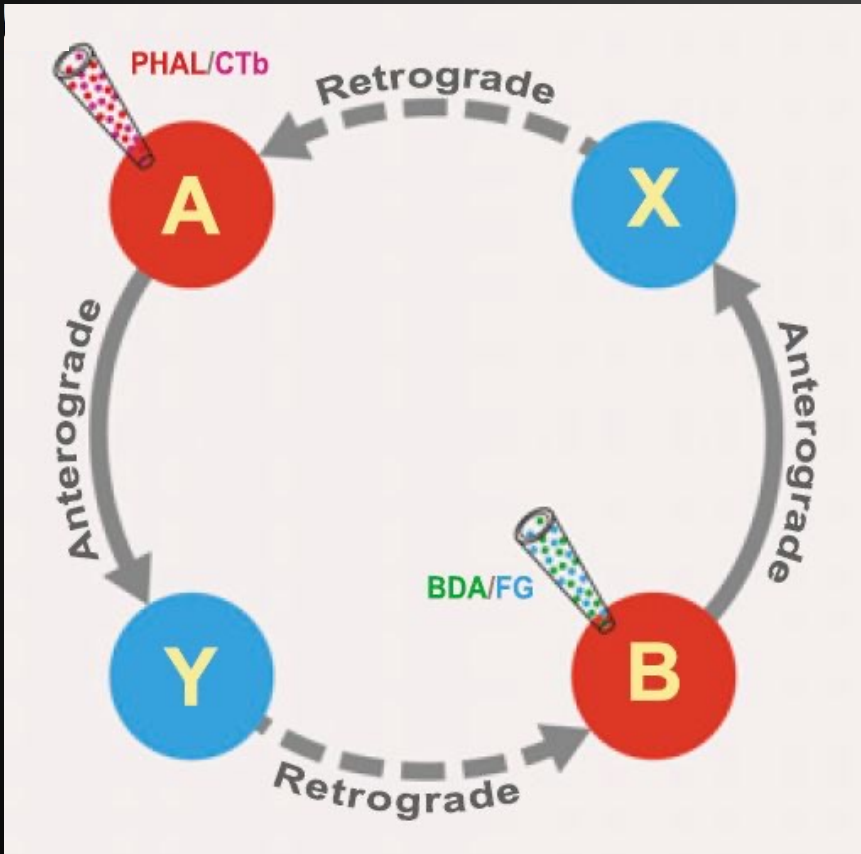
NEURONAL TRACING FOR QUALITATIVE AND QUANTITATIVE NEUROANATOMY



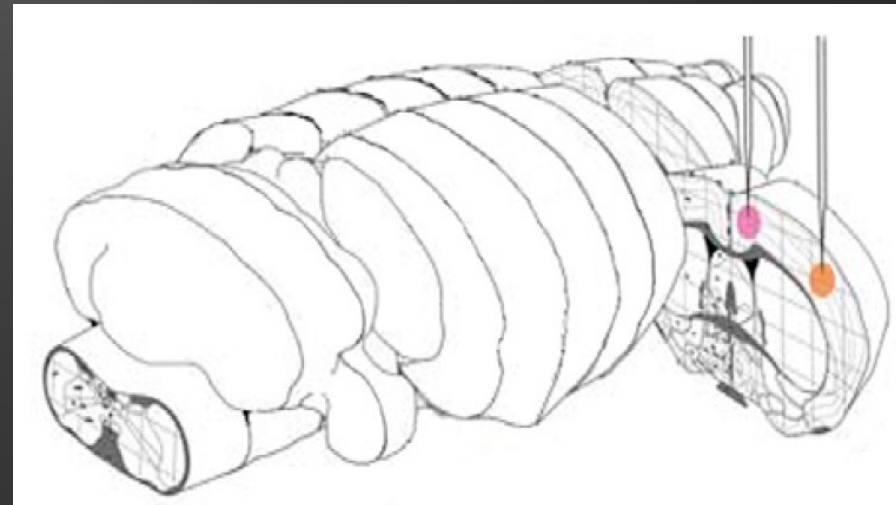
Nicholas Foster, Ph.D.

double coinjection

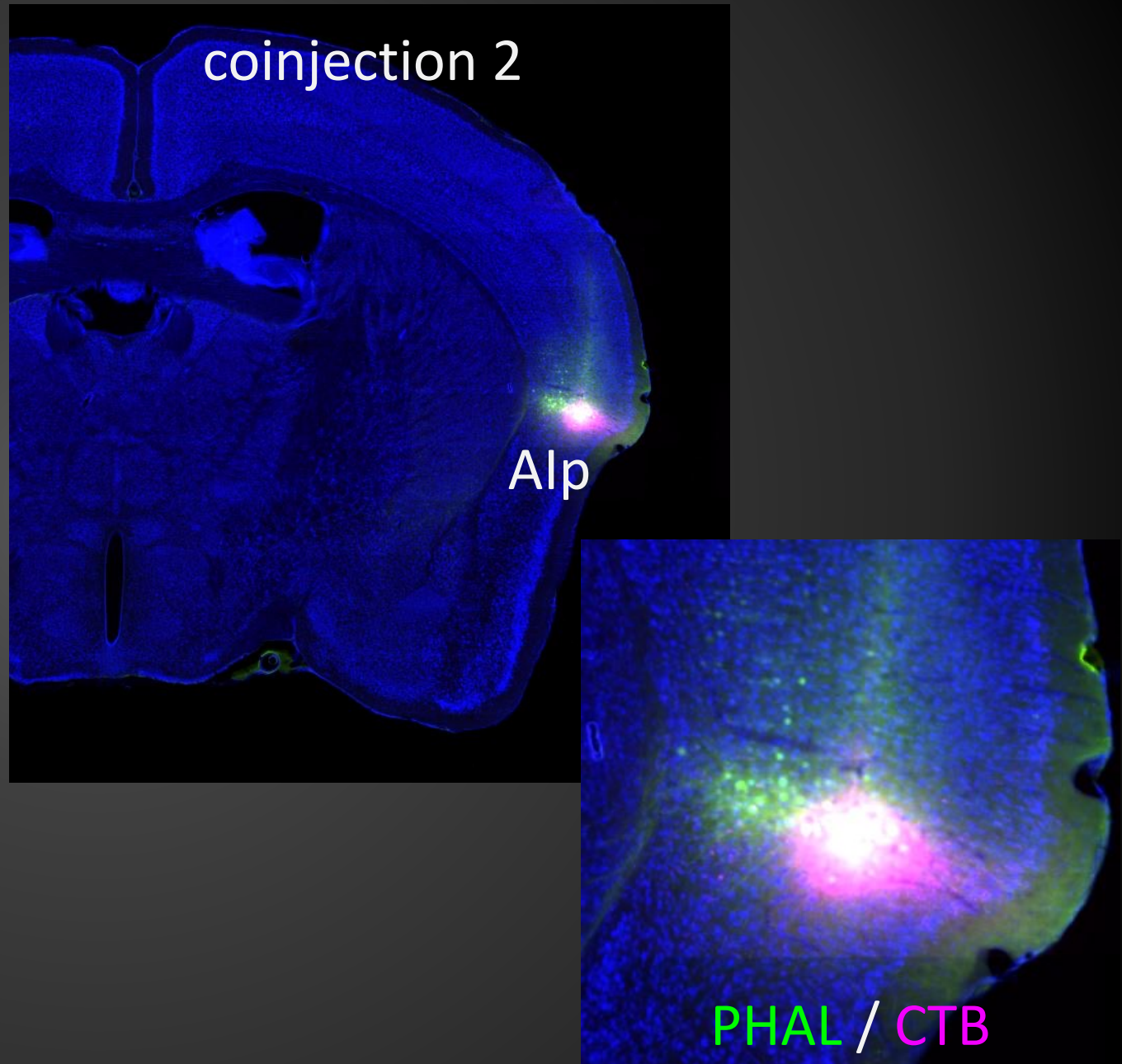
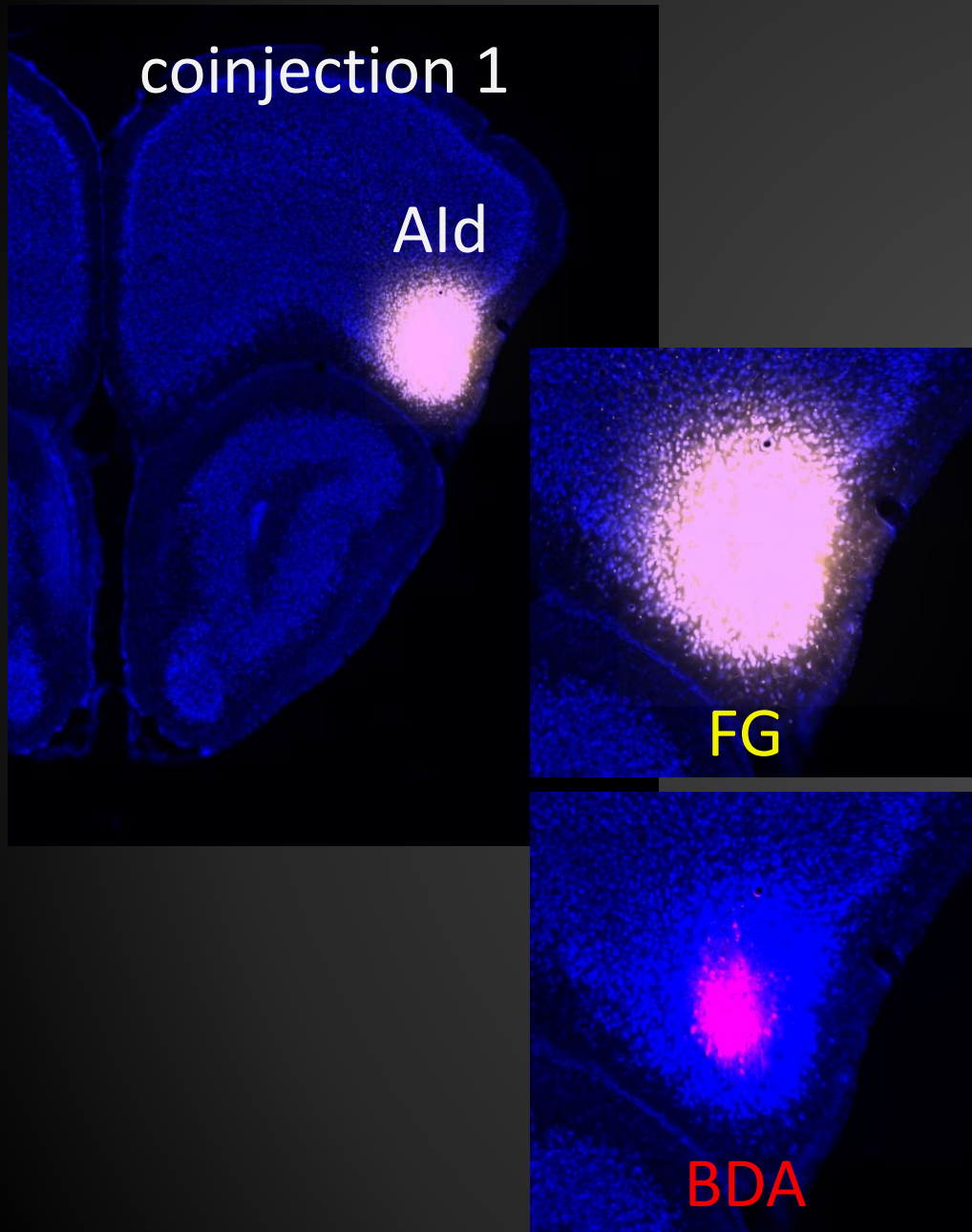
- coinjection: anterograde + retrograde
- inputs + outputs of each injection site
- can reveal areas of indirect connectivity between injection sites

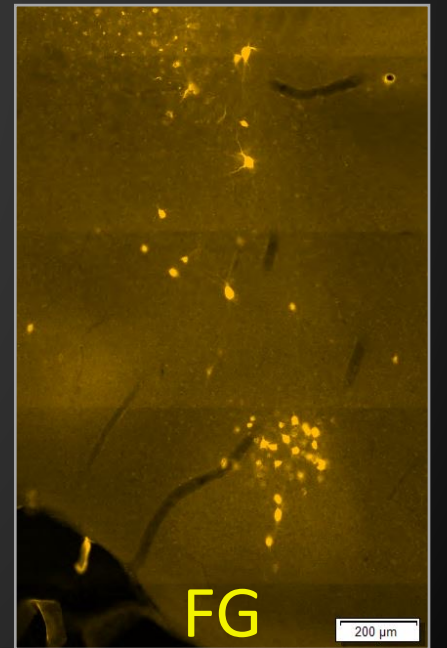
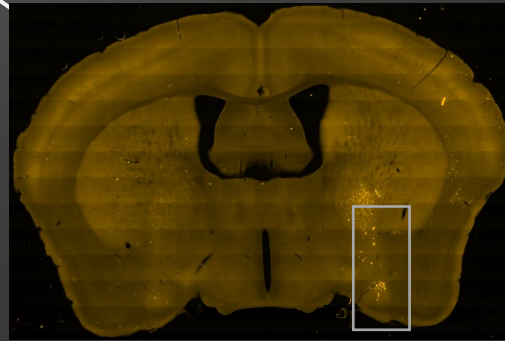
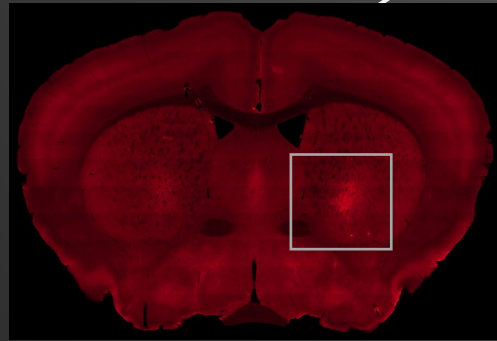
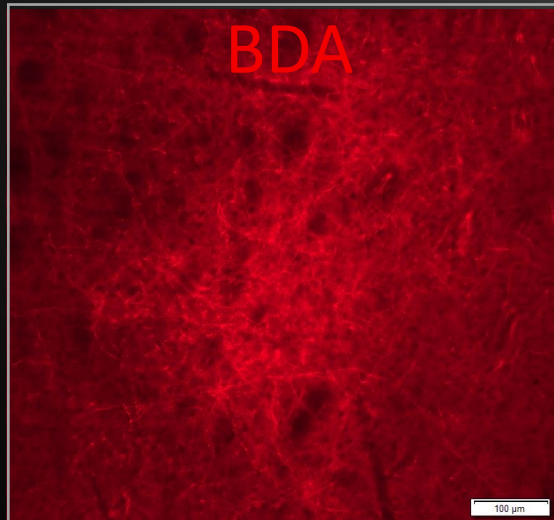
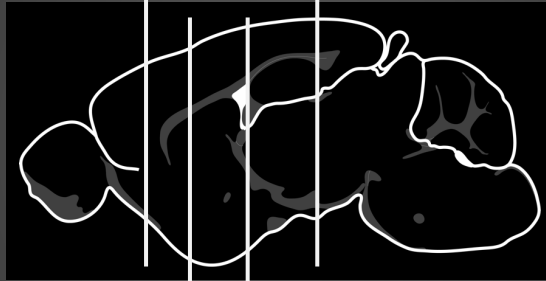
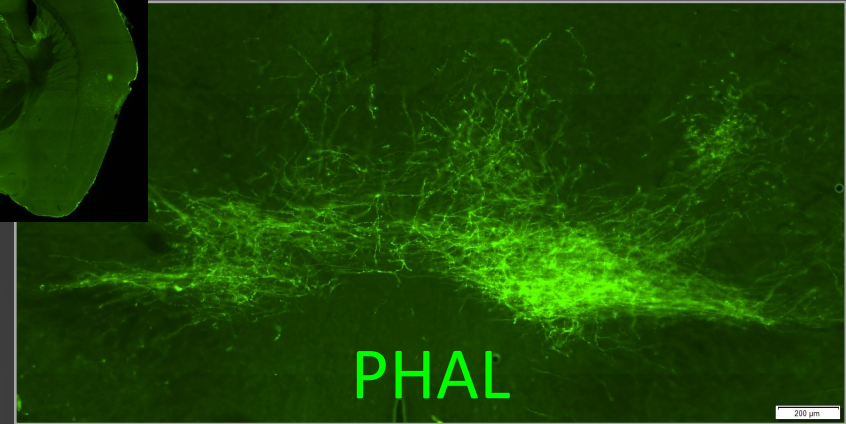
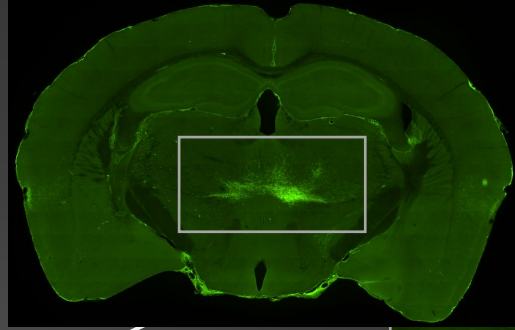
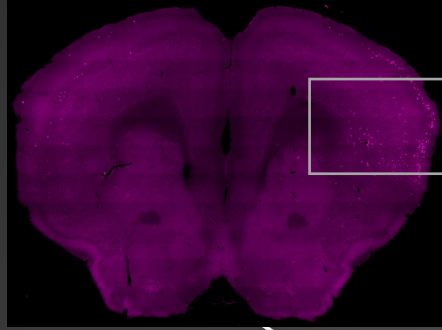
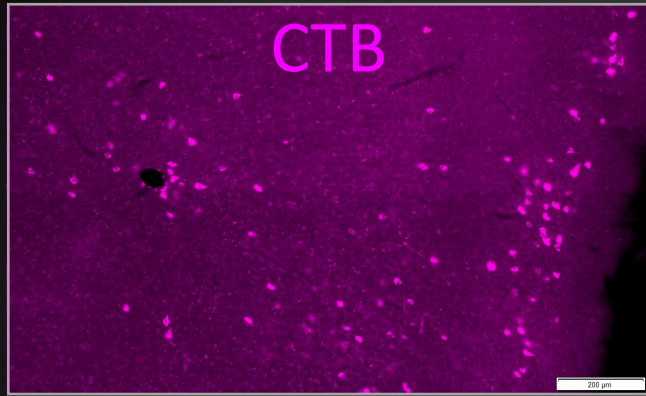


Thompson & Swanson 2010, *PNAS*

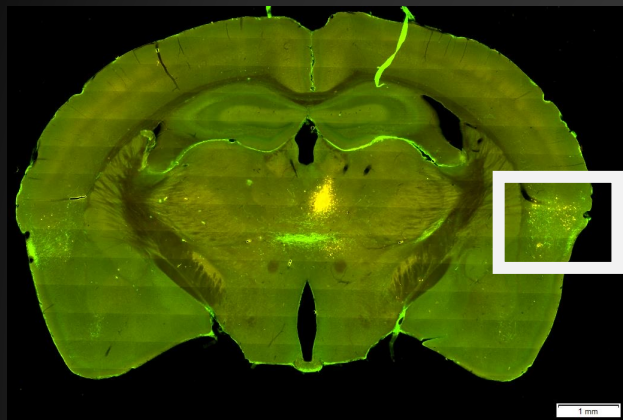


Zingg et al. 2014, *Cell*

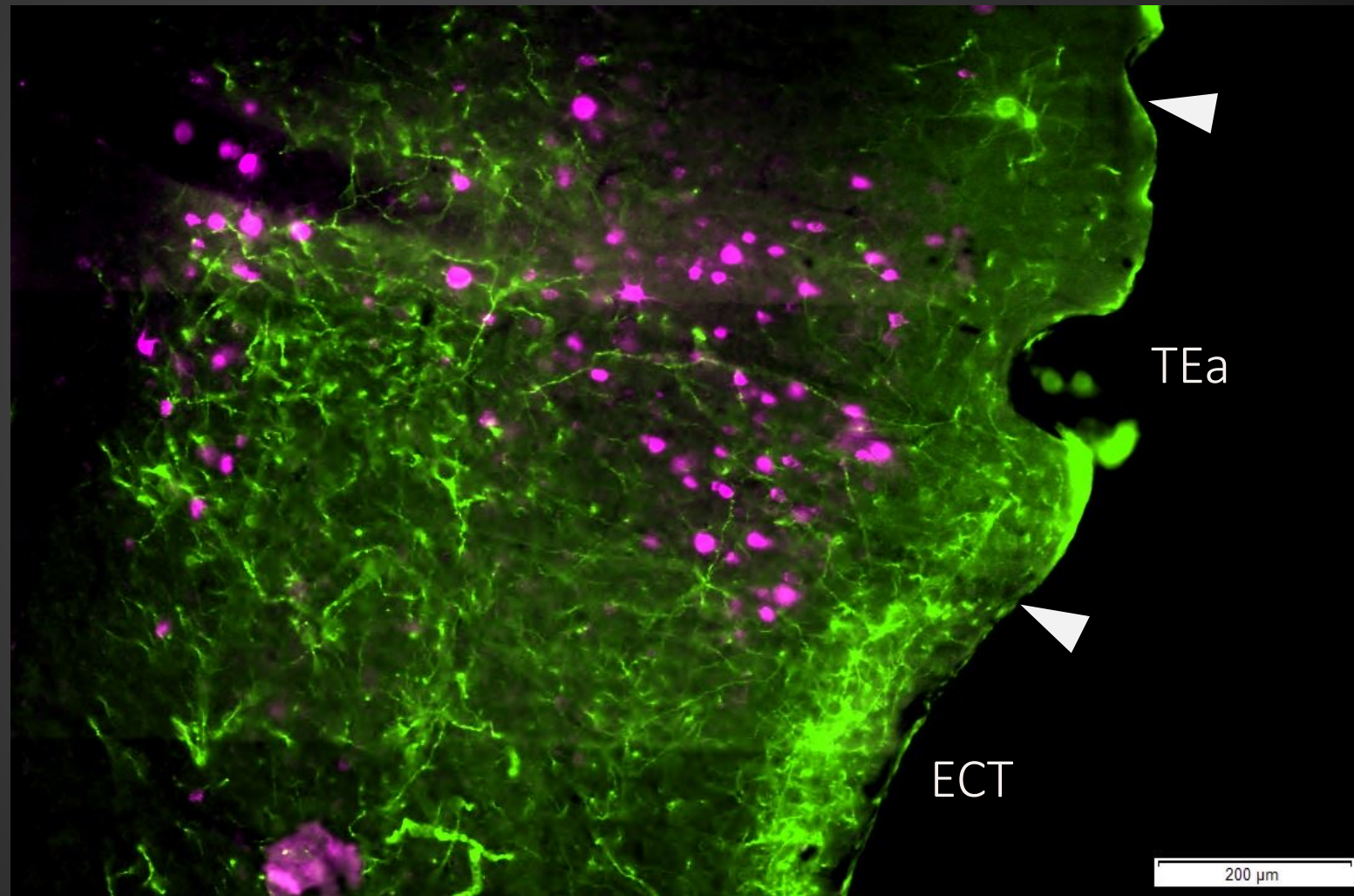




title

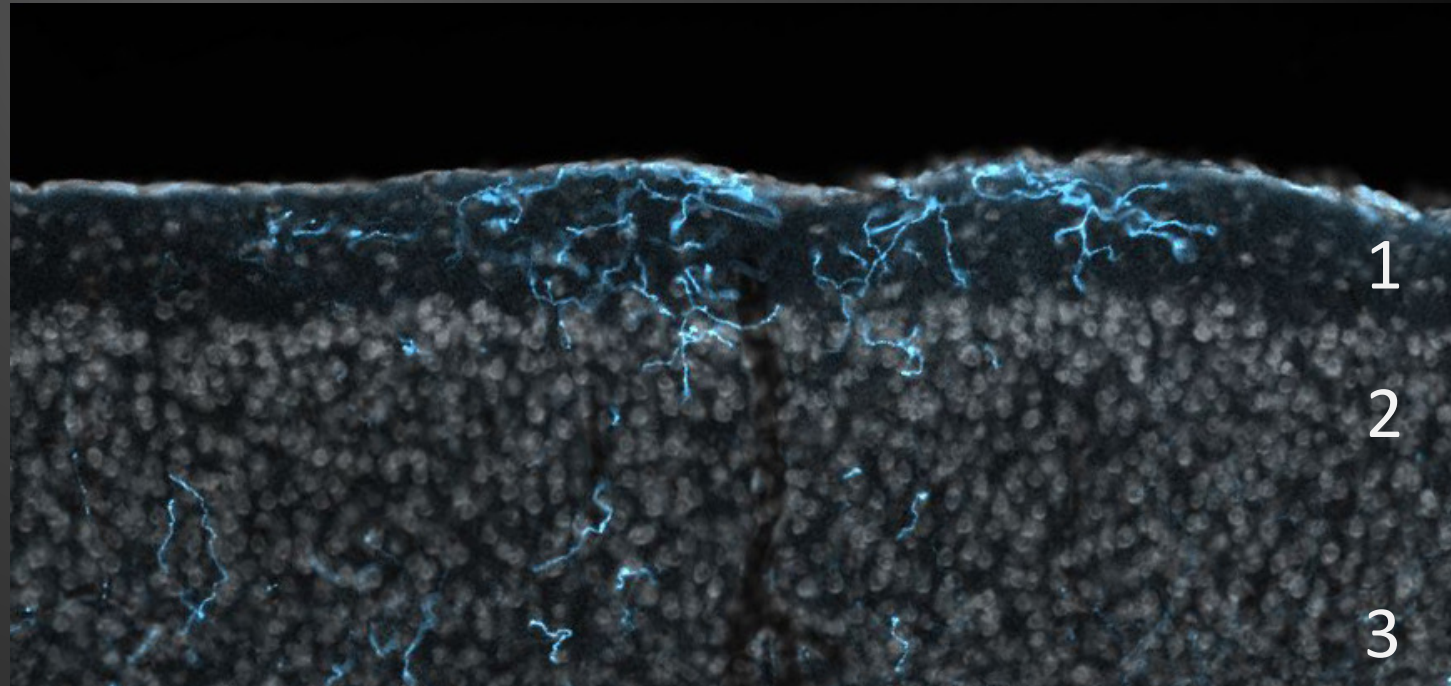


PHAL
FG (pseudocolored pink)

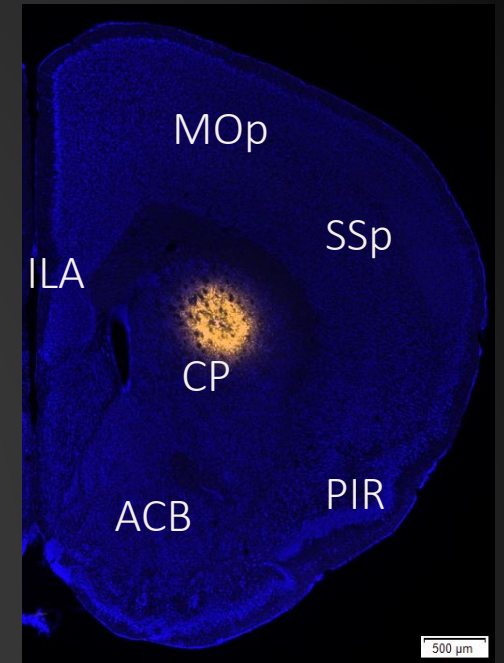
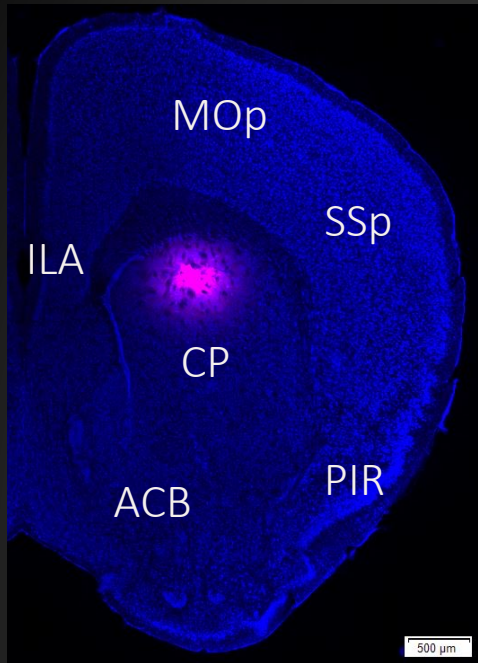


classic tracer properties

- non-selective (“all” neurons/inputs at injection site are labeled)
- most have good signal-to-noise
- most have both antero + retro activity

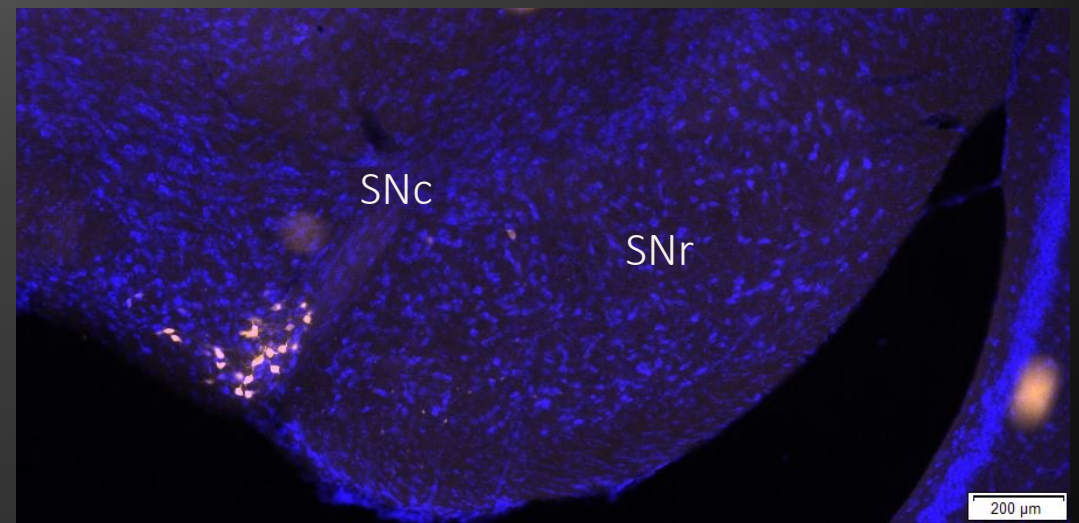
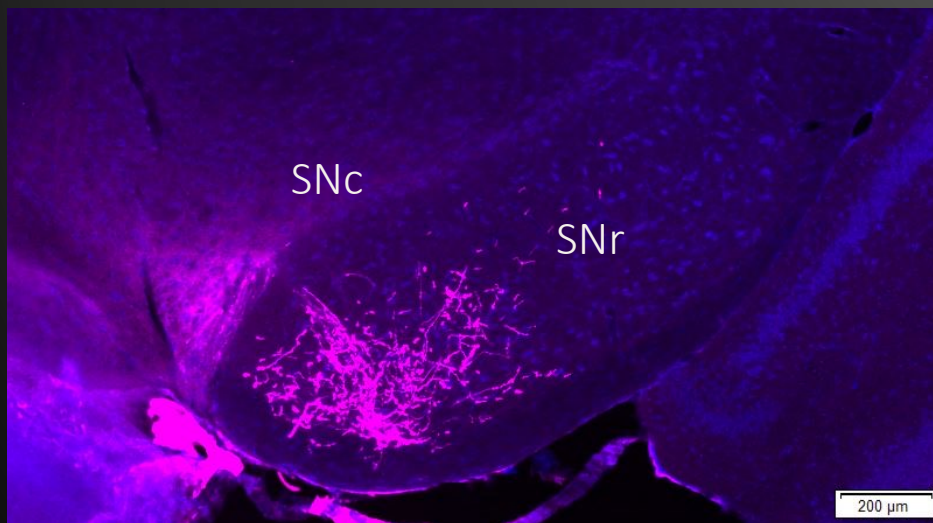


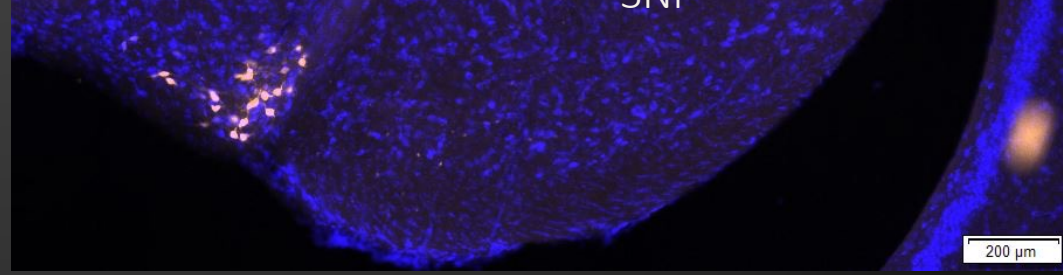
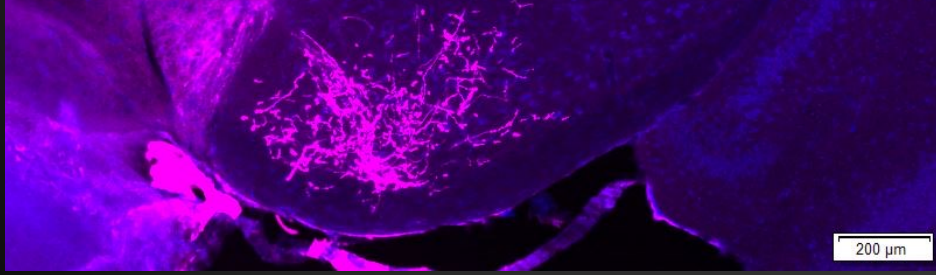
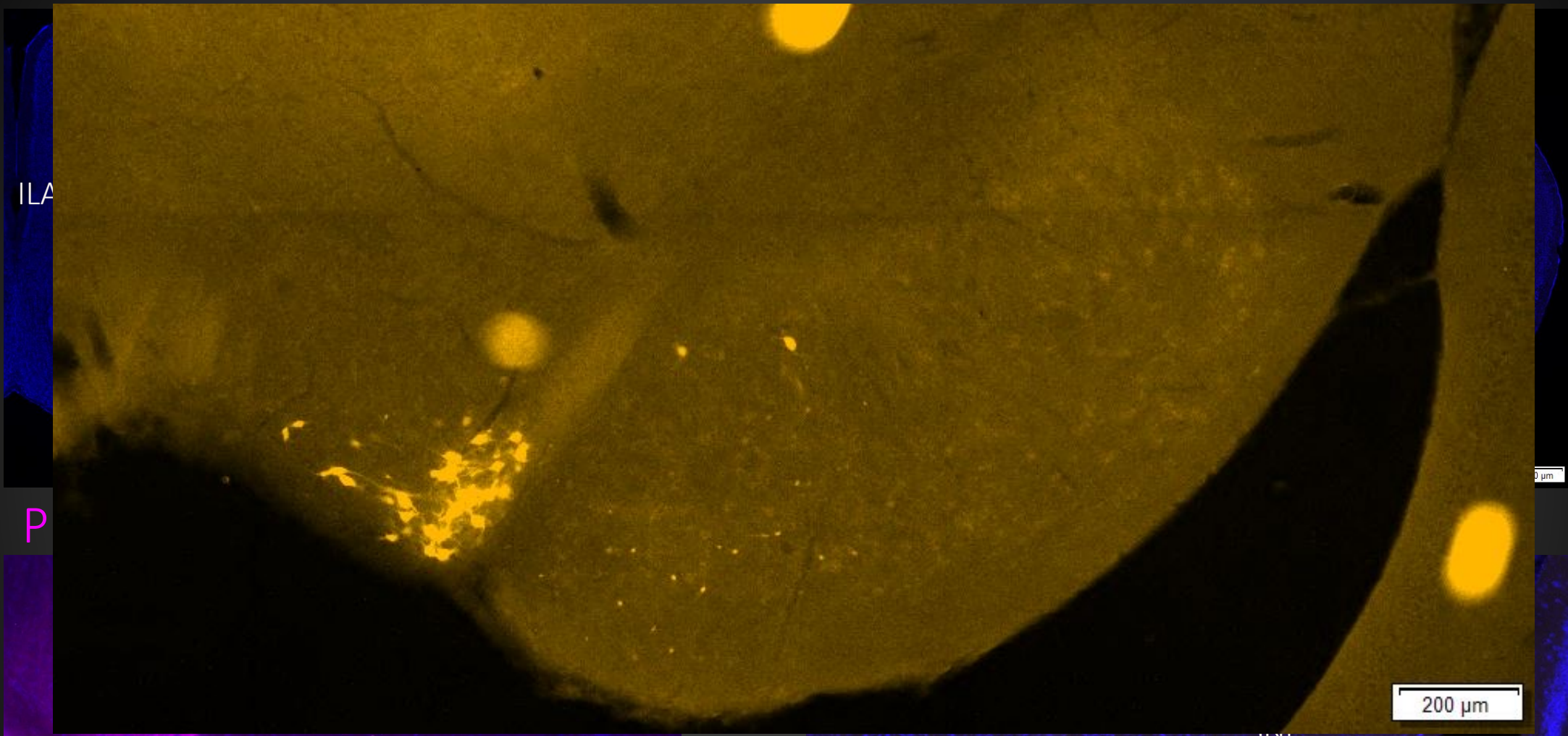
anterograde/retrograde



PHAL

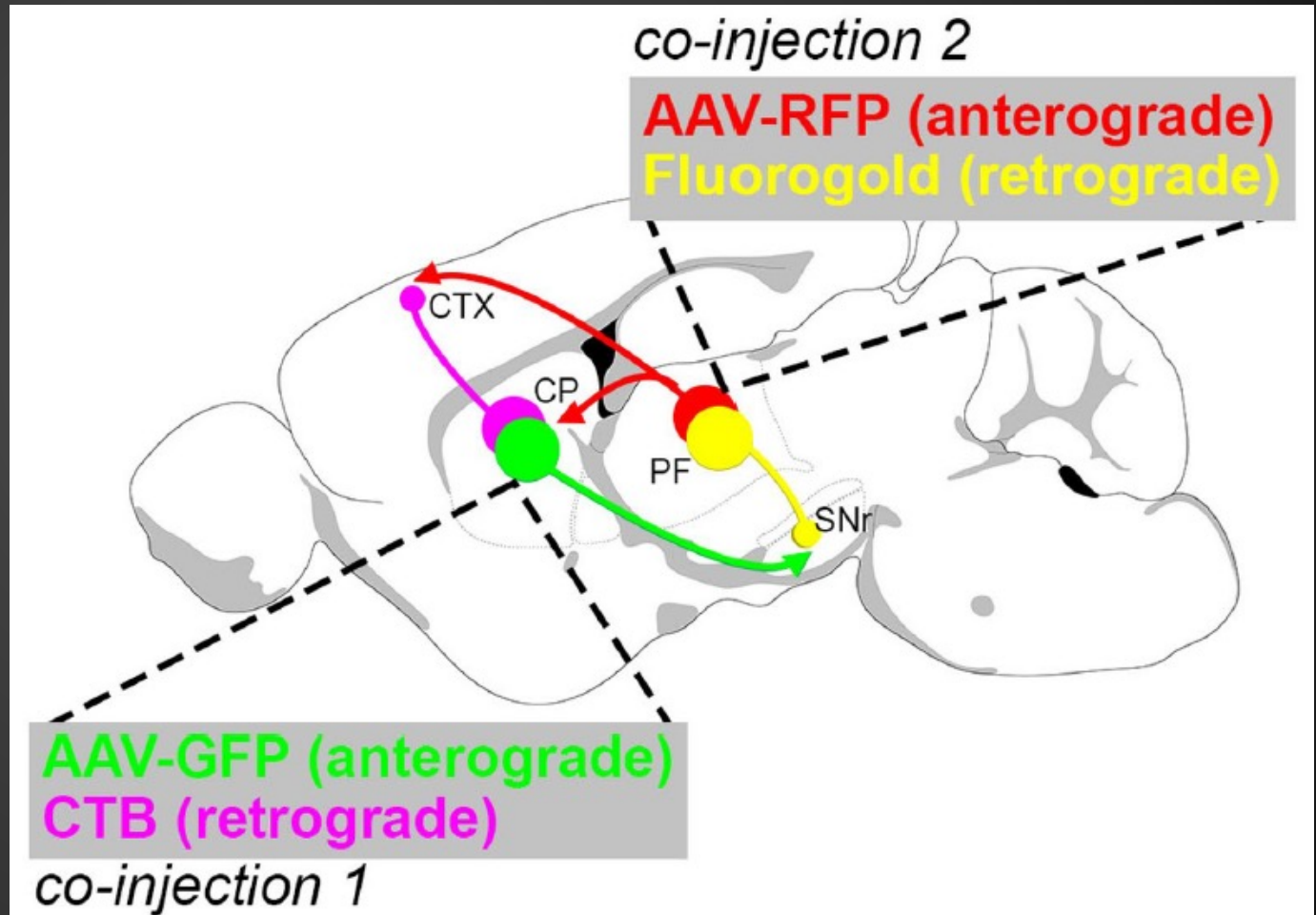
FG



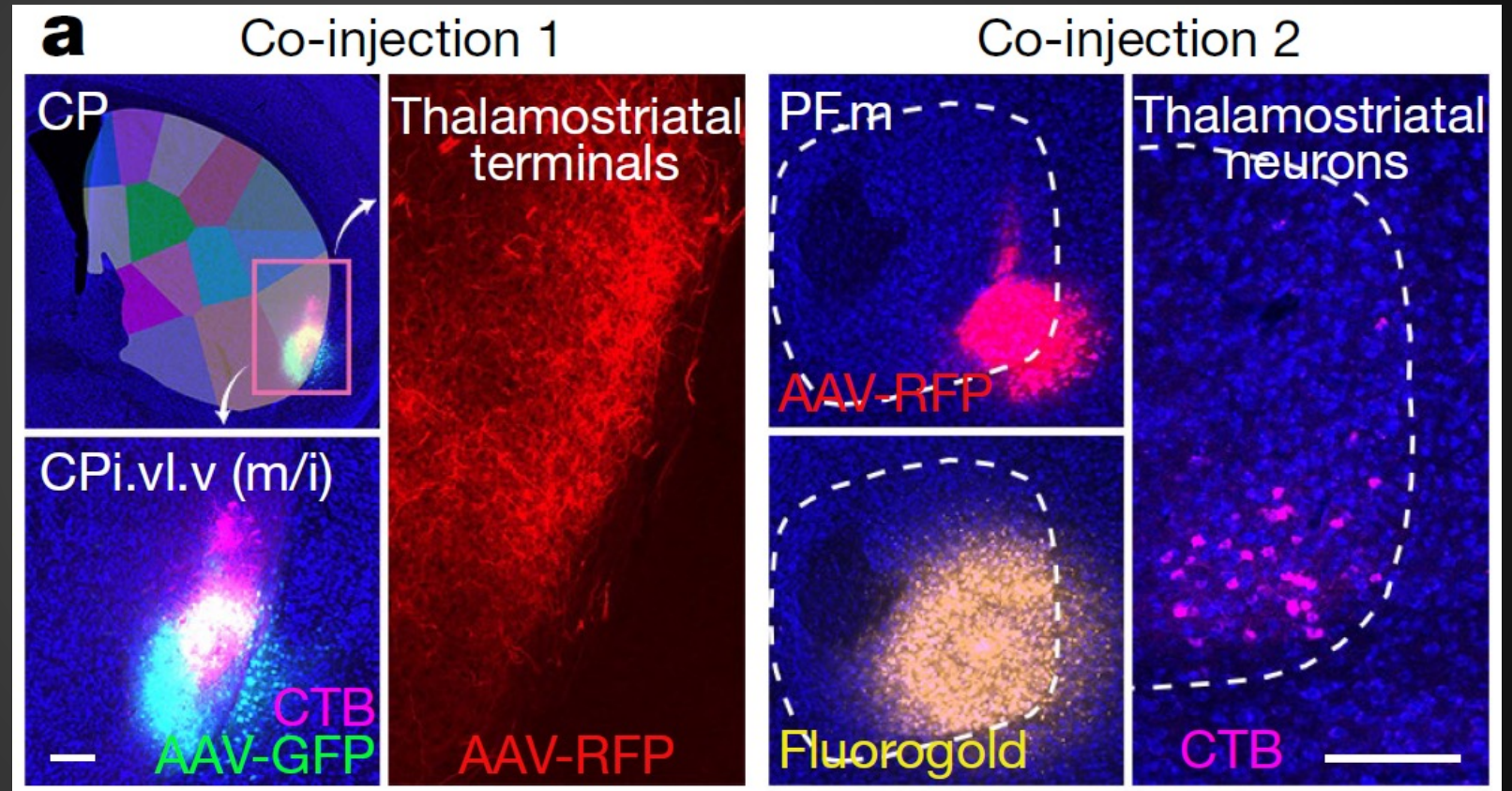
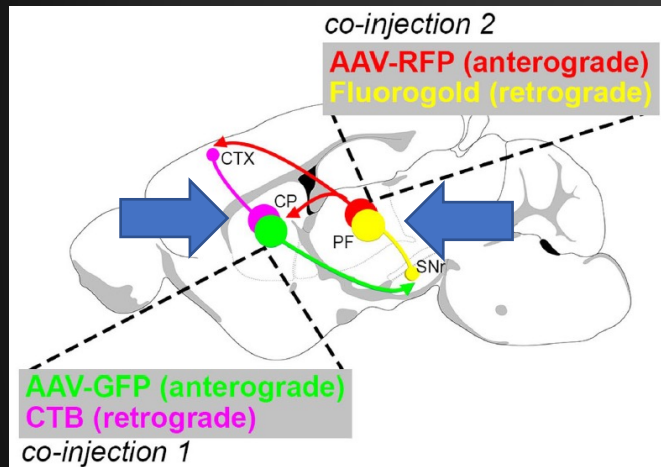


network labeling

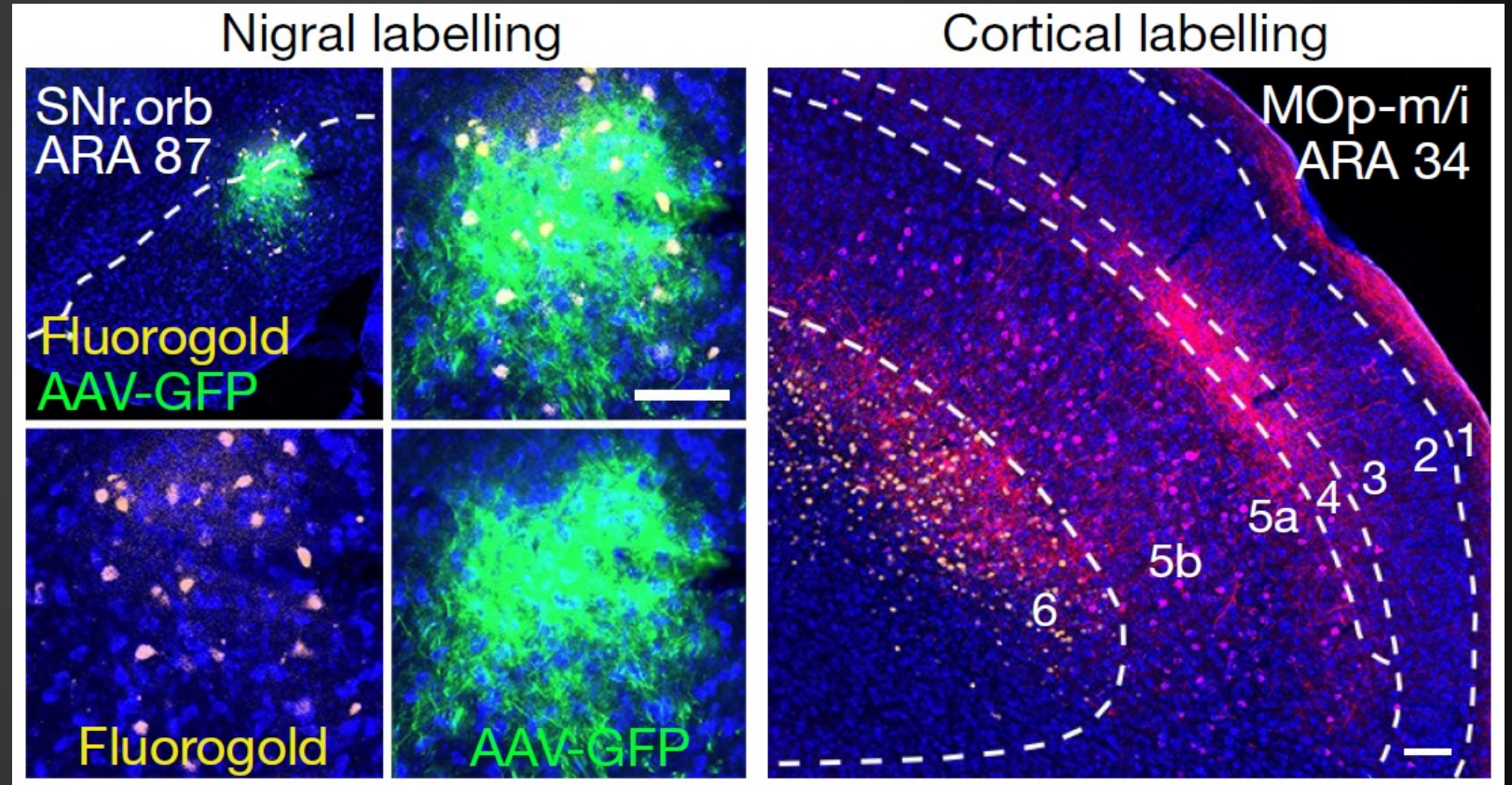
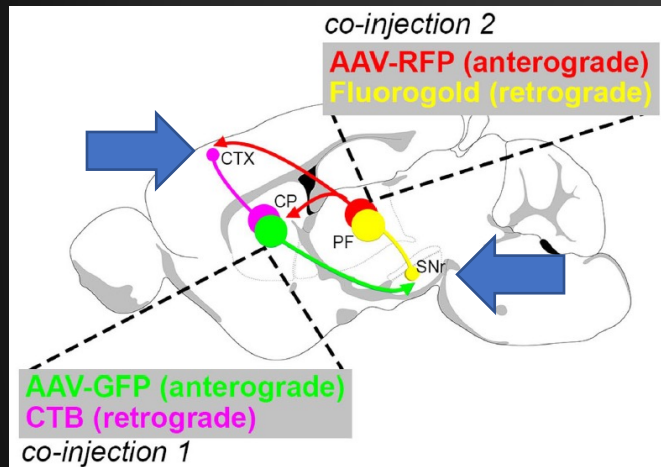
- interconnected networks of brain areas can be demonstrated simultaneously
- cortico-basal ganglia-thalamo-cortical loop



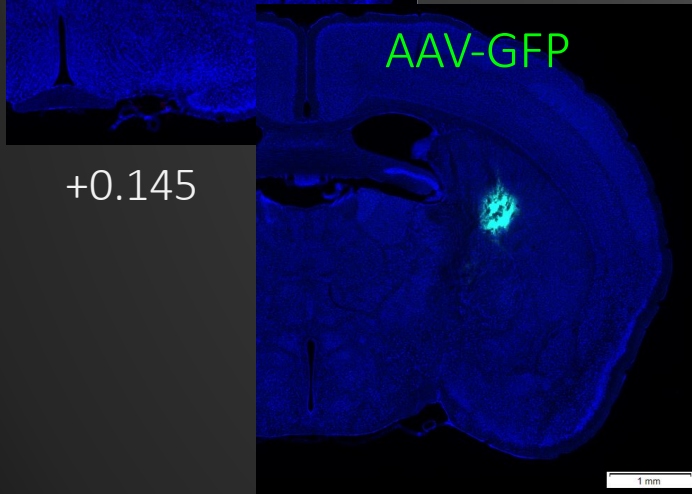
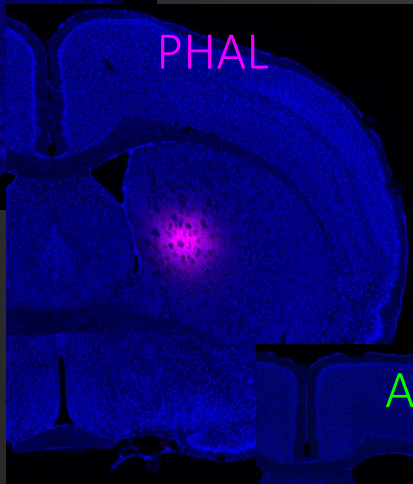
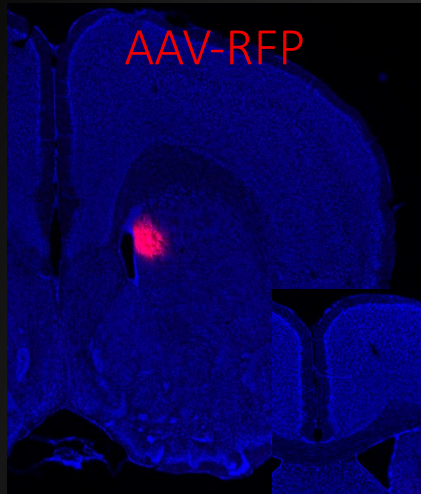
network labeling



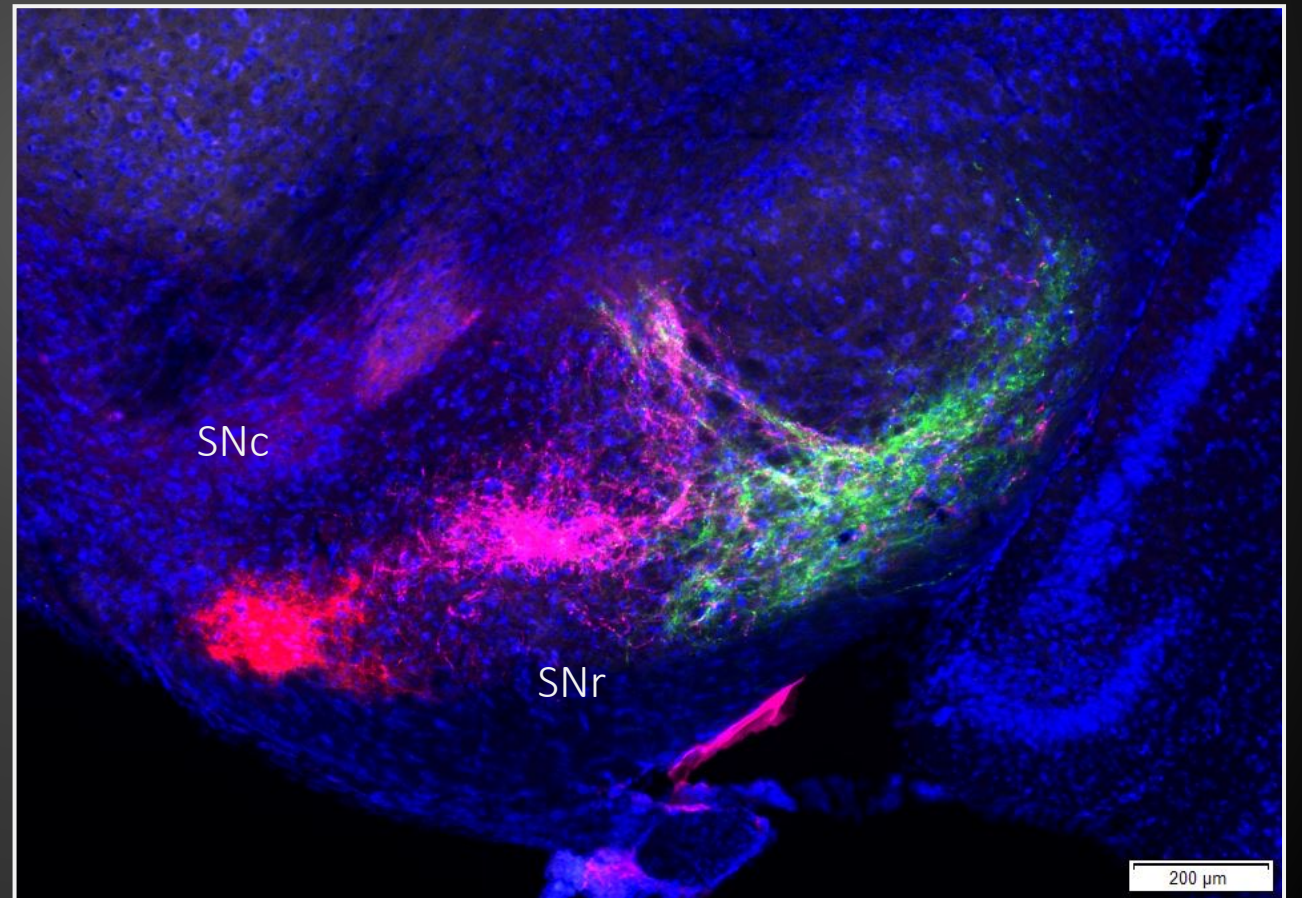
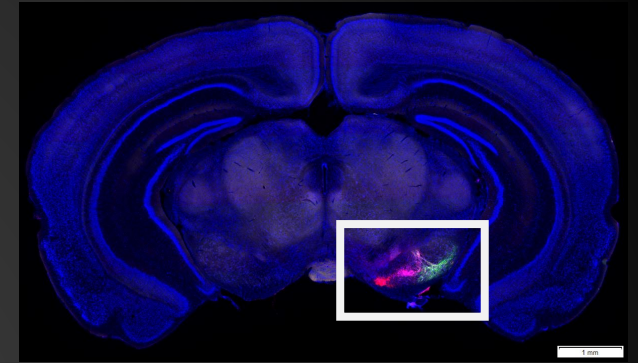
network labeling



triple anterograde

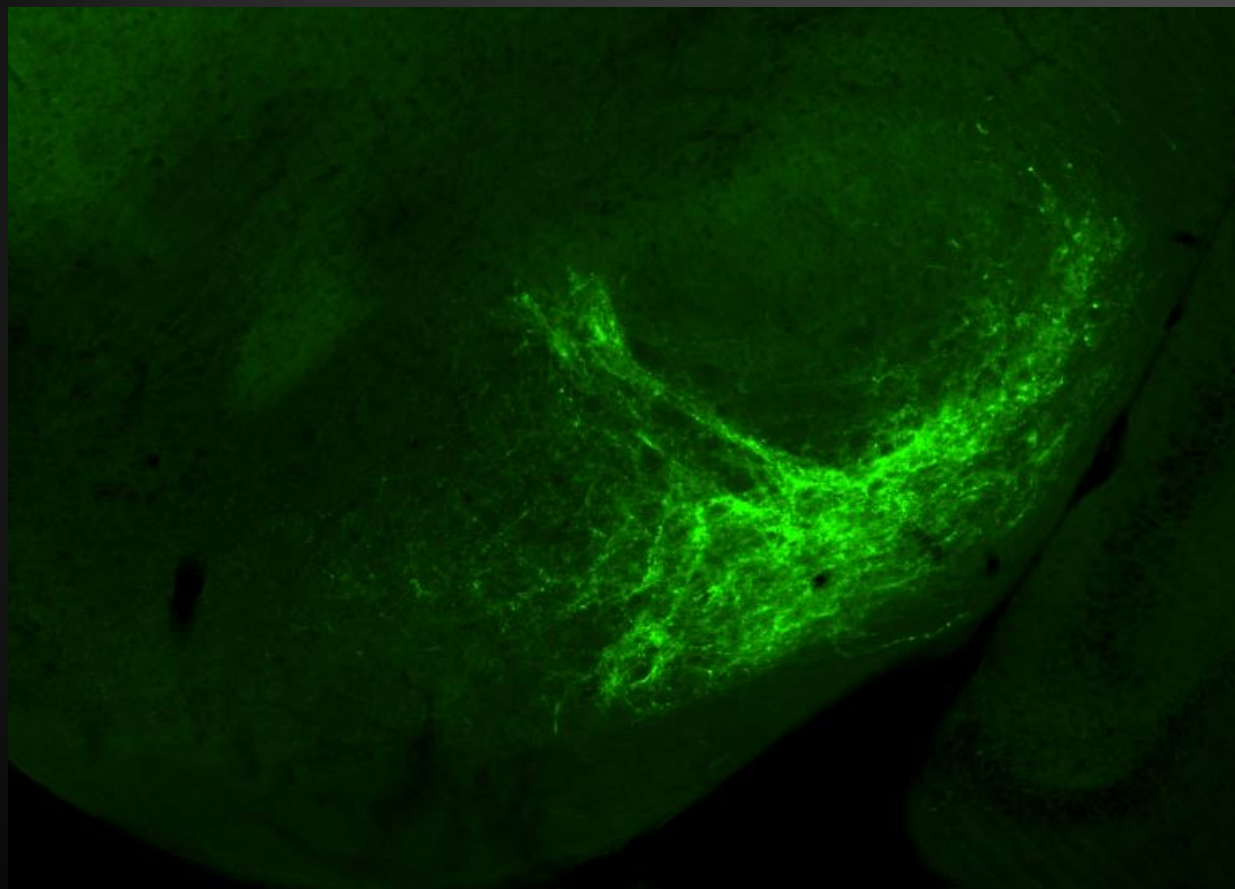


-0.755

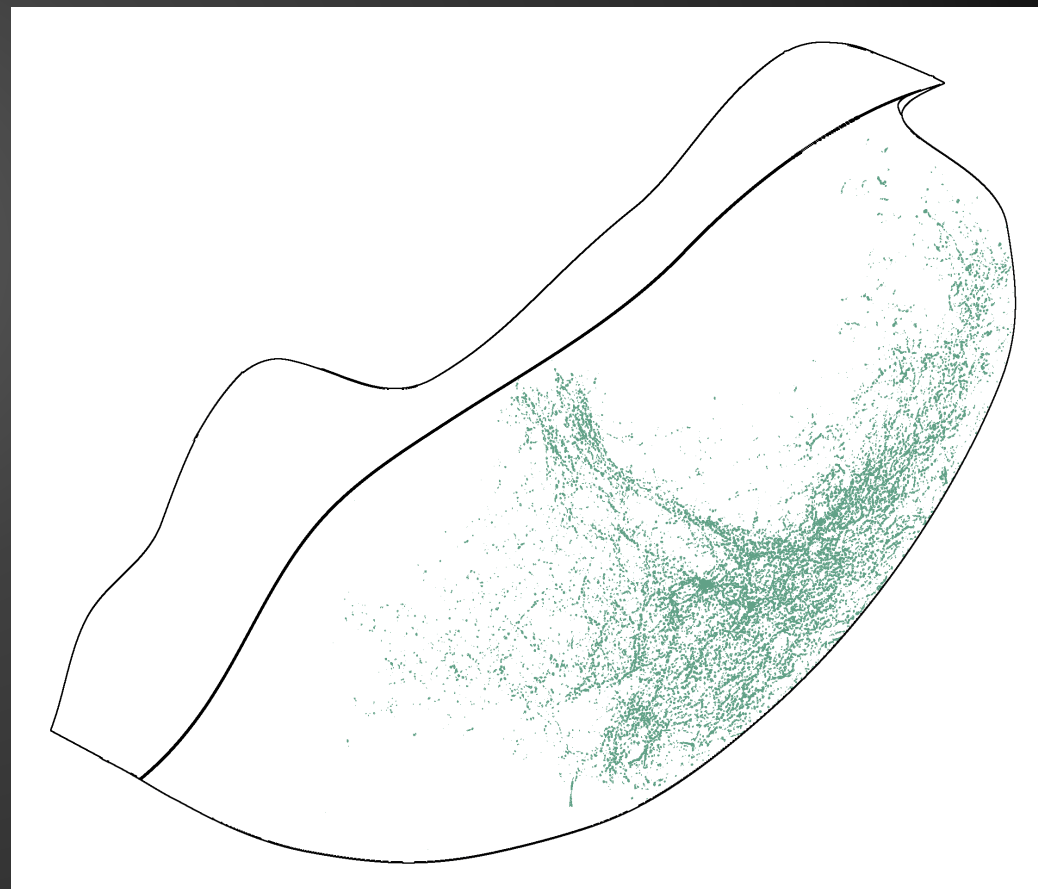


quantification

raw axonal data



segmented image



rabies

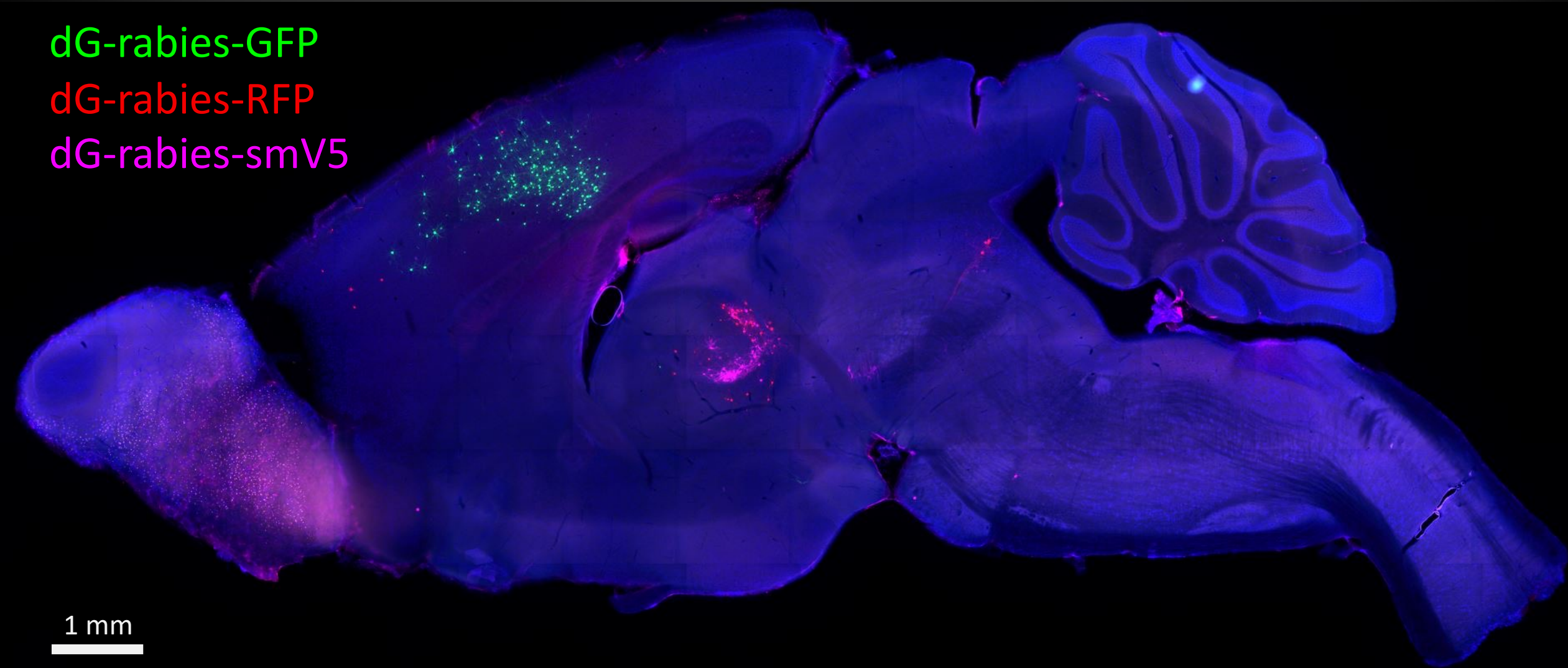
- retrograde, specific
- glycoprotein-deleted (dG-rabies), one synapse limit
- GFP, RFP, spaghetti monster versions

rabies

dG-rabies-GFP

dG-rabies-RFP

dG-rabies-smV5



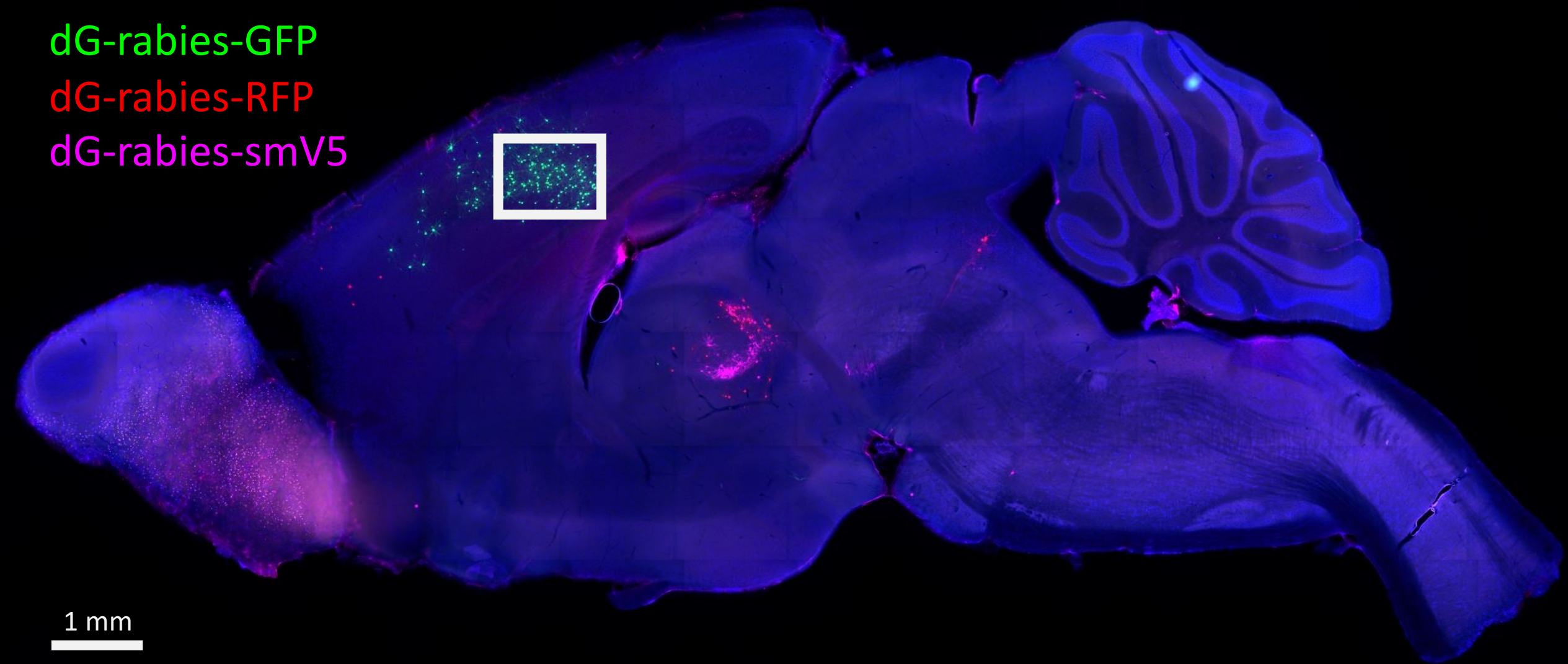
1 mm

rabies

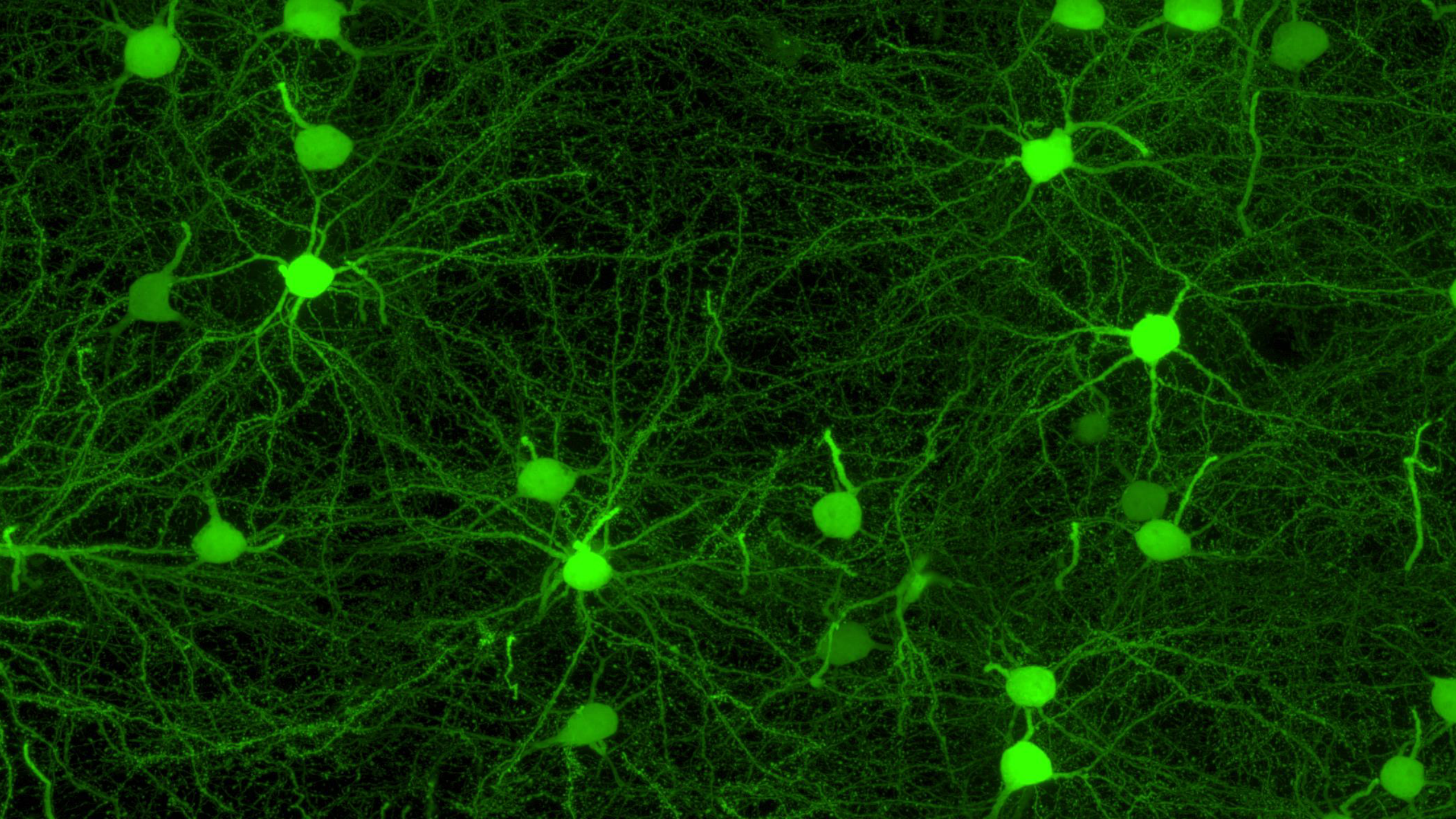
dG-rabies-GFP

dG-rabies-RFP

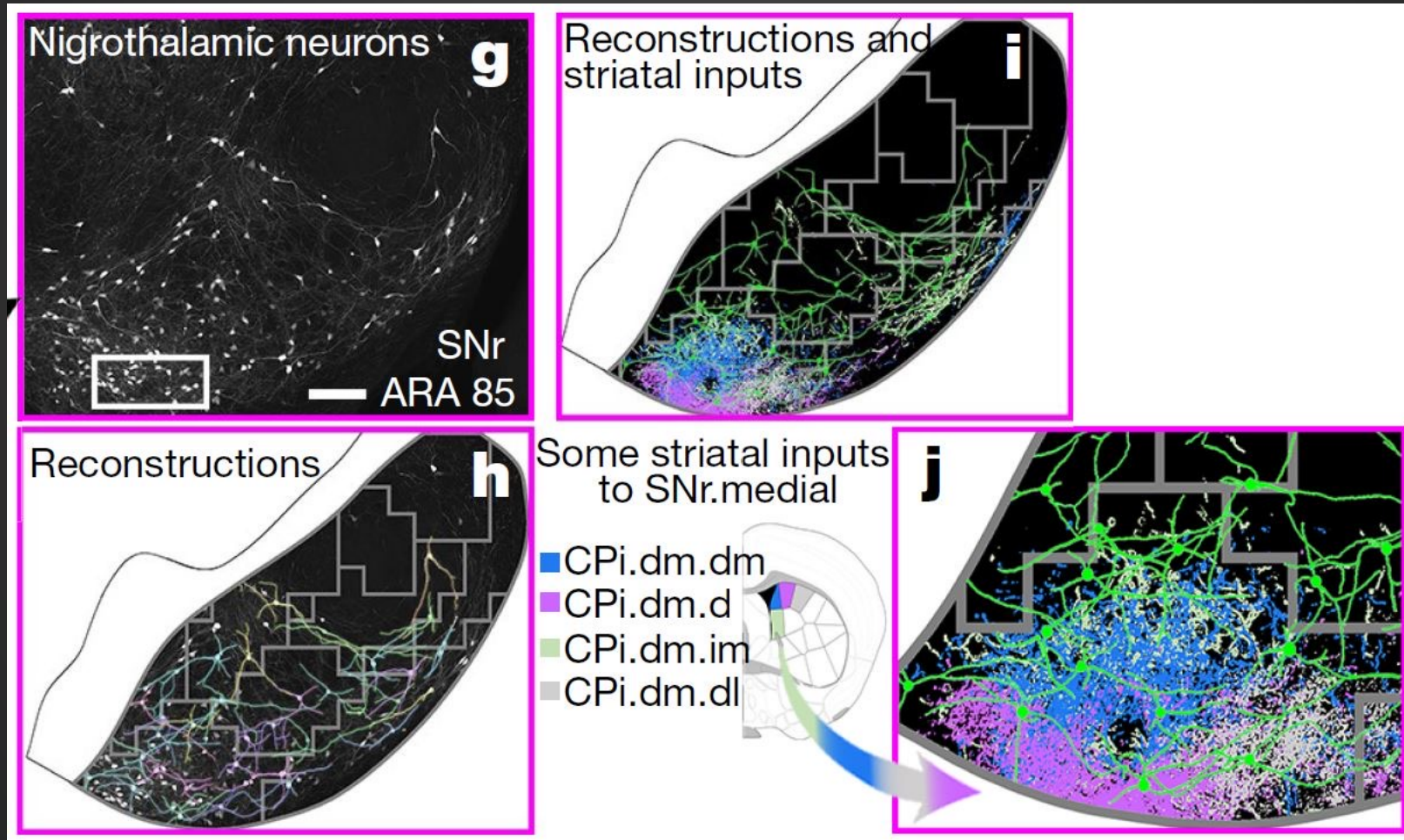
dG-rabies-smV5



1 mm



composite reconstructions



B.R.A.I.N. Laboratory
Brain Research and Artificial Intelligence Nexus
Hongwei Dong, P.I.



AAV vs. PHAL

