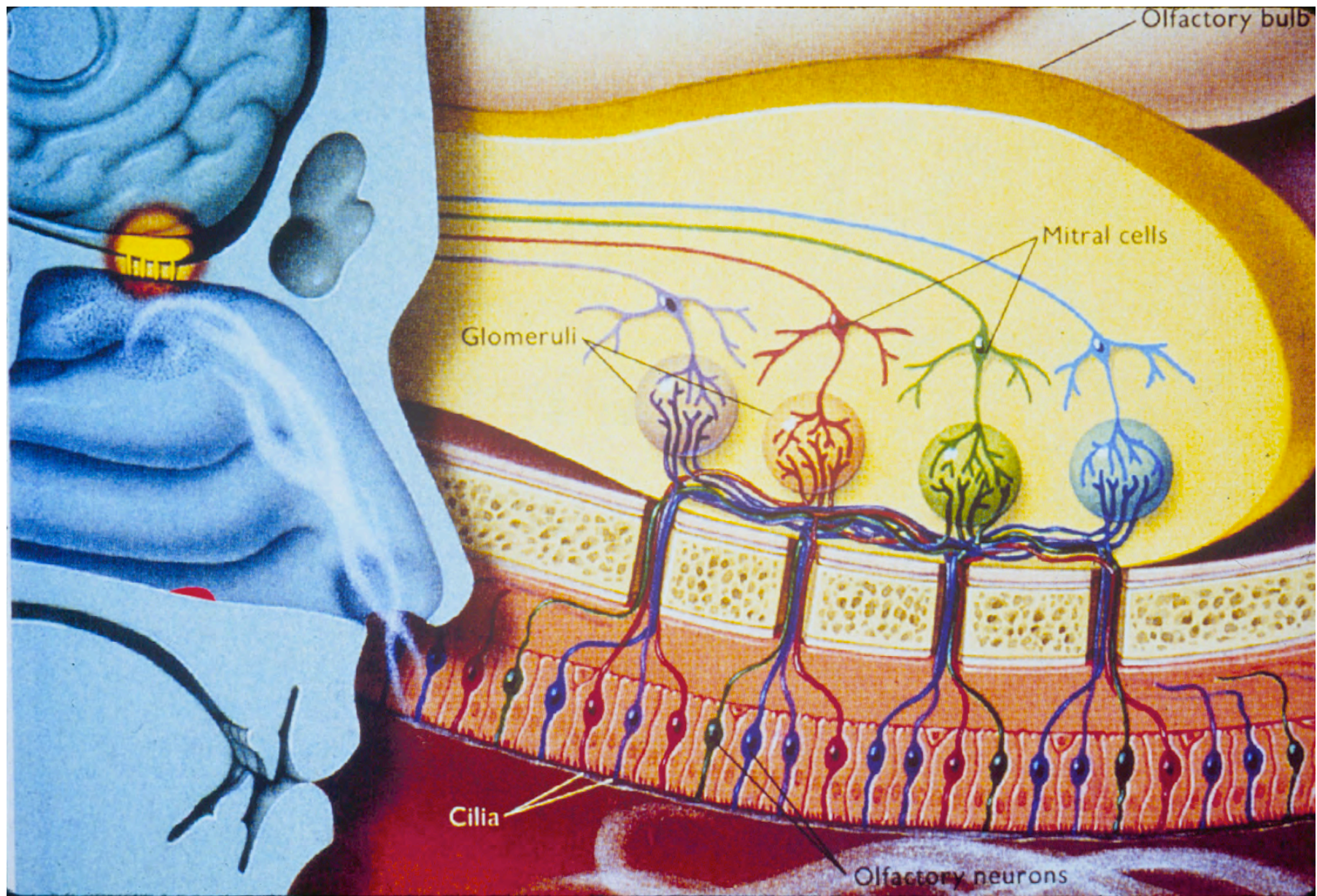


*Ceci n'est pas un nez*









# Different Sensory Modalities Employ Receptor Repertoires of Vastly Different Size



3

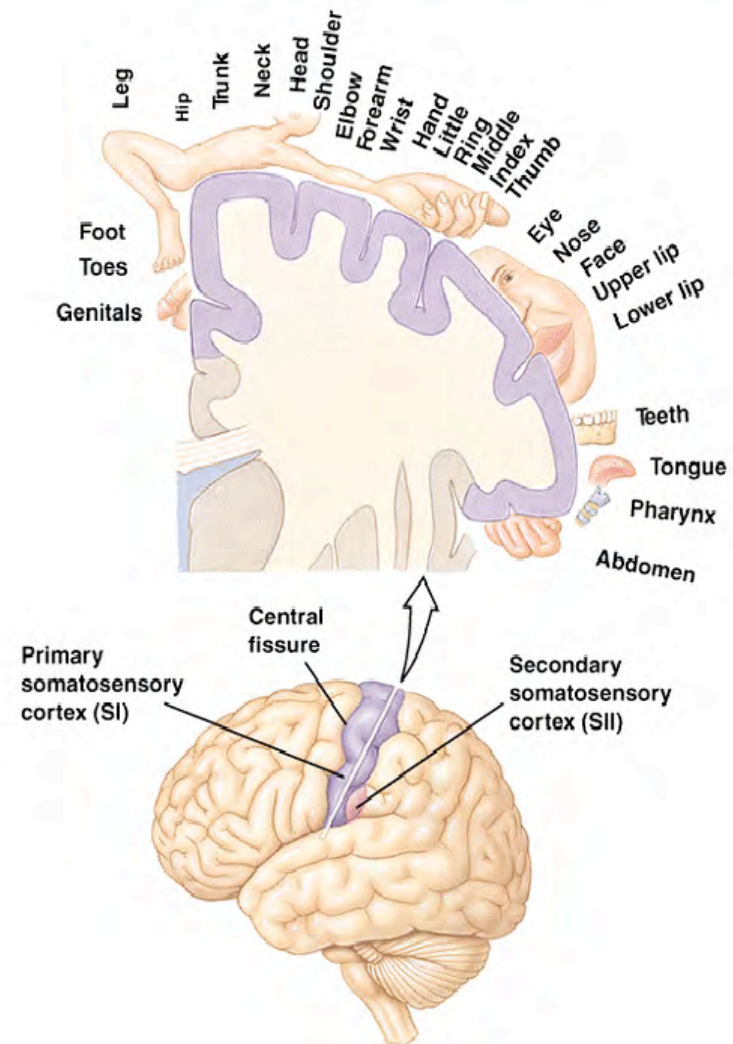


29

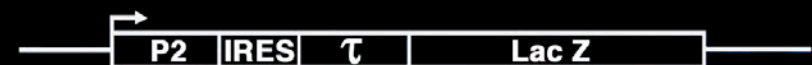
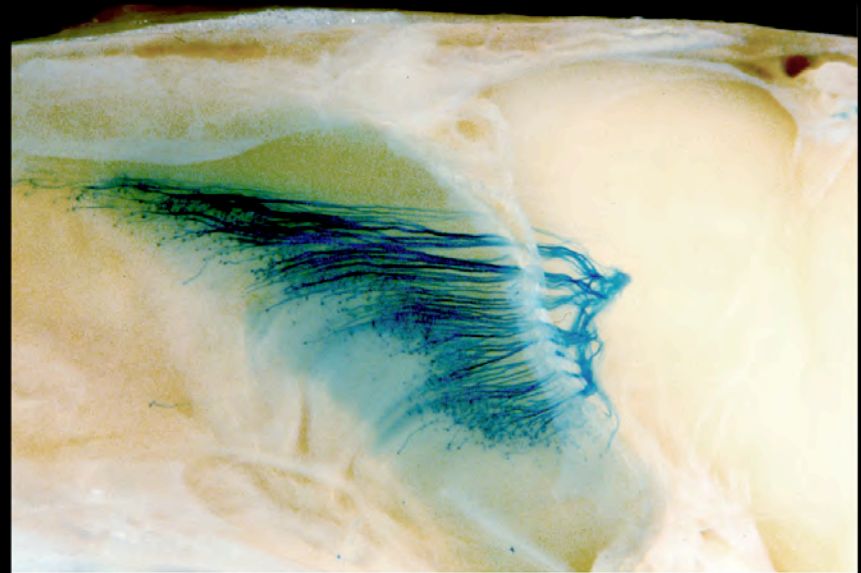
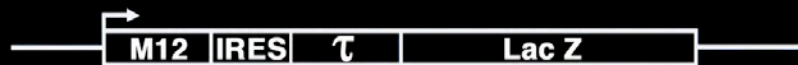
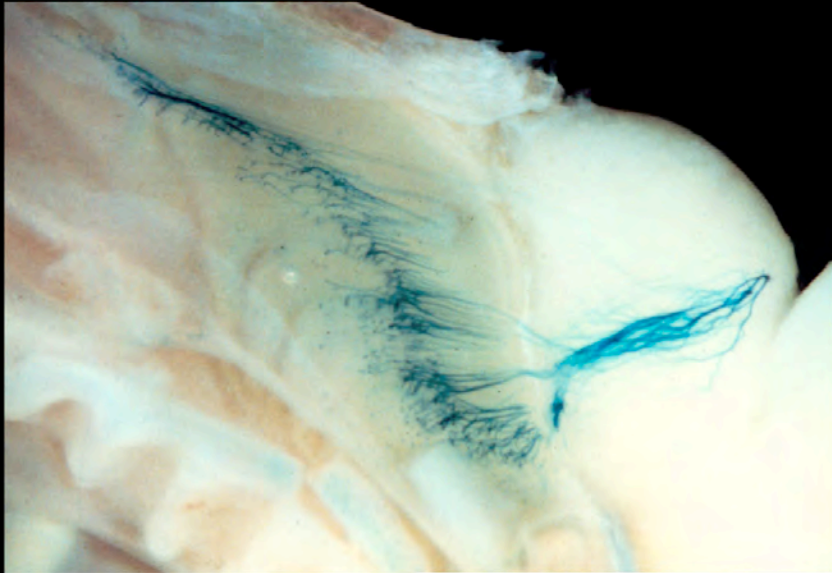


900

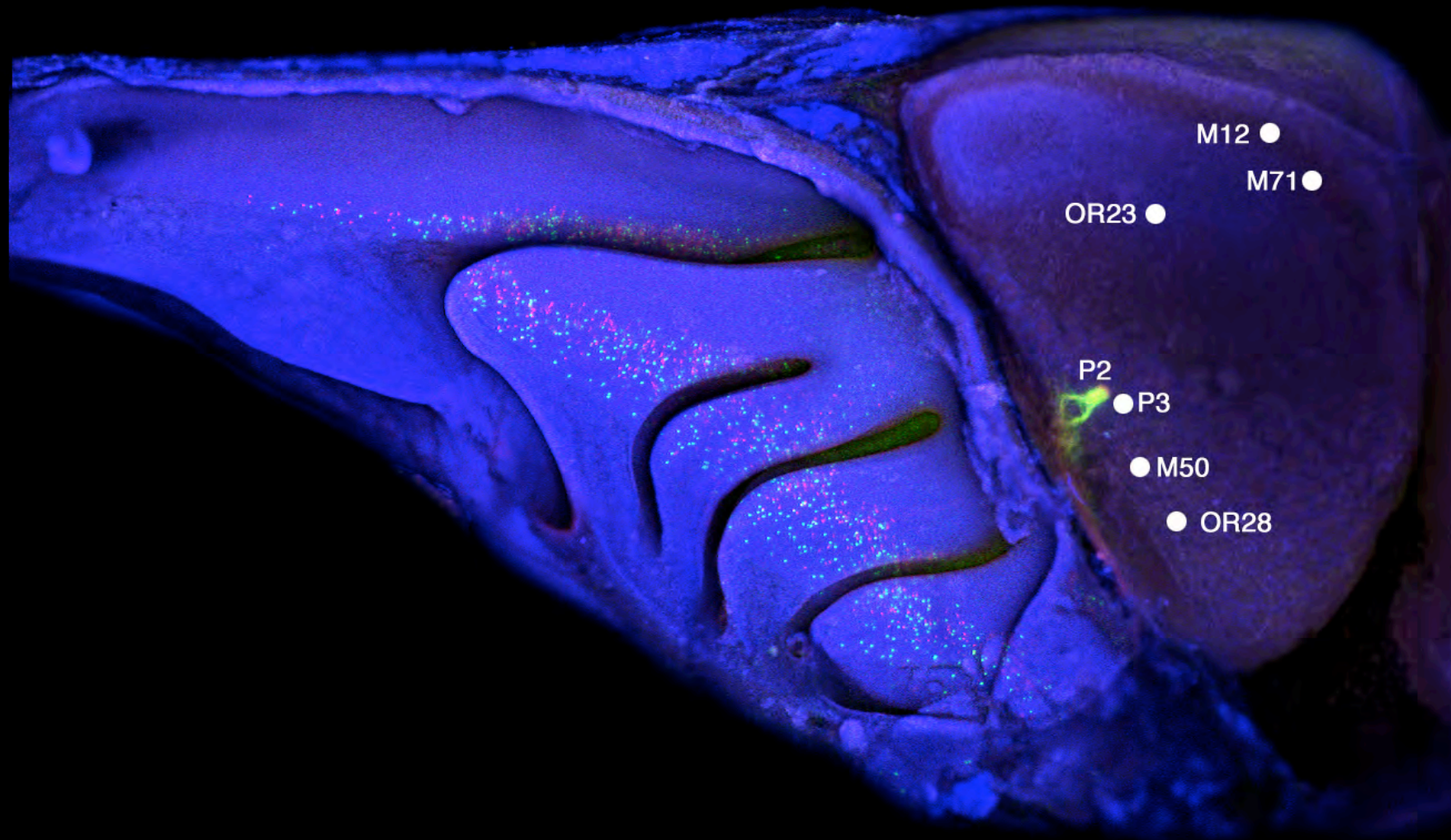
## Sensory Map of the Somatosensory System





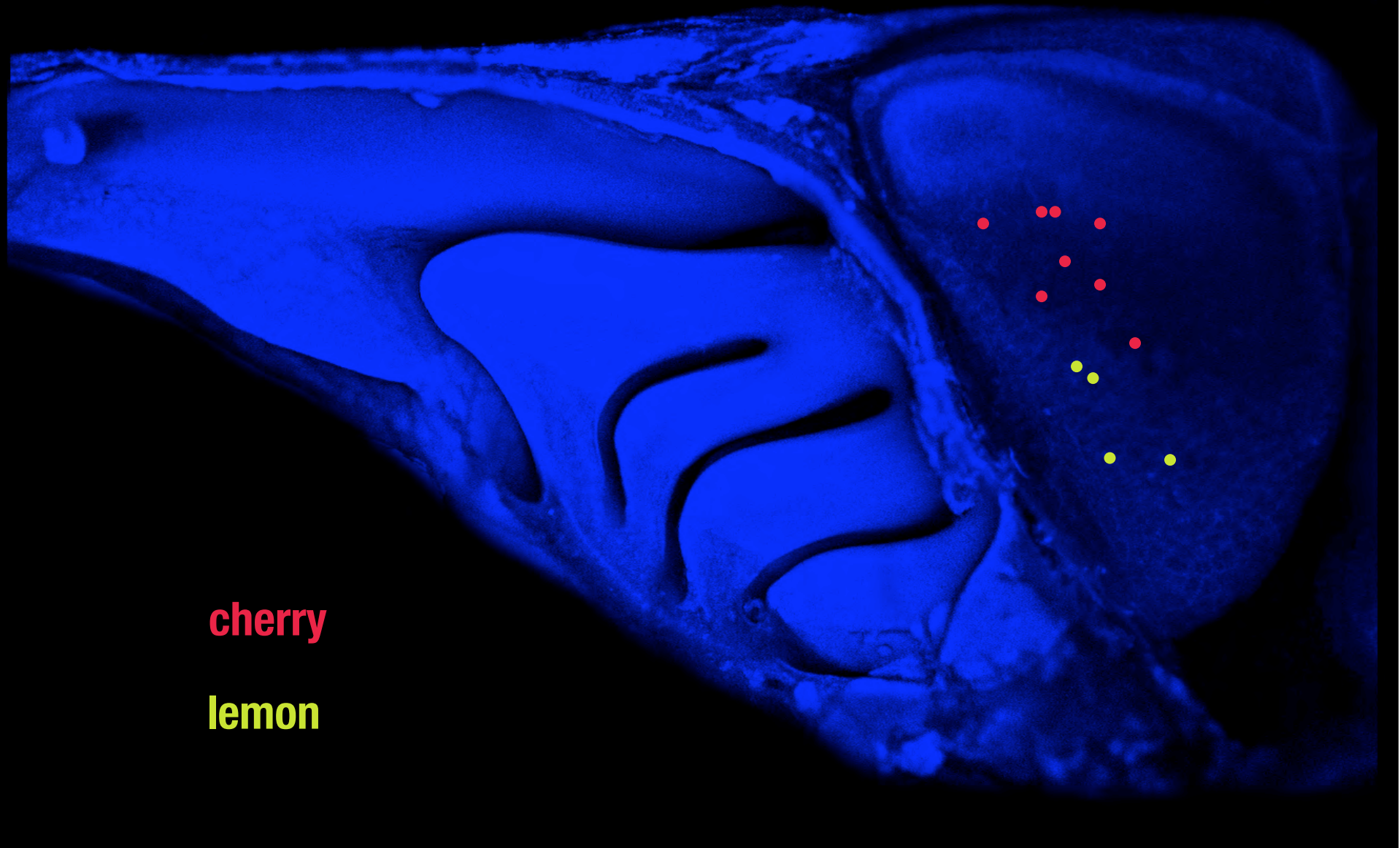


# Olfactory Sensory Map



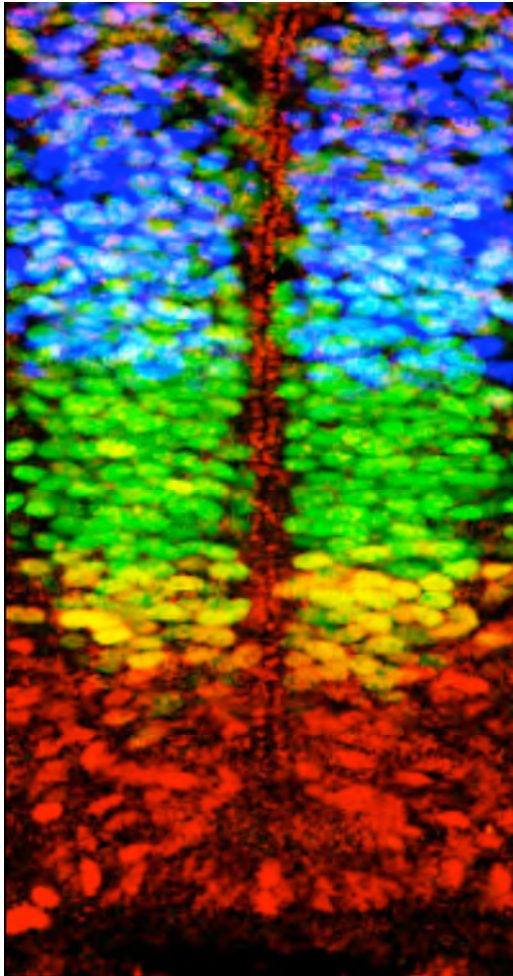


# Odor Quality Encoded By Spatial Pattern of Activation

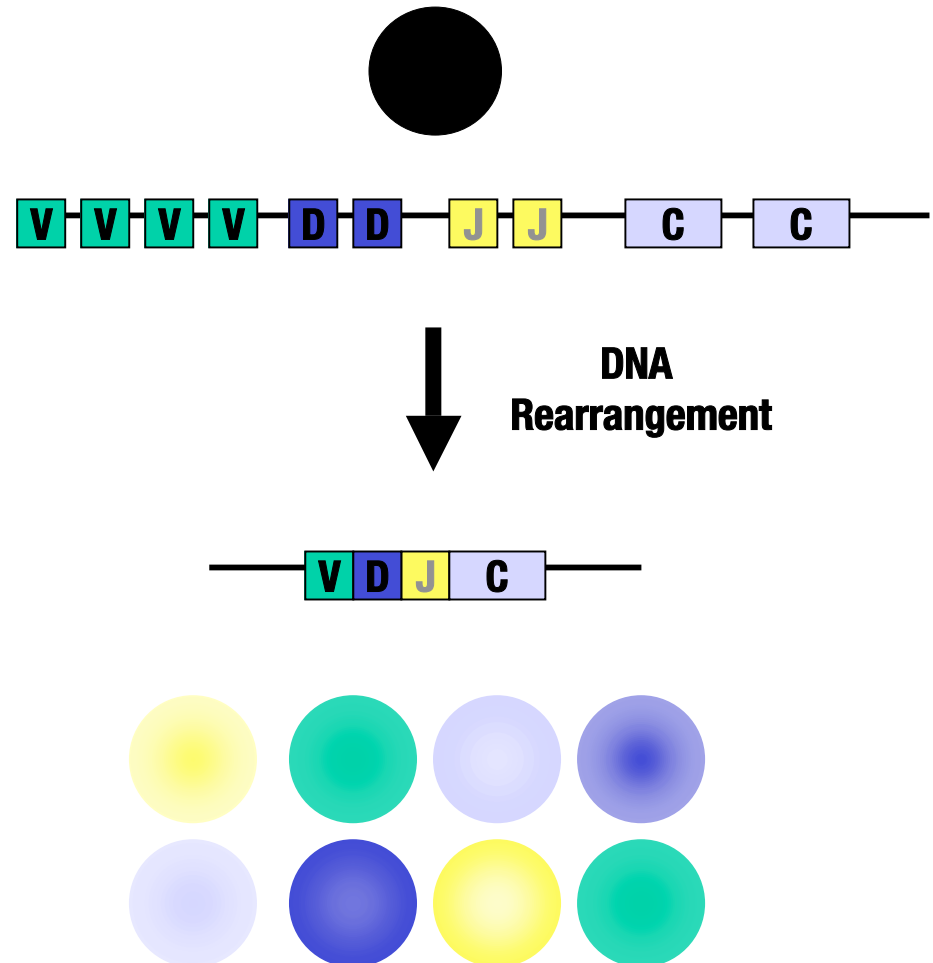


# Mechanisms for generating cellular diversity

## Deterministic



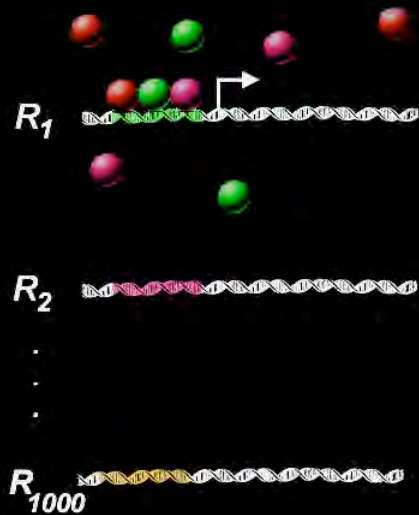
## Stochastic



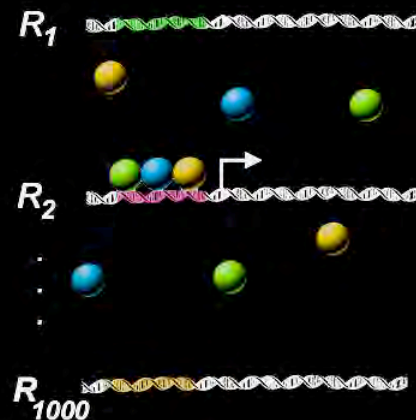


# Deterministic Choice of Receptor Alleles

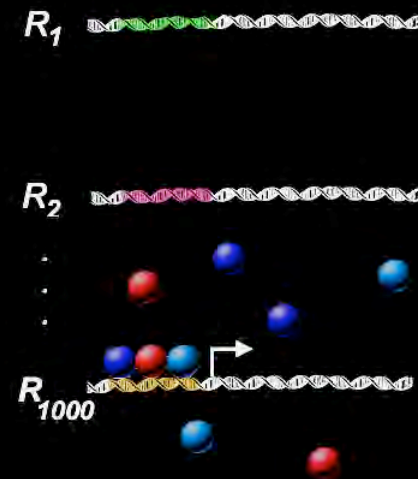
Neuron 1



Neuron 2

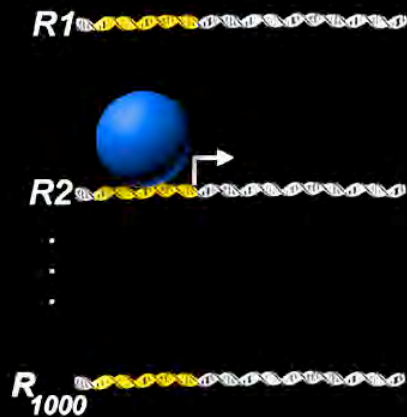


Neuron 3

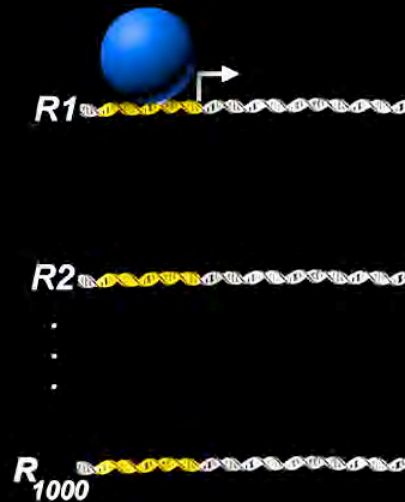


# Stochastic Choice of Receptor Alleles

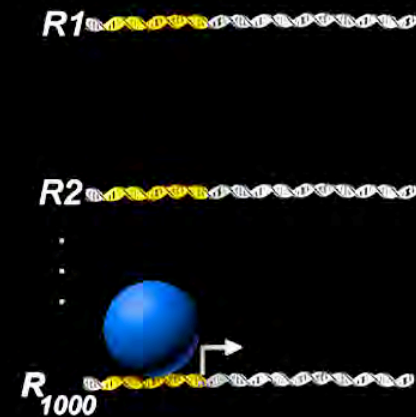
Neuron 1



Neuron 2

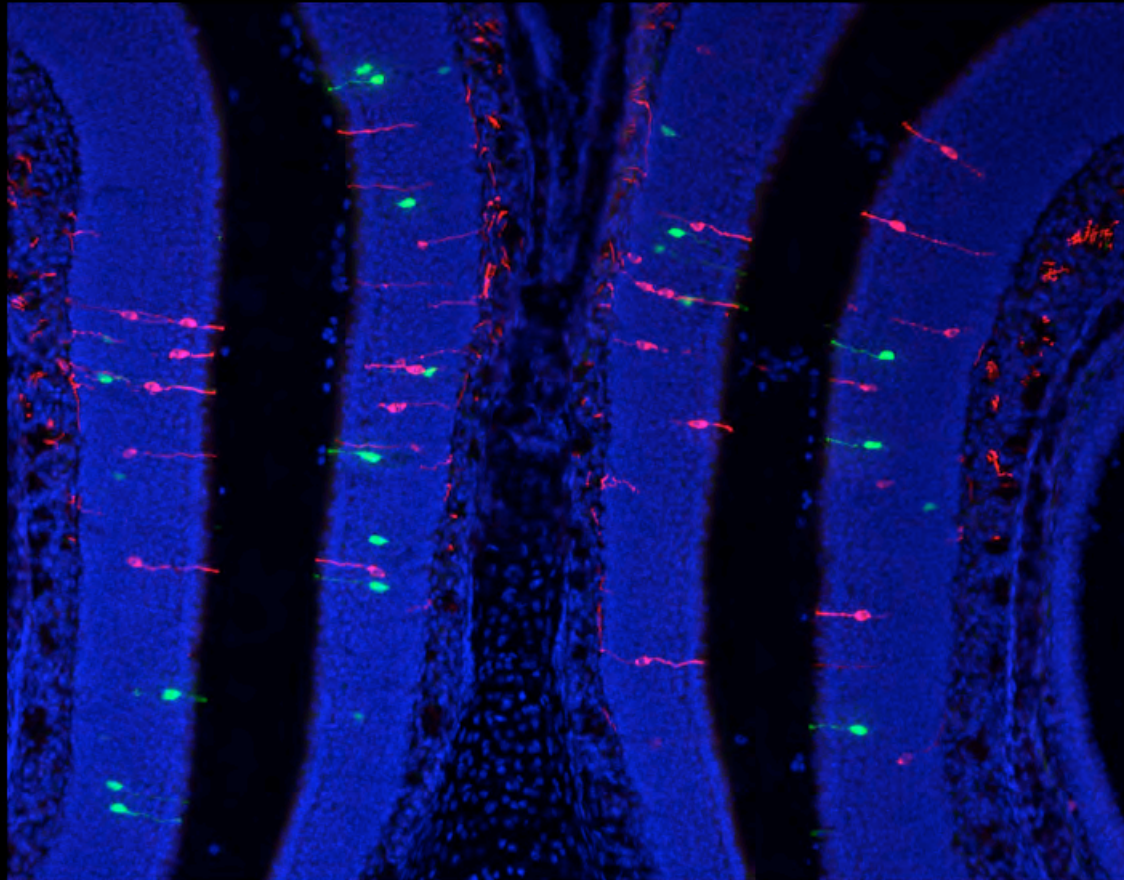


Neuron 3





# Singular Expression of OR Genes

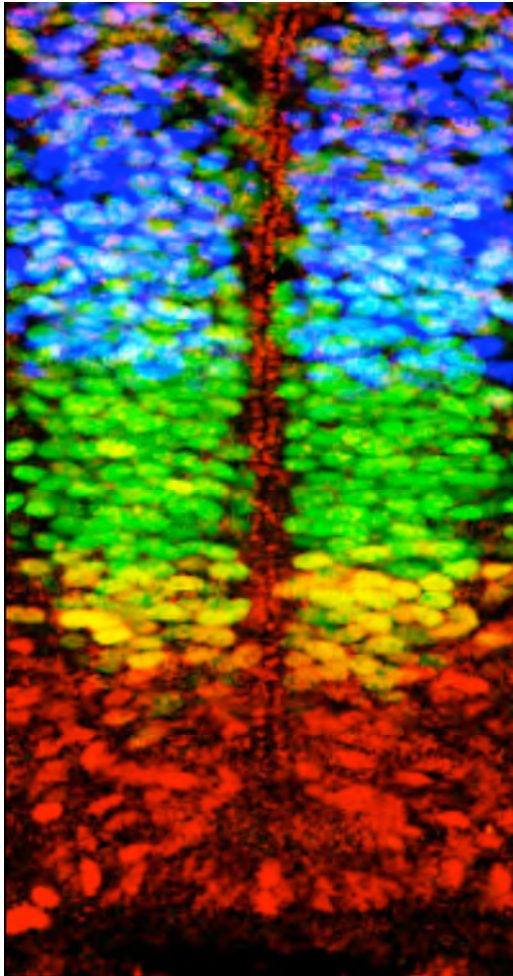


Genotype:

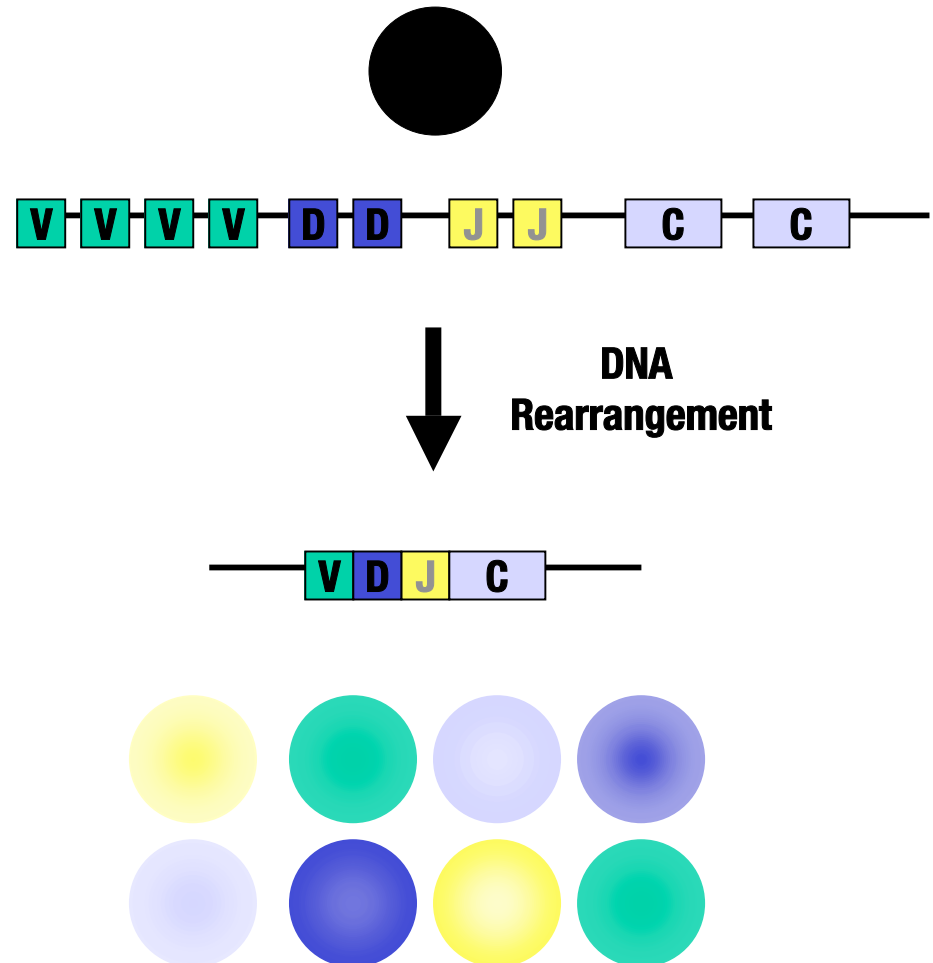
———**P2 iτlacZ**——— Endogenous  
———**P2 iGFP**——— Transgene

# Mechanisms for generating cellular diversity

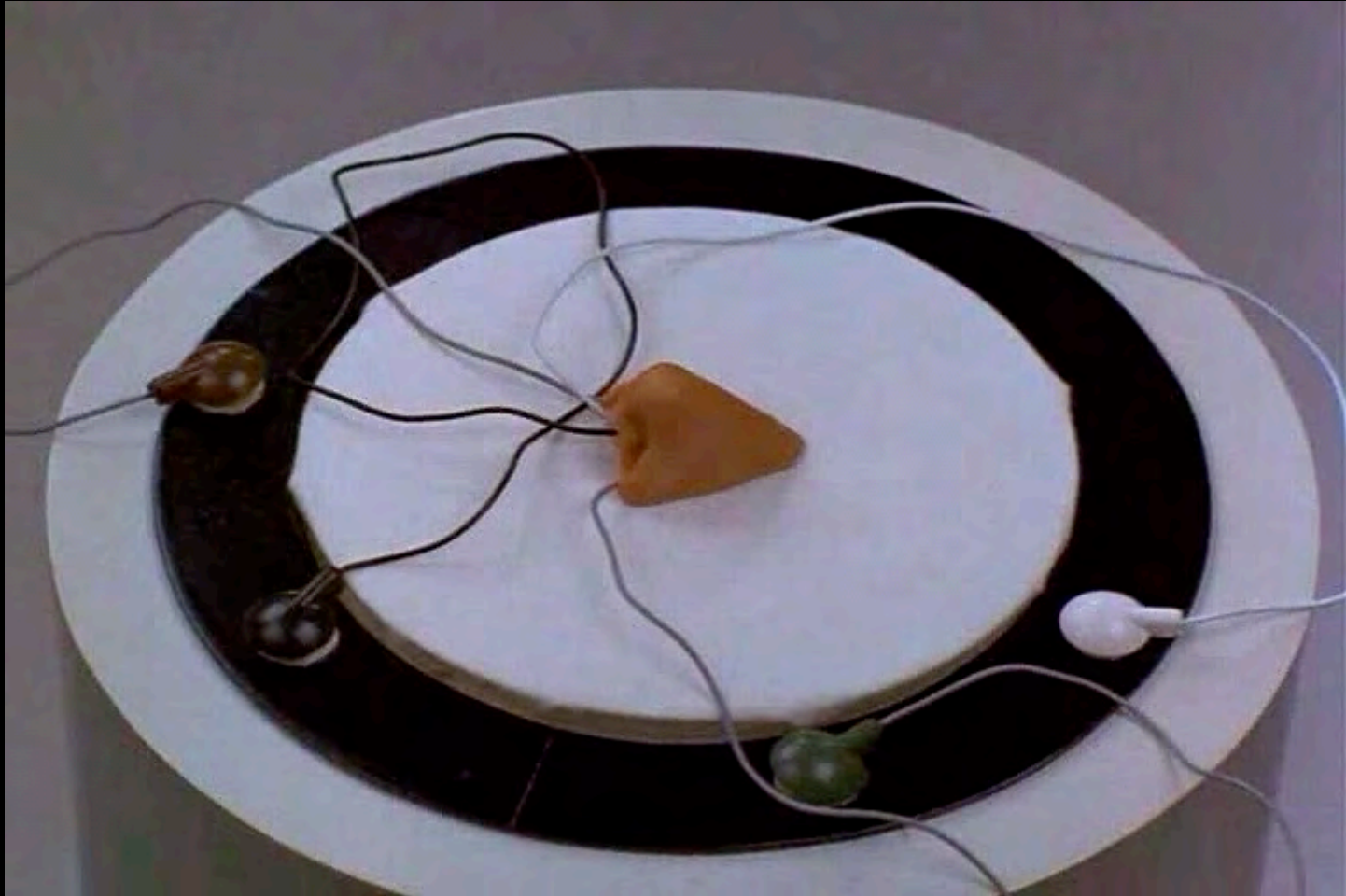
## Deterministic



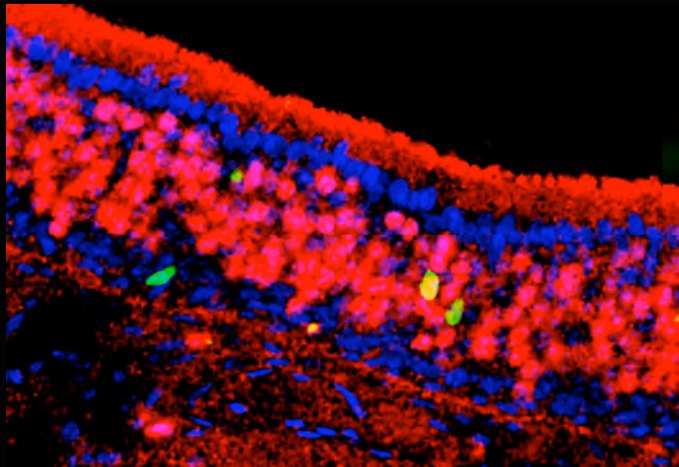
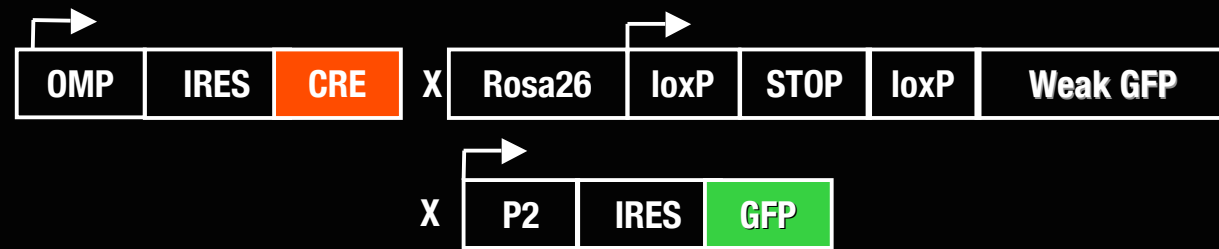
## Stochastic





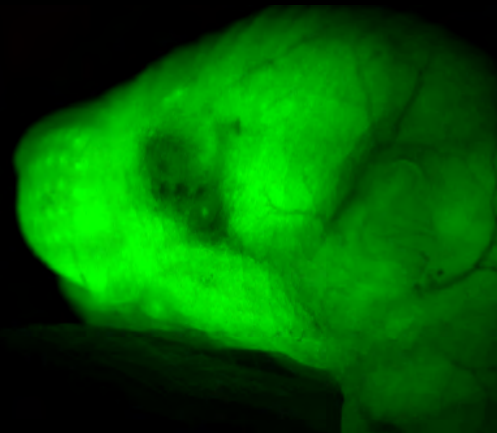
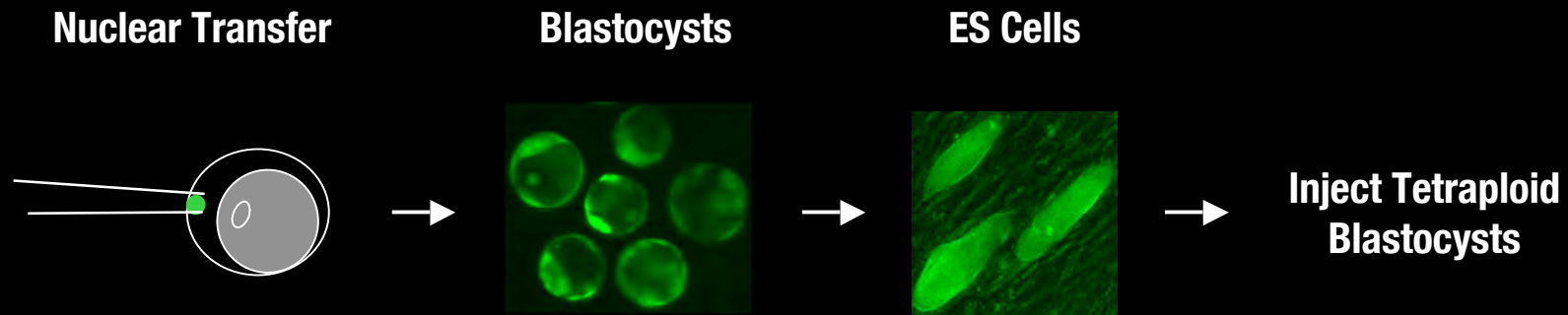


# Cloning mice from a P2 sensory neuron nucleus

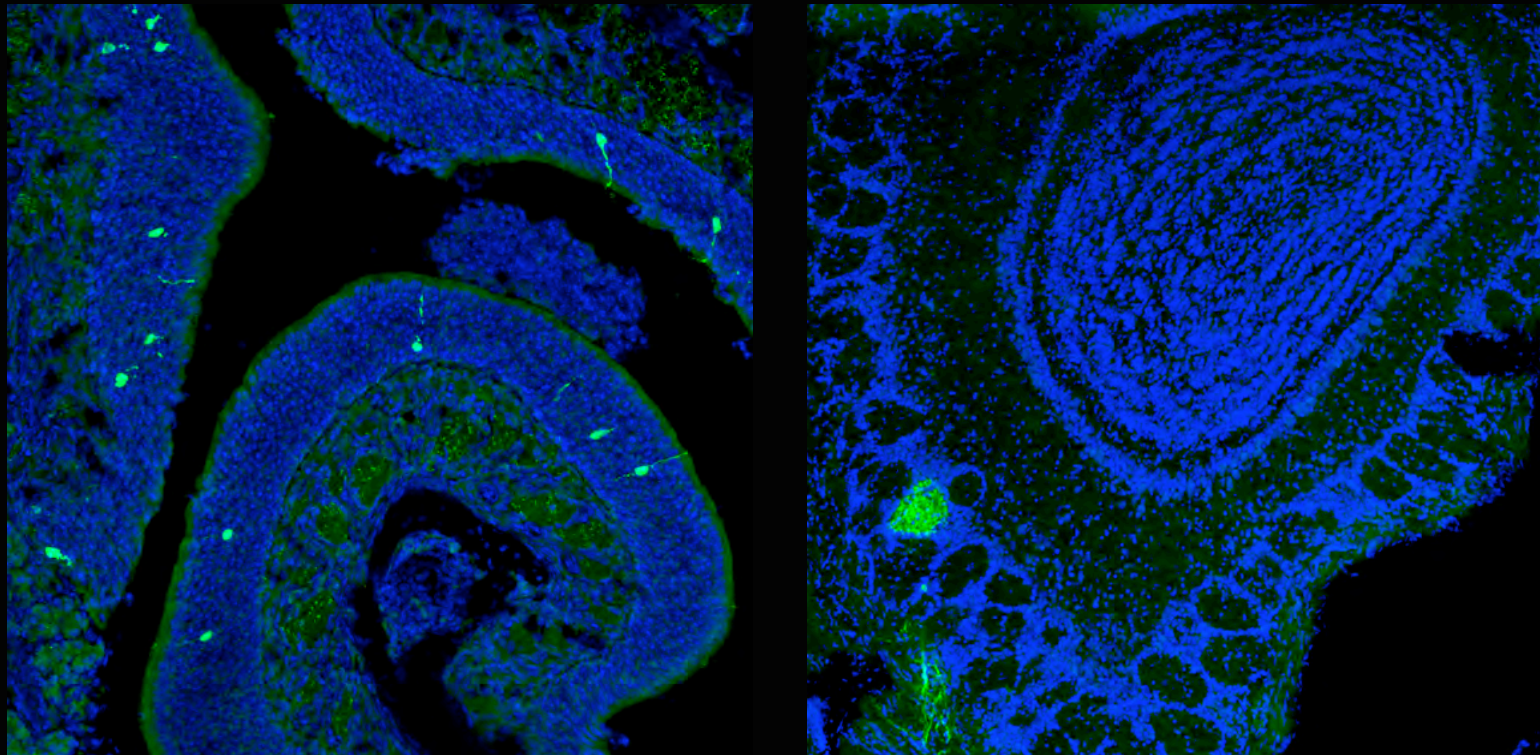




# Cloning mice from a sensory neuron nucleus

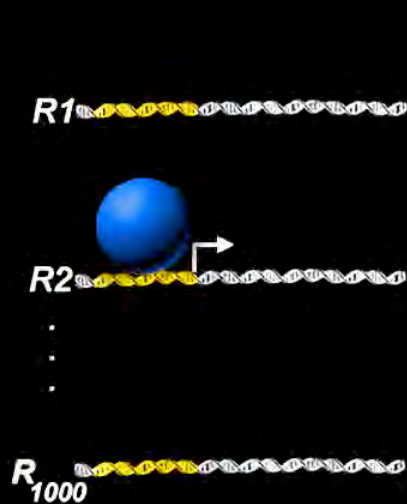


## Expression of the P2 IRES GFP allele in P2 clones

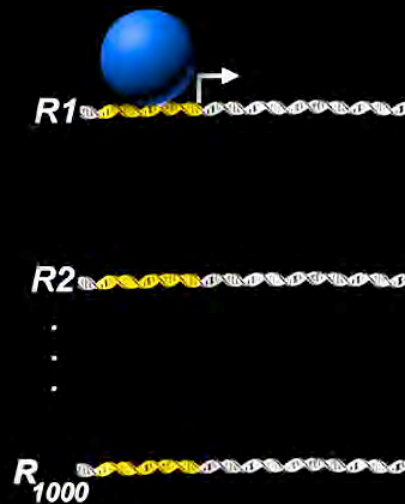


# Singular Stochastic Choice of Receptor Gene

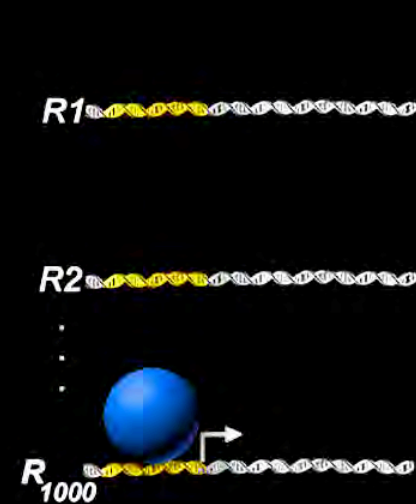
Neuron 1



Neuron 2

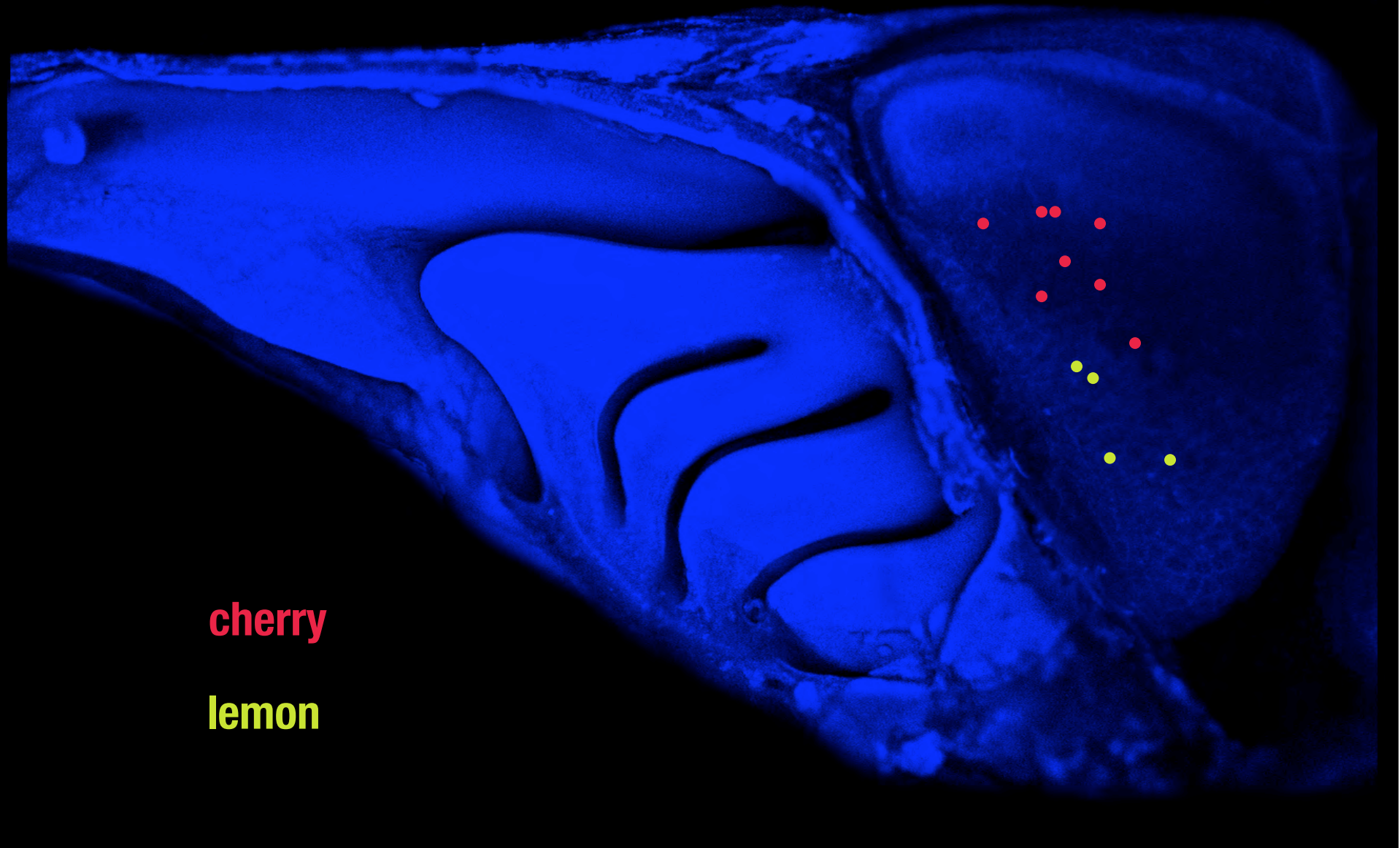


Neuron 3





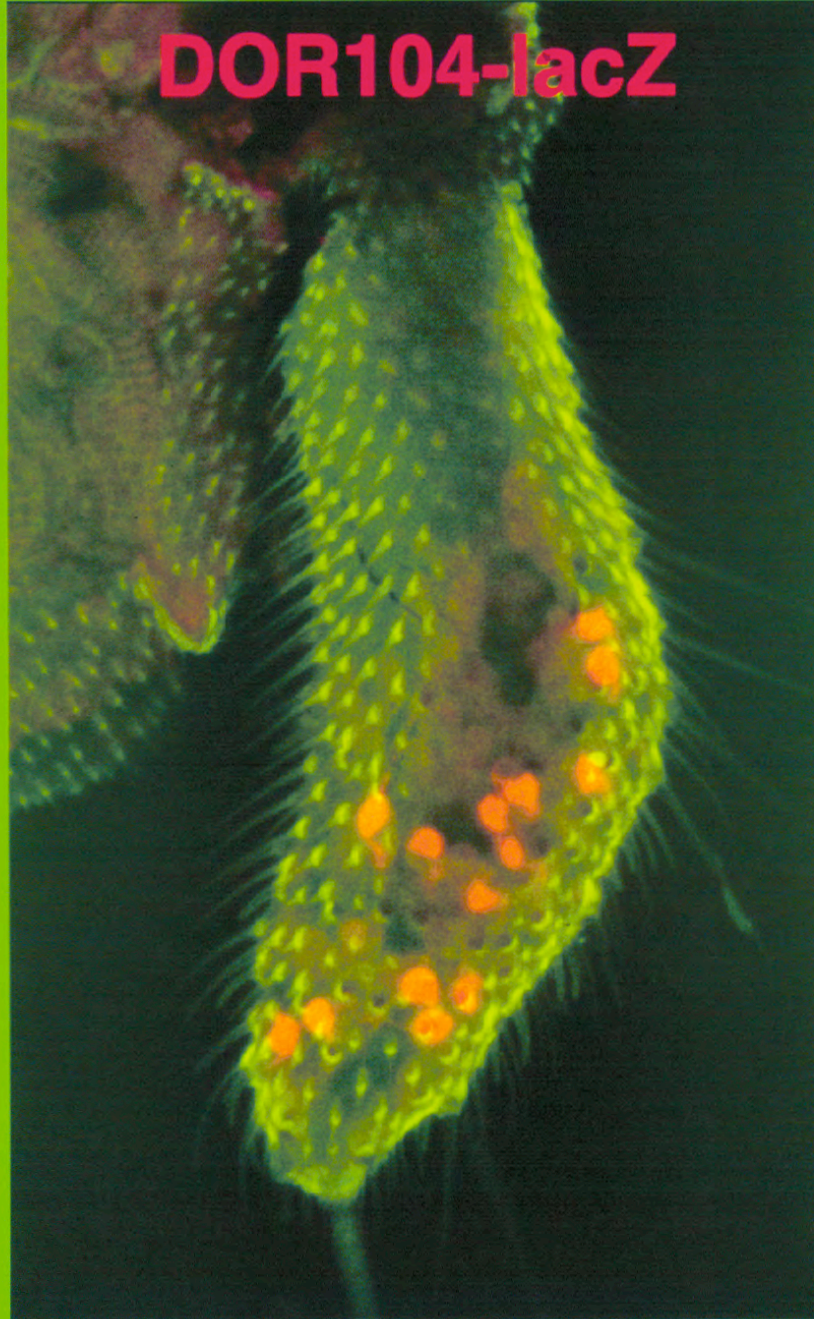
# Odor Quality Encoded By Spatial Pattern of Activation



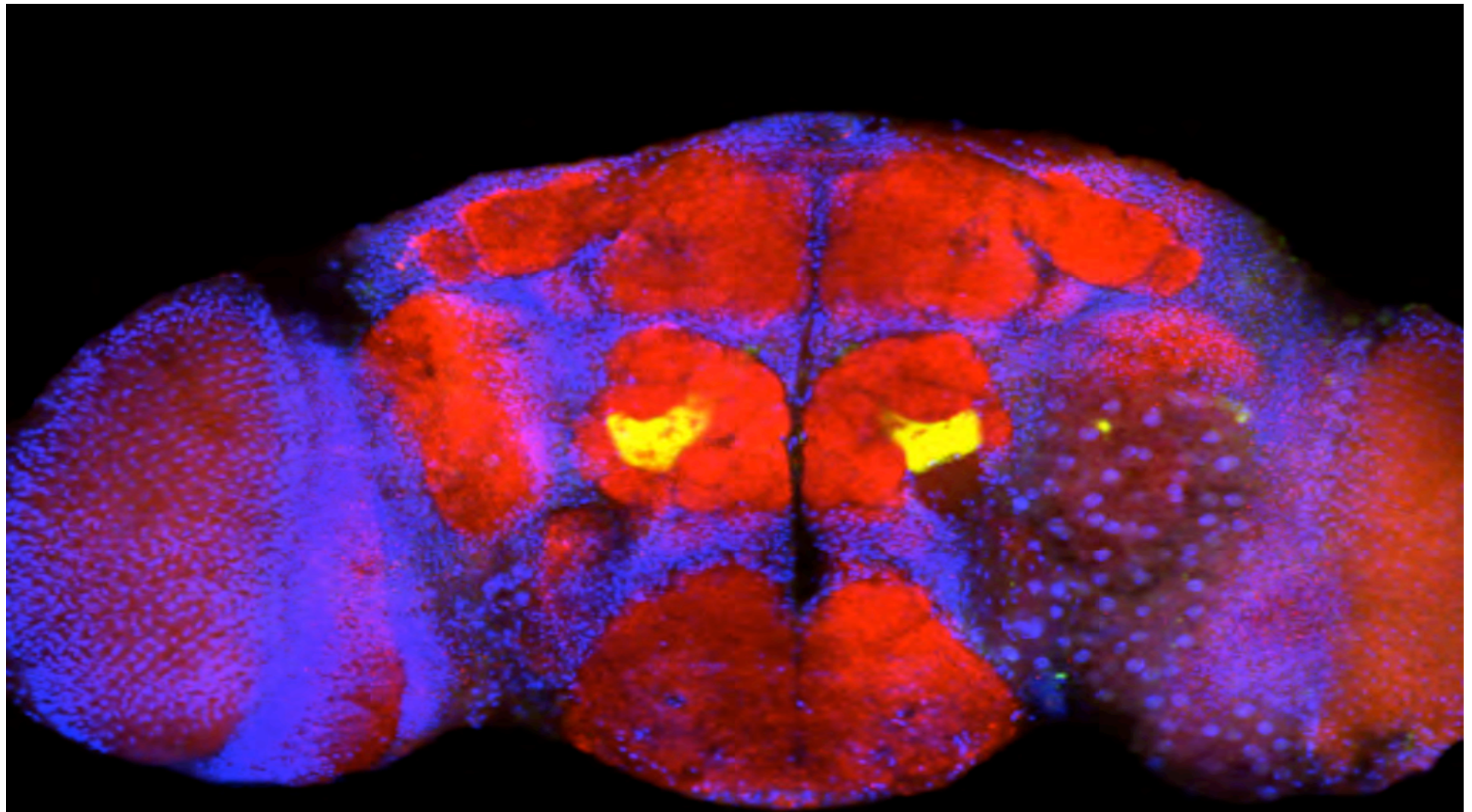




**DOR104-lacZ**

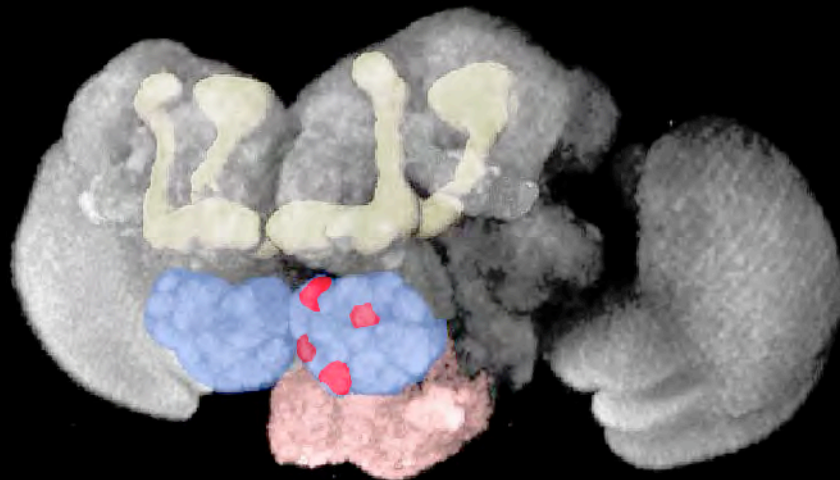




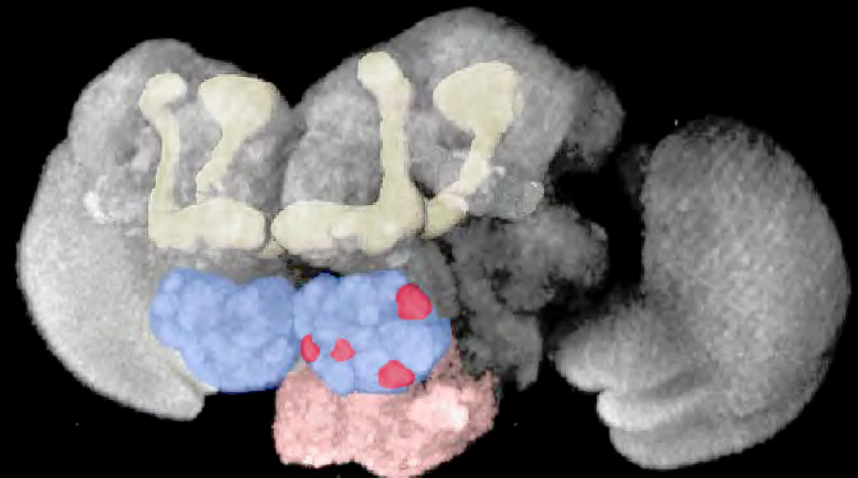


**An Olfactory Sensory Map in the Antennal Lobe**

# A Topographic Map of Odor Quality

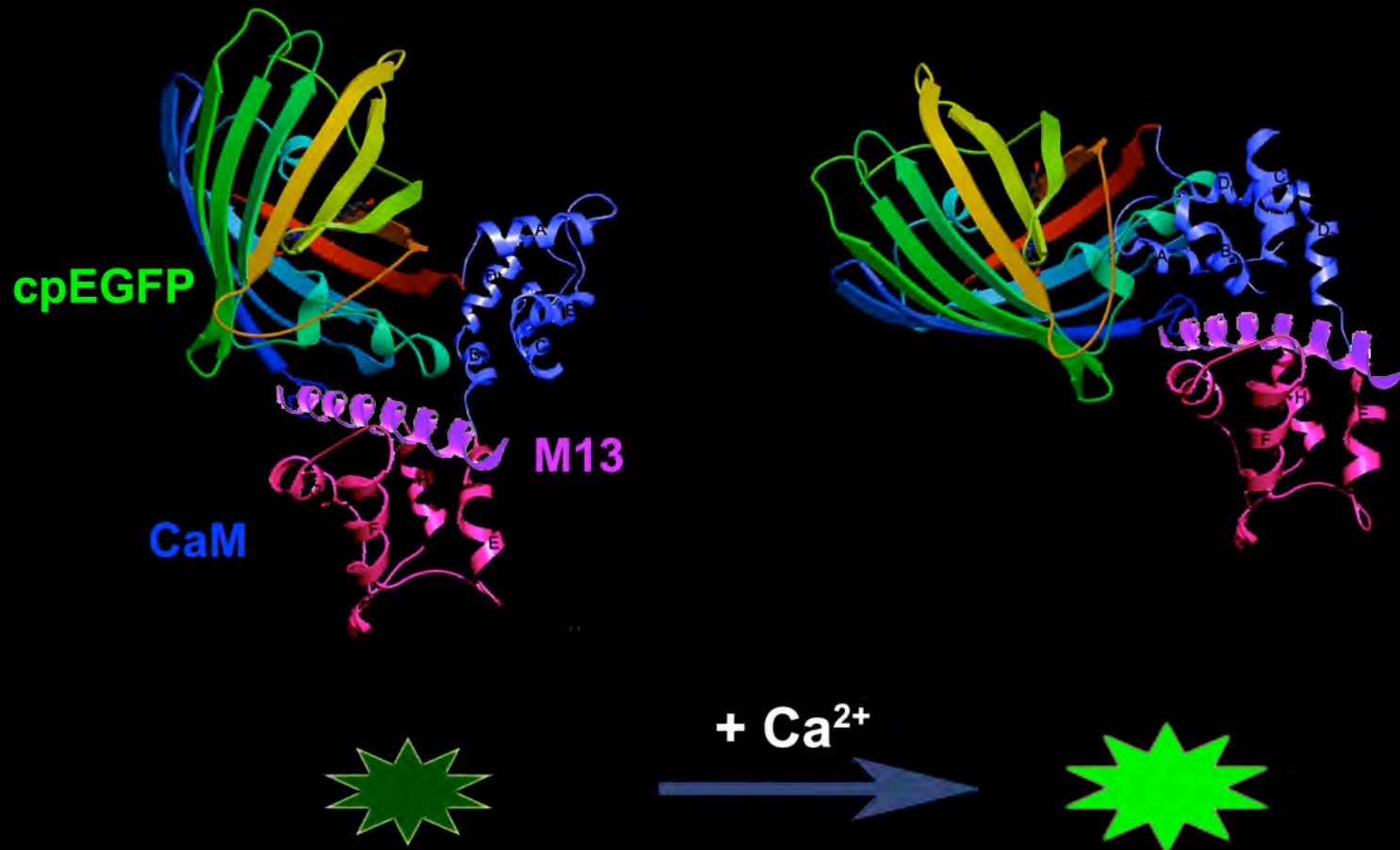


*banana*

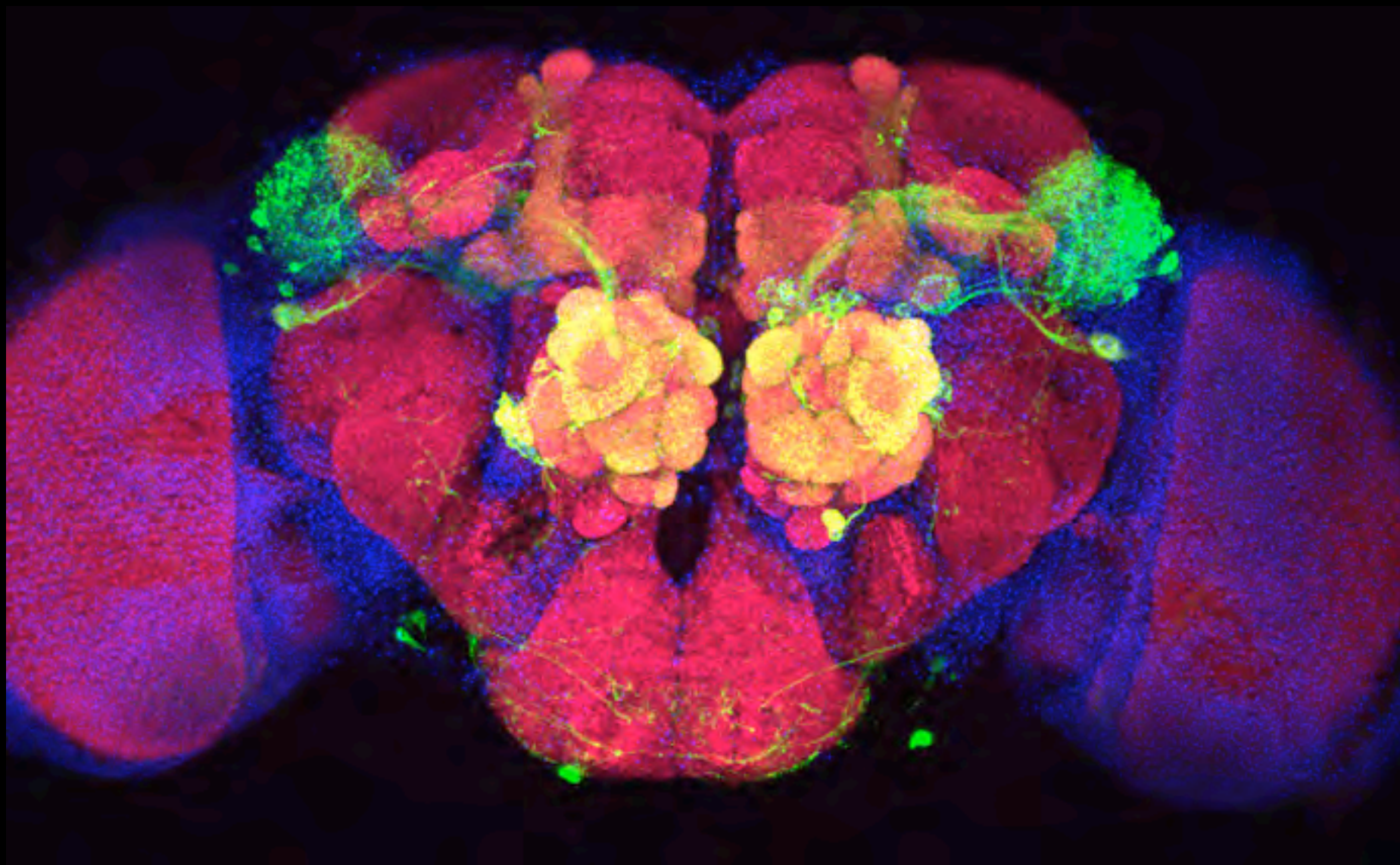


*cherry*

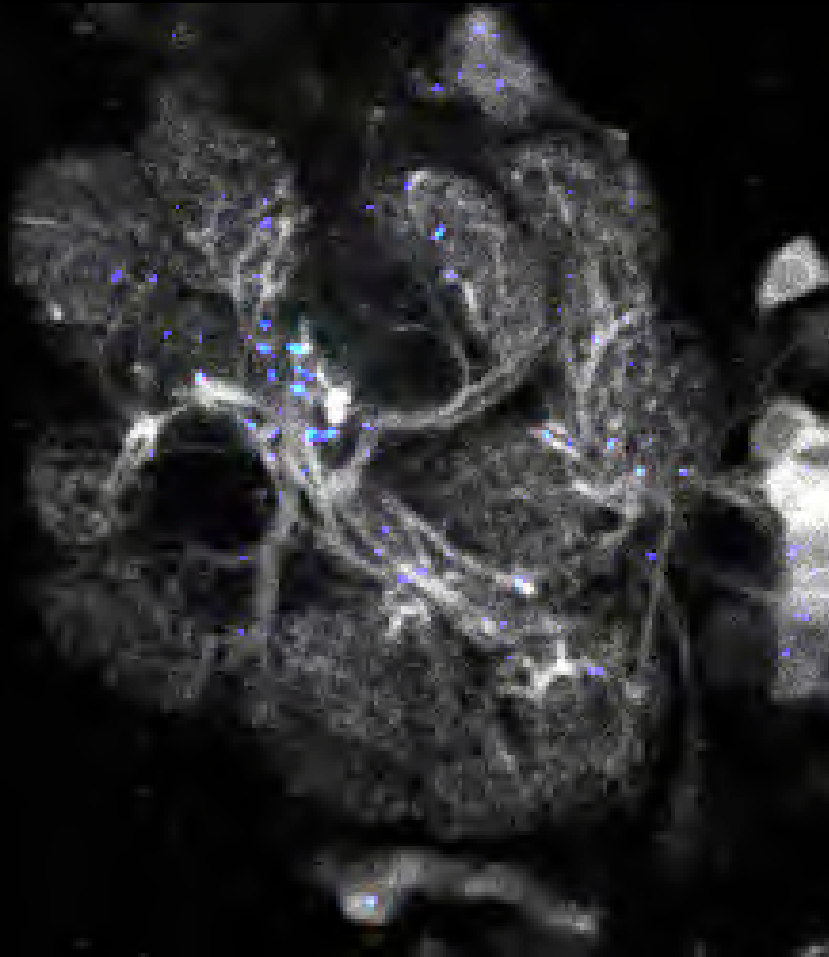
# G-CaMP: a Calcium Sensitive Fluorescent Protein



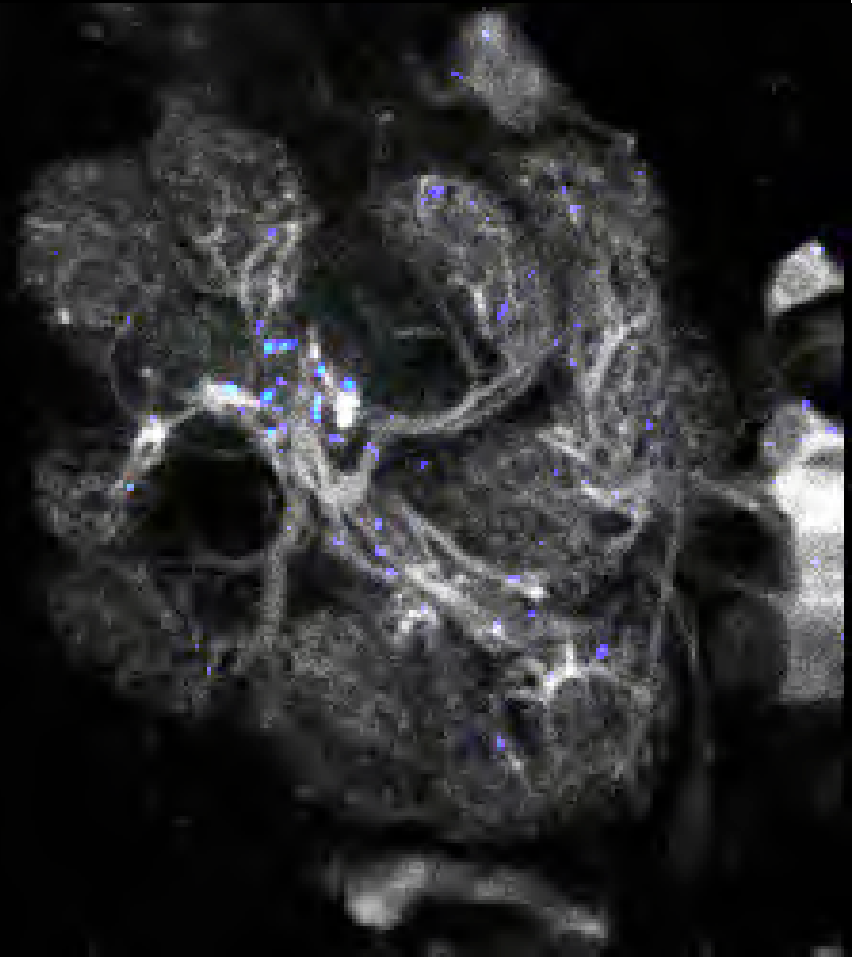




## Glomerular Response to Odor Stimulation at 2% SV

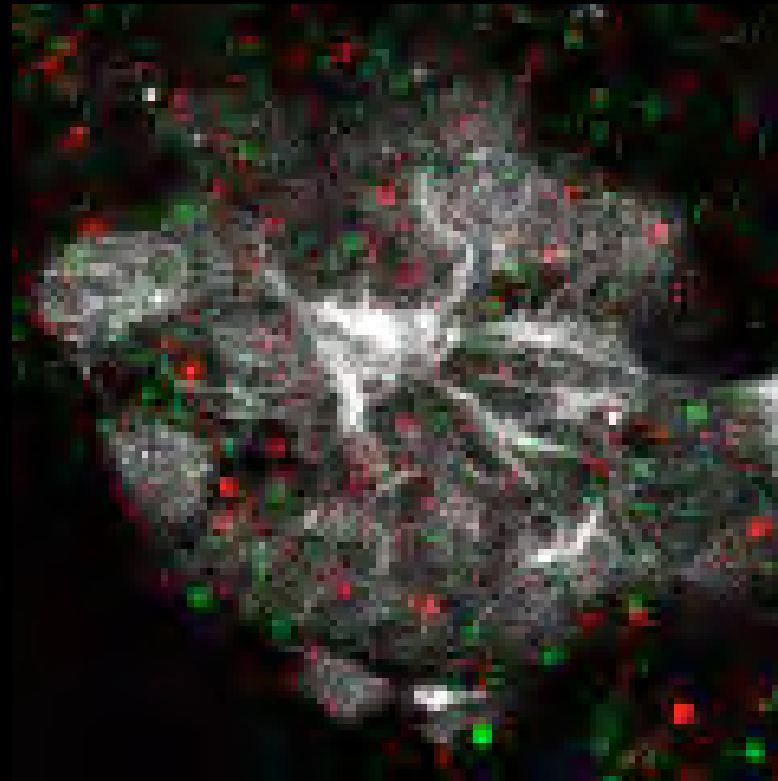


Ethyl hexanoate



Isoamyl acetate

# Glomerular Response to Caproic Acid and Pyridine

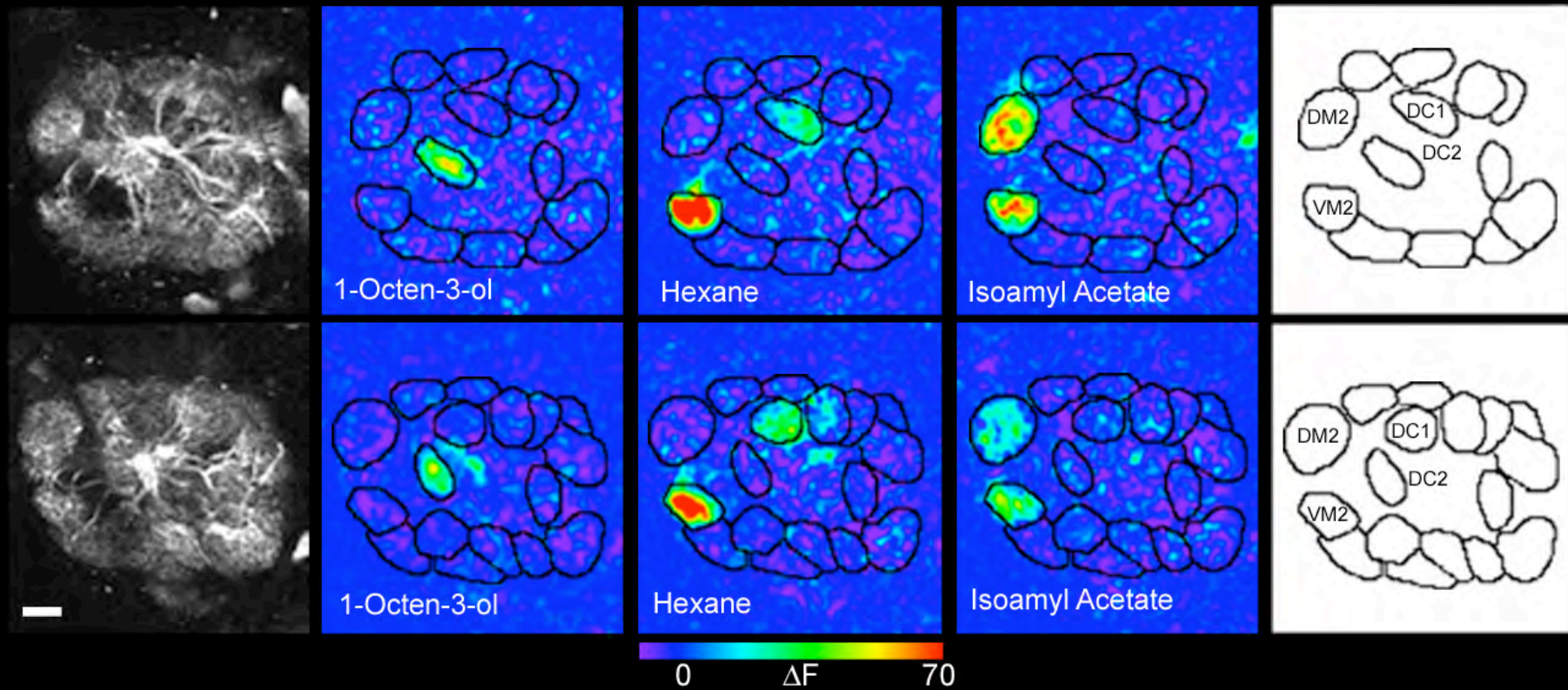


**Caproic Acid**

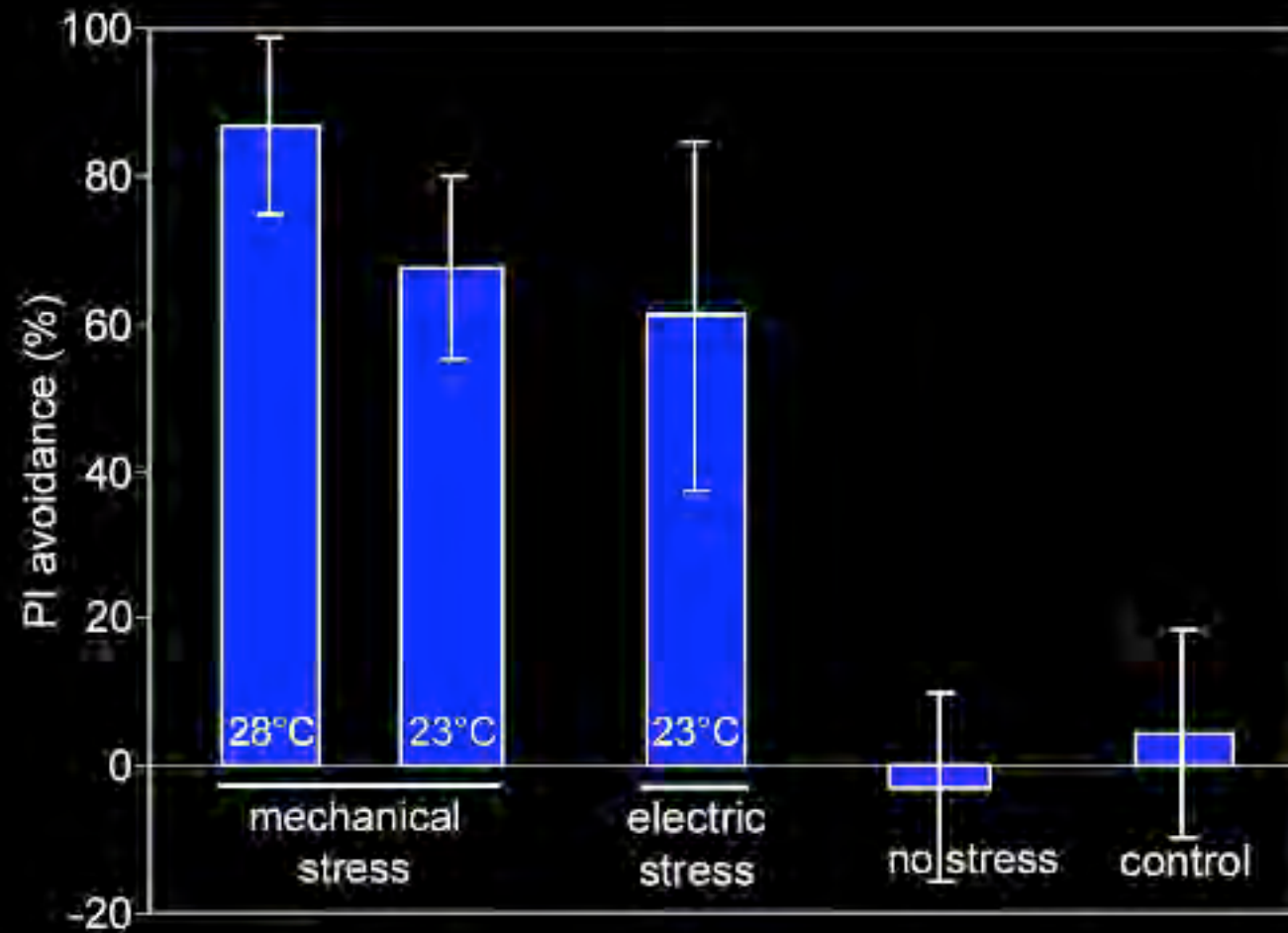
**Pyridine**



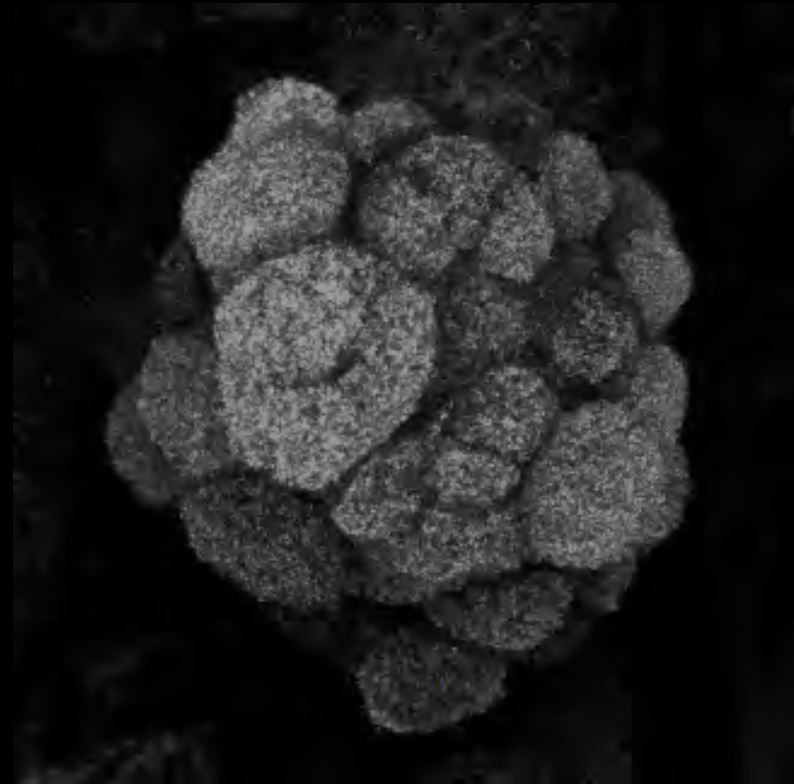
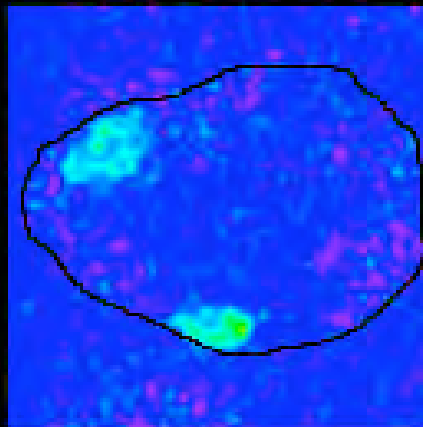
# Conserved Glomerular Patterns in Different Animals



## Stress Odors: *Drosophila* Alarm Response?

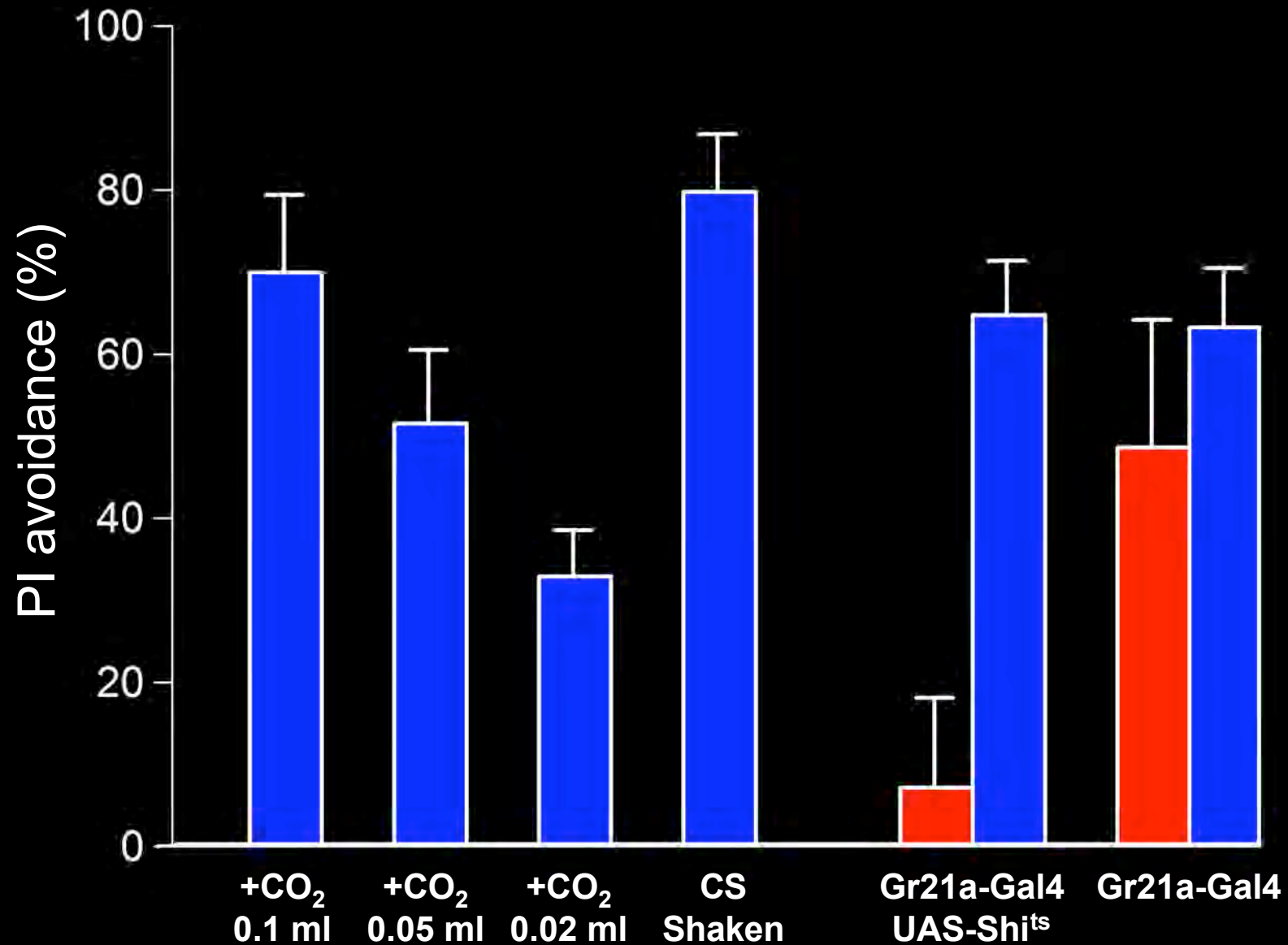


# Activation of the V glomerulus by Stress Odor and CO<sub>2</sub>

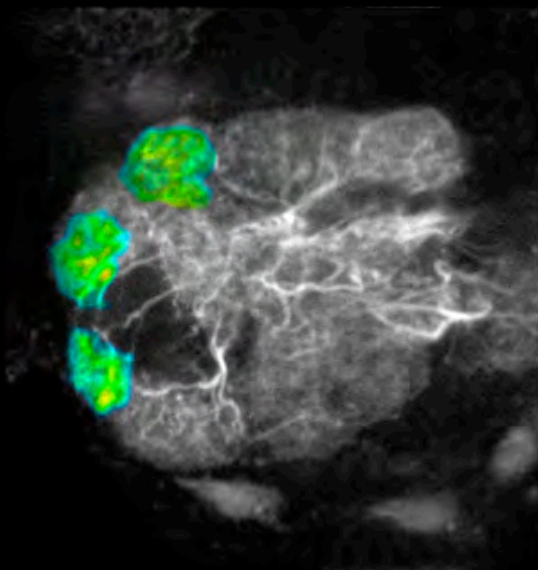




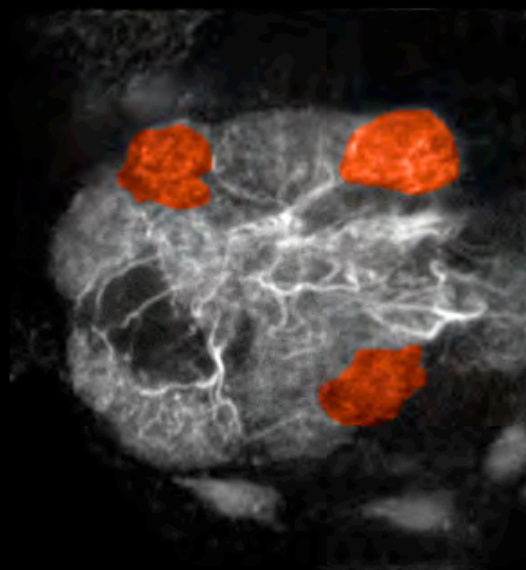
## A Single Glomerulus Mediates the Behavioral Response to CO<sub>2</sub>



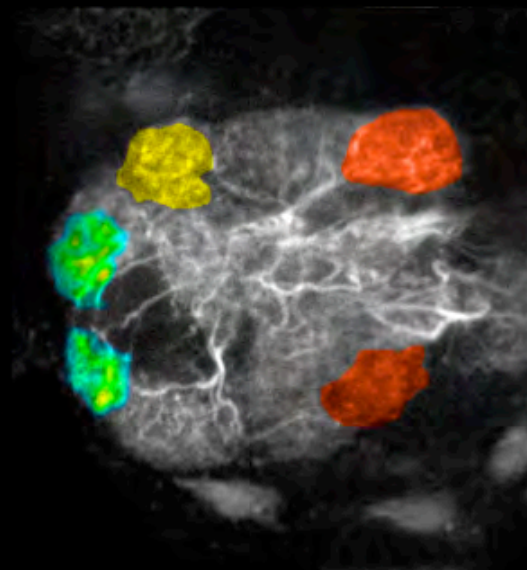
# Binding and Parsing



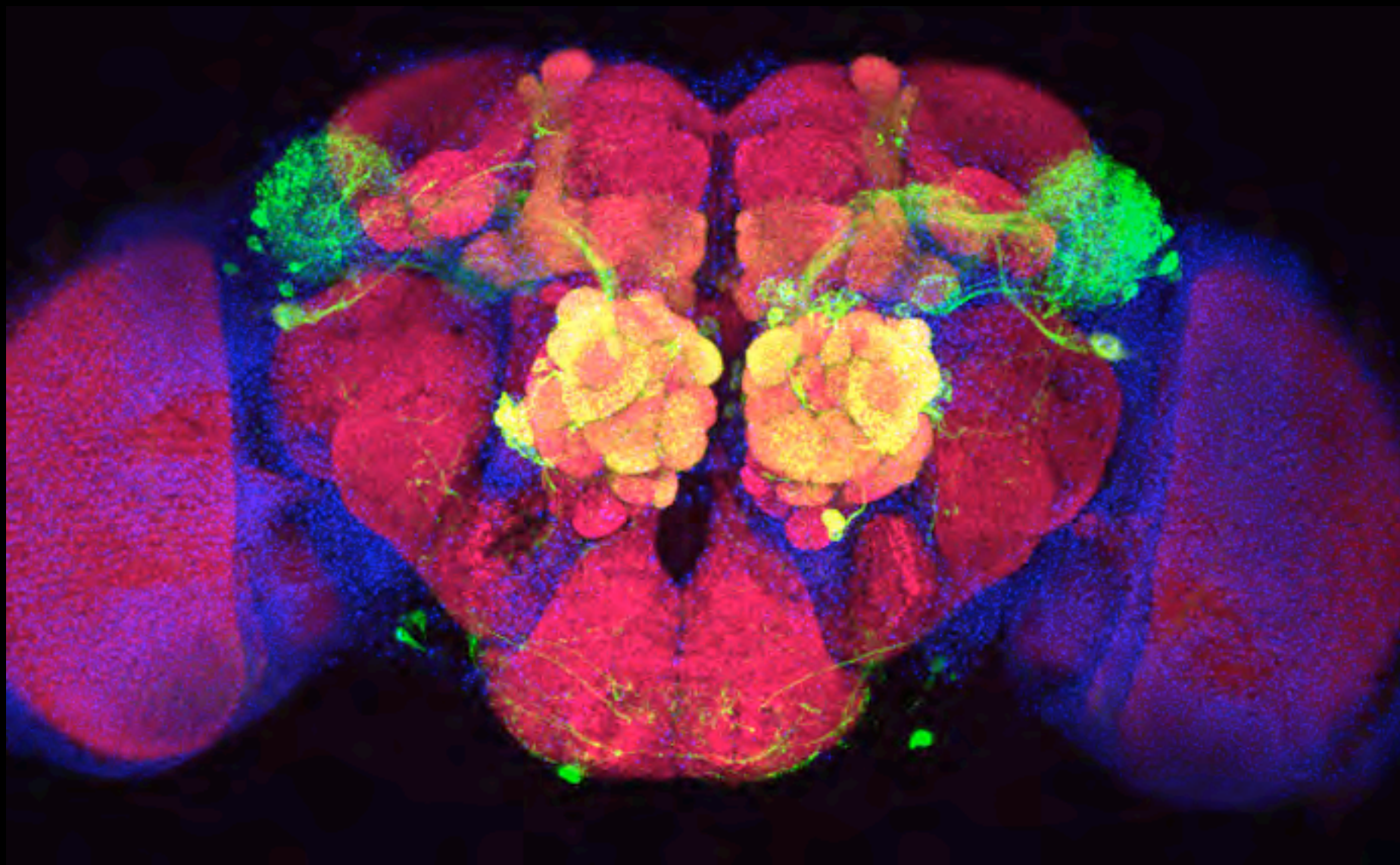
Apple



Banana

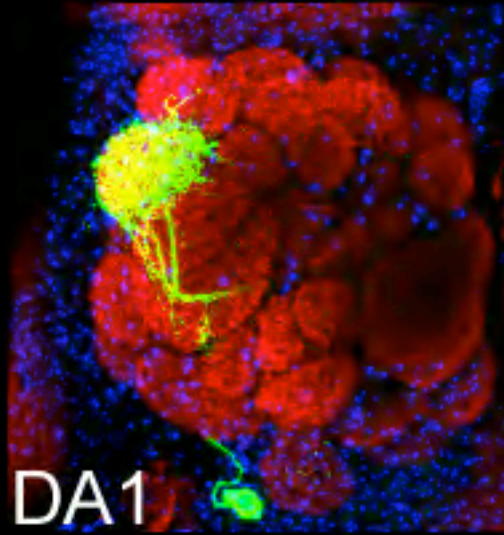
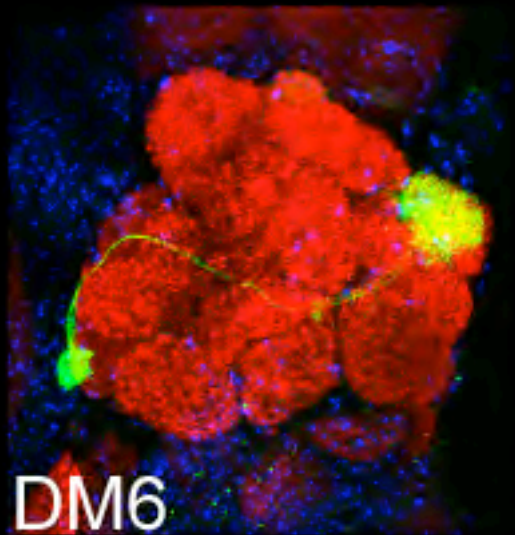
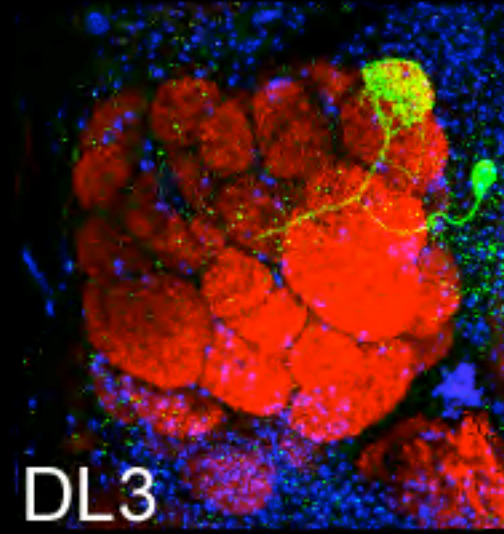
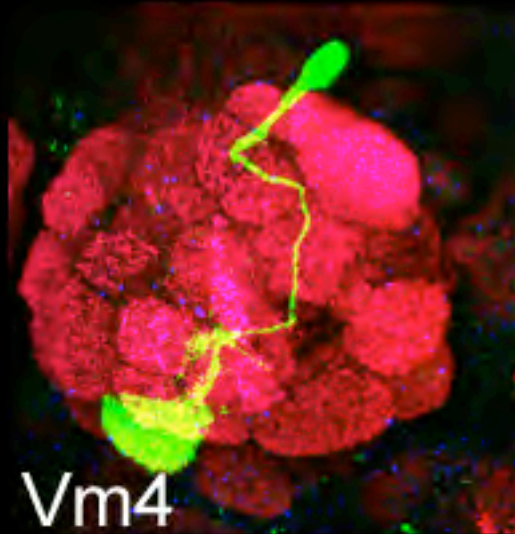


Mix

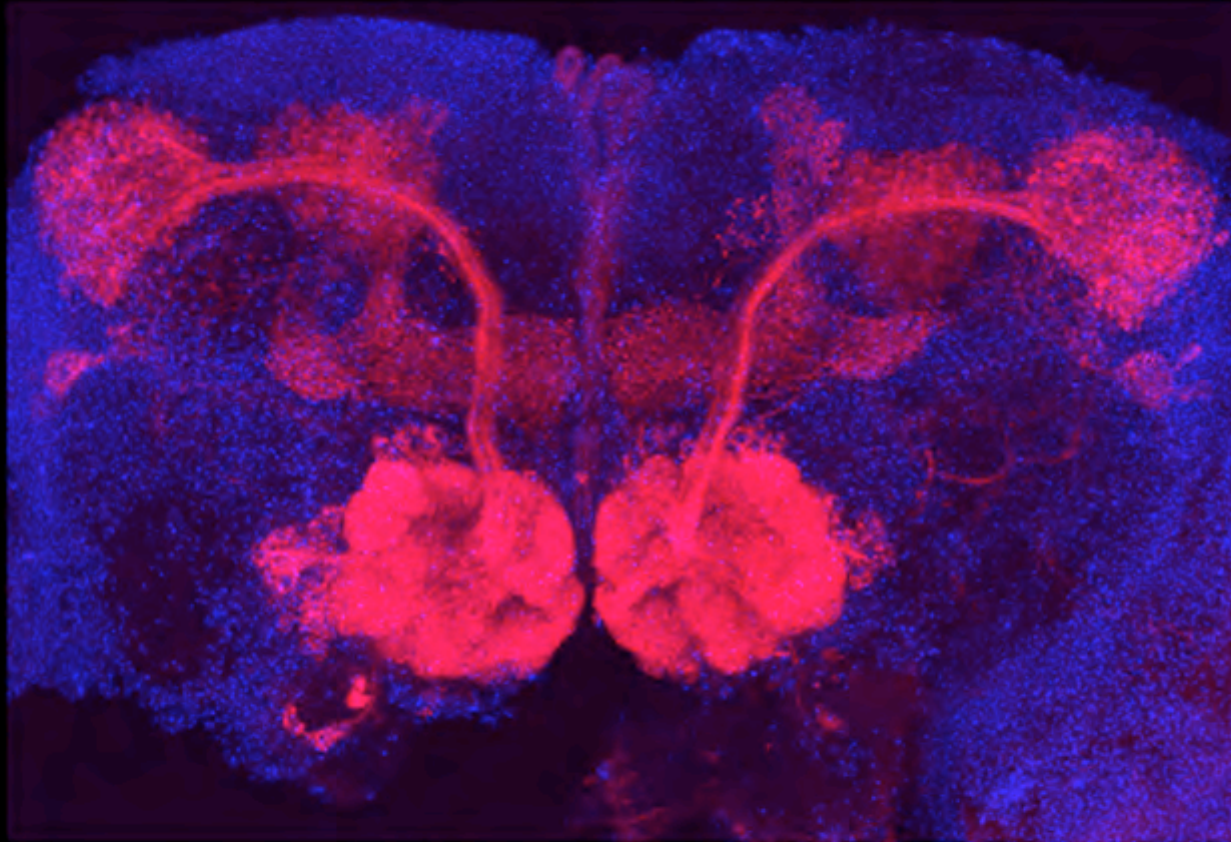






# Individual Projection Neurons Innervate a Single Glomerulus




# Expression of CD2 in a Population of Projection Neurons



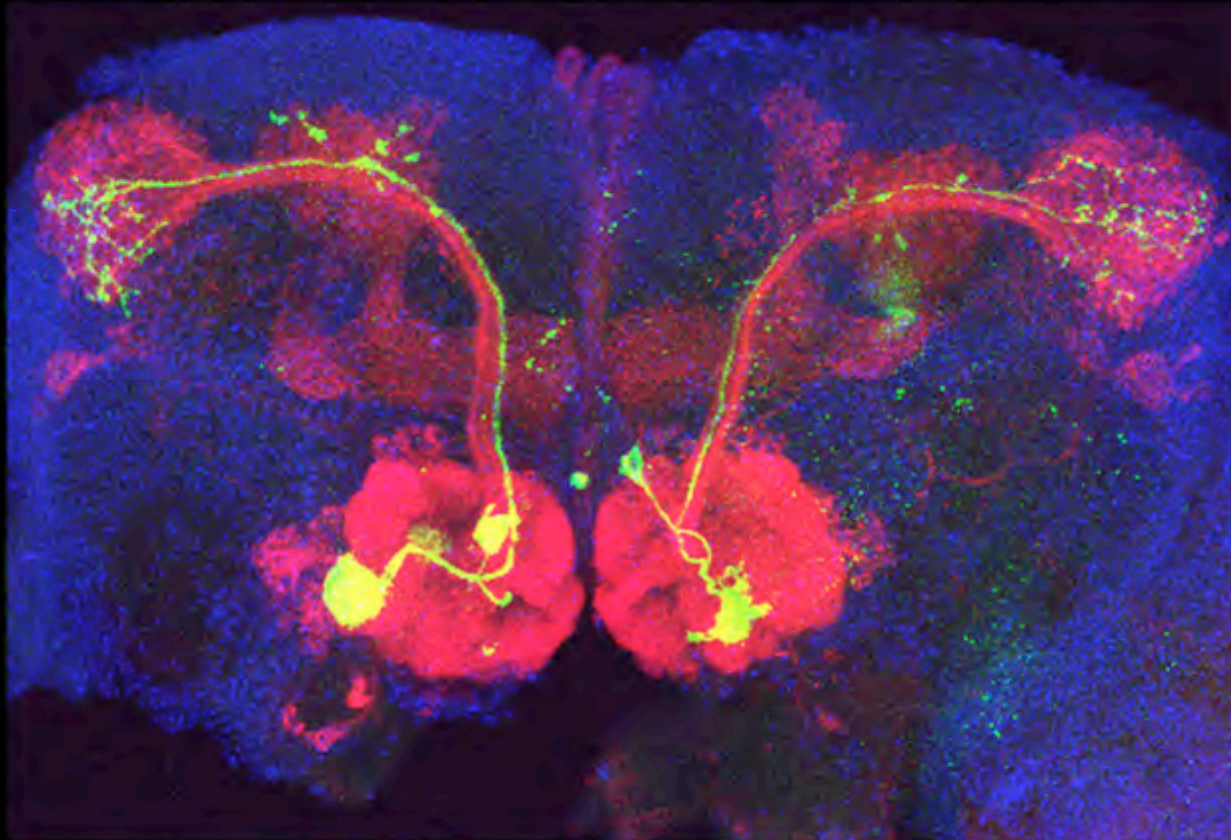
GH146  *Gal4*

UAS  *frt* *CD2* *Y+* *frt* *CD8 GFP*




hs  *FLP*




# Expression of CD8-GFP in Single Projection Neurons



GH146  Gal4

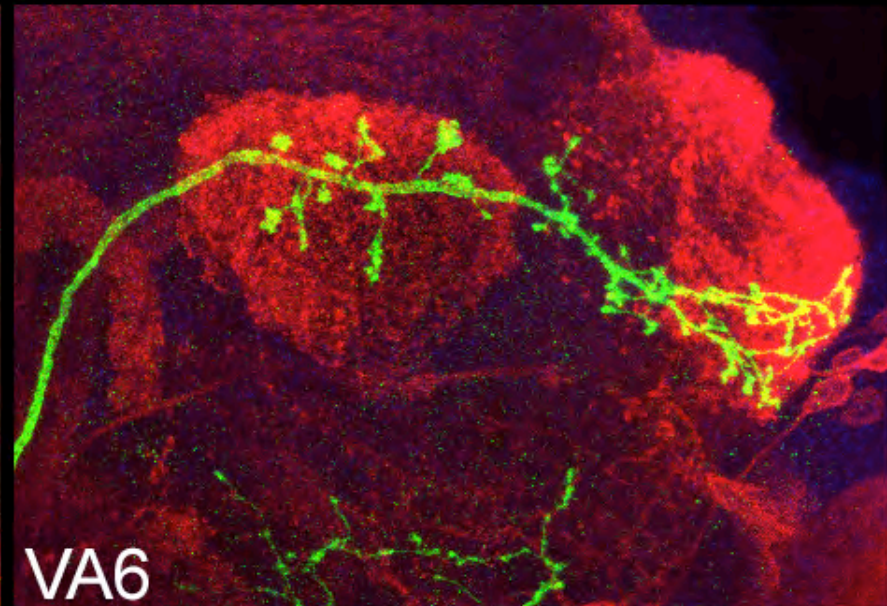
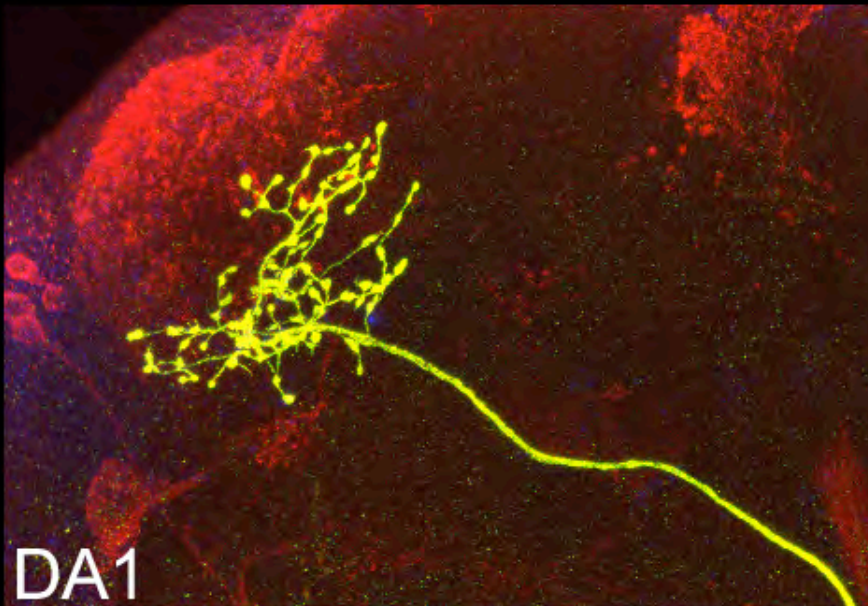
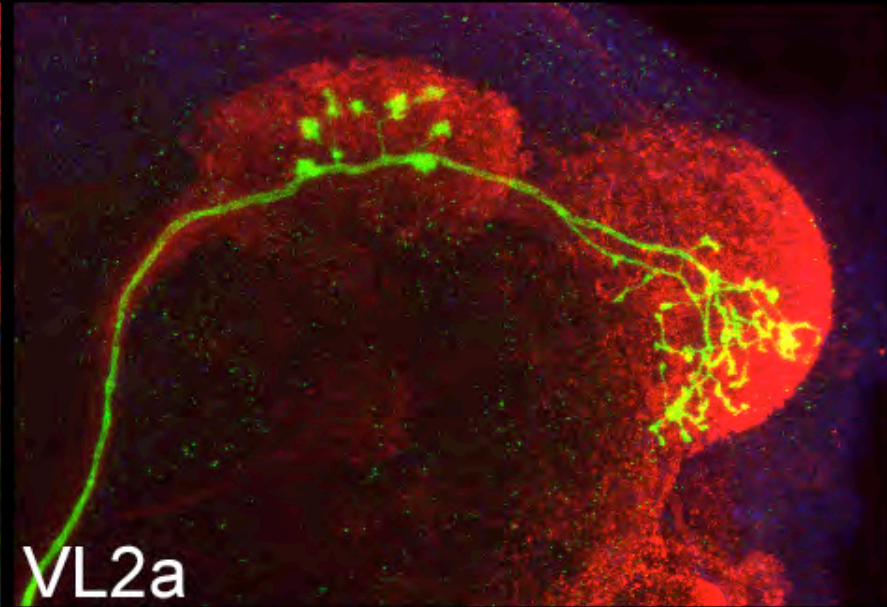
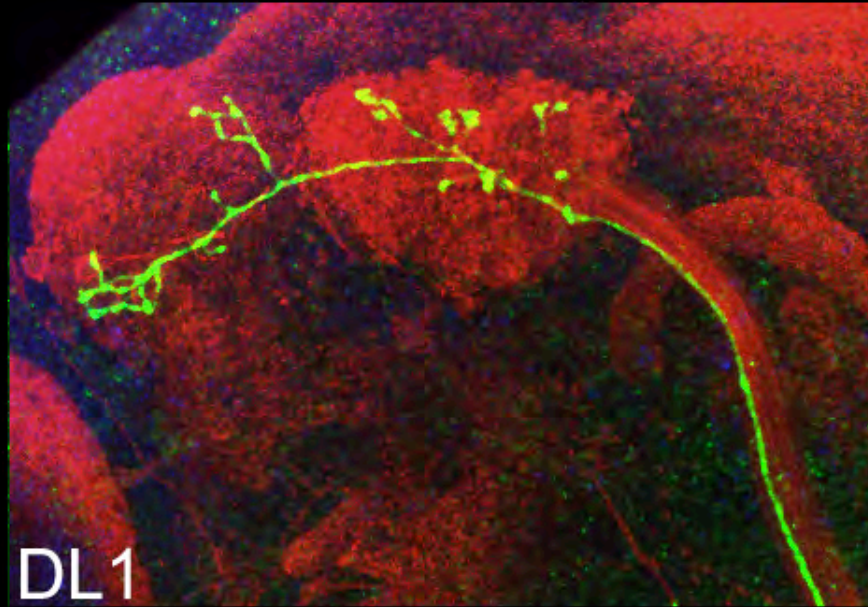
UAS  frt  CD2 Y+ frt  CD8 GFP

hs  FLP

UAS  frt  CD8 GFP

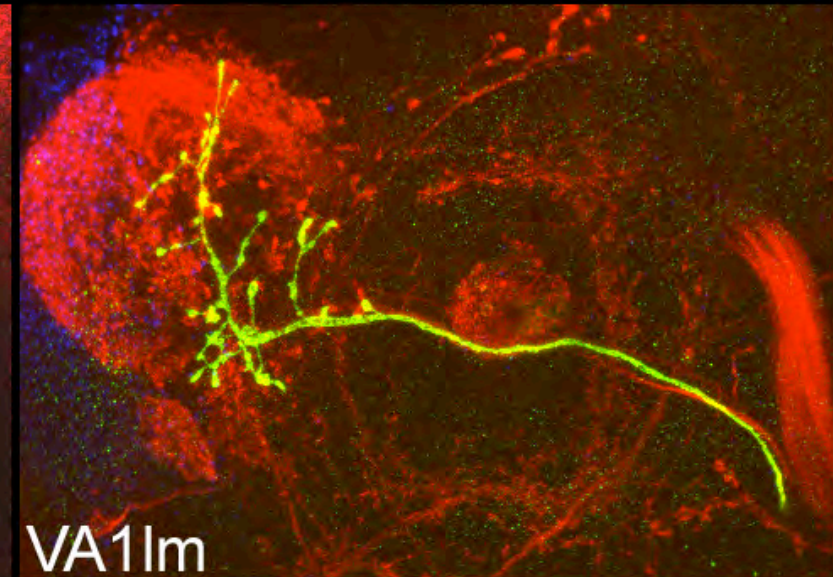
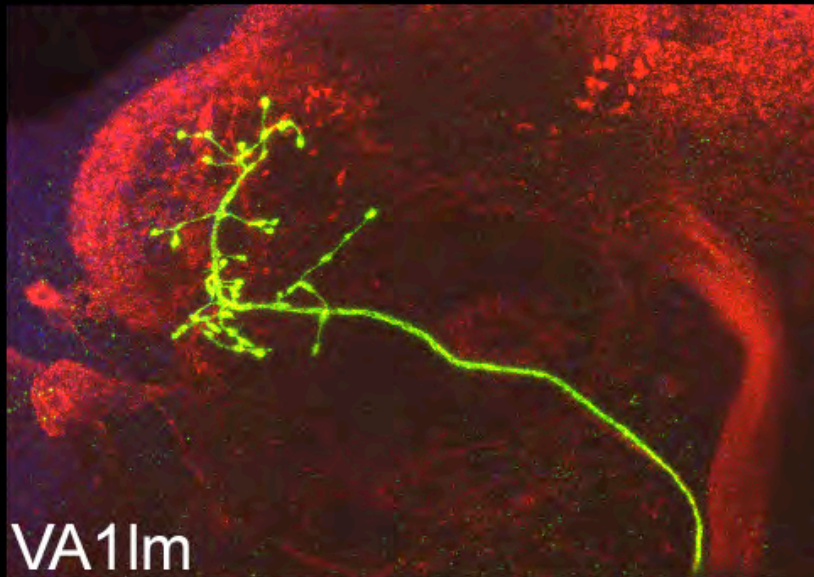
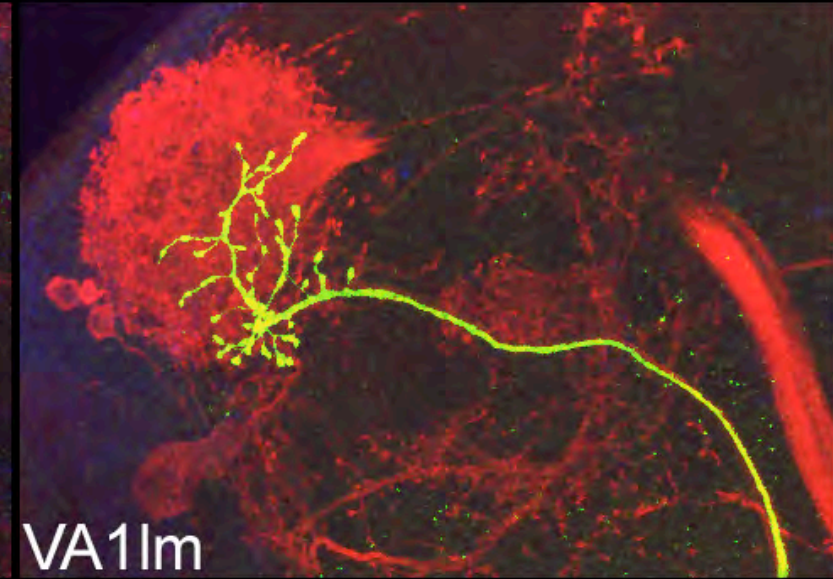
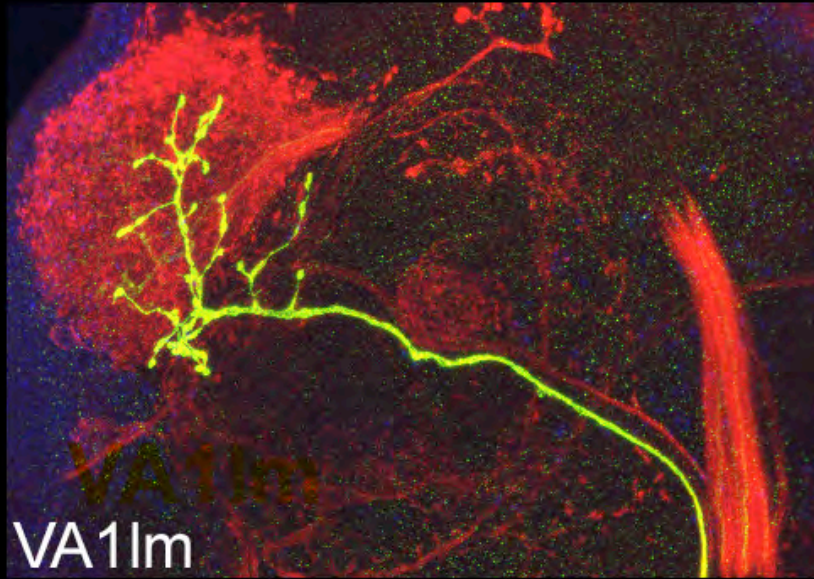


## Different Projection Neurons Show Distinct Patterns in the Protocerebrum

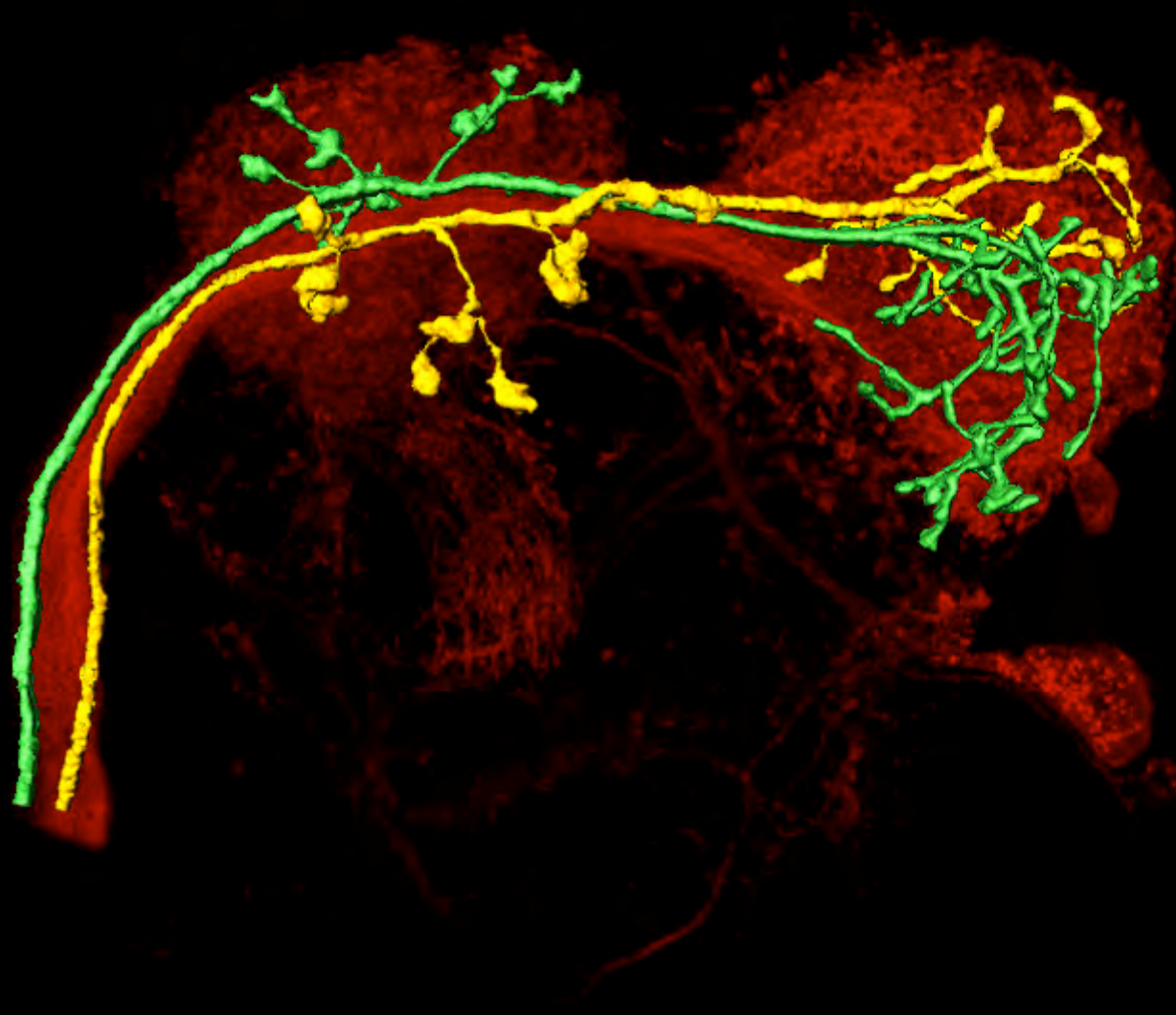




# Maintenance of a Spatial Map in the Protocerebrum



# Mapping the Fly Olfactory System





# Convergence of Glomerular Information

