



What is it like to be a **Giant anteater**? Cytoarchitectonic analysis of open data with **MicroDraw**

Katja **Heuer**, Céline **Delettre**, Xiaoyun **Gui**, Roberto **Toro**

Histological data provides **unique information** on the fine structure of the brain, and has been collected for **more than a century**, for an incredible **number of species**.



- Site Map
- HOME PAGE
- LIST OF SPECIMENS
- EXPLORE COLLECTIONS
- BRAIN SECTIONS
- BRAIN EVOLUTION
- BRAIN DEVELOPMENT
- BRAIN CIRCUITRY
- BRAIN FUNCTIONS
- LOCATION & USE
- RELATED WEBSITES
- CONTACT US
- PERSONNEL
- MSU PORTAL
- MANATEE BRAIN SITE
- BRAIN ATLASES

Comparative Mammalian Brain Collections



MAJOR NATIONAL RESOURCES FOR STUDY OF BRAIN ANATOMY
 the University of Wisconsin, Michigan State University and The National Museum of Health and Medicine.

Wally Welker, John Irwin Johnson, Adrienne Noe

This web site provides browsers with images and information from one of the world's largest collection of well-preserved, sectioned and stained brains of mammals. Viewers can see and download photographs of brains of over 100 different species of mammals (including humans) representing over 20 Mammalian Orders.

Also available are examples of stained sections from a wide variety of brains of special interest, including Humans, Chimpanzees, Monkeys, various Rodents and Carnivores, California Sealion, Florida Manatee, Big Brown Bat, American Badger, American Raccoon, Yellow Mongoose, Zebra, Cow, and the Atlantic Bottlenose Dolphin. A complete list of all available specimens is available. How brain evolution has occurred is discussed.

Viewers will learn why these collections are important, why and how they were assembled, and why it is important to protect, preserve and maintain them. Moreover, a variety of issues in brain science are discussed.

For users who are interested in using any of our images for educational or research purposes, you have our permission to use them. But, they are not to be published and copyrighted since this would prohibit others from using the same images. At any rate, we request that you identify them as from the University of Wisconsin and Michigan State Comparative Mammalian Brain Collections, as well as from those at the National Museum of Health and Medicine. Also, we request that you refer to the Web Site where you obtained them, as well as the fact that preparation of all these images and specimens have been funded by the National Science Foundation, as well as by the National Institutes of Health.

SEARCH
 Enter keyword:

 Go



- Site Map
- HOME PAGE
- LIST OF SPECIMENS
- EXPLORE COLLECTIONS
- BRAIN SECTIONS
- BRAIN EVOLUTION
- BRAIN DEVELOPMENT
- BRAIN CIRCUITRY
- BRAIN FUNCTIONS
- LOCATION & USE
- RELATED WEBSITES
- CONTACT US
- PERSONNEL
- MSU PORTAL
- MANATEE BRAIN SITE
- BRAIN ATLASES

List of Specimens



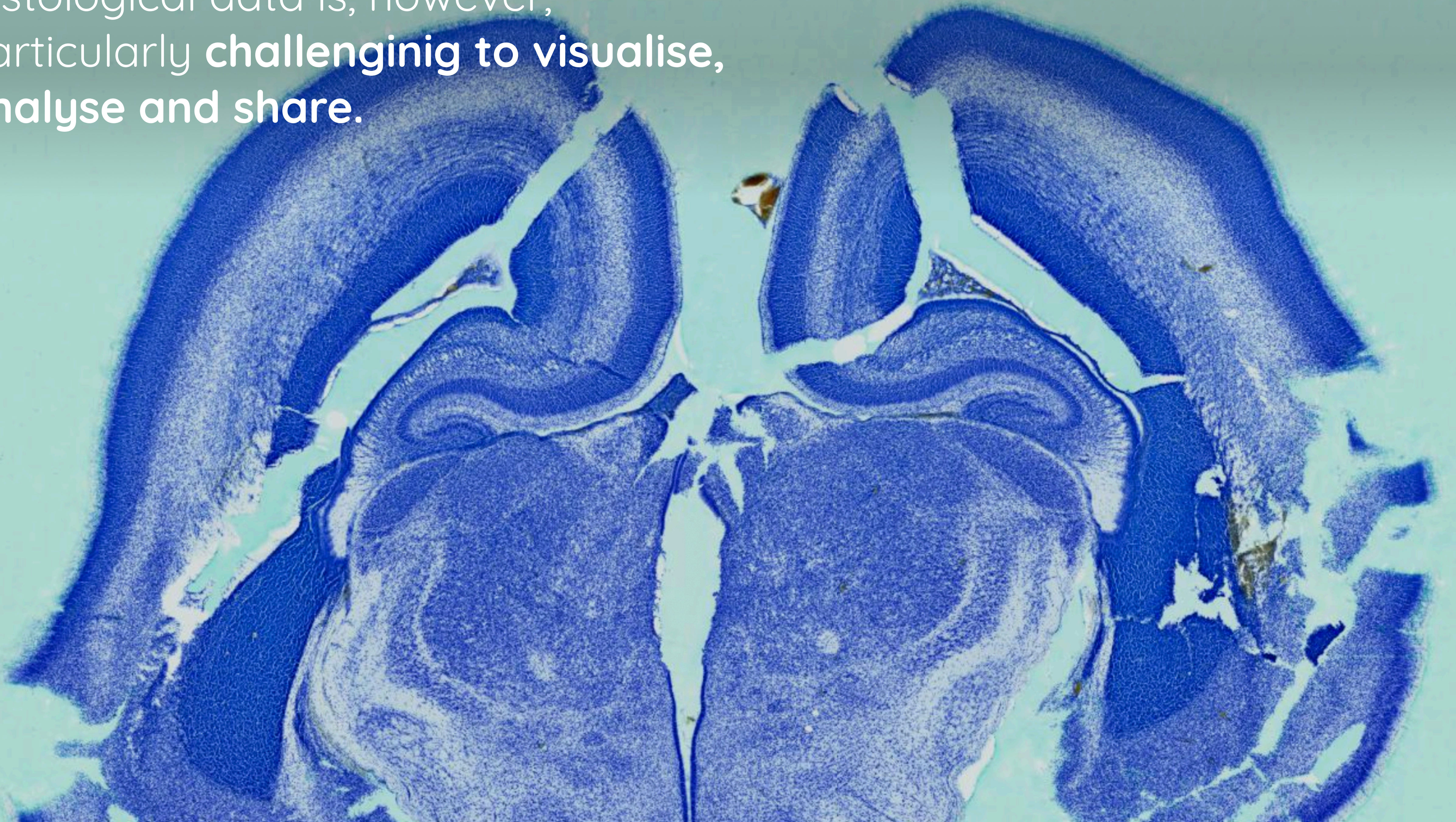
• **Simple Linear List**

| COMMON NAME | SCIENTIFIC NAME |
|---|---|
| | <i>Rationale for using scientific terminology</i> |
| • Platypus, Echidnas | • Monotremata |
| • Opossums | • Didelphimorphia |
| • Caenolestids | • Paucituberculata |
| • Monito del Monte | • Microbiotheria |
| • Marsupial Moles | • Notoryctemorphia (not represented) |
| • Quoll, Tasmanian Devil | • Dasyuromorphia |
| • Bandicoots | • Peramelemorphia |
| • Kangaroos, Gliders, Wallabies | • Diprotodontia |
| • Tenrecs | • Afrosoricida |
| • Elephant Shrews | • Macroscelidea |
| • Aardvark (not represented) | • Tubulidentia (not represented) |
| • Hyraxes | • Hyracoidea |
| • Elephants | • Proboscidea |
| • Manatees, Dugongs | • Sirenia |
| • Armadillos | • Cingulata |
| • Sloths, Anteaters | • Pilosa |
| • Treeshrews | • Scandentia |
| • Flying Lemurs | • Dermoptera |
| • Prosimians, Monkeys, Apes, Humans | • Primates |
| • Rabbits, Hares, Pikas | • Lagomorpha |
| • Hedgehogs | • Erinaceomorpha |
| • Moles, Shrews | • Soricomorpha |
| • Bats | • Chiroptera |
| • Pangolins, Scaly Anteater (not represented) | • Pholidota (not represented) |
| • Dogs, Bears, Raccoons, Cats, Weasels | • Carnivora |
| • Seals, Walrus, Sea Lions | • (Formerly Pinnipedia, now in Carnivora) |

SEARCH
 Enter keyword:

 Go

Histological data is, however,
particularly **challenging to visualise,**
analyse and share.





MicroDraw

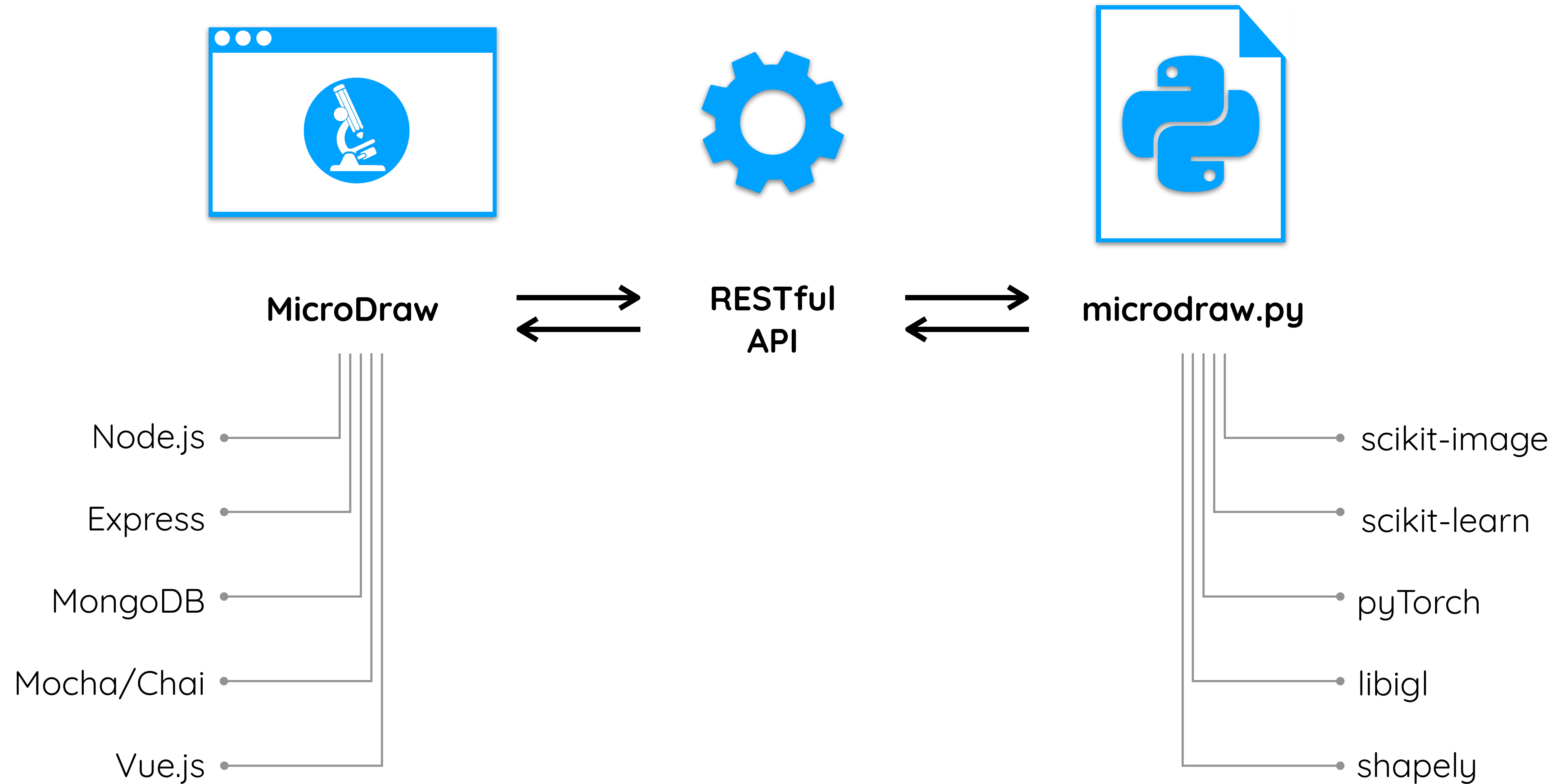
Collaborative atlas creation

MicroDraw is a web application to visualise and annotate collaboratively high resolution histology data. Annotations are vectorial, and you can use boolean operations to combine, subtract and split regions. Point MicroDraw to your own DeepZoom data, or try the sample datasets below.

Enter a DeepZoom image URL and click Go

[▼ A list of datasets to try](#)

Technology stack



67-29

#1020

0
100
200
300
400
500
600
700
800



1 cm

University of Wisconsin-Madison Brain Collection

0 200 400 600 800 1000

67-29

#1020

0
100
200
300
400
500
600
700
800



1 cm

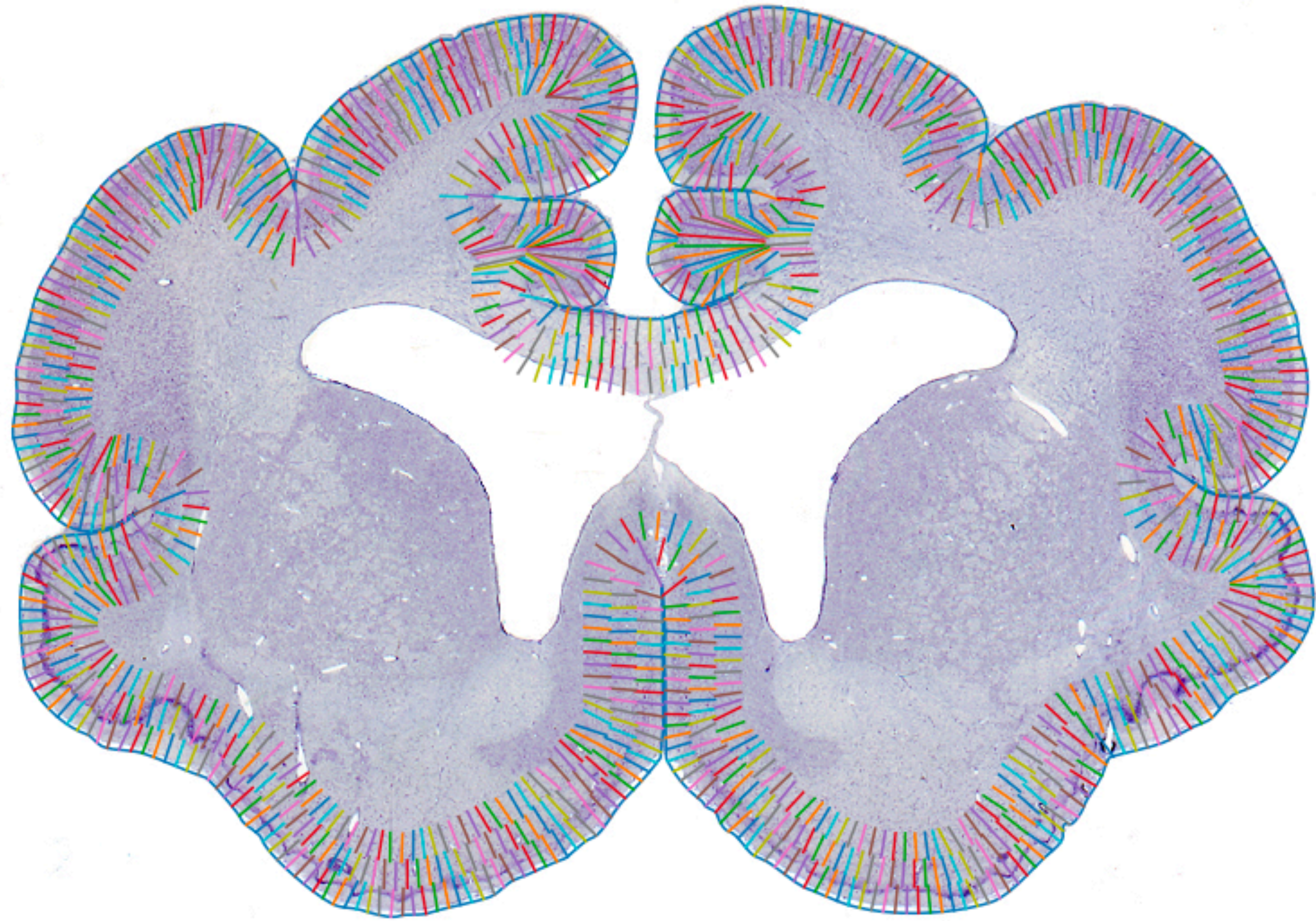
University of Wisconsin-Madison Brain Collection

0 200 400 600 800 1000

67-29

#1020

0
100
200
300
400
500
600
700
800

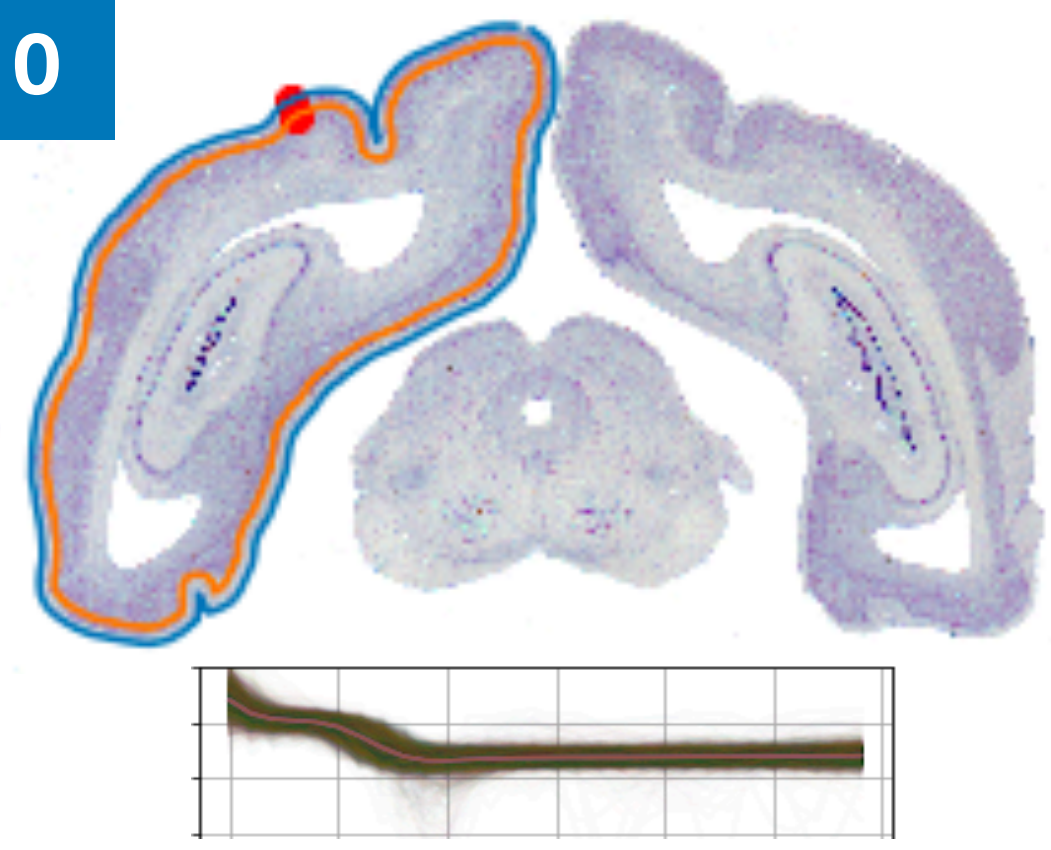


1 cm

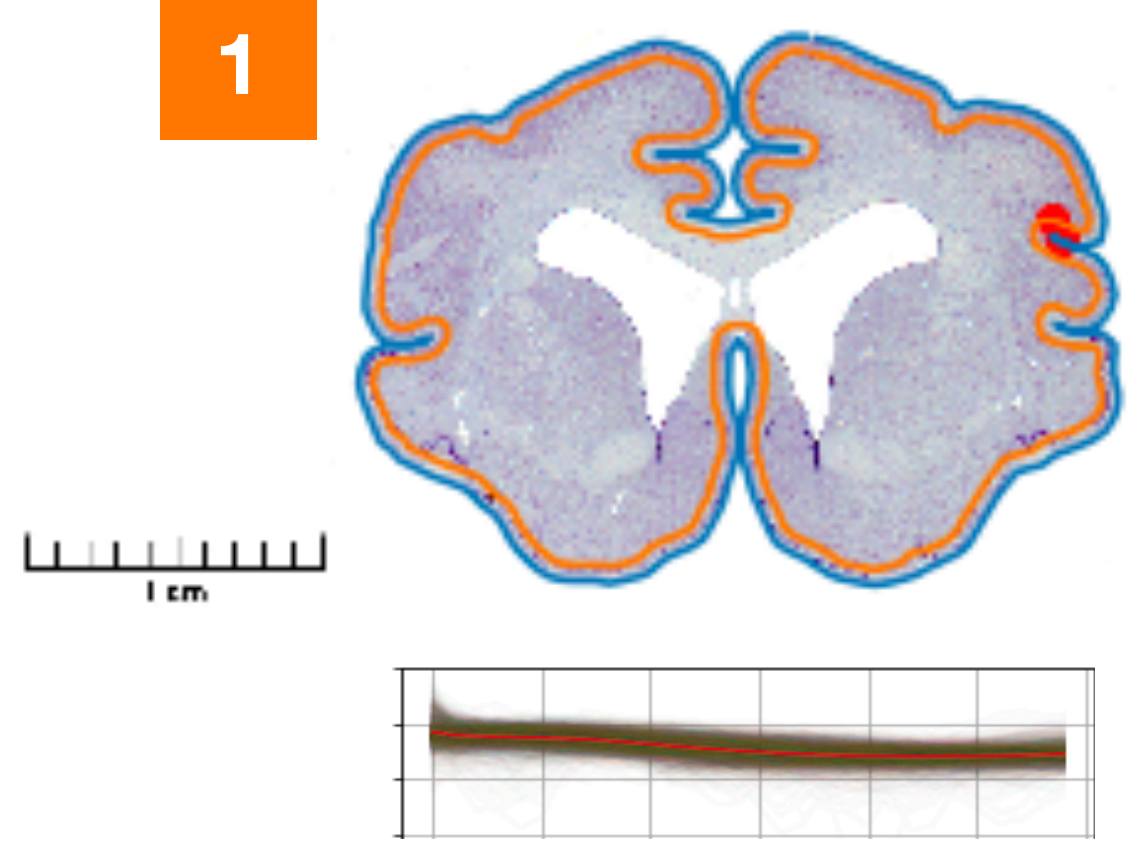
University of Wisconsin-Madison Brain Collection

0 200 400 600 800 1000

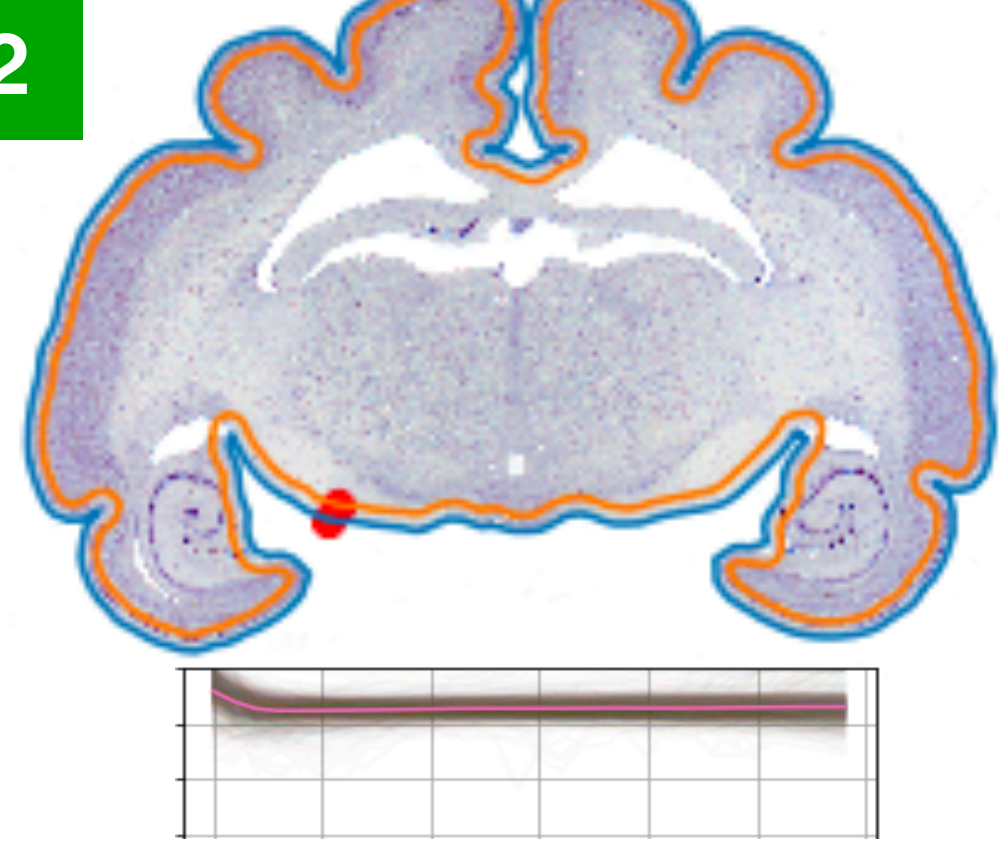
0



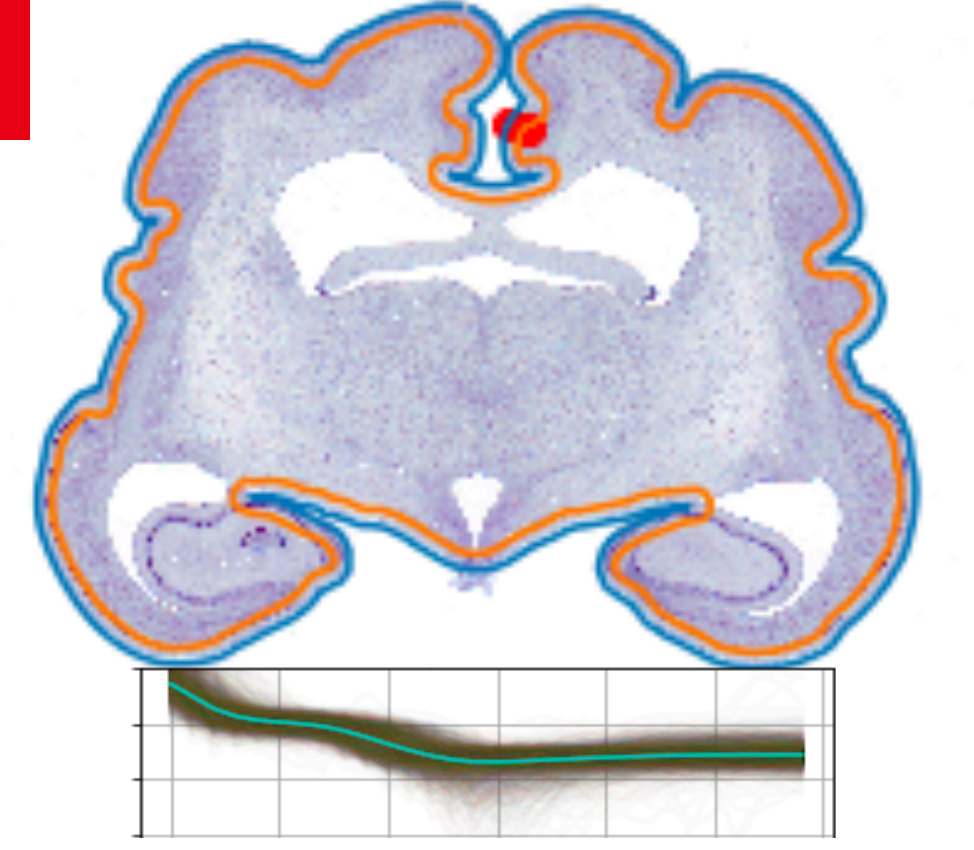
1



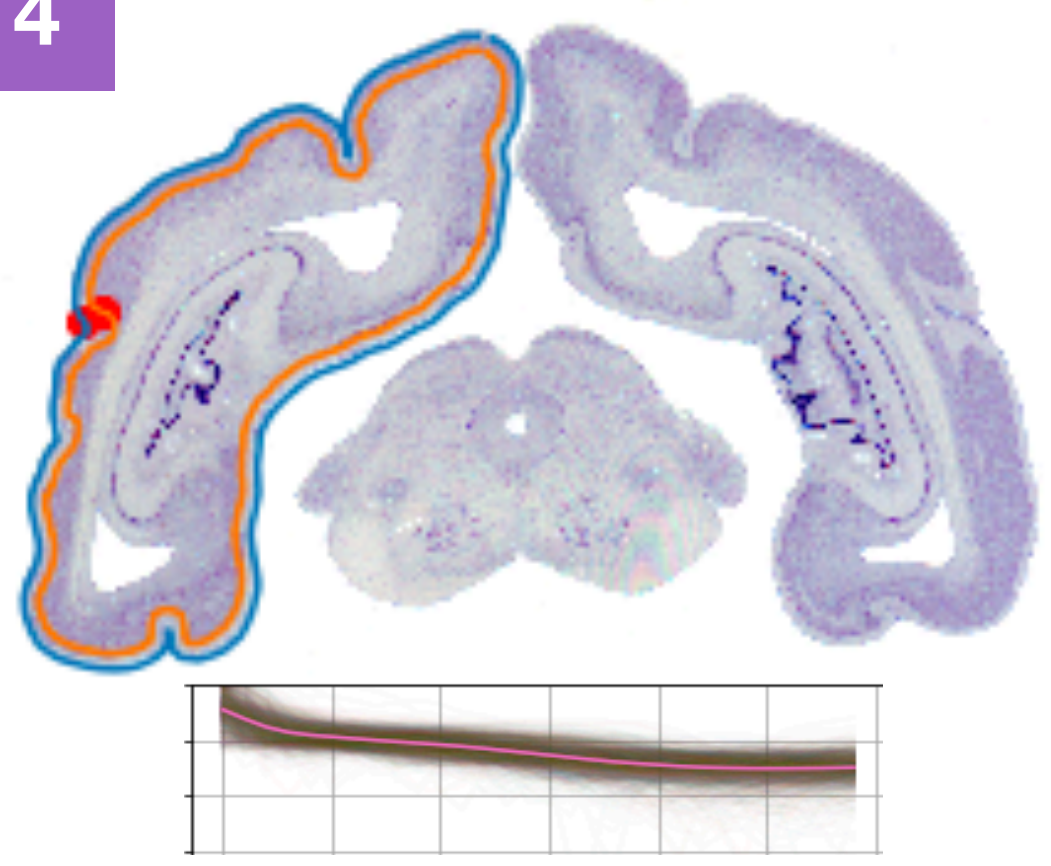
2



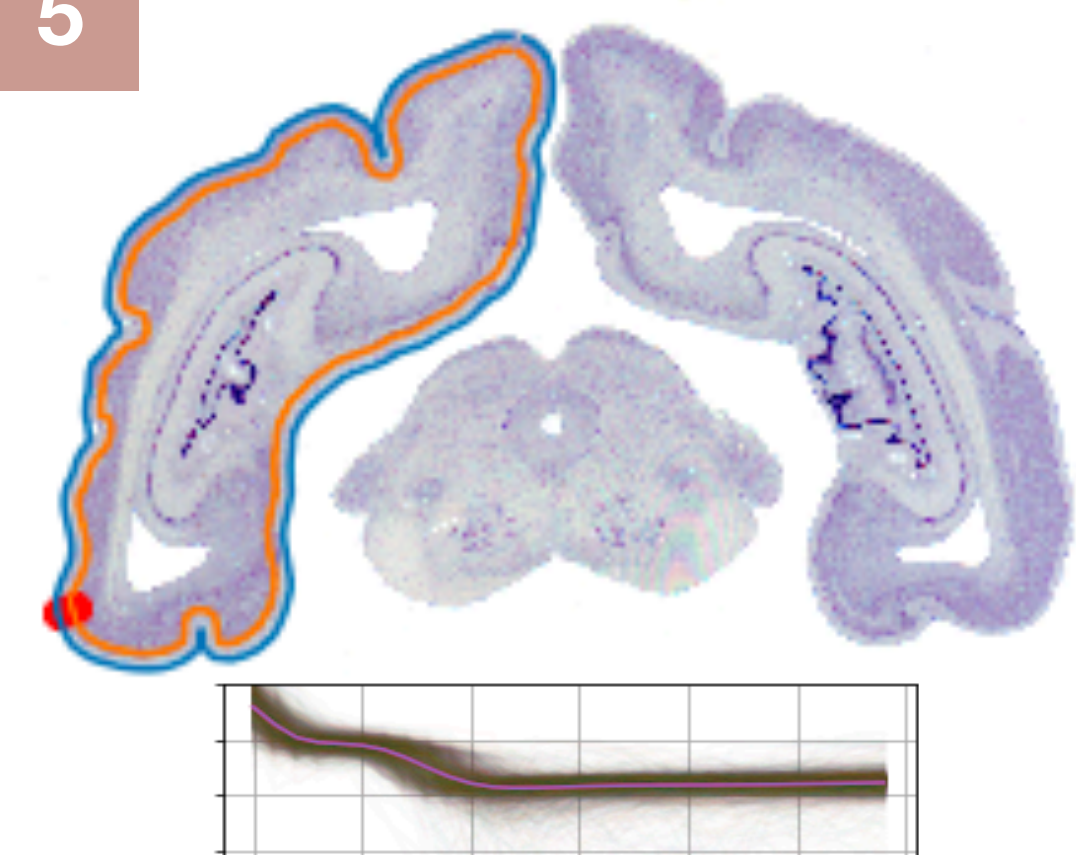
3



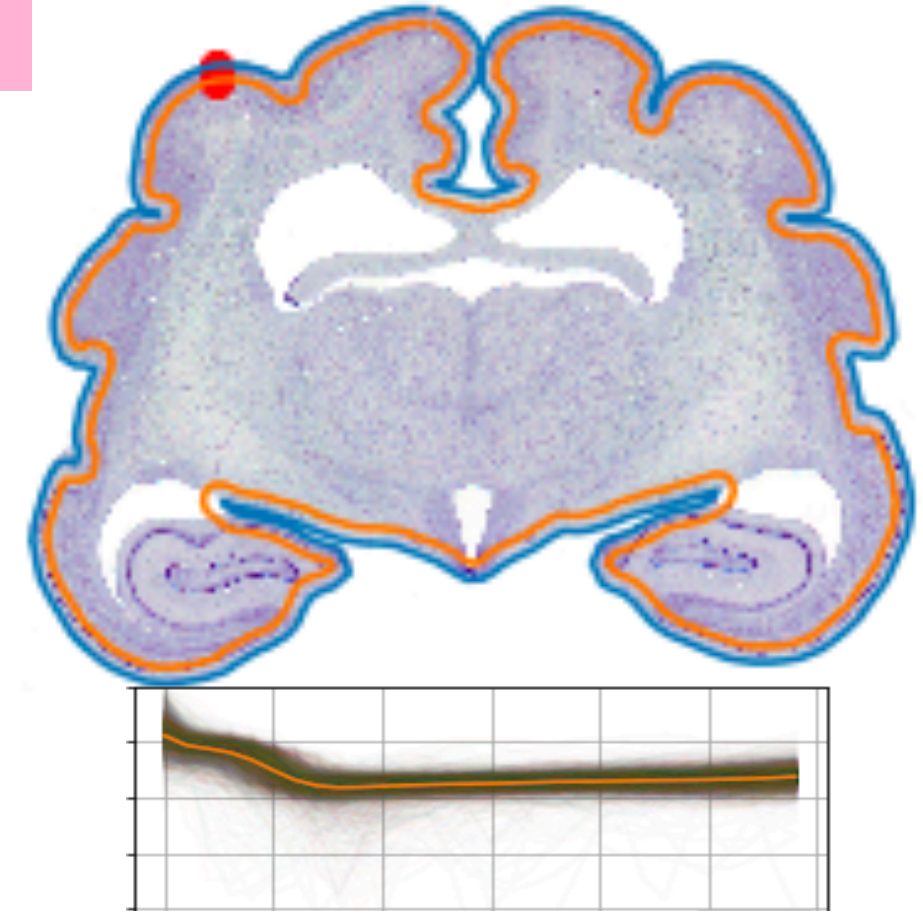
4



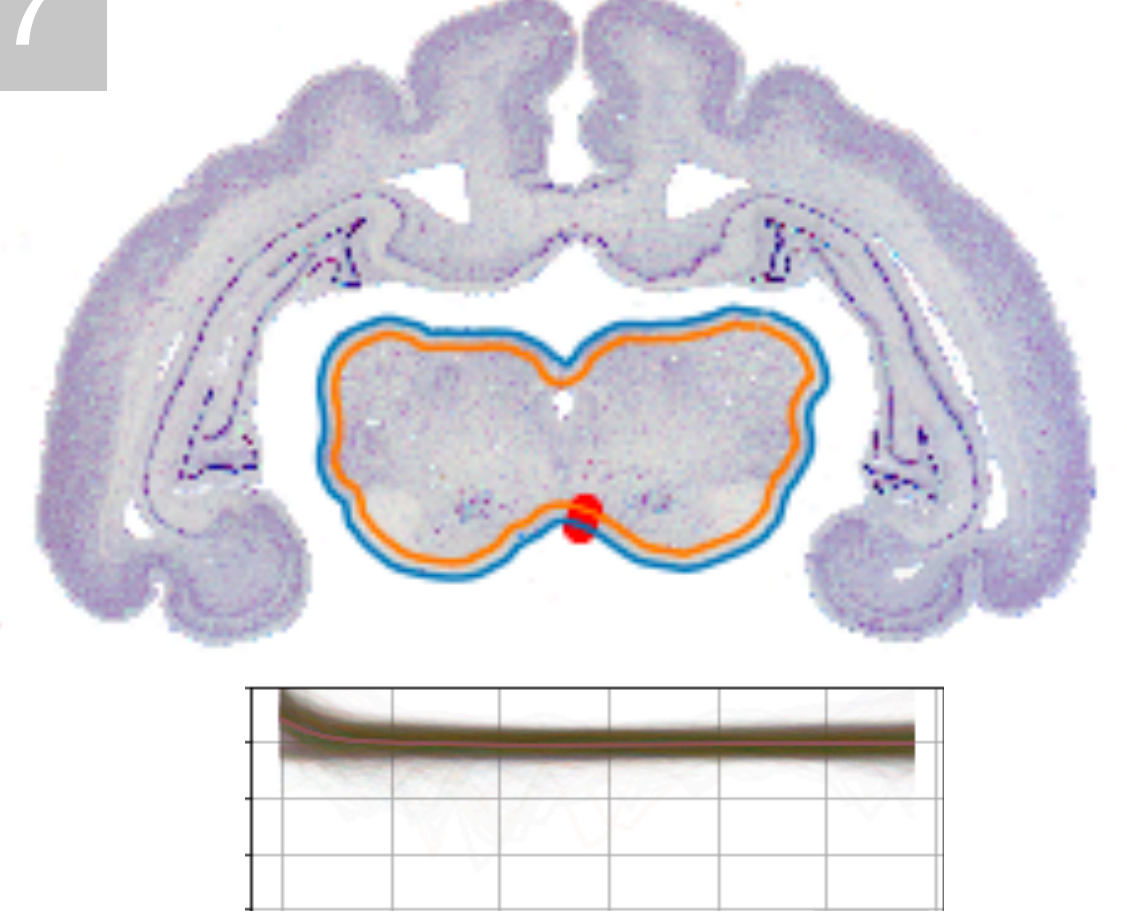
5



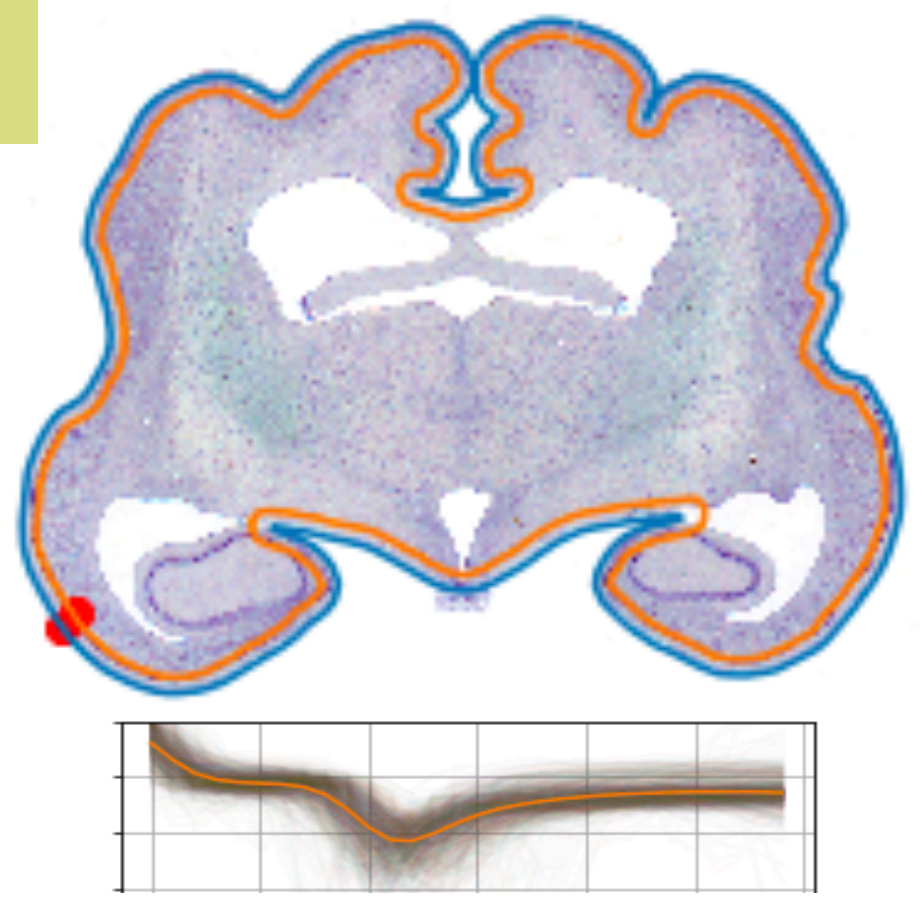
6



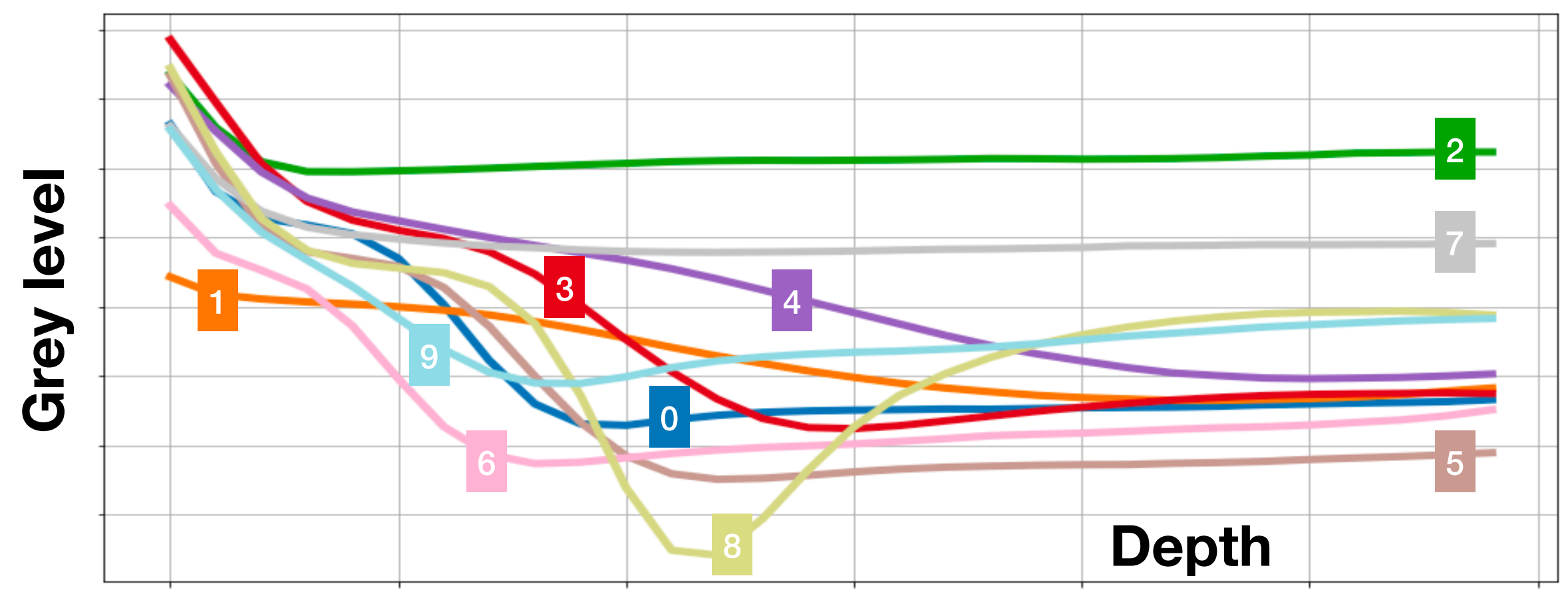
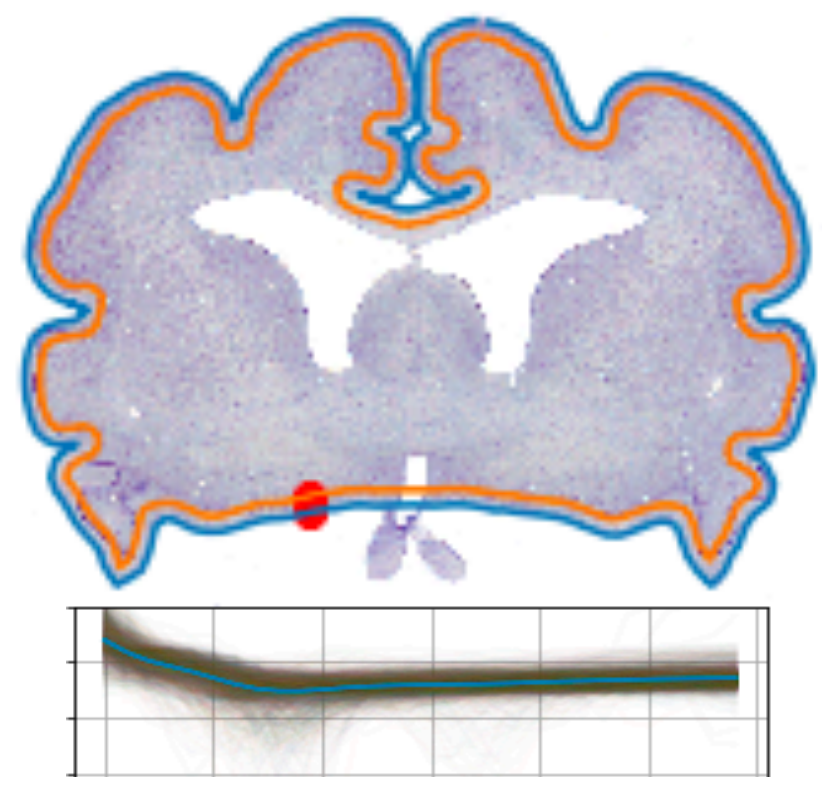
7

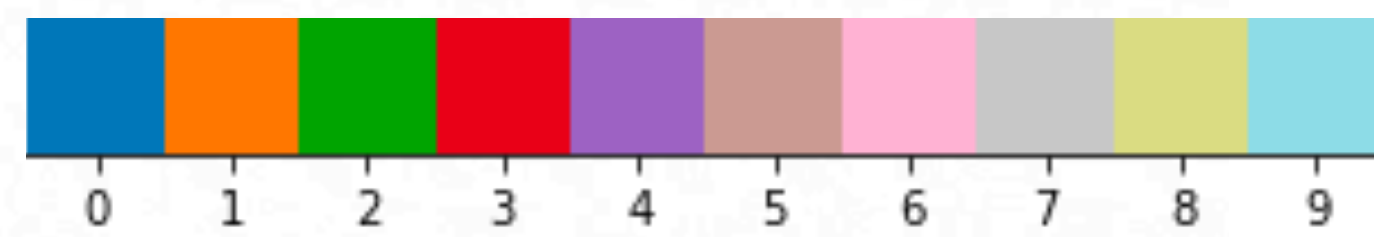
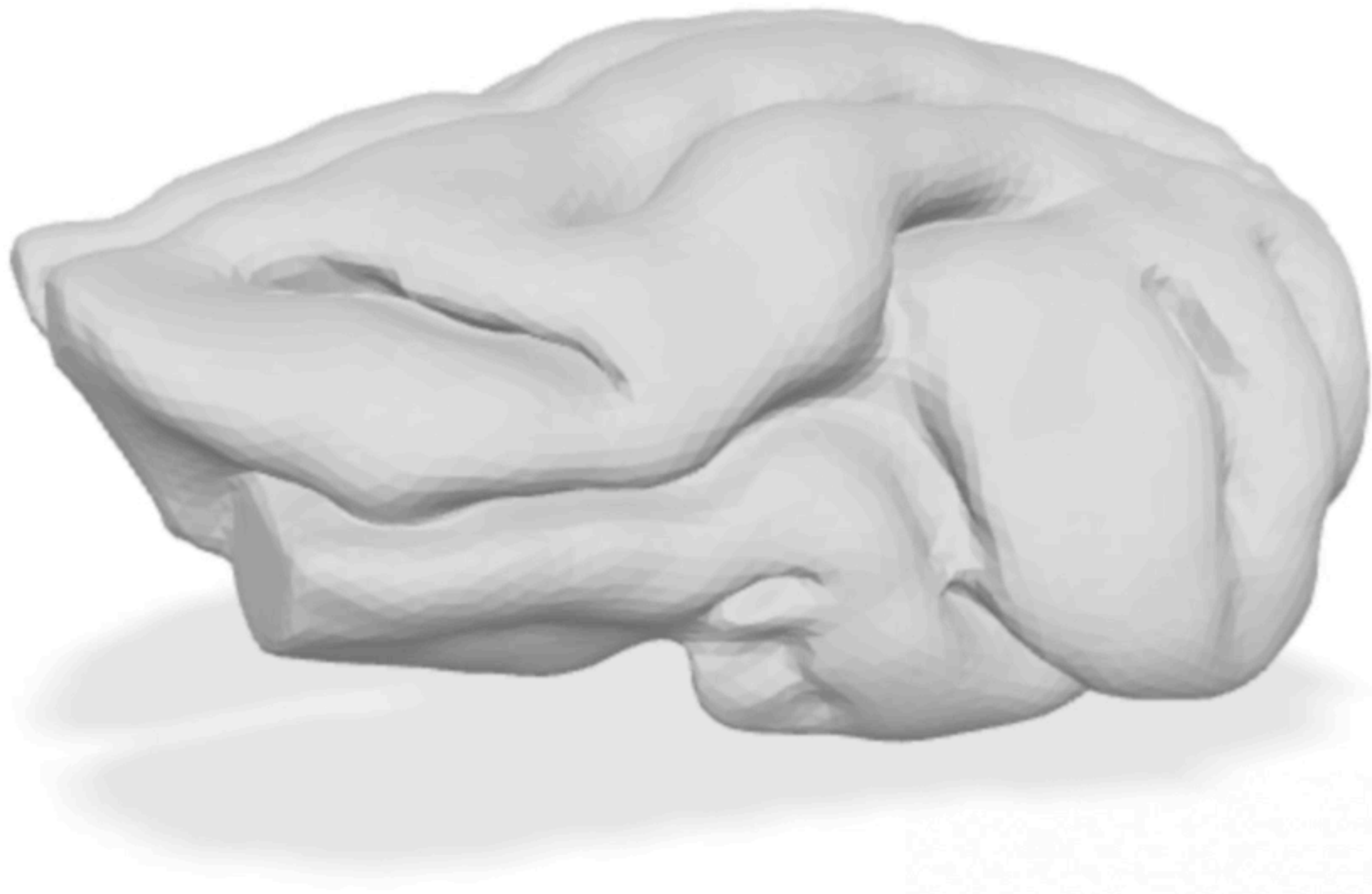


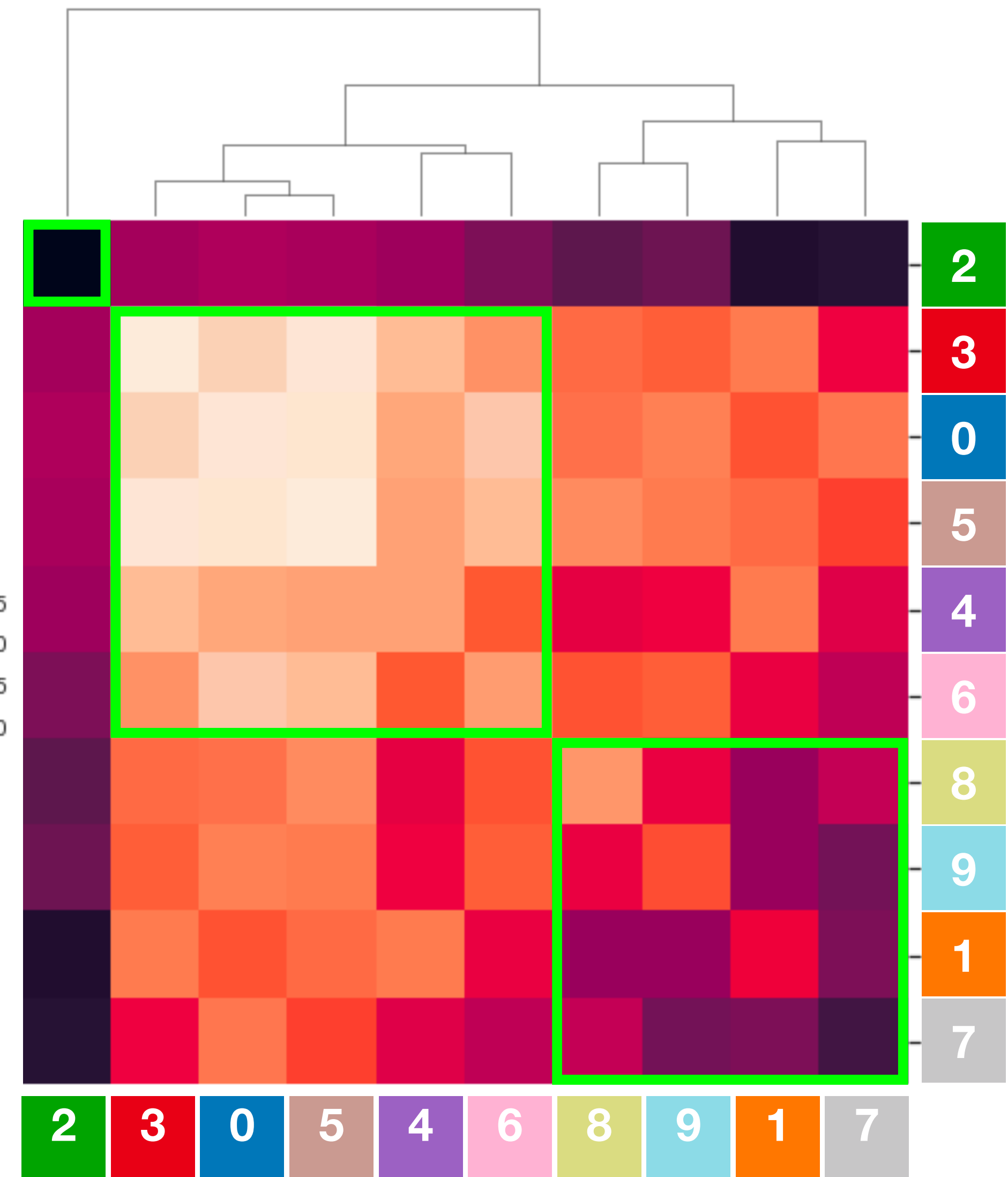
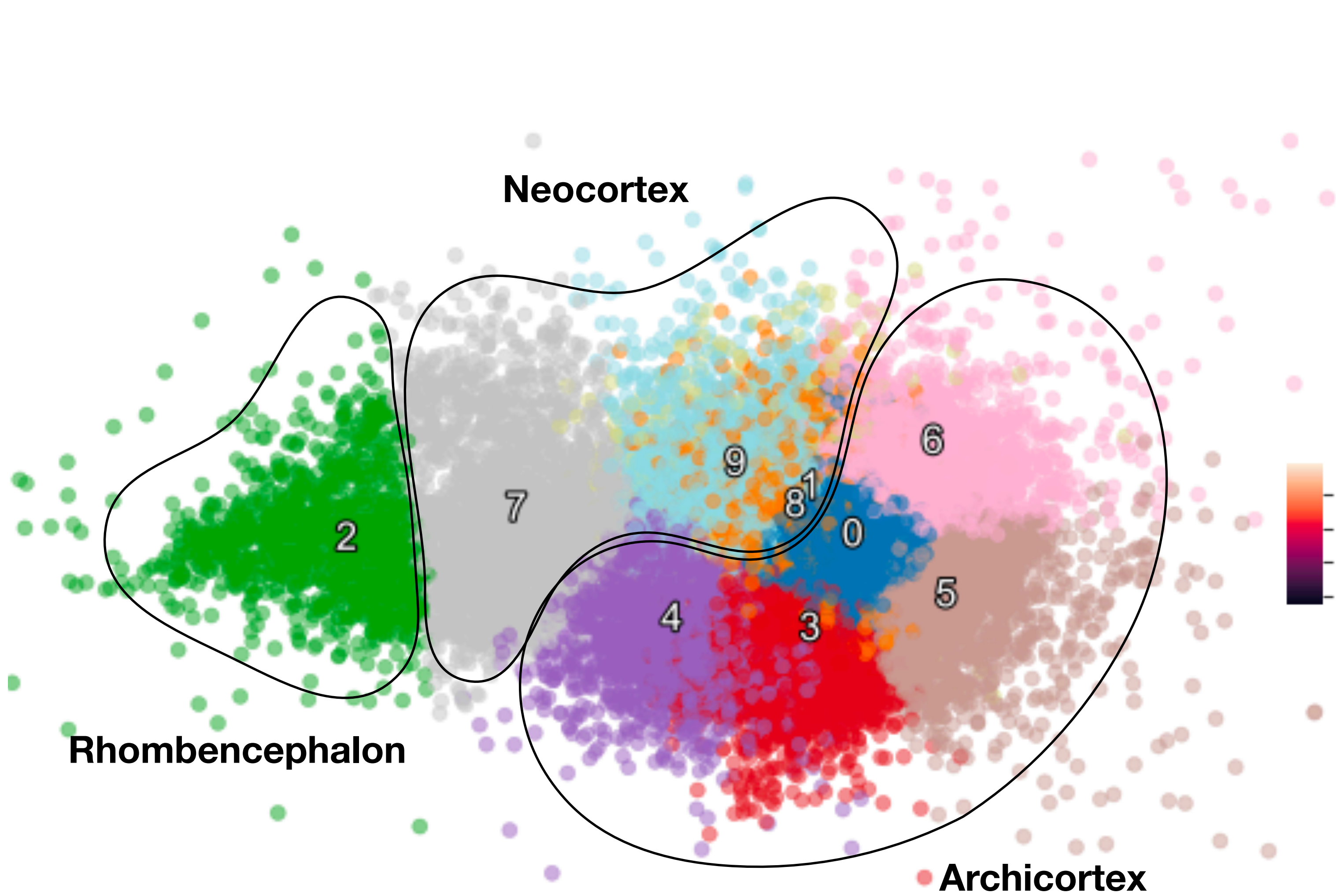
8



9







Most neocortical sulci look like archicortex ↑

MicroDraw allowed us to perform a **complete** quantitative cytoarchitectonic analysis.

MicroDraw is fast and lightweight, runs on desktop computers and mobile devices, its code is open, and its development adheres to open science and software engineering **best practices**.

MicroDraw could provide a platform for data-sharing in our community, facilitating distributed scientific **collaboration** and citizen science.

