

NeuroMaps Mapper

The Mapper is a stand-alone application for mapping data to brain atlases for presentation and publication.

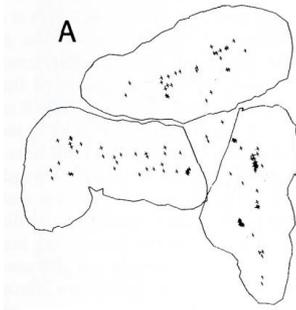
Image data are mapped to a stereotaxic MRI atlas of the macaque brain or the mouse brain.

This tutorial shows how mapping to a standard atlas adds value to image data.

It illustrates mapping an area to the macaque atlas but is equally applicable to the mouse atlas.

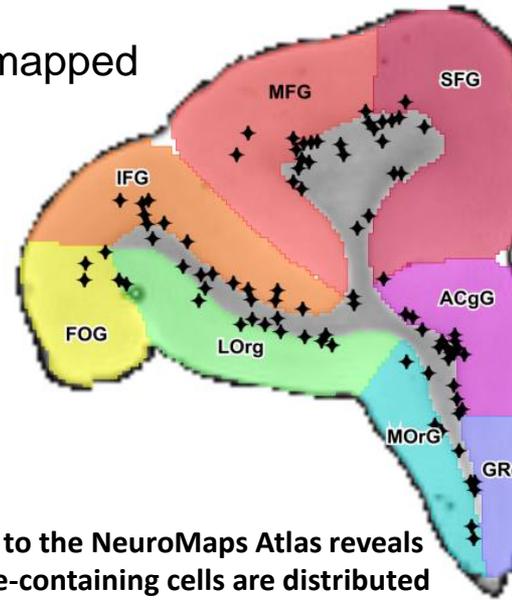
Mapping Image Data to a Standard Atlas Adds Value

Original



Dopaminergic cells in prefrontal cortex.
Illustration from Dubach M (1994) in
*Phylogeny and Development of
Catecholamine Systems*, Smeets JAJ and
Reiner A Eds.

Cells Remapped

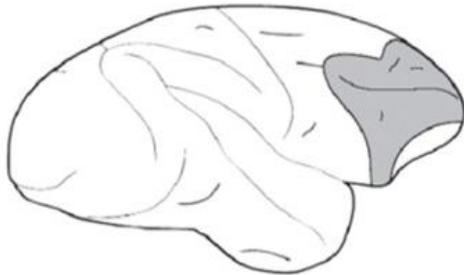


**Mapping cells to the NeuroMaps Atlas reveals
that dopamine-containing cells are distributed
along the gray-white boundary of all areas of
prefrontal cortex.**



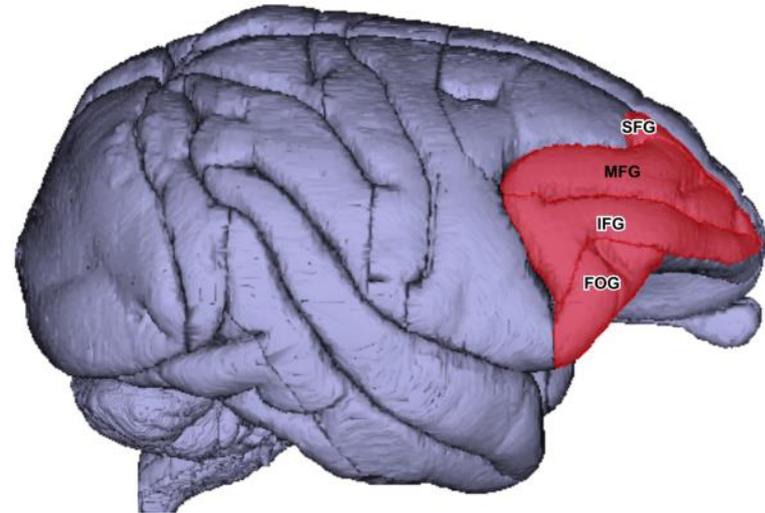
Mapping Image Data to a Standard Atlas Adds Value

Original



Lateral prefrontal cortex lesion
causing top-down attentional deficit
Rossi, A. F. et al., *Journal of Neuroscience*
27:11306-11314 (2007)

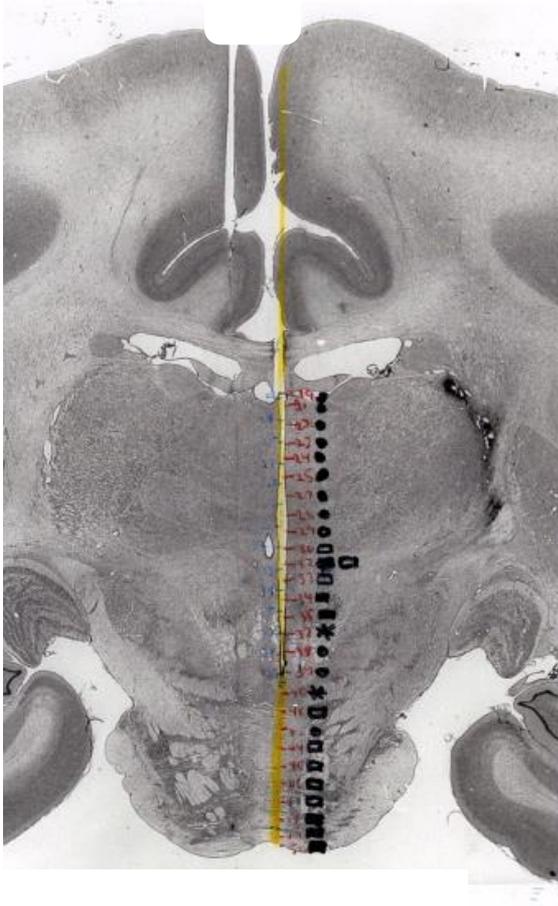
Lesion Remapped



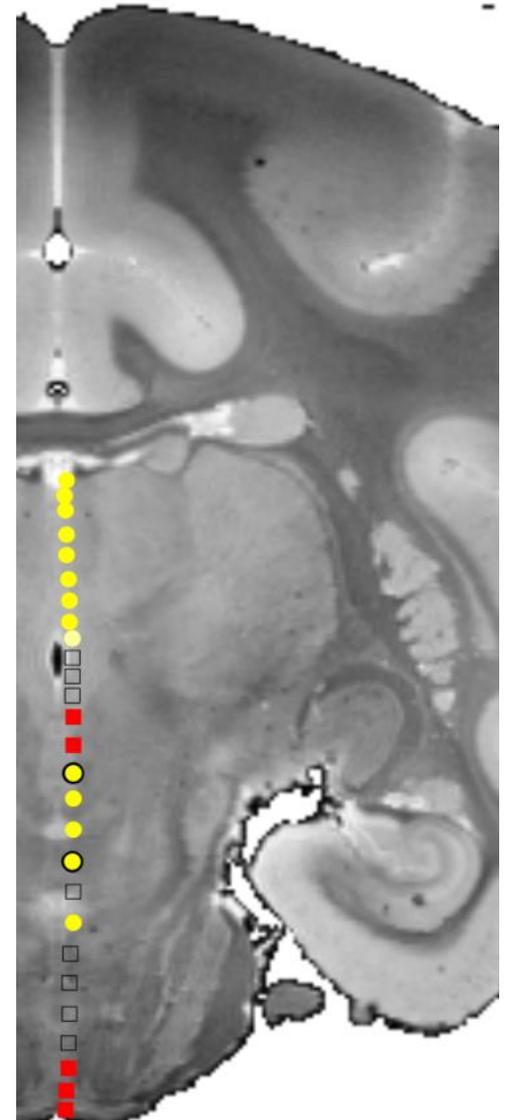
Mapping the lesion to a lateral surface view of the NeuroMaps Atlas shows that the lesion involves the superior, middle, inferior, and fronto-orbital gyri of the frontal lobe



Mapping Image Data to a Standard Atlas Adds Value

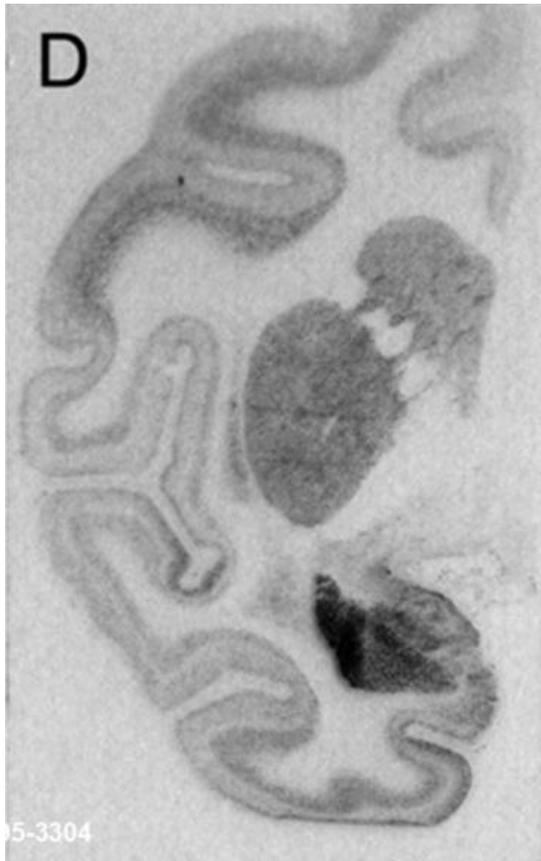


Color coding of positive and negative sites makes salient the grouping of sites by reinforcement value.

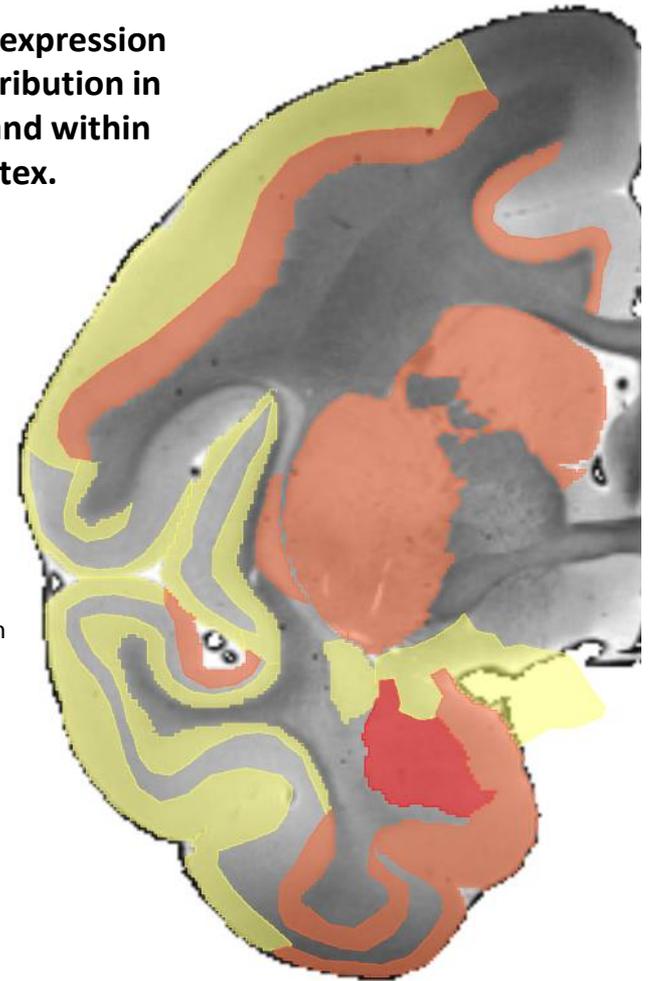
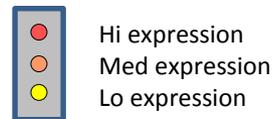


Sites of positive and negative reinforcement
by electrical brain stimulation
Bowden DM (unpublished)

Mapping Image Data to a Standard Atlas Adds Value



Color coding level of expression makes salient its distribution in different structures and within layers of cerebral cortex.



Expression of gene GUCY1A3 in infant macaques subjected to maternal deprivation
Sabatini, M. J. et al., *Journal of Neuroscience* 2007;27:3295-3304

**This tutorial
will illustrate
mapping cortical
area 4(F1)**

**from a page in the
rhesus macaque atlas
of
Paxinos, Huang & Toga
(2000)**

to the

**NeuroMaps Macaque
Brain Atlas**

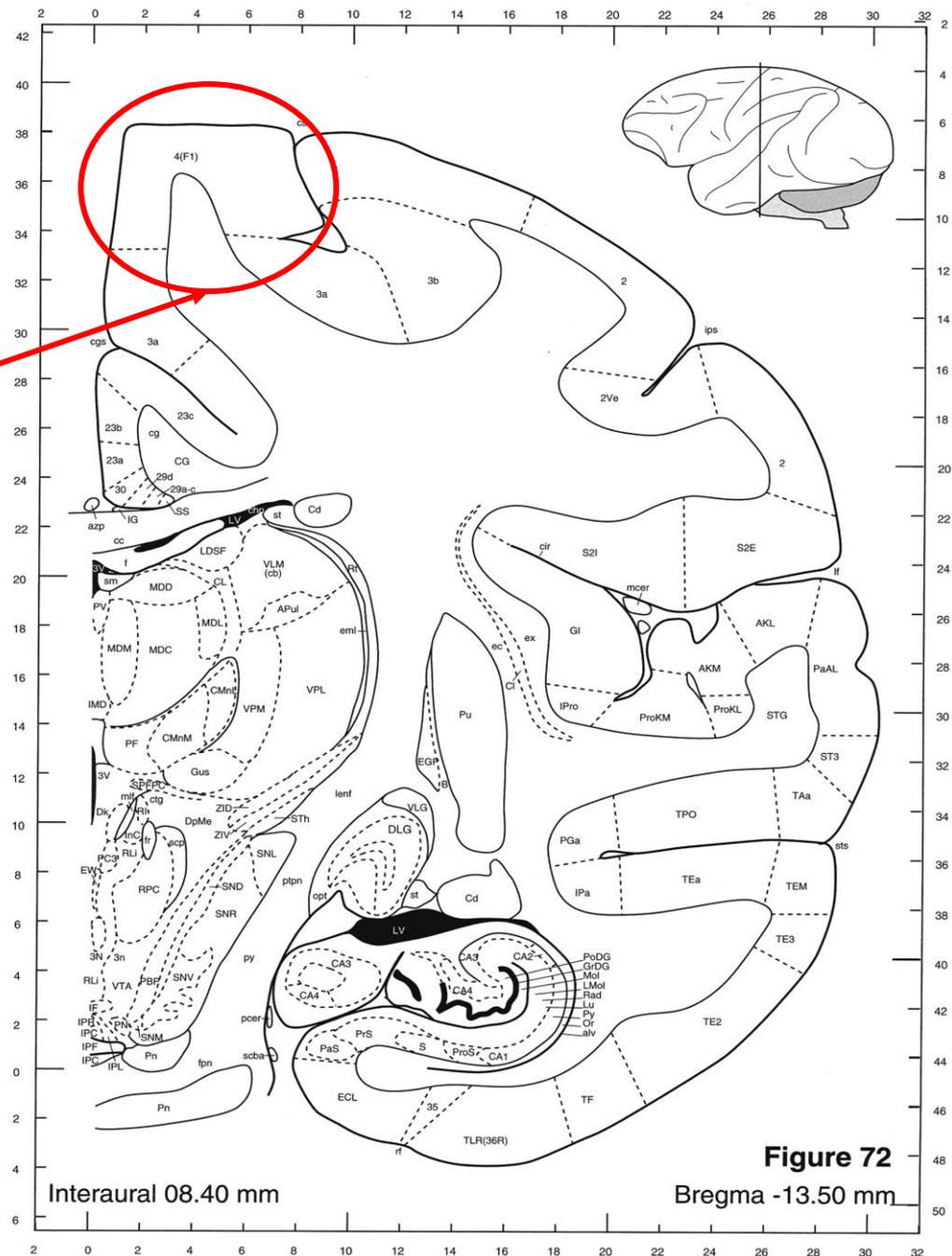


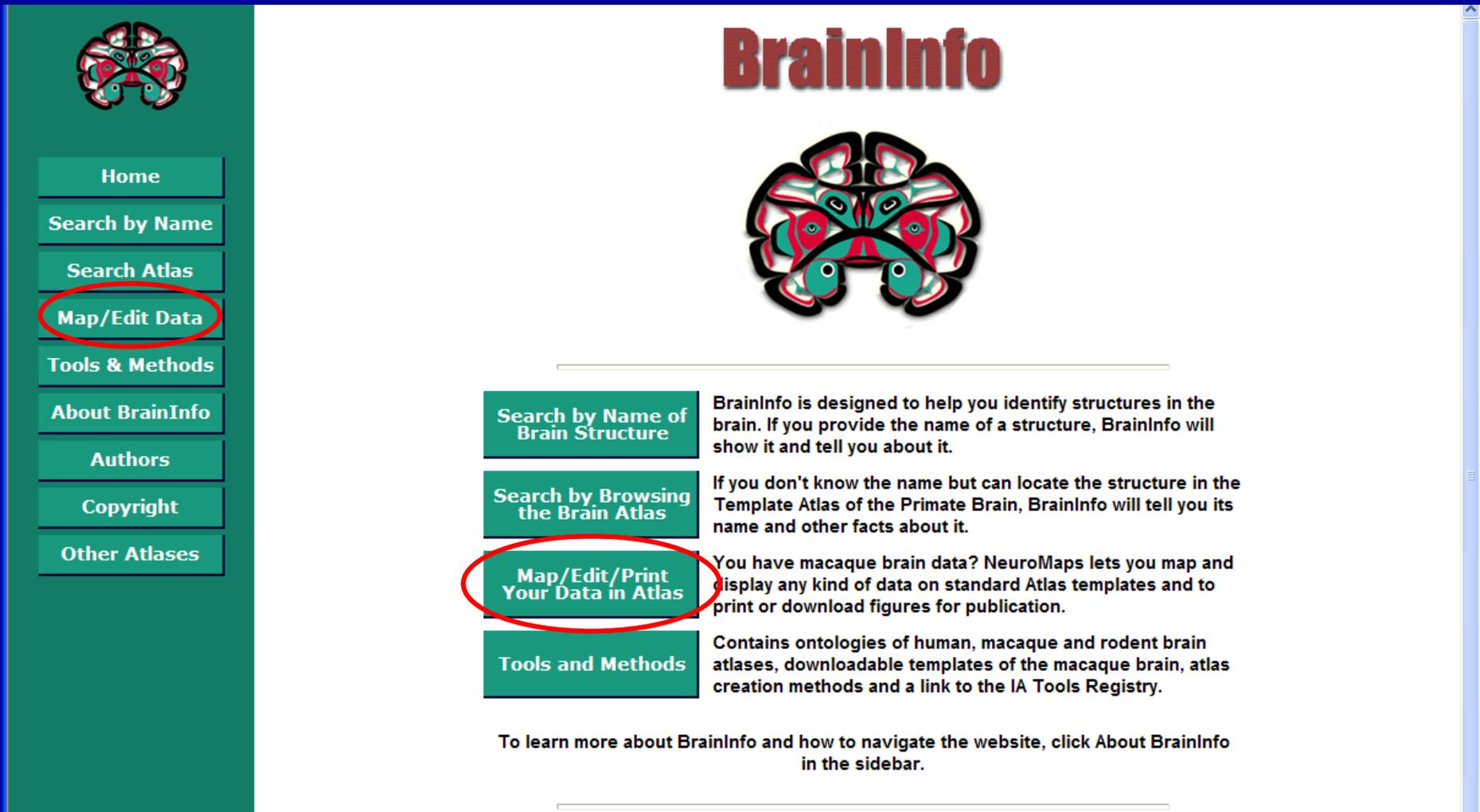
Figure 72

Bregma -13.50 mm

To download the Mapper the first time, go to BrainInfo: <http://braininfo.org>

Click 'Map/Edit/Print Your Data in Atlas'

After the first download you will enter the Mapper directly from your desktop



BrainInfo

Home
Search by Name
Search Atlas
Map/Edit Data
Tools & Methods
About BrainInfo
Authors
Copyright
Other Atlases

Search by Name of Brain Structure BrainInfo is designed to help you identify structures in the brain. If you provide the name of a structure, BrainInfo will show it and tell you about it.

Search by Browsing the Brain Atlas If you don't know the name but can locate the structure in the Template Atlas of the Primate Brain, BrainInfo will tell you its name and other facts about it.

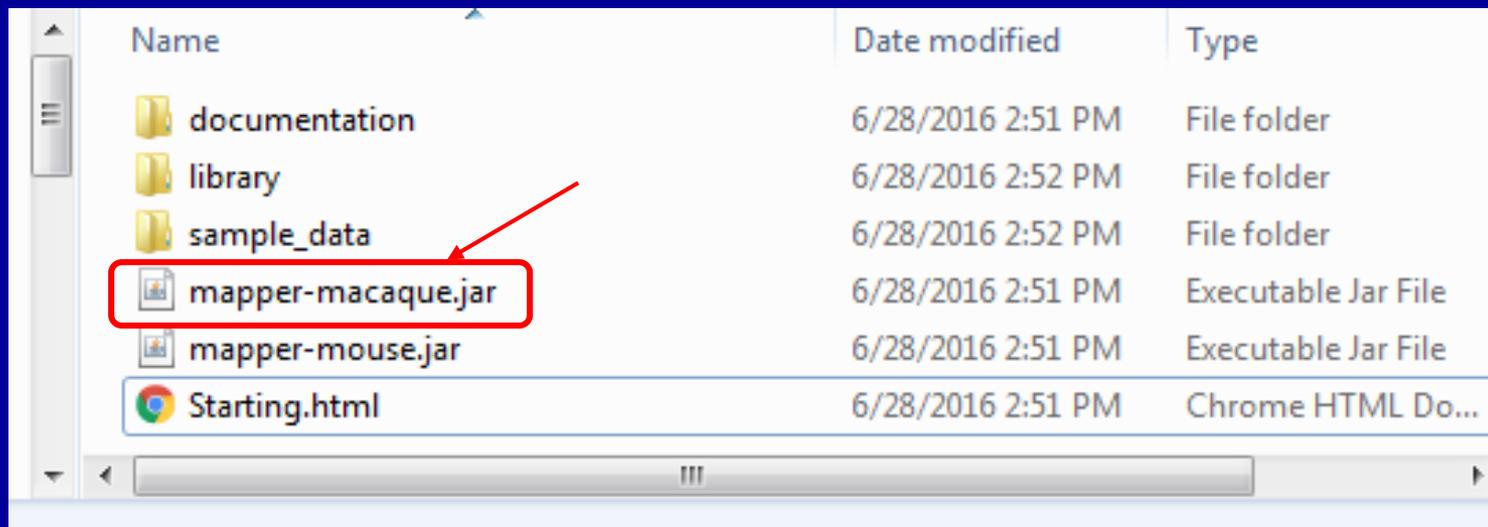
Map/Edit/Print Your Data in Atlas You have macaque brain data? NeuroMaps lets you map and display any kind of data on standard Atlas templates and to print or download figures for publication.

Tools and Methods Contains ontologies of human, macaque and rodent brain atlases, downloadable templates of the macaque brain, atlas creation methods and a link to the IA Tools Registry.

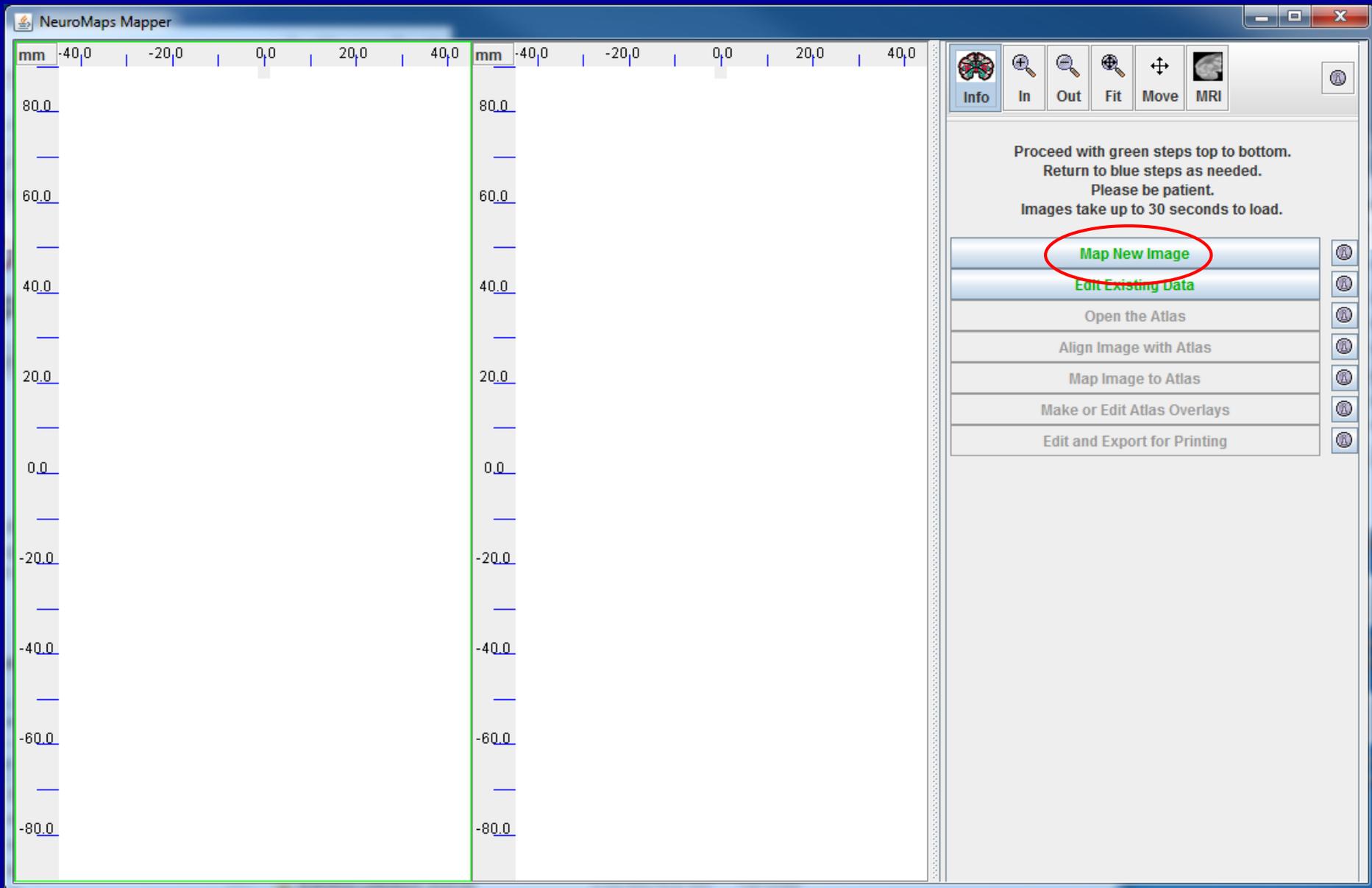
To learn more about BrainInfo and how to navigate the website, click About BrainInfo in the sidebar.

You will follow the instructions in BrainInfo for download and installation of the Mapper

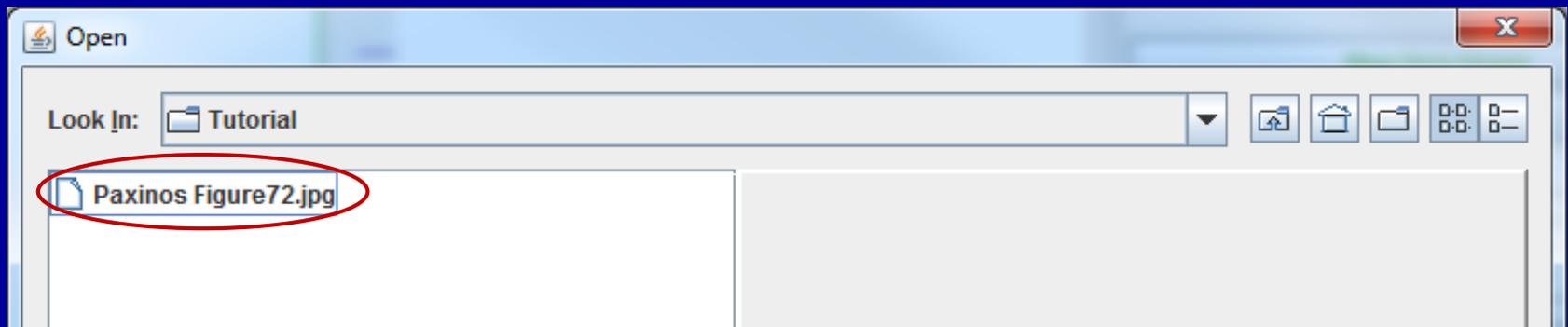
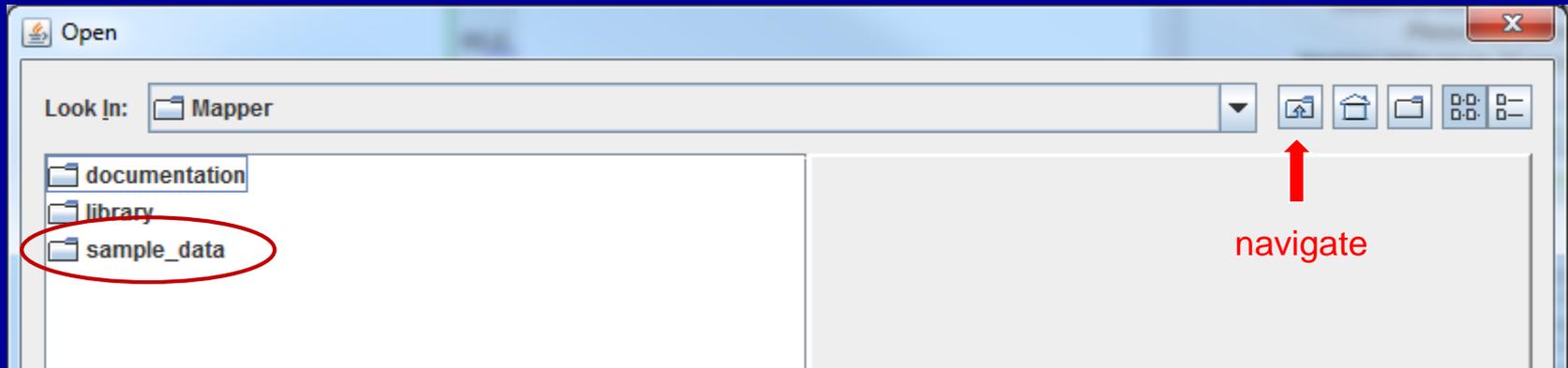
When you have opened the folder below, double click 'mapper-macaque.jar'



On the opening page:
Click: 'Map New Image'



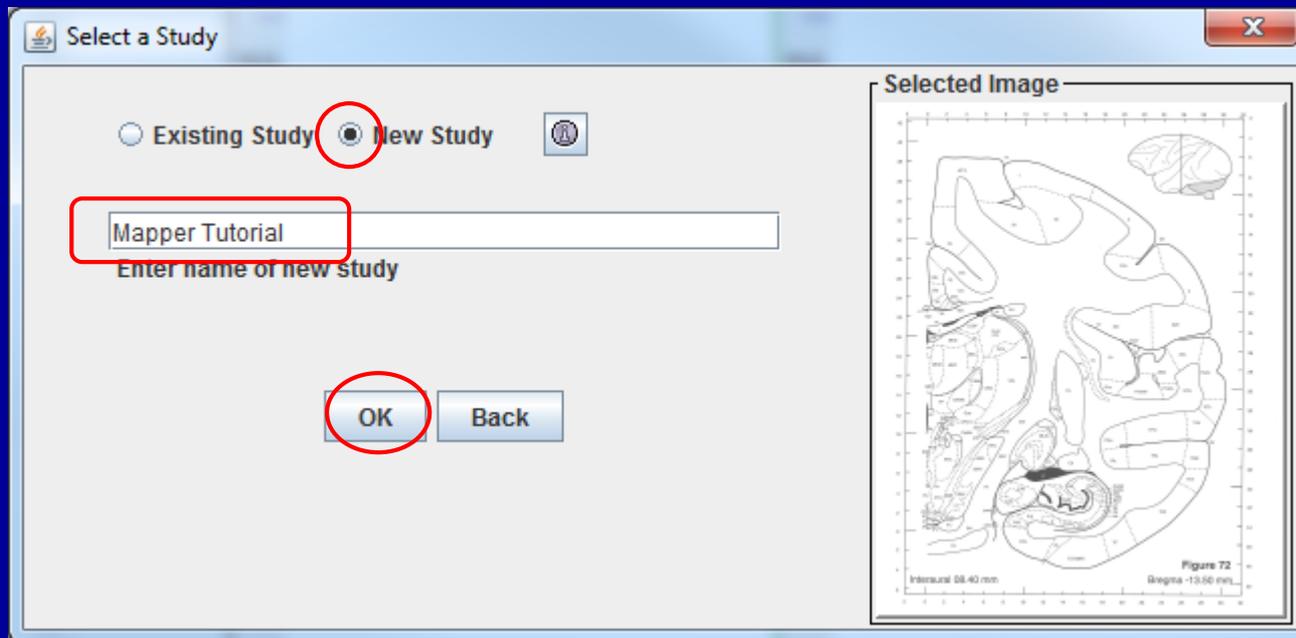
Navigate in your directory to the figure provided in the Mapper 'sample_data' folder that you installed.
Open: Paxinos Figure72.jpg



Click: 'New Study'

Enter a name for the study, e.g., 'Mapper Tutorial'

Click: 'OK'



Click: 'Open the Atlas'

NeuroMaps Mapper

mm -40,0 -20,0 0,0 20,0 40,0 mm -30,0 -15,0 0,0 15,0 30,0

80,0
60,0
40,0
20,0
0,0
-20,0
-40,0
-60,0
-80,0

60,0
45,0
30,0
15,0
0,0
-15,0
-30,0
-45,0
-60,0

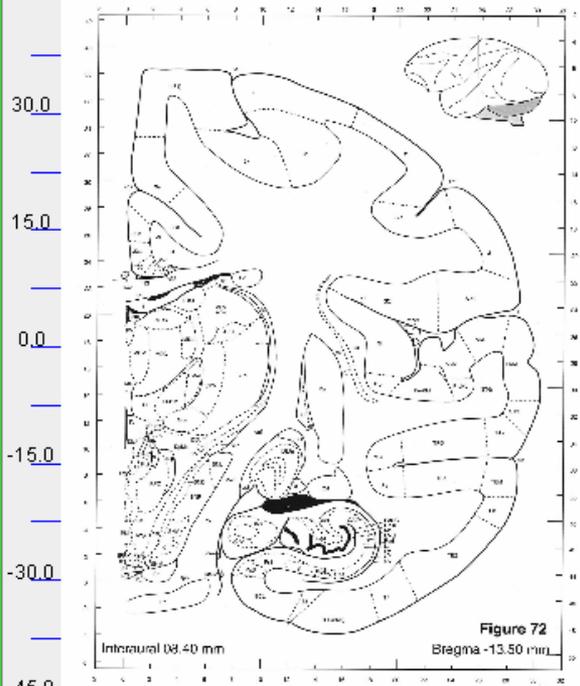


Figure 72
Intercanal 08.40 mm
Bregma -13.50 mm

Info In Out Fit Move MRI

Proceed with green steps top to bottom.
Return to blue steps as needed.
Please be patient.
Images take up to 30 seconds to load.

Map New Image
Edit Existing Data
Open the Atlas
Align Image with Atlas
Map Image to Atlas
Make or Edit Atlas Overlays
Edit and Export for Printing

Note the 'i' icon next to each tool. If you are ever confused, do not hesitate to click it.

The screenshot shows the NeuroMaps Mapper software interface. On the left, there is a 3D brain model with a coordinate scale from -40.0 to 40.0 mm. On the right, there is a 2D anatomical diagram with a coordinate scale from -30.0 to 30.0 mm. A toolbar is located in the top right corner, containing icons for Info, In, Out, Fit, Move, and MRI. A red arrow points from the text above to the 'i' icon next to the MRI tool. A 'Toolbar' dialog box is overlaid in the center, providing instructions for each tool. The dialog box includes a 'Close' button at the bottom.

Toolbar

FOR INFORMATION ABOUT A STRUCTURE named in the left panel: click INFO, then click the structure.

ZOOM IN: click 'In' and then the panel containing the image you want to enlarge OR click and drag to box an area to enlarge.

ZOOM OUT: click 'Out' and then the image you want to reduce.

REDUCE IMAGE TO FIT PANEL: click 'Fit' and then the image you want to reduce.

MOVE IMAGE: click 'Move' and then click and drag the image.

SELECT ATLAS FORMAT: Click 'MRI-LINES-COLOR' for the format you will map to: MRI is usually preferred.

Close

The Atlas appears as a 2D coronal plane through the center of the anterior commissure (AP 0). The next couple of slides are a detour to show how to obtain different views for mapping. To see the choice of surface views, click the 'Surface' button. From here on, click Continue or Next Step (bottom right) to proceed.

The screenshot displays the NeuroMaps Mapper software interface. The main window is divided into two vertical panels. The left panel shows a grayscale coronal slice of a brain, with a vertical axis on the left ranging from -40.0 to 80.0 mm. The right panel shows a schematic diagram of the brain with various regions outlined, also with a vertical axis on the left ranging from -40.0 to 80.0 mm. At the top of the window, there are two horizontal axes labeled 'mm' ranging from -40.0 to 40.0. On the right side, there is a control panel with several buttons and options. The 'Atlas View' section has two radio buttons: 'Section' (selected) and 'Surface' (circled in red). Below this are three buttons: 'Coronal', 'Sagittal', and 'Horizontal'. The 'Distance from stereotaxic zero' section has a button labeled 'Ant. - Pos.' and a text field showing '(0.00,-0.00,0.00) mm'. The 'Tilt or Rotate Atlas' section has a button and a circular icon with four arrows. The 'View Plane of Section' section has a button and a small brain icon with a red line. At the bottom right, there are three buttons: 'Cancel', 'Save', and 'Continue'. A 'Back to Coronal' button is also visible on the right side of the control panel.

For other views, click the button labeled 'Atlas' here (upper right corner of the sidebar) and step through the six views circled below. Run your cursor over a structure and see its name at the top of the panel. Click the structure to see BrainInfo's page about it...Continue

The screenshot displays the NeuroMaps Mapper application. At the top, there are coordinate axes in millimeters (mm) ranging from -40.0 to 40.0. A 3D brain model is shown on the left, with a red arrow pointing to a specific region. In the center, a web browser window displays the BrainInfo page for the 'middle frontal gyrus' (Acronym: MFG). The page includes a description, a 'Click Here For Illustrations' link, and a grid of links for 'All Names & Sources', 'Internal Structure', 'Cells Found There', 'Genes Expressed There', 'Locus in Brain Hierarchy', 'Connections', 'Models Where It Appears', and 'Publications About It'. On the right, the 'Atlas' sidebar is visible, featuring a toolbar with buttons for 'Info', 'In', 'Out', 'Fit', 'Move', and 'Atlas' (circled in red). Below the toolbar, there are radio buttons for 'Atlas View', 'Section', and 'Surface' (with 'Surface' selected). A red box highlights six view buttons: 'Lateral', 'Dorsal', 'Rostral', 'Medial', 'Ventral', and 'Caudal'. Below these are controls for 'Tilt or Rotate Atlas' and 'View Plane of Section', along with a 'Back to Lateral' button. At the bottom, there are checkboxes for 'Flip your image: Horizontal' and 'Vertical', and buttons for 'Cancel', 'Save', and 'Continue'. A 'Notes' field is at the very bottom.

This is the MRI surface view.
To return to the coronal cross-sectional view,
You will click the button to select 'Section'.
Continue

The screenshot displays the NeuroMaps Mapper software interface. The main window is divided into two panels. The left panel shows a 3D surface view of a brain, with a vertical axis on the left ranging from -40.0 to 80.0 mm. The right panel shows a coronal cross-section of the brain, with a vertical axis on the left ranging from -40.0 to 80.0 mm. The right panel also includes a control panel with the following elements:

- Info** button
- In** button
- Out** button
- Fit** button
- Move** button
- MRI** button
- Open the Atlas** button
- Atlas View** section with **Section** and **Surface** radio buttons.
- Lateral**, **Dorsal**, **Rostral** buttons.
- Medial**, **Ventral**, **Caudal** buttons.
- Tilt or Rotate Atlas** section with a circular control.
- View Plane of Section** section with a brain icon.
- Flip your image:** **Horizontal** **Vertical**
- Back to Lateral** button.
- Cancel**, **Save**, and **Continue** buttons.

Click the 'In', 'Out', and 'Move' buttons (circled top) and then click on the Atlas to adjust its size and location. We want to map to the opposite side of the Atlas, so click 'Horizontal'. Match the Atlas plane of section to the data image using the Slider for AP adjustment and the pie icon to tilt and rotate the plane of section. (AP -8.10 & bottom tilt 1.5° in this case.) Next Step

mm 0,0 -15,0 0,0 15,0 30,0 mm 30,0 -15,0 0,0 15,0 30,0

40,0
30,0
20,0
10,0
0,0
-10,0
-20,0
-30,0
-40,0
-50,0
-60,0

60,0
45,0
30,0
15,0
0,0
-15,0
-30,0
-45,0

Info In Out Fit Move MRI

Click tool, then click image.

Open the Atlas

Atlas View Section Surface

Coronal Sagittal Horizontal

Flip your image Horizontal Vertical

Tips for Orientation

Distance of plane of section from stereotaxic zero (center of anterior commissure)

Posterior (-) to Anterior (+) (-2.55) mm

Change Slider Direction

Tilt or Rotate Atlas

Plane of Section

Rotated 0.0°; Tilted 0.0°

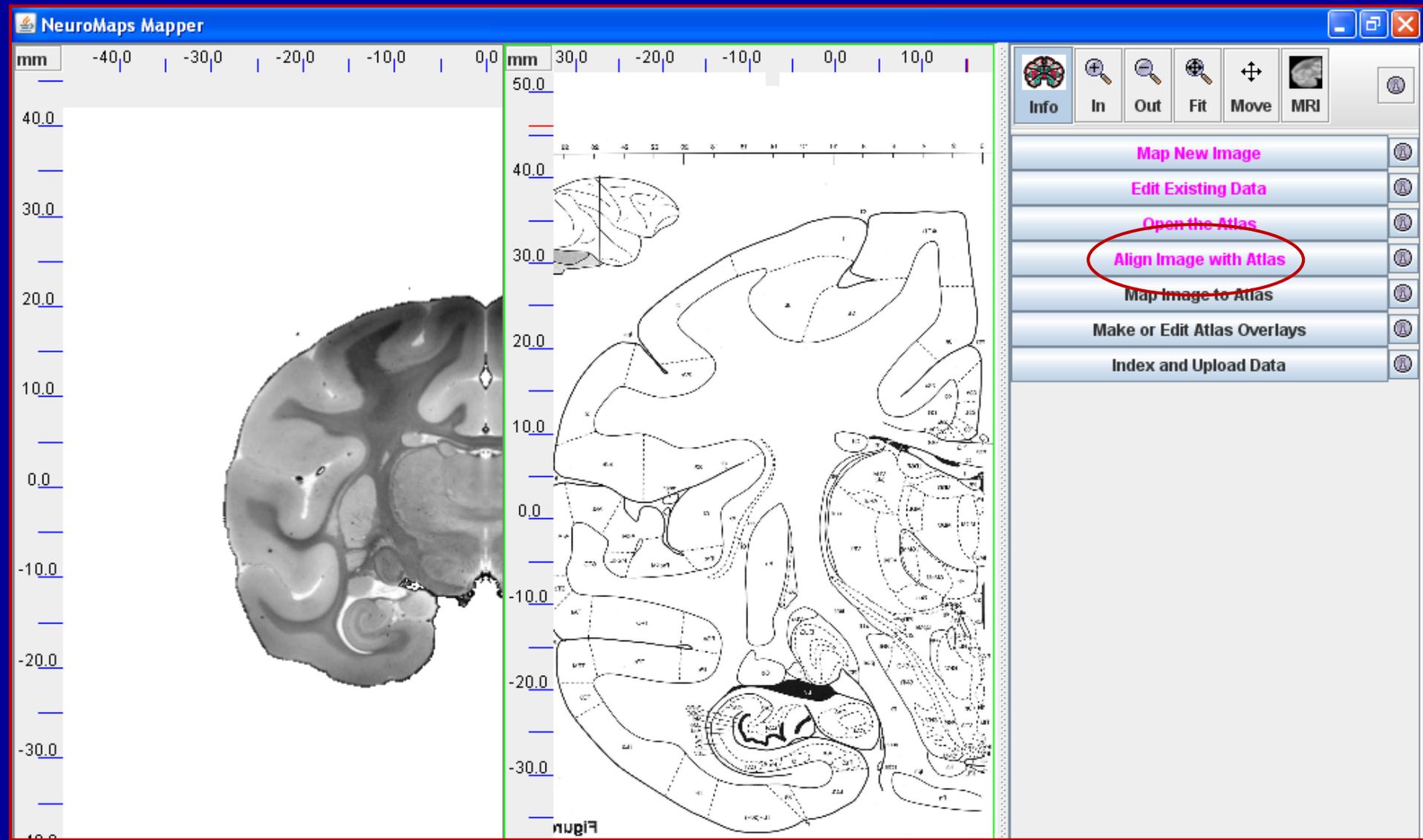
Data from Unknown hemisphere(s) of brain.

If unsure, select Unknown

Cancel Save Next Step

Figure 72
Intersural 08.40 mm
Bregma -19.50 mm

Having adjusted the plane of section of the Atlas to match the data image,
Click 'Align Image with Atlas' to proceed.

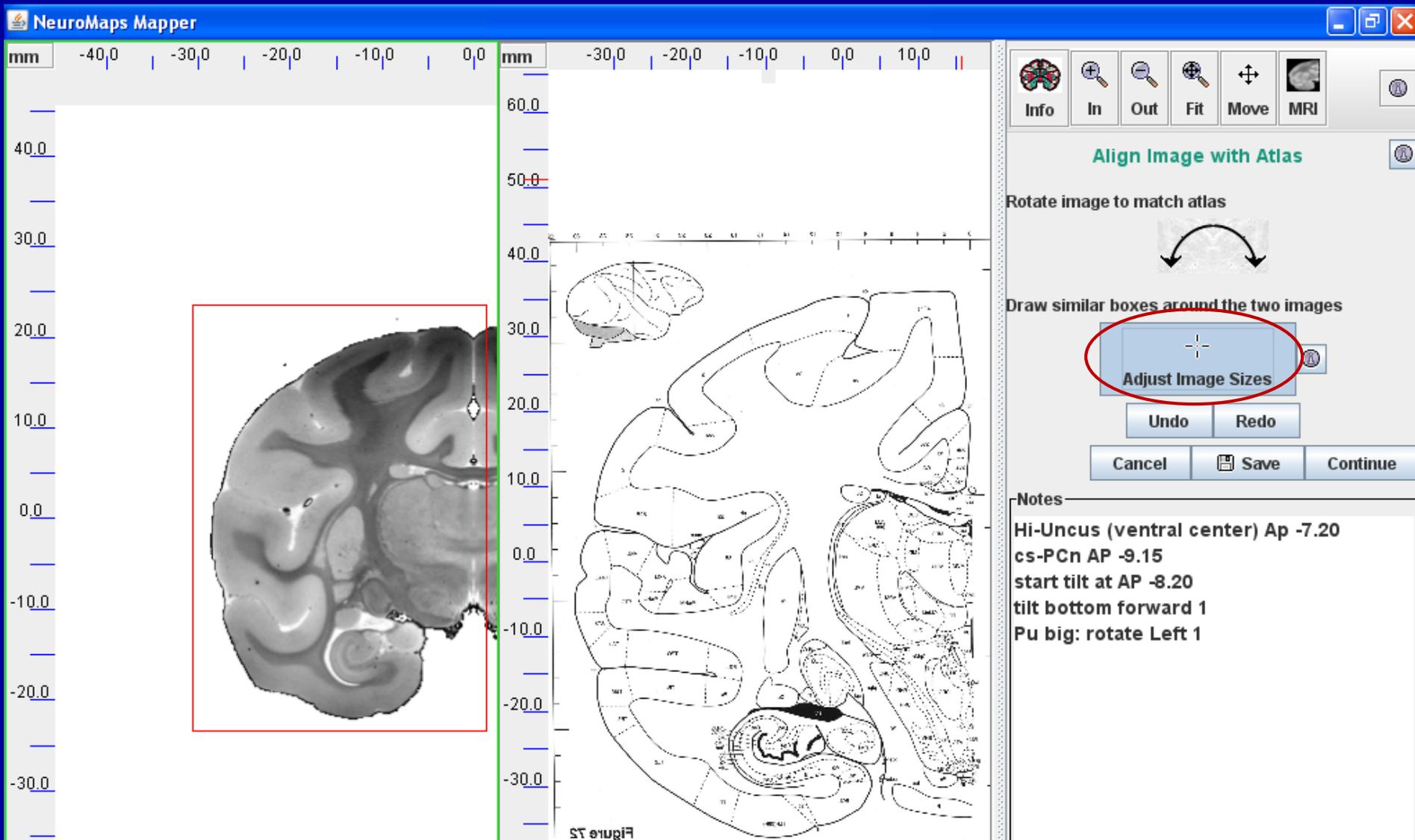


Here you can, if necessary, rotate the image to match the atlas by clicking the ends of the double-headed arrow. (Not necessary in this case)

The screenshot displays the NeuroMaps Mapper software interface. On the left, a grayscale MRI slice of a brain is shown. The central panel features a detailed anatomical atlas with various brain regions outlined and labeled. The interface includes coordinate axes (mm) and a toolbar with icons for 'Info', 'In', 'Out', 'Fit', 'Move', and 'MRI'. A red arrow points from the text above to a double-headed curved arrow icon in the 'Align Image with Atlas' section of the control panel. Below this icon are buttons for 'Adjust Image Sizes', 'Undo', 'Redo', 'Cancel', 'Save', and 'Continue'. A 'Notes' section at the bottom right contains the following text:

Notes
Hi-Uncus (ventral center) Ap -7.20
cs-PCn AP -9.15
start tilt at AP -8.20
tilt bottom forward 1
Pu big: rotate Left 1

And here you can adjust the size of either or both images roughly to match. Click the circled button. Here, click and drag in the left panel to create a box around the part of the Atlas image to which you want to map.



Do the same to create a box around the equivalent area of the data image.
When you click 'Continue', the images will snap to the same size.

The screenshot displays the NeuroMaps Mapper interface. On the left, a grayscale MRI slice of a brain section is shown with a red rectangular box around it. The top and left axes are labeled in millimeters (mm) with values from 0.0 to -24.0. On the right, a corresponding anatomical atlas diagram is shown, also with a red rectangular box around it. The top and left axes are similarly labeled in millimeters. A toolbar at the top right includes icons for Info, In, Out, Fit, Move, and MRI. Below the toolbar, the 'Align Image with Atlas' section contains instructions: 'Rotate image to match atlas' (with a rotation arrow icon), 'Draw similar boxes around the two images', and a red circle around the 'Adjust Image Sizes' button. Below this are 'Undo' and 'Redo' buttons. At the bottom of this section are 'Cancel', 'Save', and 'Continue' buttons, with 'Continue' circled in red. A 'Notes' section at the bottom right contains the following text: 'Hi-Uncus (ventral center) Ap -7.20', 'cs-PCn AP -9.15', 'start tilt at AP -8.20', 'tilt bottom forward 1', and 'Pu big: rotate Left 1'.

NeuroMaps Mapper

mm 0.0 -24.0 -18.0 -12.0 -6.0 0.0

36.0

30.0

24.0

18.0

12.0

6.0

0.0

-6.0

-12.0

-18.0

24.0

30.0

36.0

mm 0.0 -24.0 -18.0 -12.0 -6.0 0.0

Info In Out Fit Move MRI

Align Image with Atlas

Rotate image to match atlas

Draw similar boxes around the two images

Adjust Image Sizes

Undo Redo

Cancel Save Continue

Notes

Hi-Uncus (ventral center) Ap -7.20
cs-PCn AP -9.15
start tilt at AP -8.20
tilt bottom forward 1
Pu big: rotate Left 1

Click 'Select Equivalent Points'. Then click pairs of equivalent landmark points in the two images. It is good to click the first four pairs near the top, bottom, left and right sides of the image.

NeuroMaps Mapper

mm 0,0 -24,0 -18,0 -12,0 -6,0 0,0

mm 0,0 -24,0 -18,0 -12,0 -6,0 0,0

36,0 30,0 24,0 18,0 12,0 6,0 0,0 -6,0 -12,0 -18,0

36,0 30,0 24,0 18,0 12,0 6,0 0,0 -6,0 -12,0 -18,0

Info In Out Fit Move MRI

Map Image to Atlas

Select Equivalent Points

Remove Point Pair

Undo last point pair

Outline Red

Map It!

Cancel Save Continue

Notes

Hi-Uncus (ventral center) Ap -7.20
cs-PCn AP -9.15
start tilt at AP -8.20
tilt bottom forward 1
Pu big: rotate Left 1

Figure 15
Biedma -13.20 mm
mm 0,0 18,0

When the fourth pair is entered, the outlines of Atlas structures will be superimposed on the data image. It will reveal the greatest mismatches, which will guide the placement of further pairs. The green ovals indicate an area to be worked on first, because it is close to area 4(F1), which we want to map to the Atlas.

The image displays a software interface for brain mapping. On the left, a coronal MRI slice of a brain is shown with a green oval highlighting a specific region. On the right, an atlas diagram with red outlines of brain structures is shown, also with a green oval highlighting the same region. A control panel on the right side of the interface includes several buttons: 'Info', 'In', 'Out', 'Fit', 'Move', and 'MRI'. Below these is a section titled 'Map Image to Atlas' containing a button with a crosshair icon labeled 'Select Equivalent Points', a button with a red 'X' labeled 'Remove Point Pair', a button labeled 'Undo last point pair', a dropdown menu labeled 'Outline Red', and a button labeled 'Map It!'. At the bottom of the control panel are buttons for 'Cancel', 'Save', and 'Continue'. A 'Notes' section at the bottom right contains the following text:

Notes
Hi-Uncus (ventral center) Ap -7.20
cs-PCn AP -9.15
start tilt at AP -8.20
tilt bottom forward 1
Pu big: rotate Left 1

Having mapped pairs of landmarks to bring the borders of the sulcus into line, we see that the medial boundary of the gyrus has been pulled left of the Atlas boundary. The next step will be to bring that into line.

NeuroMaps Mapper

mm 3,0 -24,0 -18,0 -12,0 -6,0 0,0

mm 3,0 -24,0 -18,0 -12,0 -6,0 0,0

36,0 30,0 24,0 18,0 12,0 6,0 0,0 -6,0 -12,0 -18,0

36,0 30,0 24,0 18,0 12,0 6,0 0,0 -6,0 -12,0 -18,0

Info In Out Fit Move MRI

Map Image to Atlas

Select Equivalent Points

Remove Point Pair

Undo last point pair

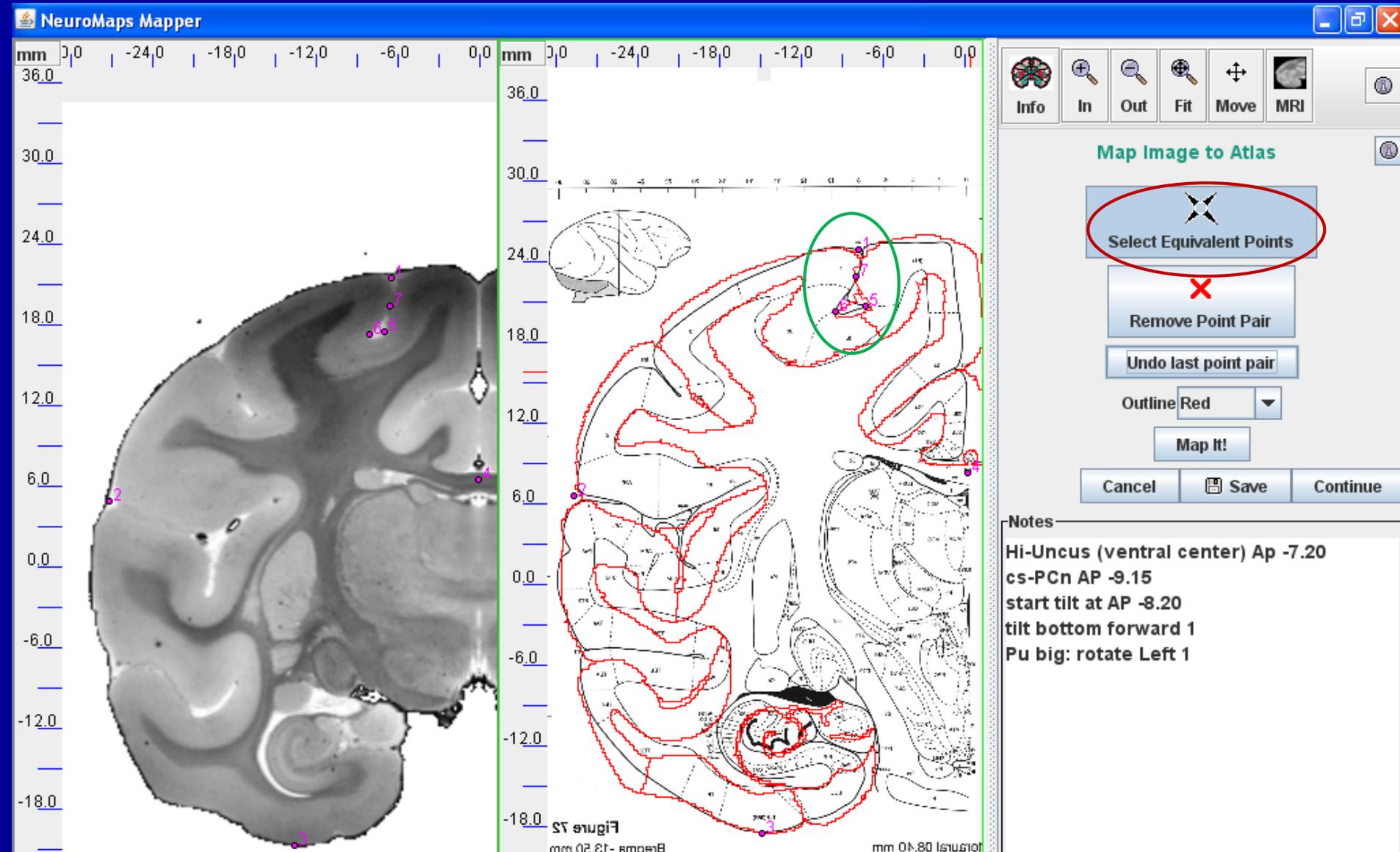
Outline Red

Map It!

Cancel Save Continue

Notes

Hi-Uncus (ventral center) Ap -7.20
cs-PCn AP -9.15
start tilt at AP -8.20
tilt bottom forward 1
Pu big: rotate Left 1



Clicking a few more pairs brings the midline and gray-white boundaries of the gyrus into line.

NeuroMaps Mapper

mm 36.0 30.0 24.0 18.0 12.0 6.0 0.0 -6.0 -12.0 -18.0

mm 36.0 30.0 24.0 18.0 12.0 6.0 0.0 -6.0 -12.0 -18.0

Info In Out Fit Move MRI

Map Image to Atlas

Select Equivalent Points

Remove Point Pair

Undo last point pair

Outline Red

Map It!

Cancel Save Continue

Notes

Hi-Uncus (ventral center) Ap -7.20
cs-PCn AP -9.15
start tilt at AP -8.20
tilt bottom forward 1
Pu big: rotate Left 1

If you will want to map other areas in addition to area 4(F1), you can click a number or other point-pairs on the inner and outer boundaries of the cortex to bring the rest of the Atlas template into an adequate fit to map (warp) the data image to the Atlas. Click 'Map It!' and Continue.

The screenshot displays the NeuroMaps Mapper interface. On the left, a grayscale brain slice is shown with numerous numbered points (1-49) marked in pink. On the right, the same slice is overlaid with a red-outlined atlas template, also featuring numbered points. The interface includes a coordinate system at the top with values from 0.0 to -24.0 mm. A toolbar at the top right contains icons for Info, In, Out, Fit, Move, and MRI. Below the toolbar, the 'Map Image to Atlas' panel is visible, featuring buttons for 'Select Equivalent Points', 'Remove Point Pair', 'Undo last point pair', and 'Map It!'. The 'Map It!' button is circled in red. Below this panel, a 'Notes' section contains the following text:

Notes
Hi-Uncus (ventral center) Ap -7.20
cs-PCn AP -9.15
start tilt at AP -8.20
tilt bottom forward 1
Pu big: rotate Left 1

You can judge the extent of the warp by the distortion of the scales on the data image.

NeuroMaps Mapper

mm 3,0 -24,0 -18,0 -12,0 -6,0 0,0

36,0
30,0
24,0
18,0
12,0
6,0
0,0
-6,0
-12,0
-18,0

mm 3,0 -24,0 -18,0 -12,0 -6,0 0,0

36,0
30,0
24,0
18,0
12,0
6,0
0,0
-6,0
-12,0
-18,0

Info In Out Fit Move MRI

Map Image to Atlas

Select Equivalent Points

Remove Point Pair

Undo last point pair

Outline Red

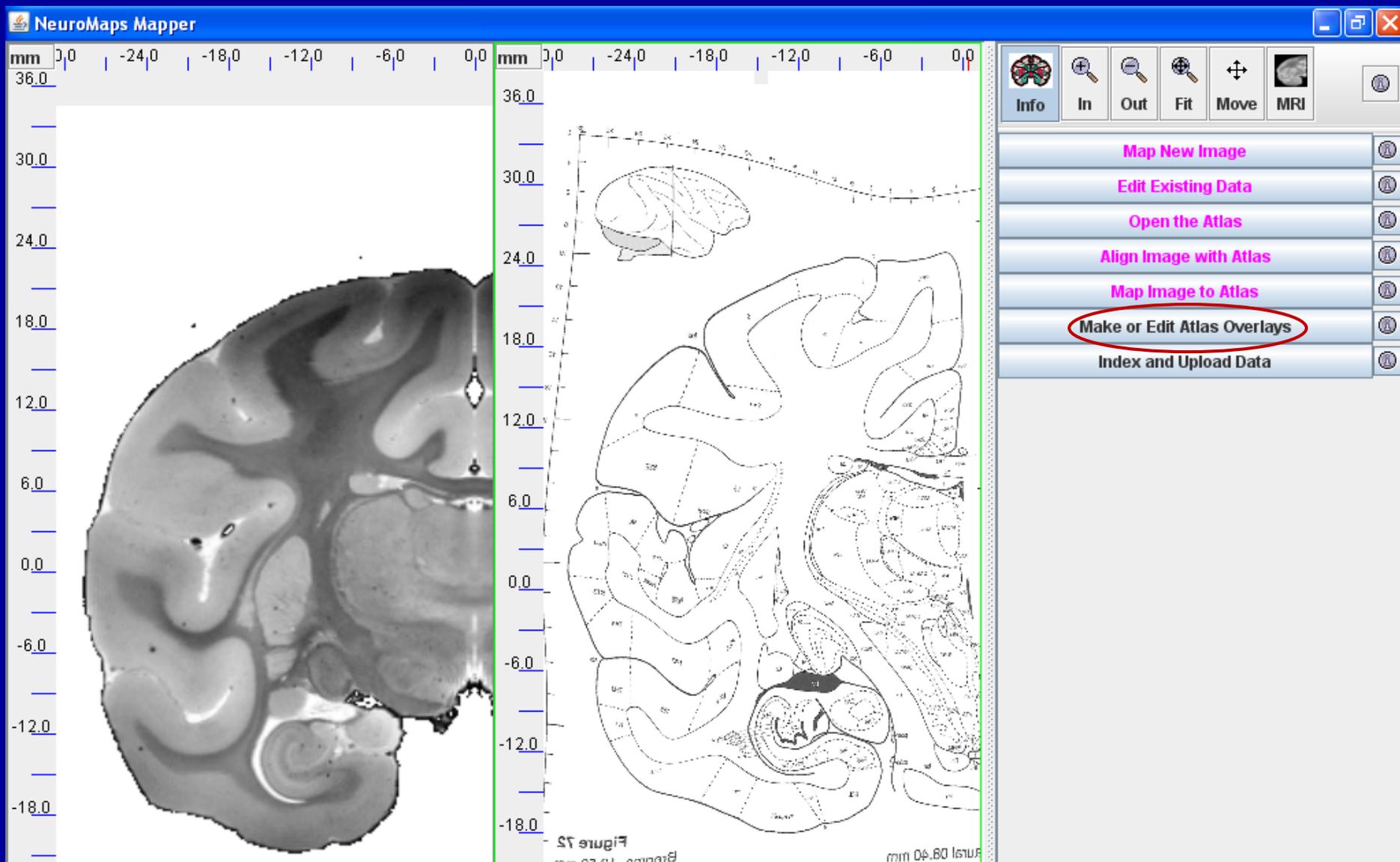
Map It!

Cancel Save Continue

Notes

Hi-Uncus (ventral center) Ap -7.20
cs-PCn AP -9.15
start tilt at AP -8.20
tilt bottom forward 1
Pu big: rotate Left 1

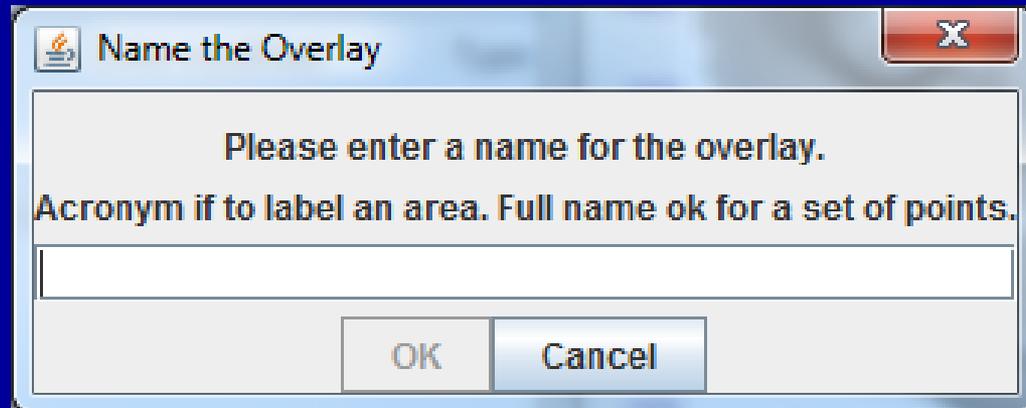
The next step is to define the boundaries of area 4(F1) and create an Atlas overlay for it.
Click 'Make or Edit Atlas Overlays'



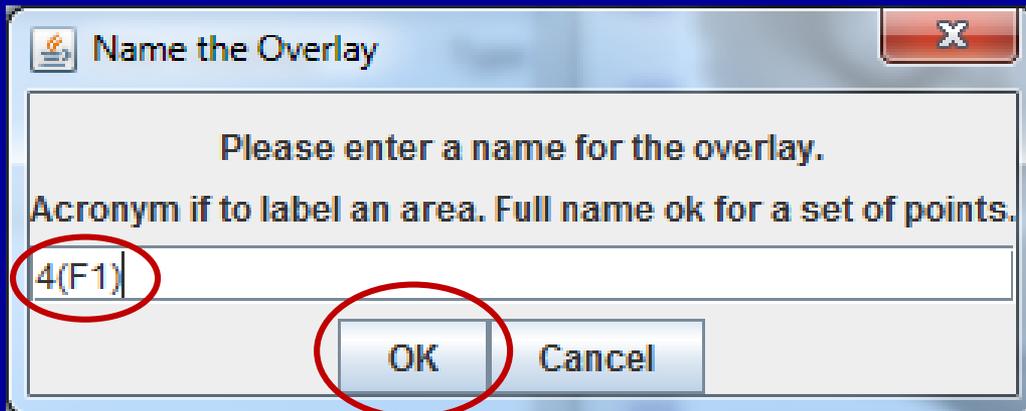
The template boundaries have been superimposed on the data image.
You will now trace the boundary of area 4(F1) to create an overlay by that name.
Click 'New Overlay'

The screenshot displays the NeuroMaps Mapper interface. On the left, a grayscale MRI slice of a brain is shown with a coordinate grid ranging from 0.0 to -36.0 mm. On the right, the same slice is overlaid with a white atlas template. Red outlines trace the boundaries of specific brain regions, including area 4 (F1). The right-hand panel, titled 'Make or Edit Atlas Overlays', contains several controls: a 'Color Atlas Outlines' dropdown set to 'Red', a 'Data Type' dropdown set to 'Area Data', and a 'Name' input field. The 'New Overlay' button is circled in red. Below these controls are 'Delete Overlay' and 'Rename Overlay' buttons, and a prompt that reads 'Click 'New Overlay' to begin.'

Enter the name of the area in the 'Choose a name' box.
Click 'OK'

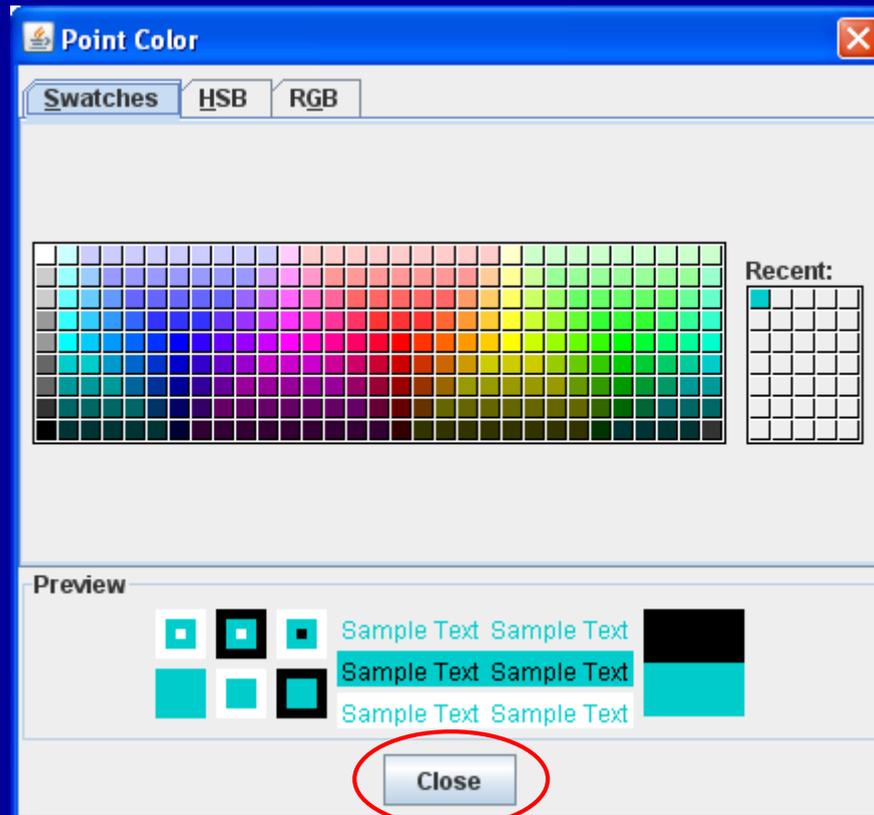


The screenshot shows a dialog box titled "Name the Overlay" with a close button (X) in the top right corner. The main text inside the dialog reads: "Please enter a name for the overlay. Acronym if to label an area. Full name ok for a set of points." Below the text is a text input field that is currently empty. At the bottom of the dialog are two buttons: "OK" and "Cancel".



The screenshot shows the same "Name the Overlay" dialog box. The text input field now contains the text "4(F1)", which is circled in red. The "OK" button at the bottom is also circled in red. The "Cancel" button remains unhighlighted.

We have elected to keep the default color 'turquoise'
Click 'Close'

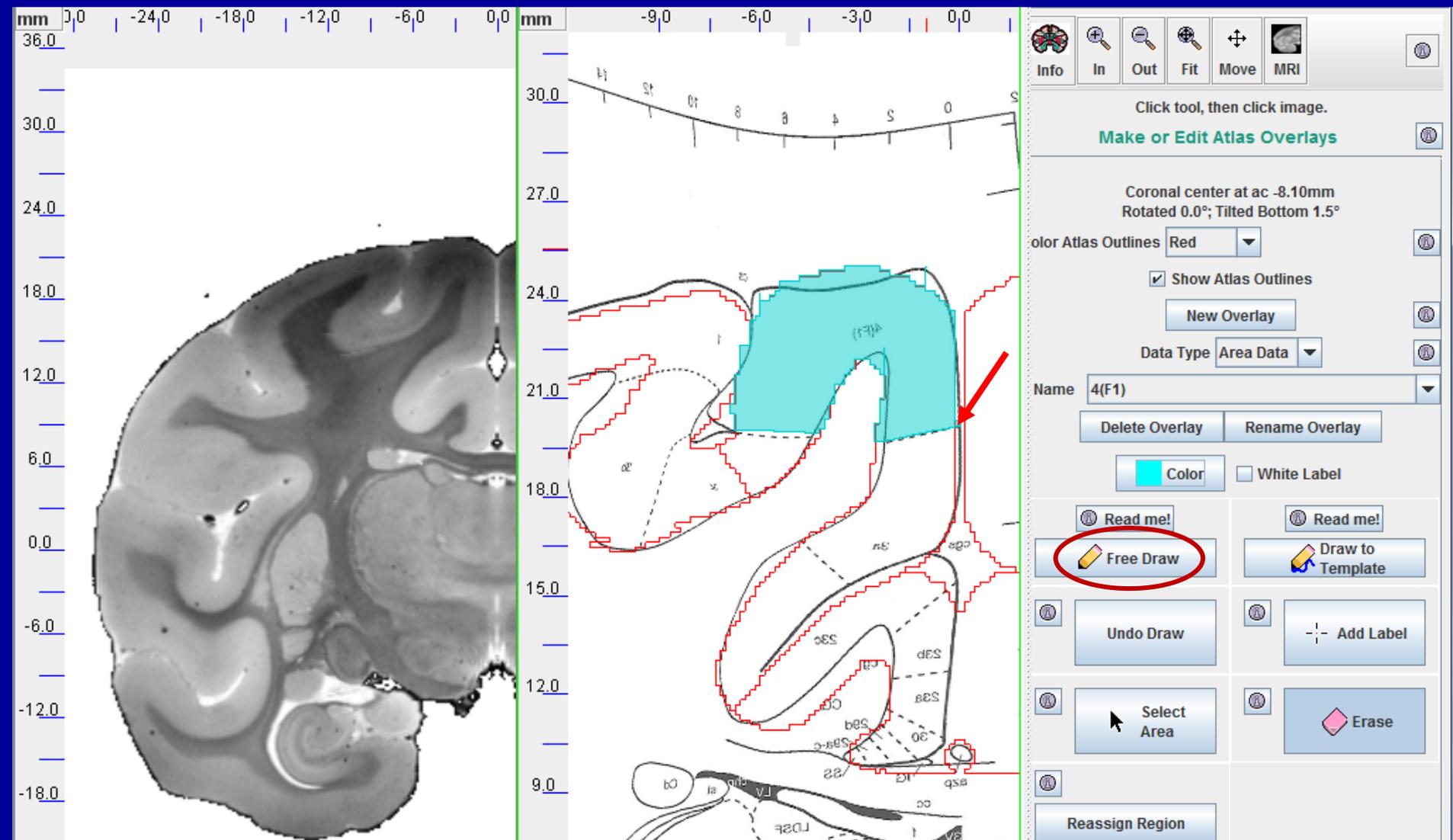


We have zoomed area 4(F1) for greater cursor control and changed the Outline Color to 'Green' for contrast with the tracing color (magenta). We have set Data Type to 'Area Data' and clicked 'Draw to Template', so that, as our cursor traces the boundary in the data image, the Mapper snaps it to the nearest Atlas boundary... the two will exactly coincide. We have clicked a starting point and dragged right.

The image shows a software interface for mapping. On the left is a map with a green outline of a region and a magenta line being drawn along its boundary. A red arrow points to the starting point of the magenta line. On the right is a control panel with the following elements:

- Color Atlas Outlines:** A dropdown menu set to "Green", circled in red.
- Show Atlas Outlines:** A checked checkbox.
- New Overlay:** A button.
- Data Type:** A dropdown menu set to "Area Data".
- Name:** A text field containing "4(F1)".
- Delete Overlay:** A button.
- Rename Overlay:** A button.
- Color:** A button with a magenta square.
- White Label:** An unchecked checkbox.
- Read me!:** Two buttons, one in each of the bottom-right panels.
- Free Draw:** A button with a pencil icon.
- Draw to Template:** A button with a pencil and blue line icon, circled in red.
- Undo Draw:** A button.
- Add Label:** A button with a crosshair icon.

When we reached the point where the boundary crossed to the inner surface of the cortex (arrow). We switched to the 'Free Draw' tool and clicked the inner surface of the cortex. The Mapper ceased to follow the Atlas outline and created a straight line across the cortex. Alternating between the two tools, we continued to trace the boundary and completed the overlay by clicking the starting point.



Here we have clicked the 'Add Label' button and clicked the place we wanted it to appear on the overlay.

The image displays a software interface for brain MRI analysis, showing a coronal slice of a brain with an atlas overlay. The interface is divided into three main sections:

- Left Panel:** Shows a grayscale MRI slice of a brain. The vertical axis is labeled in millimeters (mm) with values: 36.0, 30.0, 24.0, 18.0, 12.0, 6.0, 0.0, -6.0, -12.0, -18.0, and -24.0.
- Middle Panel:** Shows the same MRI slice with an atlas overlay. The overlay consists of red dashed lines representing anatomical boundaries and a cyan shaded region labeled "4(F1)". The horizontal axis is labeled in millimeters (mm) with values: -9.0, -6.0, -3.0, and 0.0. The vertical axis is labeled in millimeters (mm) with values: 30.0, 27.0, 24.0, 21.0, 18.0, 15.0, 12.0, and 9.0.
- Right Panel:** A control panel for the atlas overlay. It includes a toolbar with icons for "Info", "In", "Out", "Fit", "Move", and "MRI". Below the toolbar, there are several controls:
 - A text box: "Click tool, then click image."
 - A button: "Make or Edit Atlas Overlays"
 - Text: "Coronal center at ac -8.10mm Rotated 0.0°; Tilted Bottom 1.5°"
 - A dropdown menu: "Color Atlas Outlines" set to "Red"
 - A checked checkbox: "Show Atlas Outlines"
 - A button: "New Overlay"
 - A dropdown menu: "Data Type" set to "Area Data"
 - A dropdown menu: "Name" set to "4(F1)"
 - Buttons: "Delete Overlay" and "Rename Overlay"
 - Radio buttons: "Color" (selected) and "White Label"
 - Buttons: "Read me!" (two instances)
 - Buttons: "Free Draw" and "Draw to Template"
 - Buttons: "Undo Draw" and "Add Label" (highlighted with a red box)
 - Buttons: "Select Area" and "Erase"
 - A button: "Reassign Region"

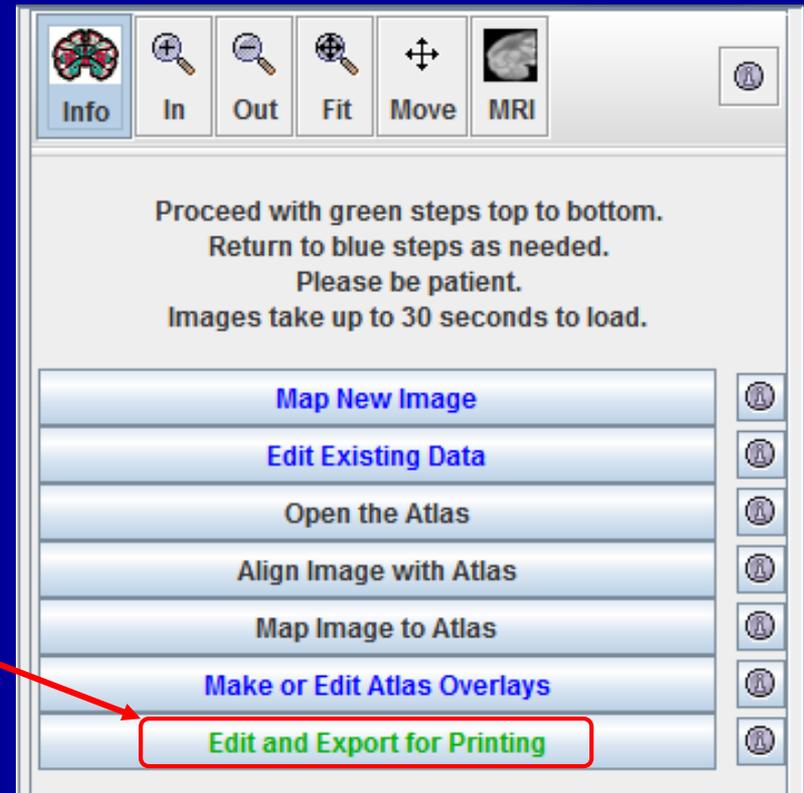
By displaying and comparing each data area mapped to the Atlas against that of the original data image, one can alternate between mapping and checking until all data areas have been overlaid on the Atlas. (See next slide.)

The image displays a software interface for brain mapping, divided into three main sections:

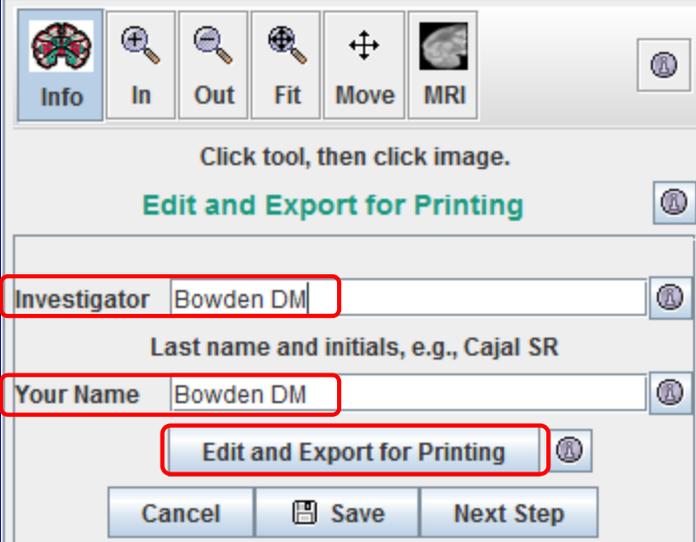
- Left Panel:** Shows a coronal MRI slice of a brain. A specific region is highlighted in teal and labeled "4(F1)". The vertical axis on the left is labeled "mm" and ranges from 36.0 at the top to -24.0 at the bottom, with major ticks every 6.0 units.
- Middle Panel:** Shows a corresponding coronal slice of the brain with red outlines representing the atlas. The same region is highlighted in teal and labeled "4(F1)". The vertical axis on the left is labeled "mm" and ranges from 60.0 at the top to -40.0 at the bottom, with major ticks every 10.0 units.
- Right Panel:** Contains a control interface with the following elements:
 - Top Row:** Icons for "Info", "In", "Out", "Fit", "Move", and "MRI".
 - Instruction:** "Click tool, then click image."
 - Section Header:** "Make or Edit Atlas Overlays".
 - Parameters:** "Coronal center at ac -8.10mm", "Rotated 0.0°; Tilted Bottom 1.5°".
 - Color Atlas Outlines:** A dropdown menu set to "Red".
 - Checkbox:** "Show Atlas Outlines" (checked).
 - Buttons:** "New Overlay", "Delete Overlay", "Rename Overlay".
 - Data Type:** A dropdown menu set to "Area Data".
 - Name:** A dropdown menu set to "4(F1)".
 - Color Selection:** Radio buttons for "Color" (selected, teal) and "White Label".
 - Tools:** "Read me!", "Free Draw", "Draw to Template", "Undo Draw", "Add Label", "Select Area", "Erase", and "Reassign Region".

Once you have mapped all of the data areas as overlays to the Atlas, you can submit it to the NeuroMaps Editor to prepare for presentation or publication.

Click: 'Edit and Export for Printing'



**Enter the name of the Investigator (the person responsible for the study) and Your Name (the person editing the image). They may, as here, be the same. Then:
Click: 'Edit and Export for Printing**



Info In Out Fit Move MRI

Click tool, then click image.

Edit and Export for Printing

Investigator Bowden DM

Last name and initials, e.g., Cajal SR

Your Name Bowden DM

Edit and Export for Printing

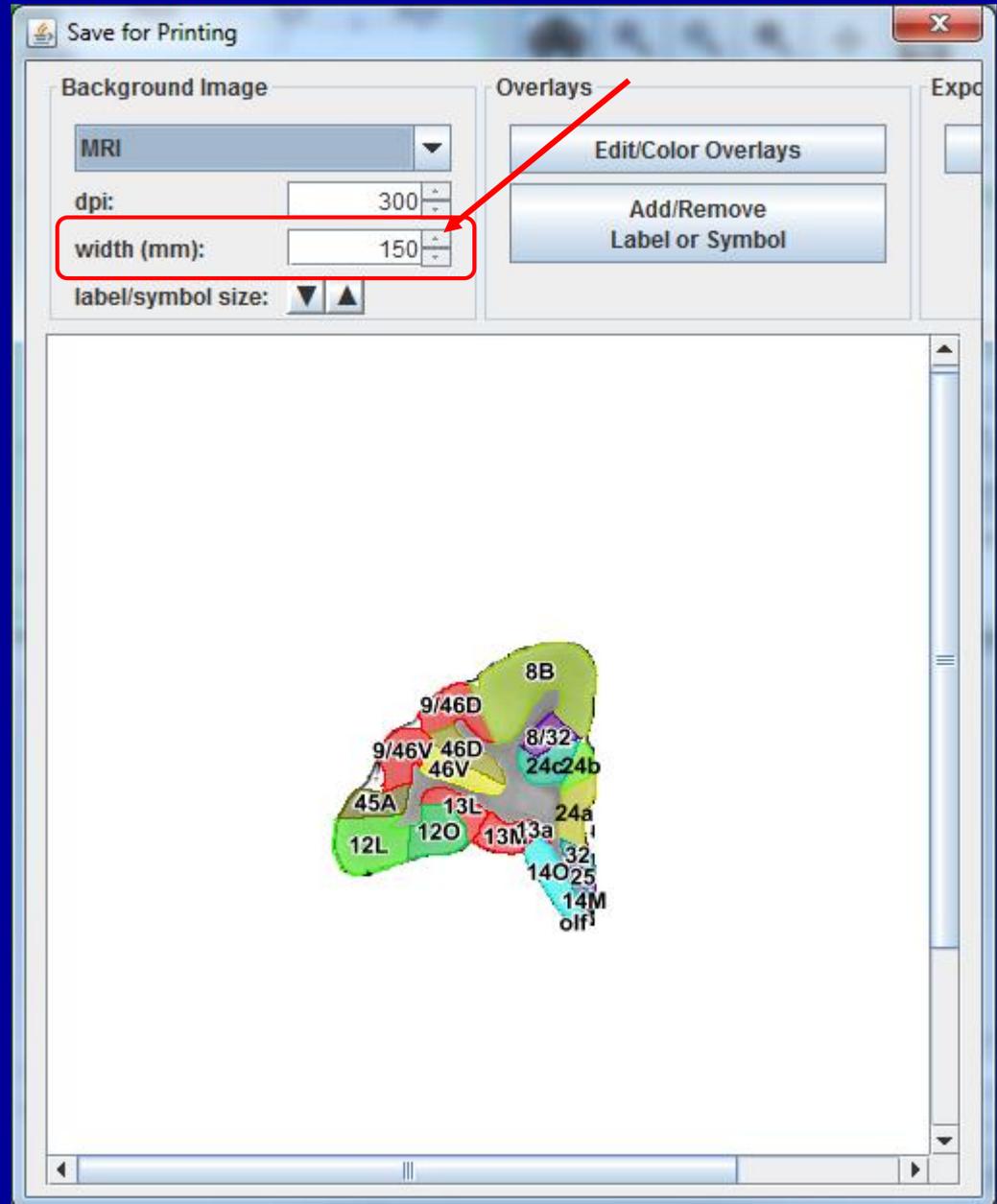
Cancel Save Next Step

This is a section from prefrontal cortex with overlays for all cytoarchitectonic areas.

To create a figure for publication, set the resolution in dots per inch (dpi usually = 300) and the size (width in millimeters) to match publisher's specifications.

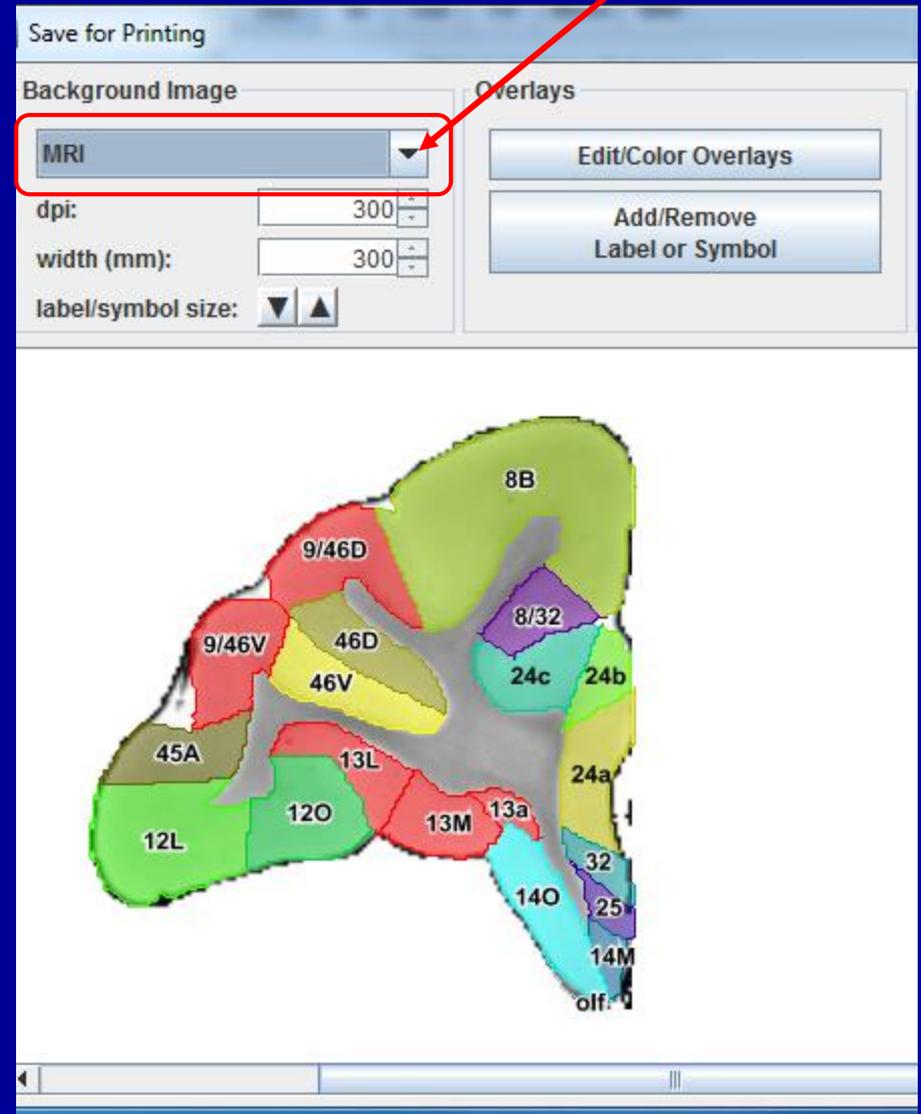
To enlarge the image to 300 mm, for example,

Click: 'width (mm)'



Here the architectonic areas are overlaid on the atlas MRI. You may prefer to present them against a plain white background.

Click the arrowhead of the message box that shows MRI and select 'Lines'.

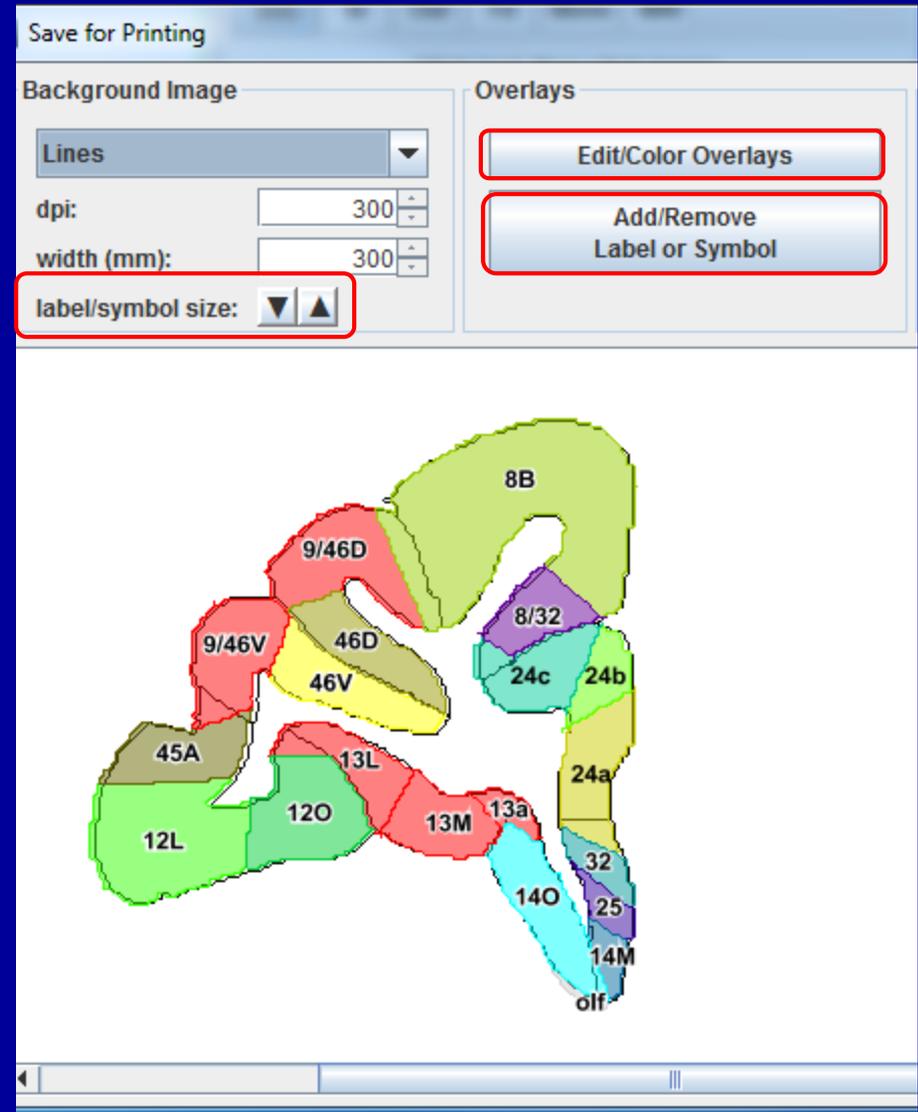


This shows the overlays against a white background.

**To add or remove a label:
Click: Add/Remove Label or Symbol
and click the site where you want it.**

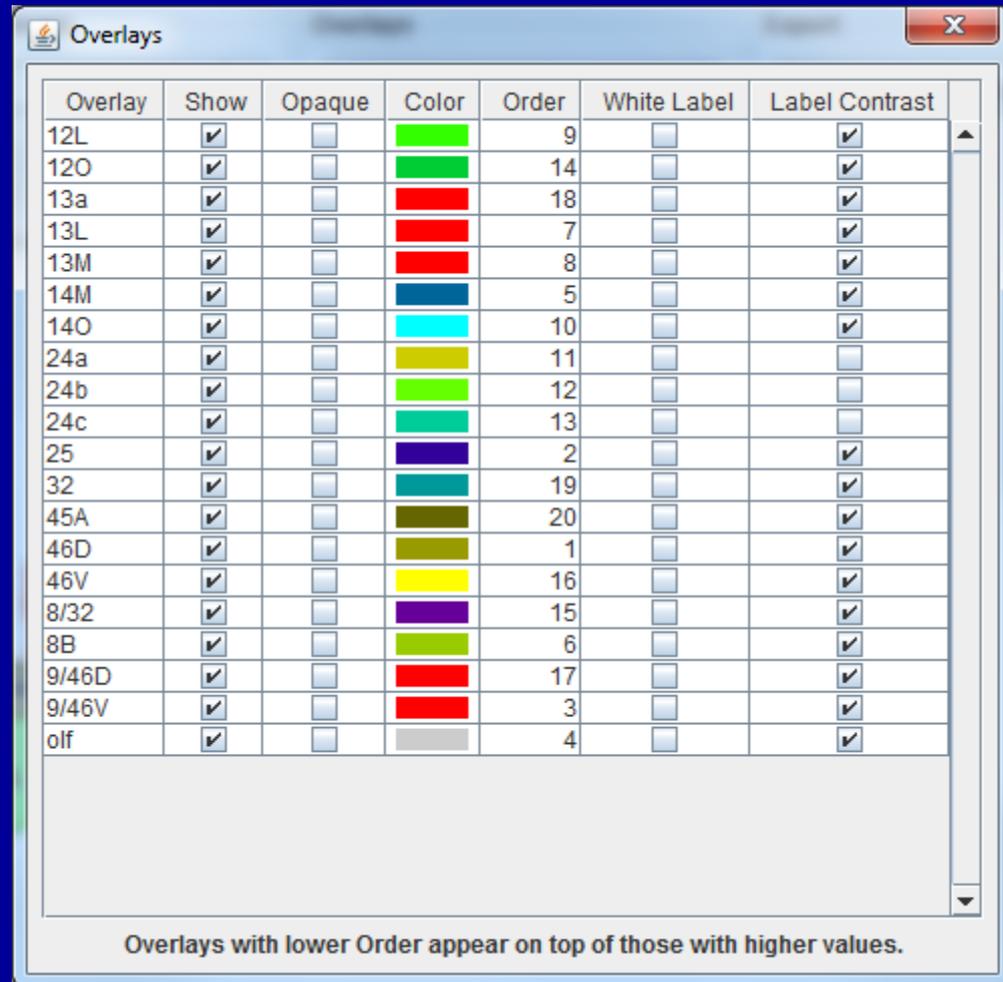
**To change the size of labels:
Click: up and down arrows
next to 'label/symbol size'**

**To change the colors of overlays:
Click: Edit/Color Overlays**



This chart allows you to

- Show or not show each overlay
- Make an overlay opaque (partially translucent) so the MRI shows thru
- Select a different color for an overlay from a color chart
- Change a label from black (default) to white
- Show a label against a contrasting background of black or white.

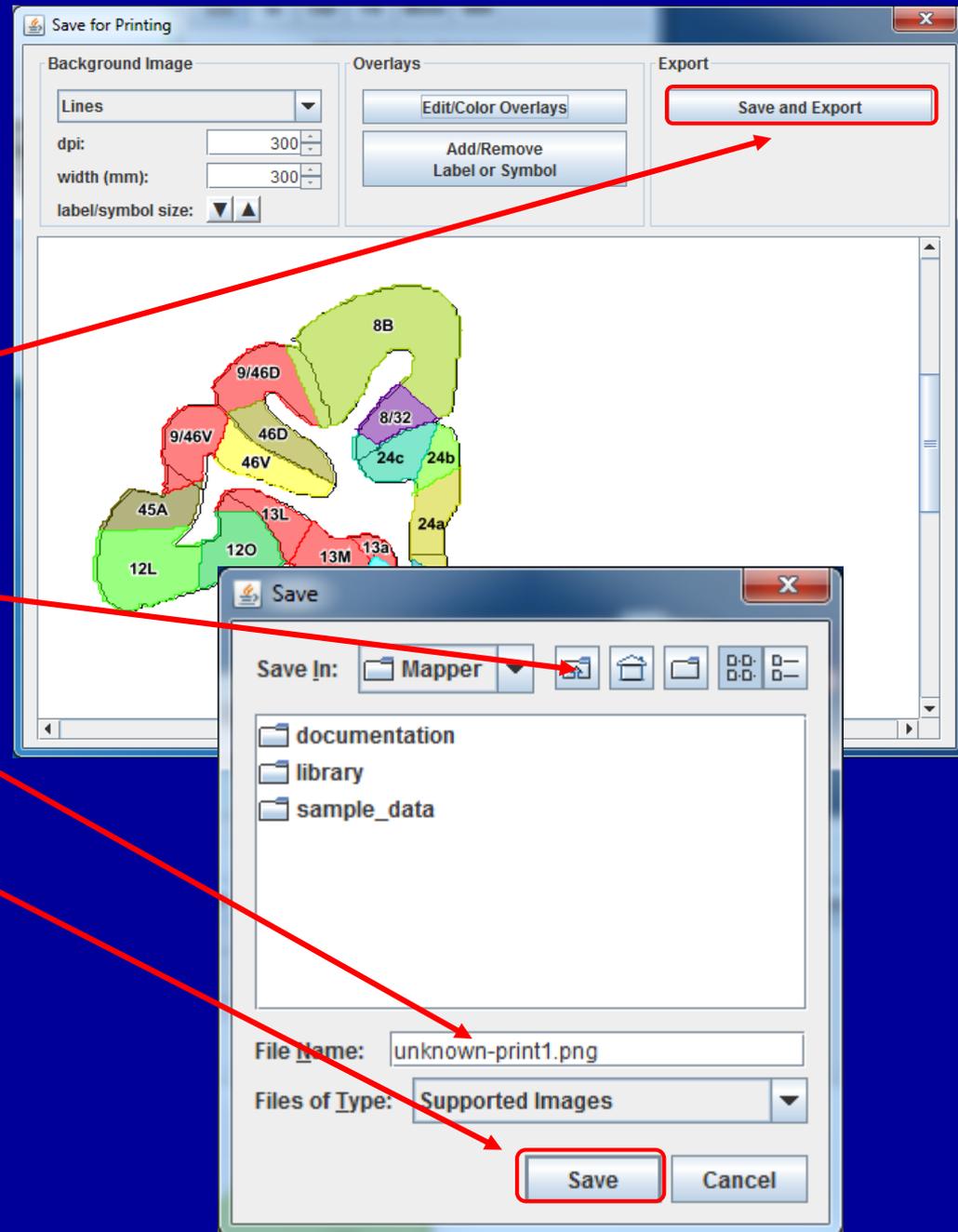


When you finish editing
Click: 'Save and Export' (upper right)

Navigate to the folder on your computer where you want to save the figure

Assign a name to the figure

Click: 'Save'



Happy Mapping!

BrainInfo/NeuroMaps

<http://braininfo.org>

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