



NAC



*Leonardo da Vinci (1452-1519), Virgin and Child with St. Anne  
Pinakothek, München*

# Data Loading & 3D Visualization

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- An **end-user application** for image analysis
- An **open-source environment** for software development
- A software platform that is both **easy to use** for clinical researchers and **easy to extend** for programmers

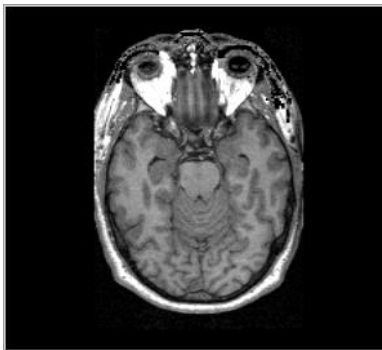


- Slicer3 is a **multi-platform** software that is developed and maintained on:
  - Windows XP
  - Linux x86\_64
  - Linux x86
  - Mac OSX – Darwin x86-Intel

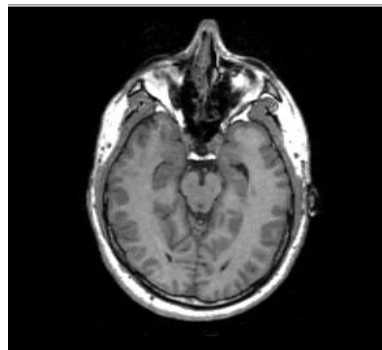
# 3D Visualization dataset

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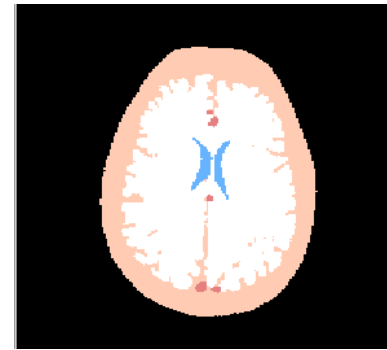
- This course is built upon three datasets of a single healthy subject brain:



MR DICOM  
GRASS



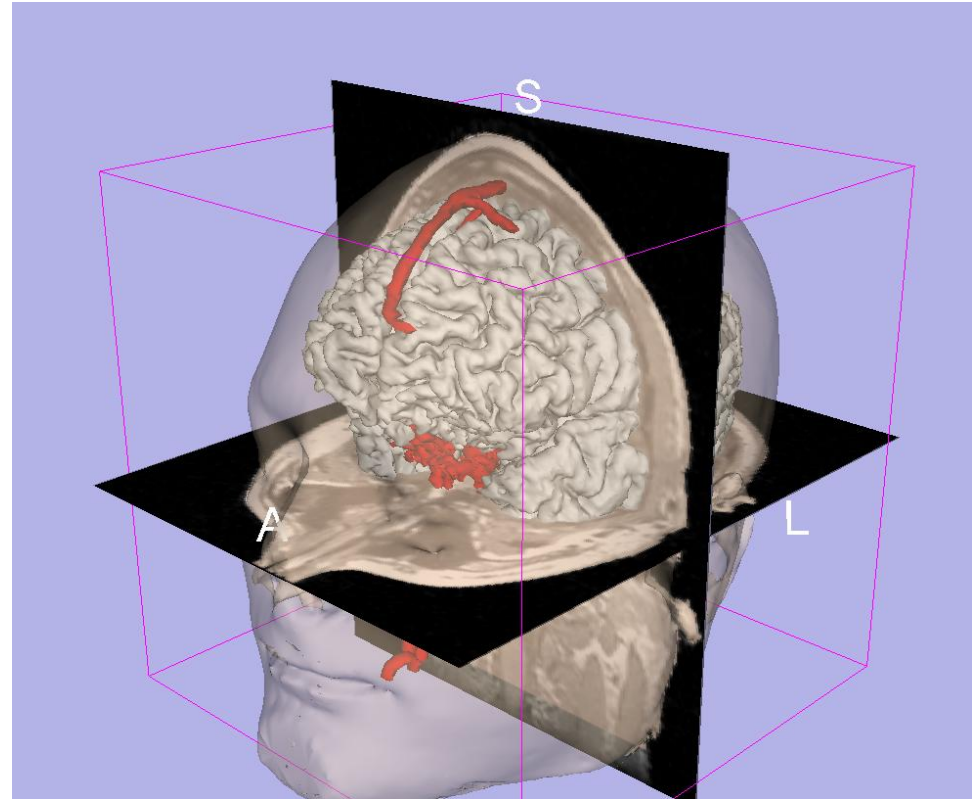
MR Nrrd  
SPGR



Pre-computed  
Label Map

# Learning objective

Following this tutorial, you'll be able to **load and visualize volumes** within Slicer3, and to **interact in 3D** with structural images and models.

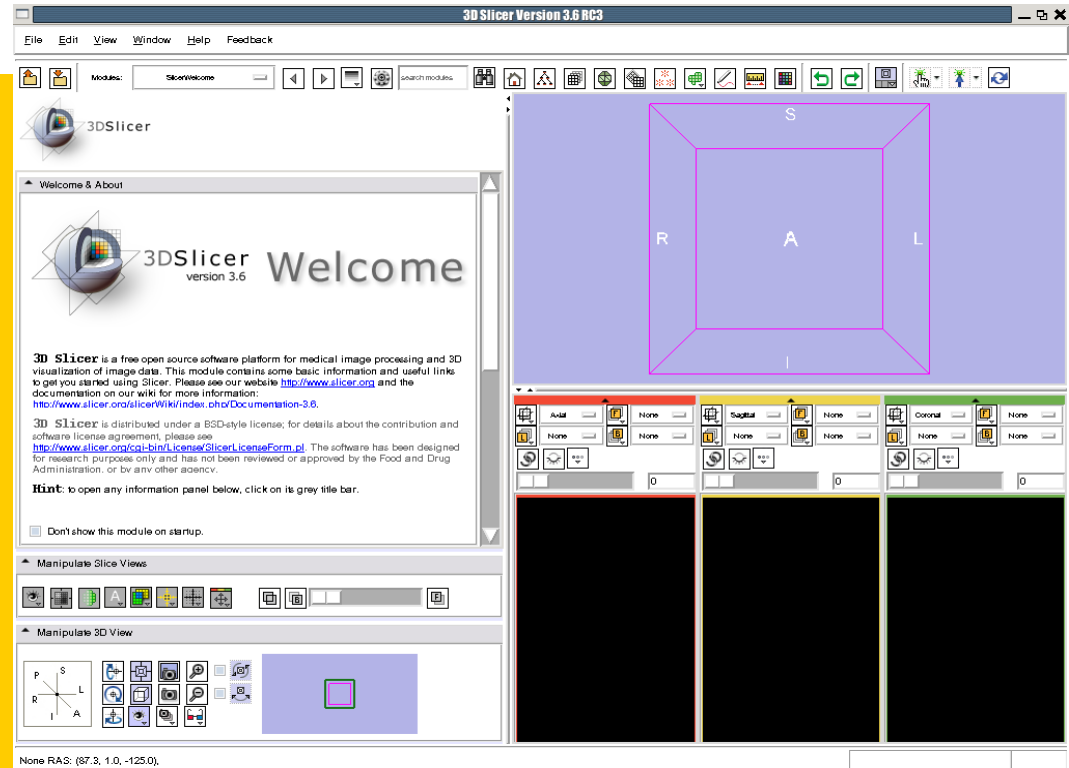




# Start Slicer3

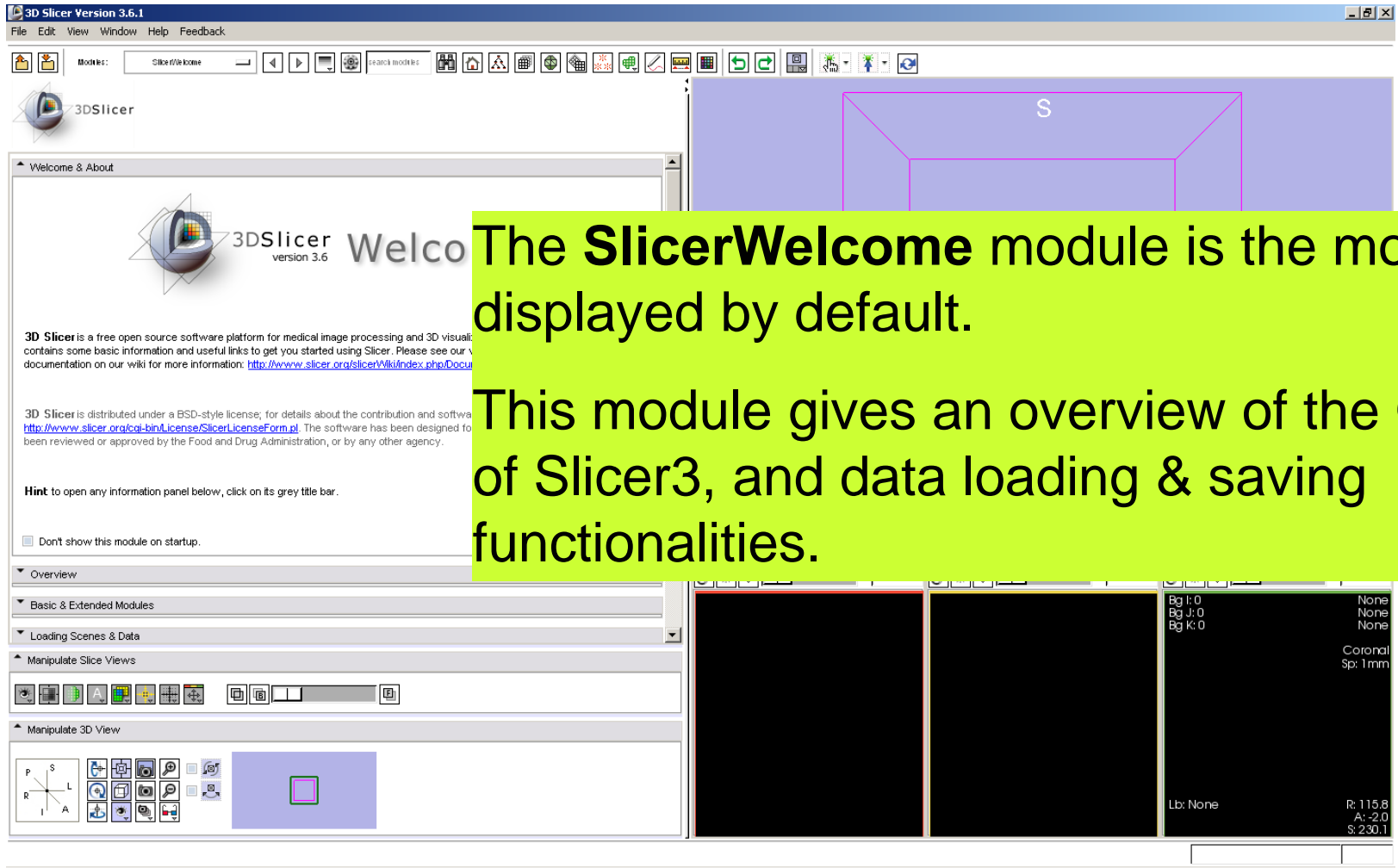
**Linux/Mac users**  
Launch the Slicer3  
executable located in  
the Slicer3.6 directory

**Windows users**  
Select  
Start → All Programs  
→ Slicer3-3.6-2010-08-23→Slicer3





# Slicer Welcome

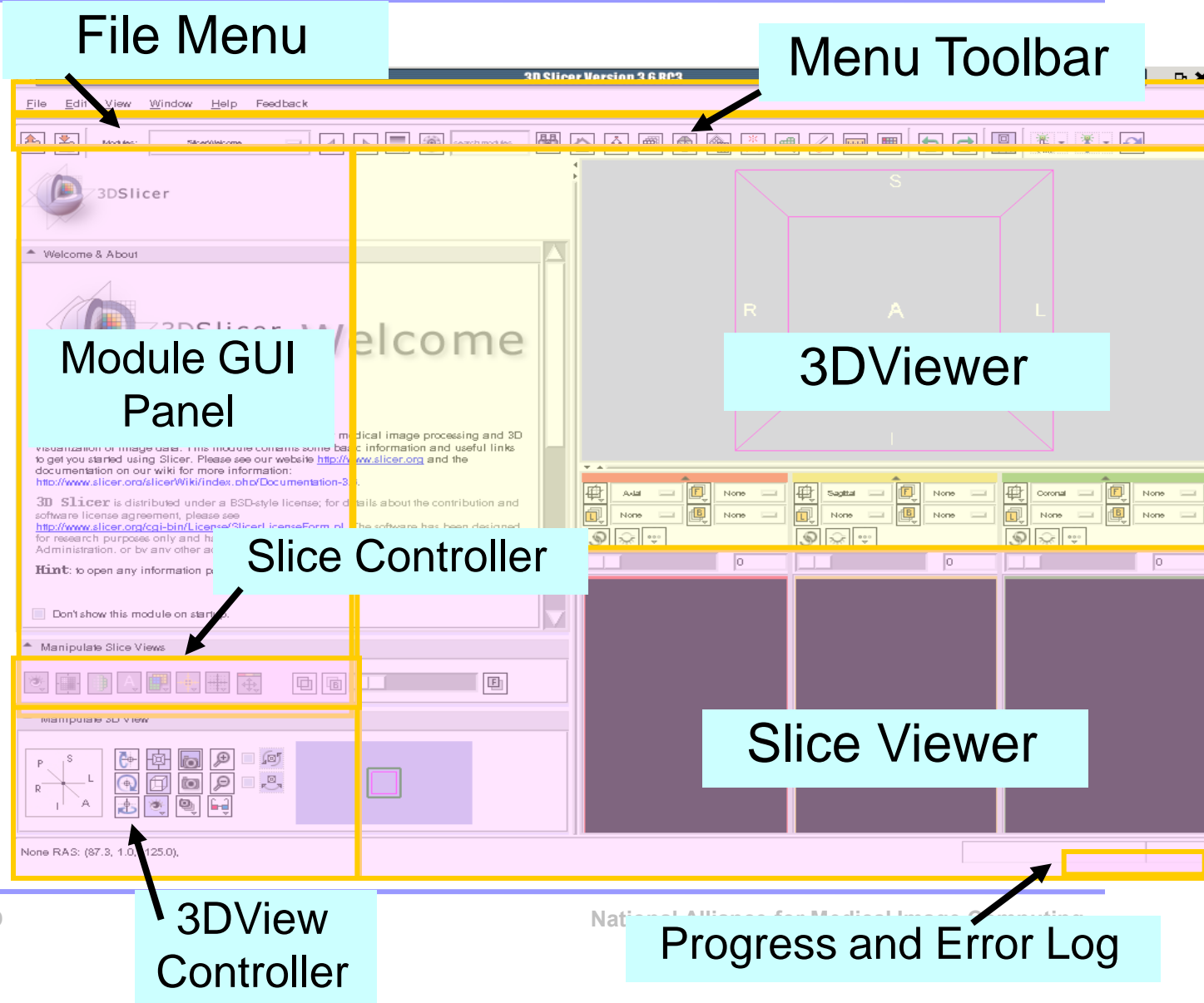


The **SlicerWelcome** module is the module displayed by default.

This module gives an overview of the GUI of Slicer3, and data loading & saving functionalities.

The Graphical User Interface (GUI) of Slicer3.6 integrates 8 main components:

- the File Menu
- the Menu Toolbar
- the Module GUI Panel
- the 3D Viewer
- the Slice Viewer
- the Slice Controller
- the 3D View Controller

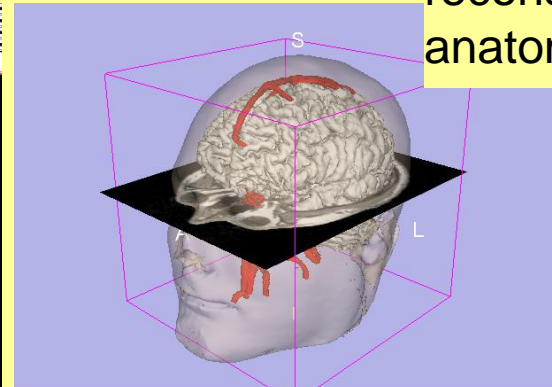




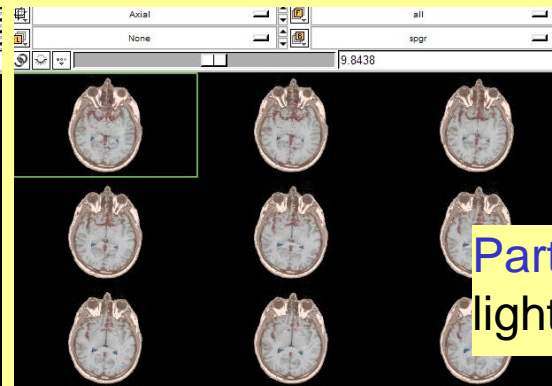
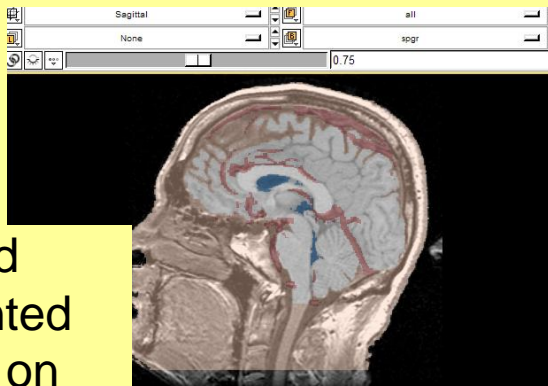
**Part 1.** Loading and visualizing multiple volumes simultaneously



**Part 3.** Visualizing 3D reconstructions of anatomical surfaces



**Part 2.** Loading and visualizing segmented structures overlaid on grayscale images

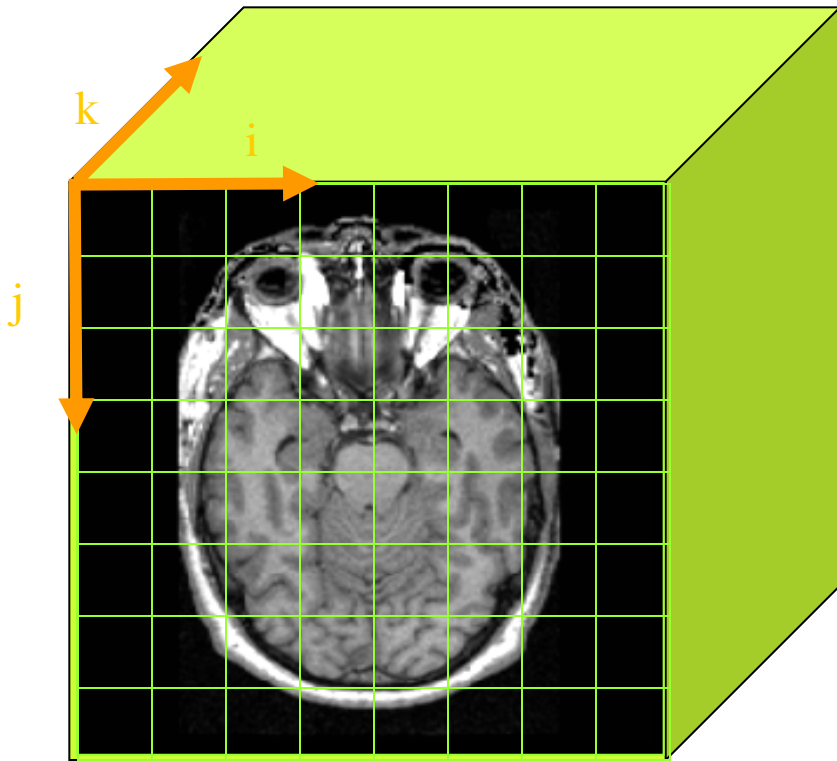


**Part 4.** The lightbox viewer

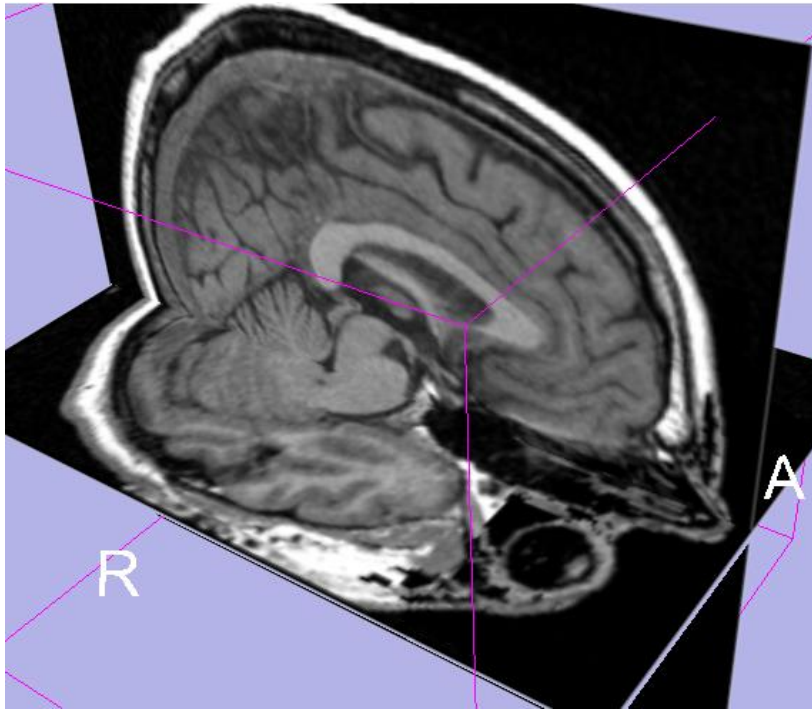
**Part 5.** Saving data

# Data Representation

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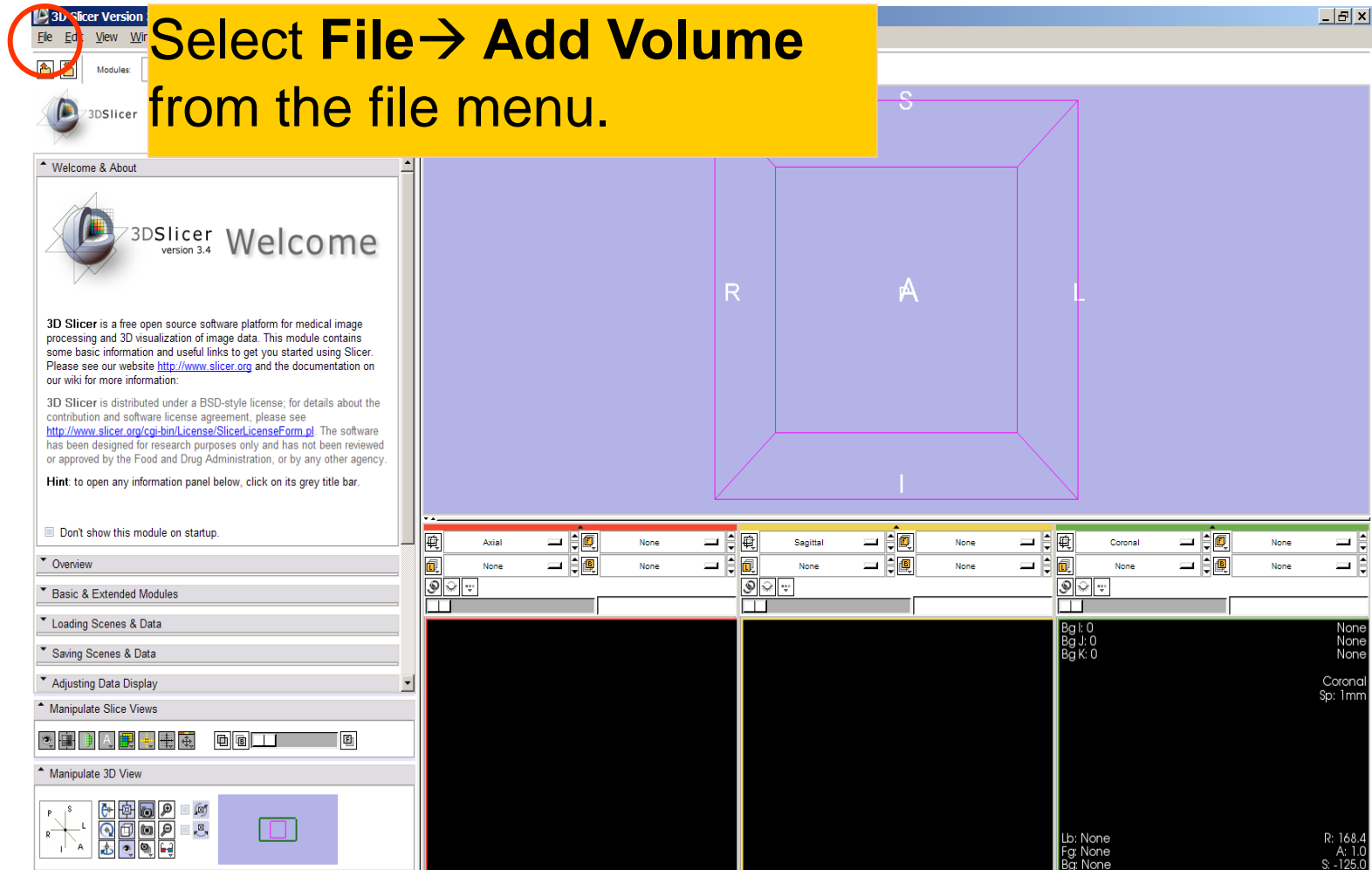


- The result of a volumetric acquisition is a **3D volume of data** related to the patient.
- The 3D raster dataset is sampled on a discrete grid with elements called **voxels** which contain the **signal intensity**.



# Part 1: Loading and visualizing multiple volumes simultaneously

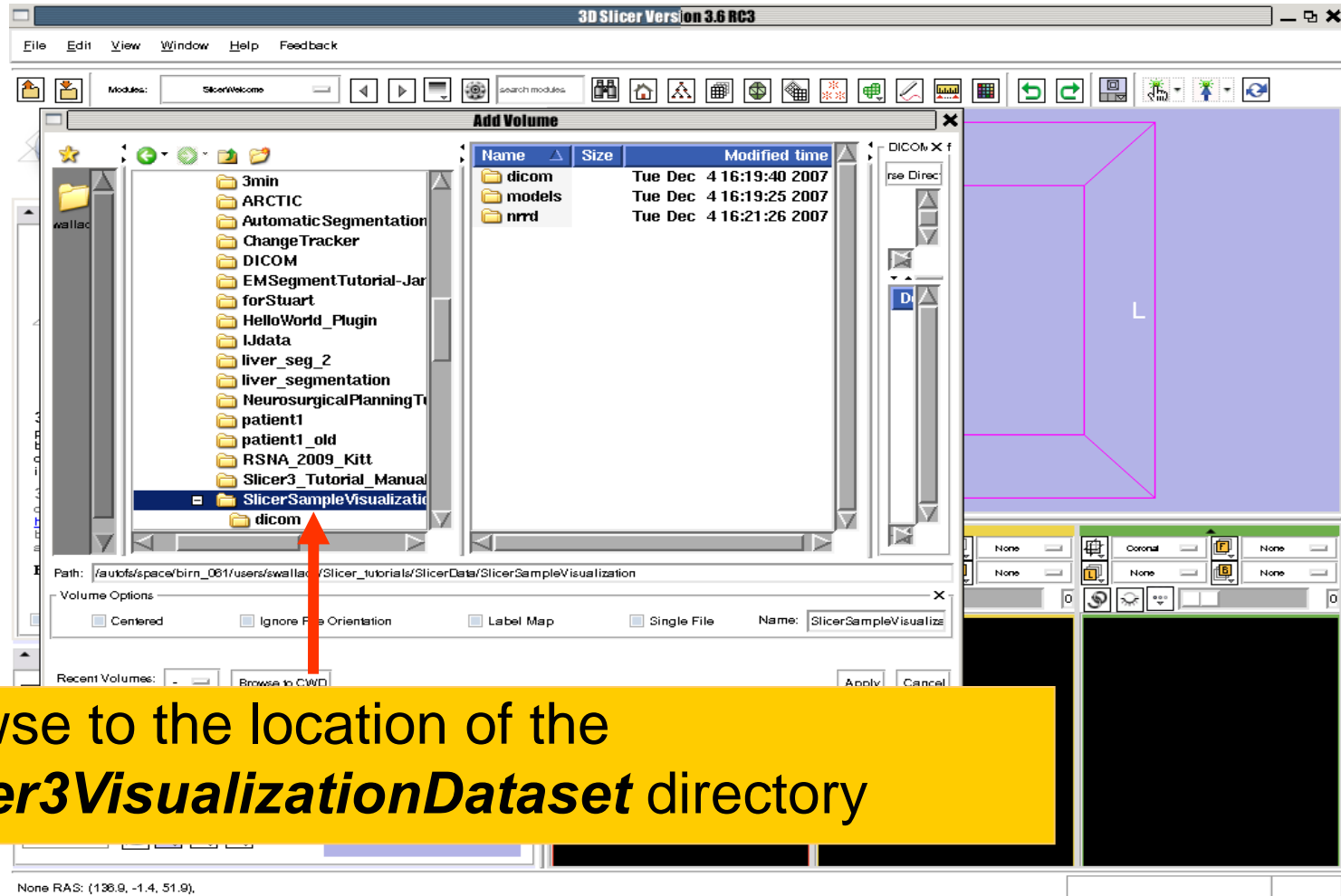
# Loading Volumes



**Select File → Add Volume**  
from the file menu.

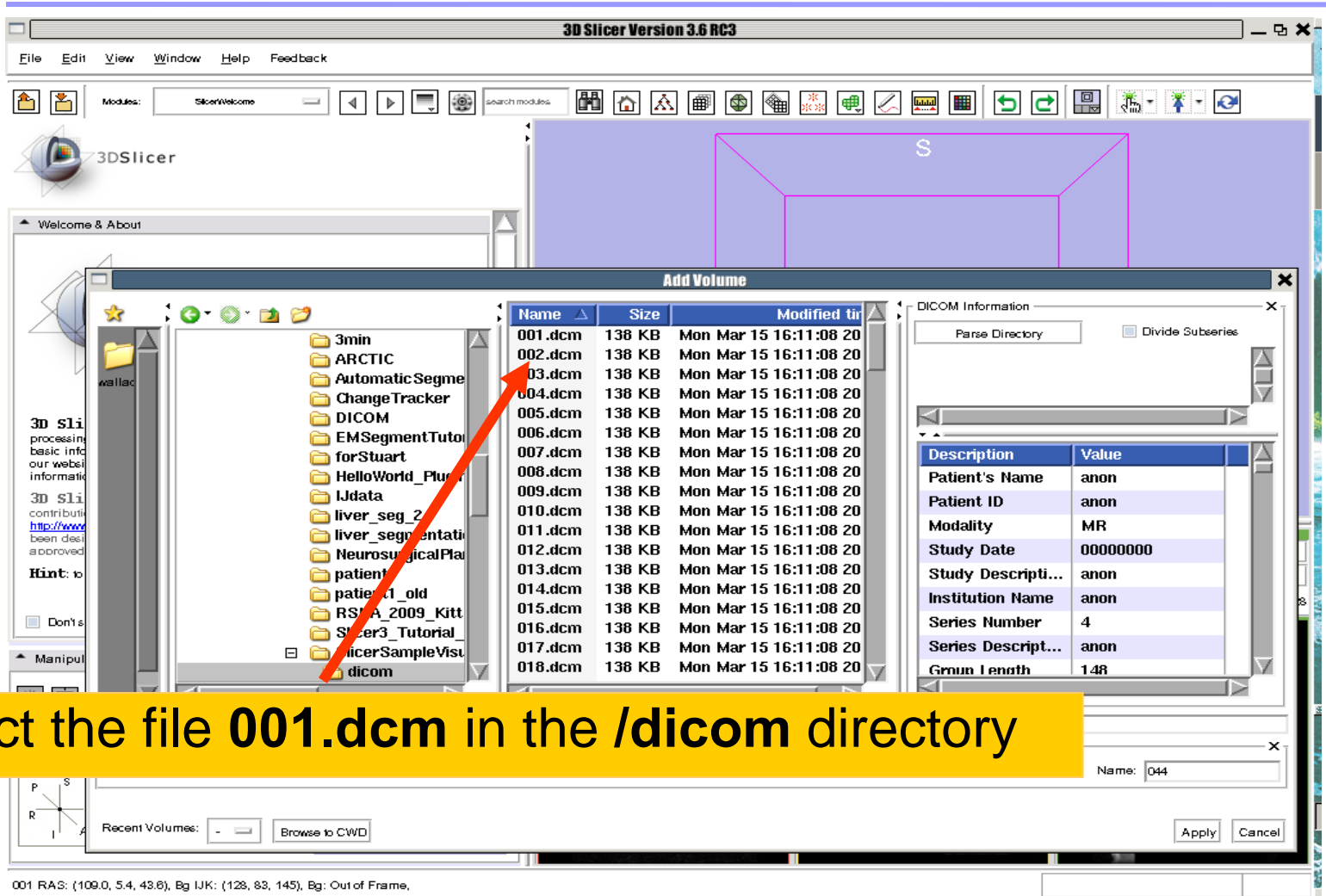
The screenshot shows the 3DSlicer software interface. A yellow callout box highlights the 'File' menu and the 'Add Volume' option. The main window displays a 3D coordinate system with axes labeled R (Right), L (Left), S (Superior), and I (Inferior). The interface includes a 'Welcome & About' panel on the left, a 'Manipulate 3D View' panel at the bottom left, and a central 3D view area with three orthogonal slices (Axial, Sagittal, Coronal) and their respective settings.

# Loading Volumes



Browse to the location of the ***Slicer3VisualizationDataset*** directory

# Loading Volumes



**Add Volume**

Name	Size	Modified time
001.dcm	138 KB	Mon Mar 15 16:11:08 20
002.dcm	138 KB	Mon Mar 15 16:11:08 20
003.dcm	138 KB	Mon Mar 15 16:11:08 20
004.dcm	138 KB	Mon Mar 15 16:11:08 20
005.dcm	138 KB	Mon Mar 15 16:11:08 20
006.dcm	138 KB	Mon Mar 15 16:11:08 20
007.dcm	138 KB	Mon Mar 15 16:11:08 20
008.dcm	138 KB	Mon Mar 15 16:11:08 20
009.dcm	138 KB	Mon Mar 15 16:11:08 20
010.dcm	138 KB	Mon Mar 15 16:11:08 20
011.dcm	138 KB	Mon Mar 15 16:11:08 20
012.dcm	138 KB	Mon Mar 15 16:11:08 20
013.dcm	138 KB	Mon Mar 15 16:11:08 20
014.dcm	138 KB	Mon Mar 15 16:11:08 20
015.dcm	138 KB	Mon Mar 15 16:11:08 20
016.dcm	138 KB	Mon Mar 15 16:11:08 20
017.dcm	138 KB	Mon Mar 15 16:11:08 20
018.dcm	138 KB	Mon Mar 15 16:11:08 20

**DICOM Information**

Parse Directory  Divide Subseries

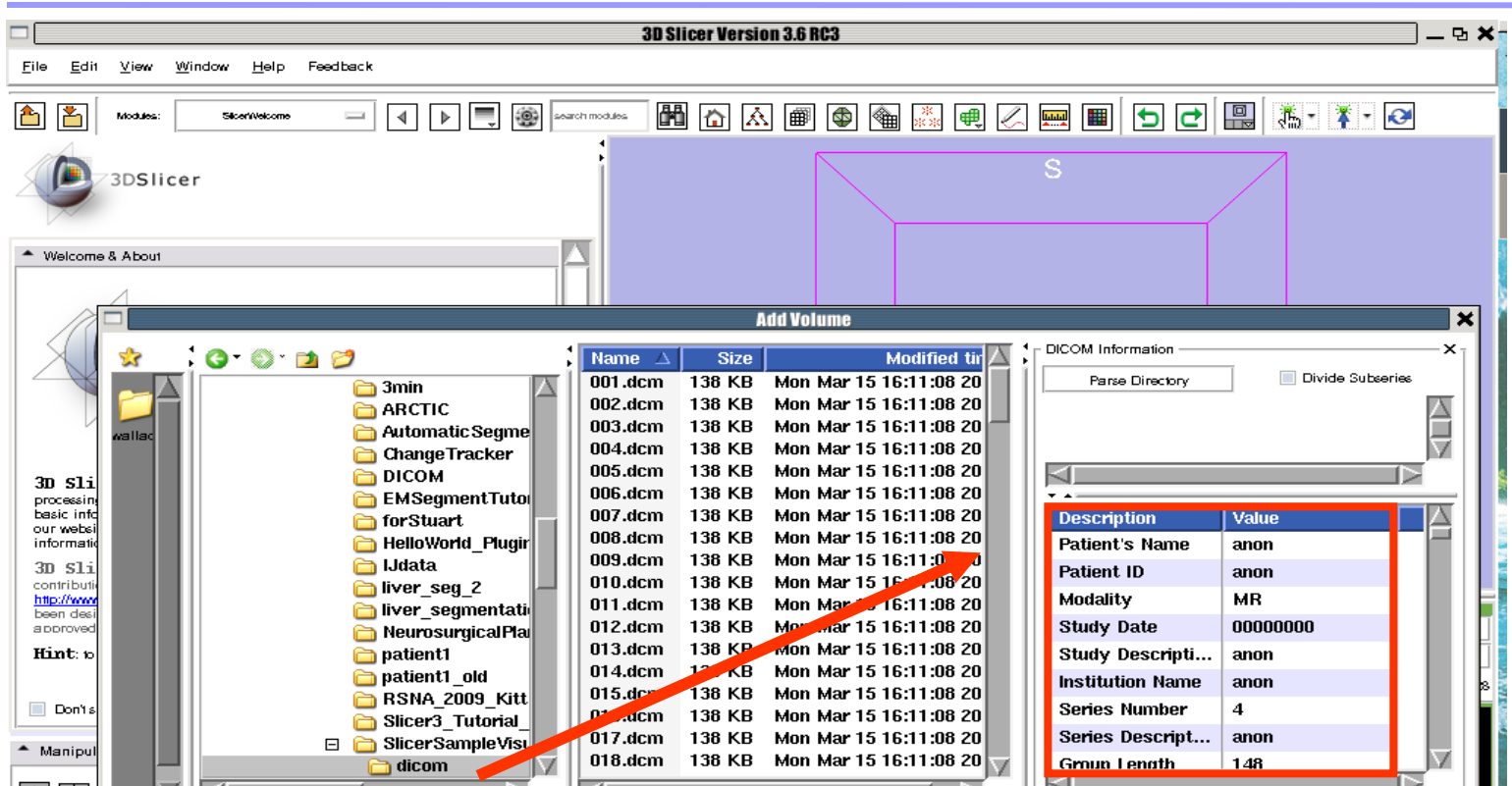
Description	Value
Patient's Name	anon
Patient ID	anon
Modality	MR
Study Date	00000000
Study Descripti...	anon
Institution Name	anon
Series Number	4
Series Descript...	anon
Group Length	148

Recent Volumes: - [ ] Browse to CWD

001 RAS: (109.0, 5.4, 43.8), Bg LJK: (128, 83, 145), Bg: Out of Frame.

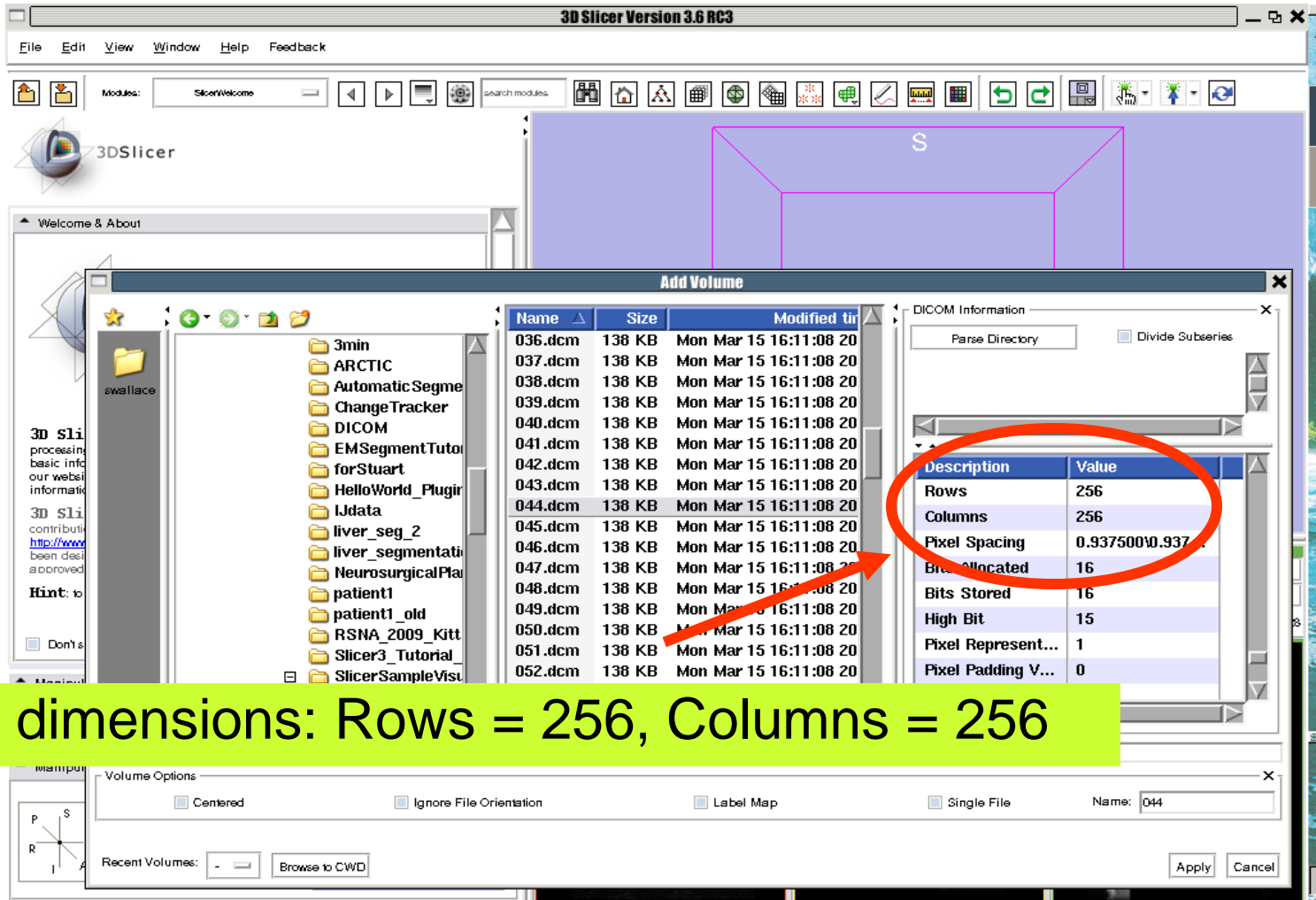
Select the file **001.dcm** in the **/dicom** directory

# Loading Volumes



Slicer displays the **Dicom header information** of the images. Browse through the Dicom information panel to display the dimensions of the images.

# Loading Volumes



3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

Welcome & About

**Add Volume**

Name	Size	Modified	Time
036.dcm	138 KB	Mon Mar 15 16:11:08 20	
037.dcm	138 KB	Mon Mar 15 16:11:08 20	
038.dcm	138 KB	Mon Mar 15 16:11:08 20	
039.dcm	138 KB	Mon Mar 15 16:11:08 20	
040.dcm	138 KB	Mon Mar 15 16:11:08 20	
041.dcm	138 KB	Mon Mar 15 16:11:08 20	
042.dcm	138 KB	Mon Mar 15 16:11:08 20	
043.dcm	138 KB	Mon Mar 15 16:11:08 20	
044.dcm	138 KB	Mon Mar 15 16:11:08 20	
045.dcm	138 KB	Mon Mar 15 16:11:08 20	
046.dcm	138 KB	Mon Mar 15 16:11:08 20	
047.dcm	138 KB	Mon Mar 15 16:11:08 20	
048.dcm	138 KB	Mon Mar 15 16:11:08 20	
049.dcm	138 KB	Mon Mar 15 16:11:08 20	
050.dcm	138 KB	Mon Mar 15 16:11:08 20	
051.dcm	138 KB	Mon Mar 15 16:11:08 20	
052.dcm	138 KB	Mon Mar 15 16:11:08 20	

DICOM Information

Parse Directory  Divide Subseries

Description	Value
Rows	256
Columns	256
Pixel Spacing	0.937500 0.937500
Bits Allocated	16
Bits Stored	16
High Bit	15
Pixel Represent...	1
Pixel Padding V...	0

Volume Options

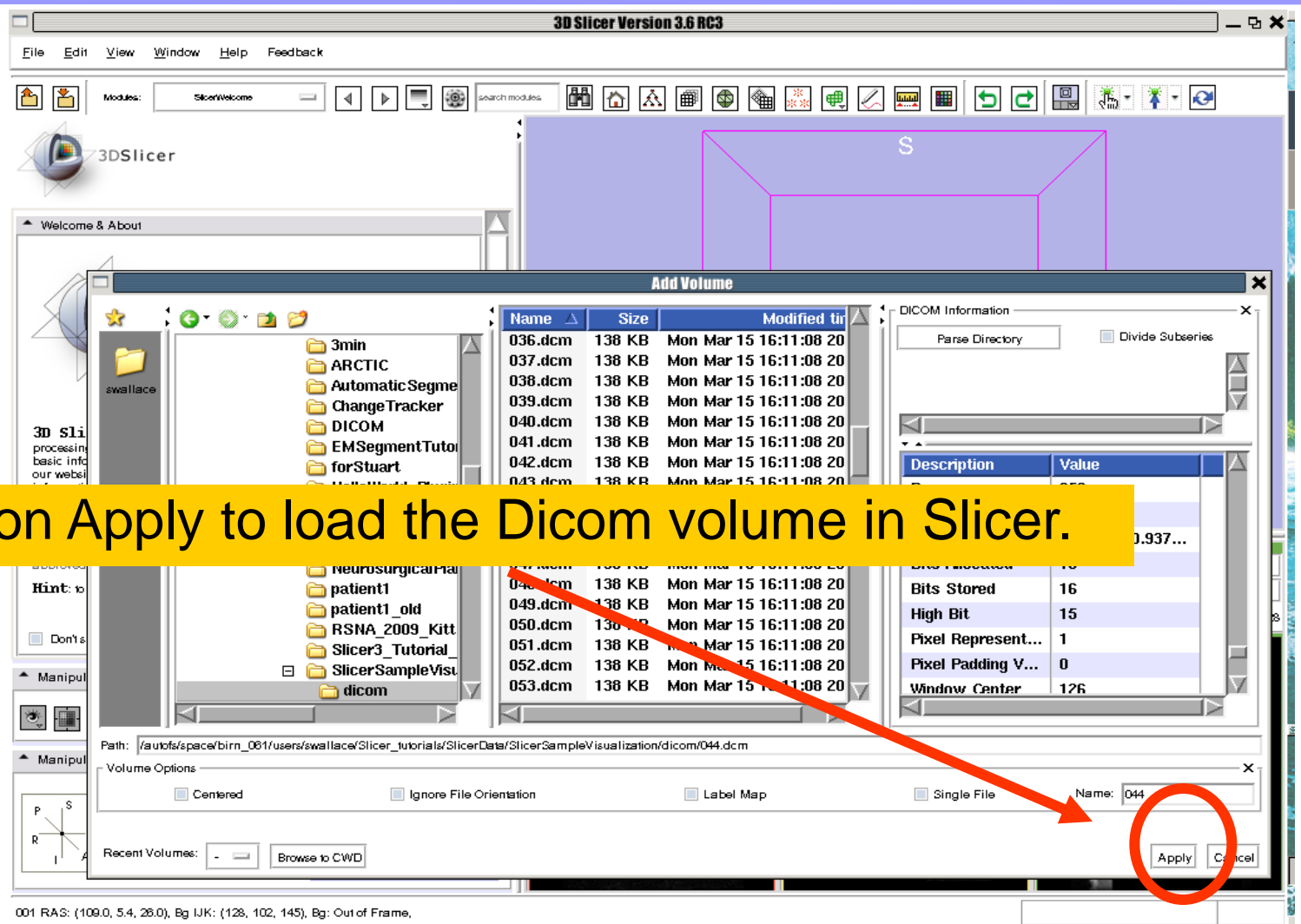
Centered  Ignore File Orientation  Label Map  Single File Name: 044

Recent Volumes:

Image dimensions: Rows = 256, Columns = 256



# Loading Volumes



3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: SlicerWelcome

Welcome & About

3DSlicer

**Add Volume**

Name	Size	Modified	Time
036.dcm	138 KB	Mon Mar 15 16:11:08 20	
037.dcm	138 KB	Mon Mar 15 16:11:08 20	
038.dcm	138 KB	Mon Mar 15 16:11:08 20	
039.dcm	138 KB	Mon Mar 15 16:11:08 20	
040.dcm	138 KB	Mon Mar 15 16:11:08 20	
041.dcm	138 KB	Mon Mar 15 16:11:08 20	
042.dcm	138 KB	Mon Mar 15 16:11:08 20	
043.dcm	138 KB	Mon Mar 15 16:11:08 20	
044.dcm	138 KB	Mon Mar 15 16:11:08 20	
045.dcm	138 KB	Mon Mar 15 16:11:08 20	
046.dcm	138 KB	Mon Mar 15 16:11:08 20	
047.dcm	138 KB	Mon Mar 15 16:11:08 20	
048.dcm	138 KB	Mon Mar 15 16:11:08 20	
049.dcm	138 KB	Mon Mar 15 16:11:08 20	
050.dcm	138 KB	Mon Mar 15 16:11:08 20	
051.dcm	138 KB	Mon Mar 15 16:11:08 20	
052.dcm	138 KB	Mon Mar 15 16:11:08 20	
053.dcm	138 KB	Mon Mar 15 16:11:08 20	

DICOM Information

Parse Directory  Divide Subseries

Description	Value
Bits Stored	16
High Bit	15
Pixel Represent...	1
Pixel Padding V...	0
Window Center	126

Path: /autofs/space/birn\_081/users/swallace/Slicer\_tutorials/SlicerData/SlicerSampleVisualization/dicom/044.dcm

Volume Options

Centered  Ignore File Orientation  Label Map  Single File


Name: 044

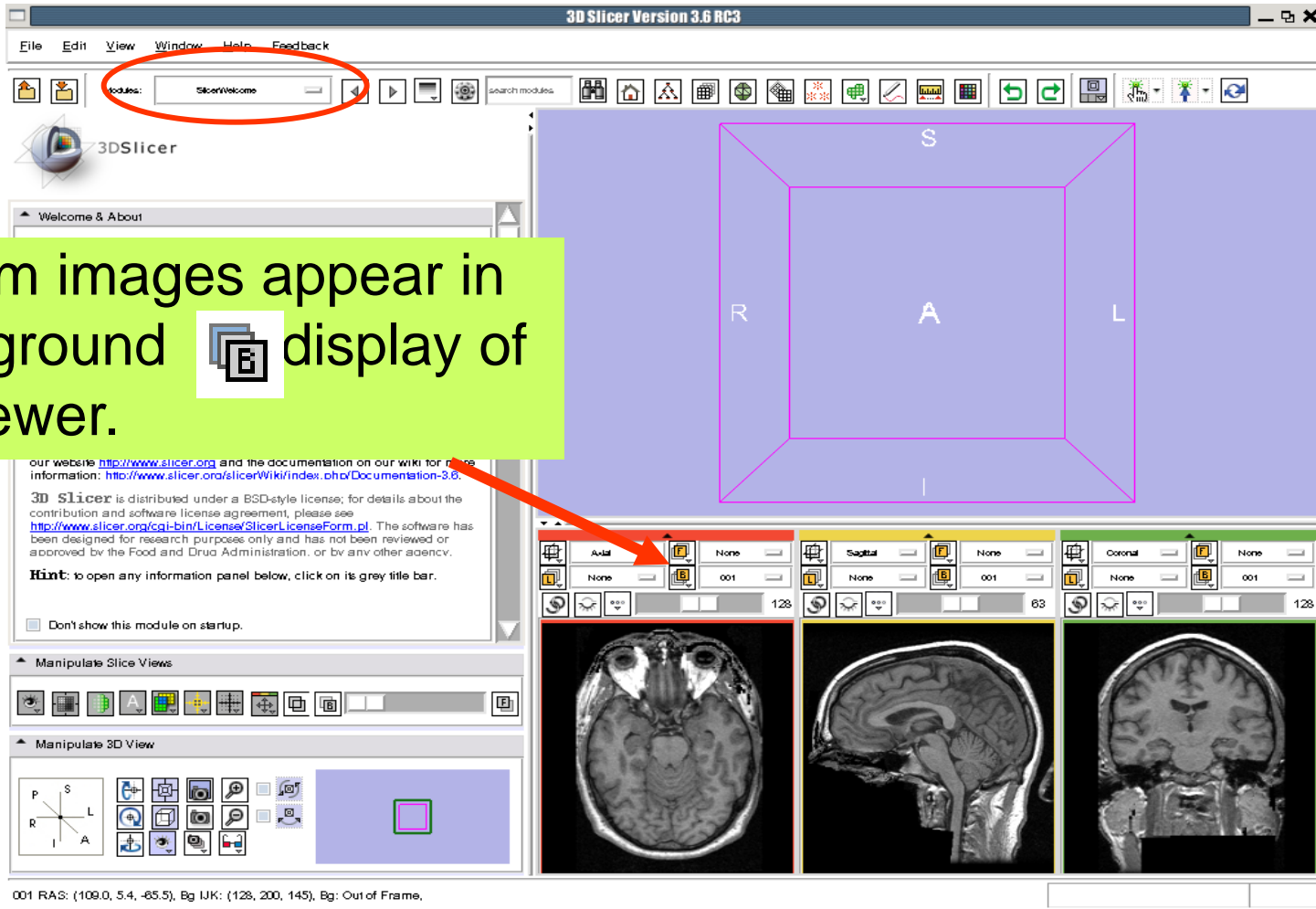
Recent Volumes: - Browse to CWD

Apply Cancel

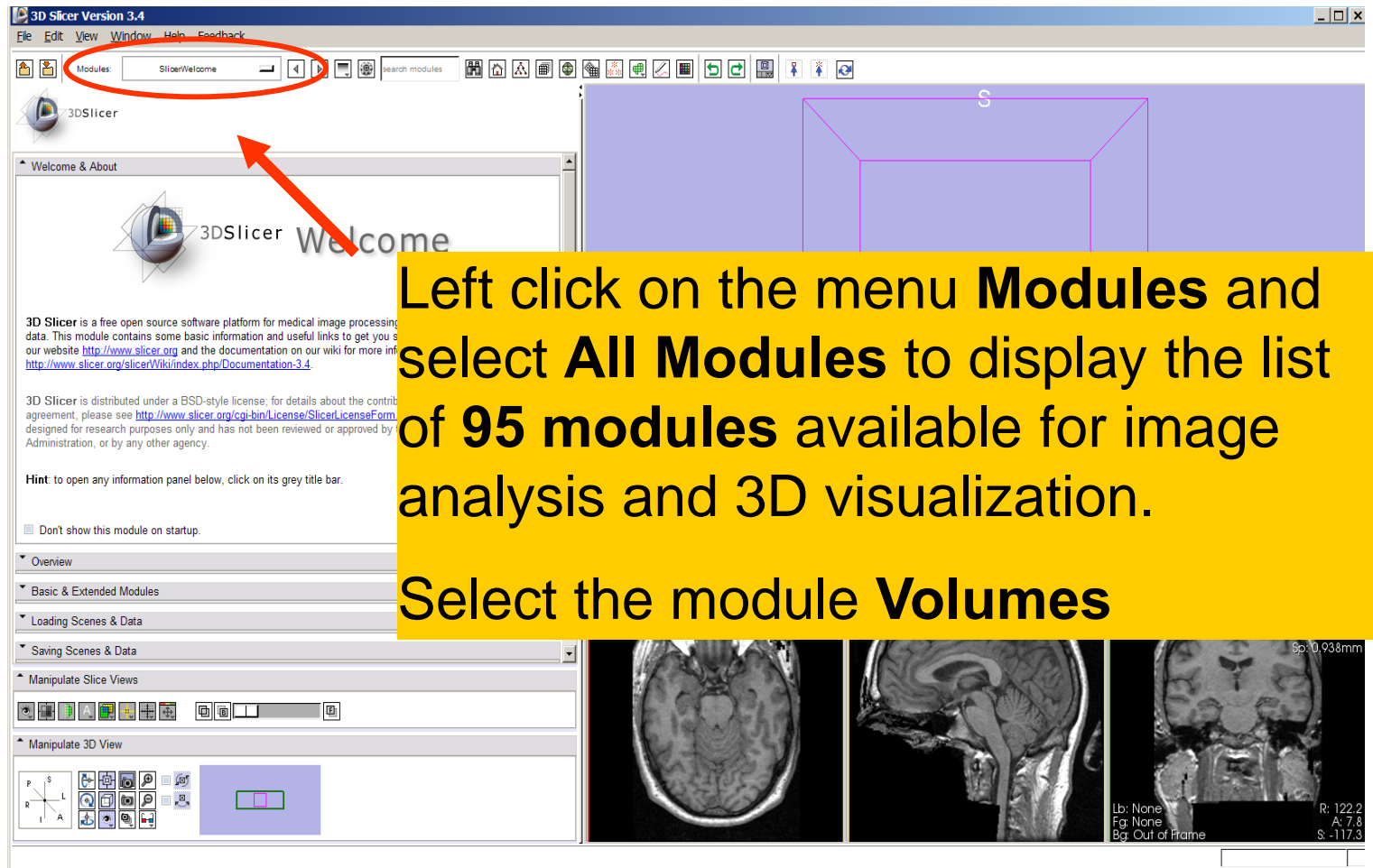
Click on Apply to load the Dicom volume in Slicer.

# Loading Volumes

The Dicom images appear in the Background  display of the 2DViewer.



# Loading Volumes



3D Slicer Version 3.4

File Edit View Window Help Feedback

Modules: SlicerWelcome

3DSlicer

Welcome & About

3DSlicer Welcome

3D Slicer is a free open source software platform for medical image processing data. This module contains some basic information and useful links to get you started. Our website <http://www.slicer.org> and the documentation on our wiki for more information <http://www.slicer.org/slicerWiki/index.php/Documentation-3.4>.

3D Slicer is distributed under a BSD-style license; for details about the contribution agreement, please see <http://www.slicer.org/cgi-bin/License/SlicerLicenseForm> designed for research purposes only and has not been reviewed or approved by the Administration, or by any other agency.

Hint: to open any information panel below, click on its grey title bar.

Don't show this module on startup.

Overview

Basic & Extended Modules

Loading Scenes & Data

Saving Scenes & Data

Manipulate Slice Views

Manipulate 3D View

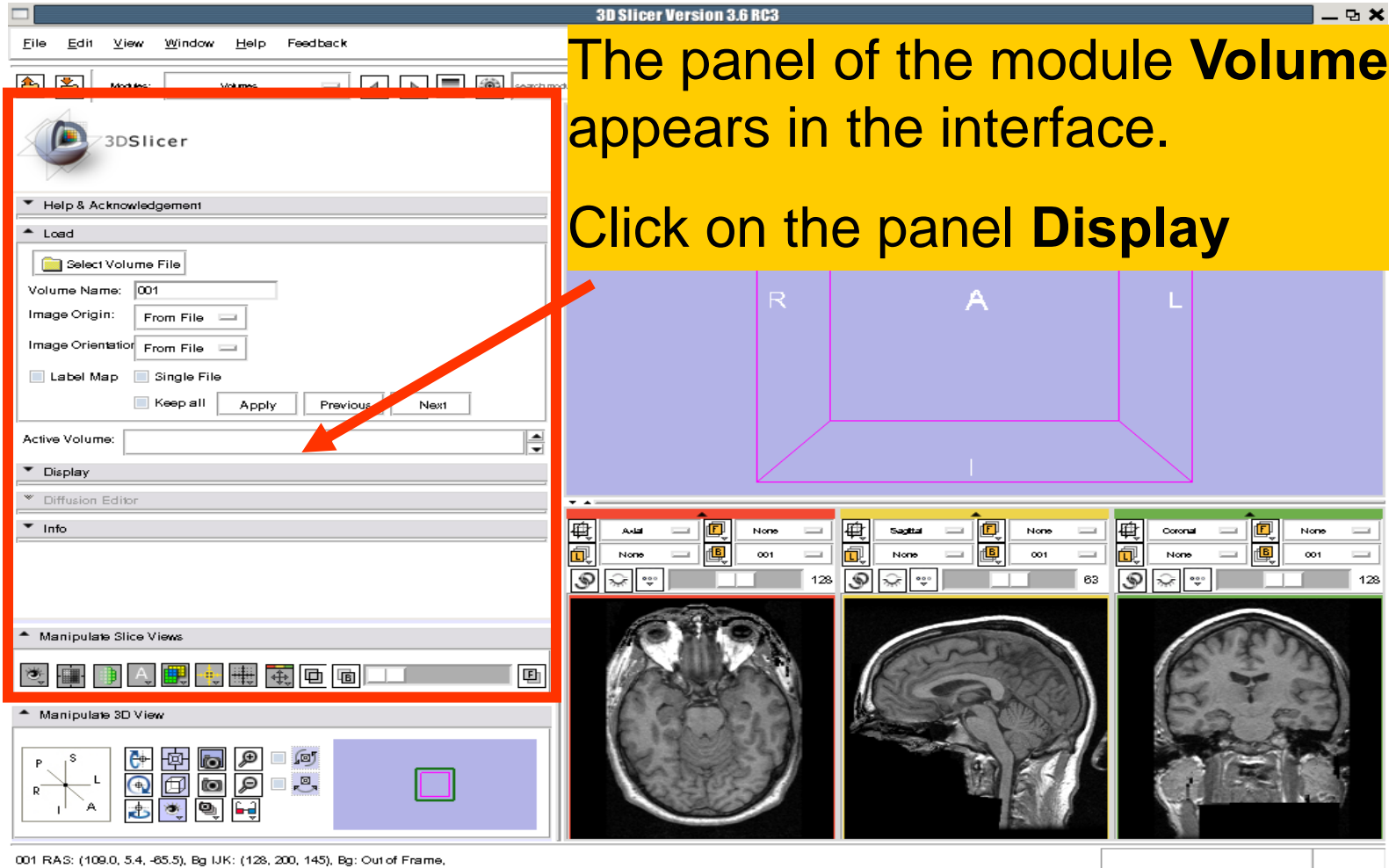
S

**Left click on the menu **Modules** and select **All Modules** to display the list of **95 modules** available for image analysis and 3D visualization.**

**Select the module **Volumes****

Lb: None R: 122.2  
Fg: None A: 7.8  
Bg: Out of Frame S: -117.3

# Loading Volumes



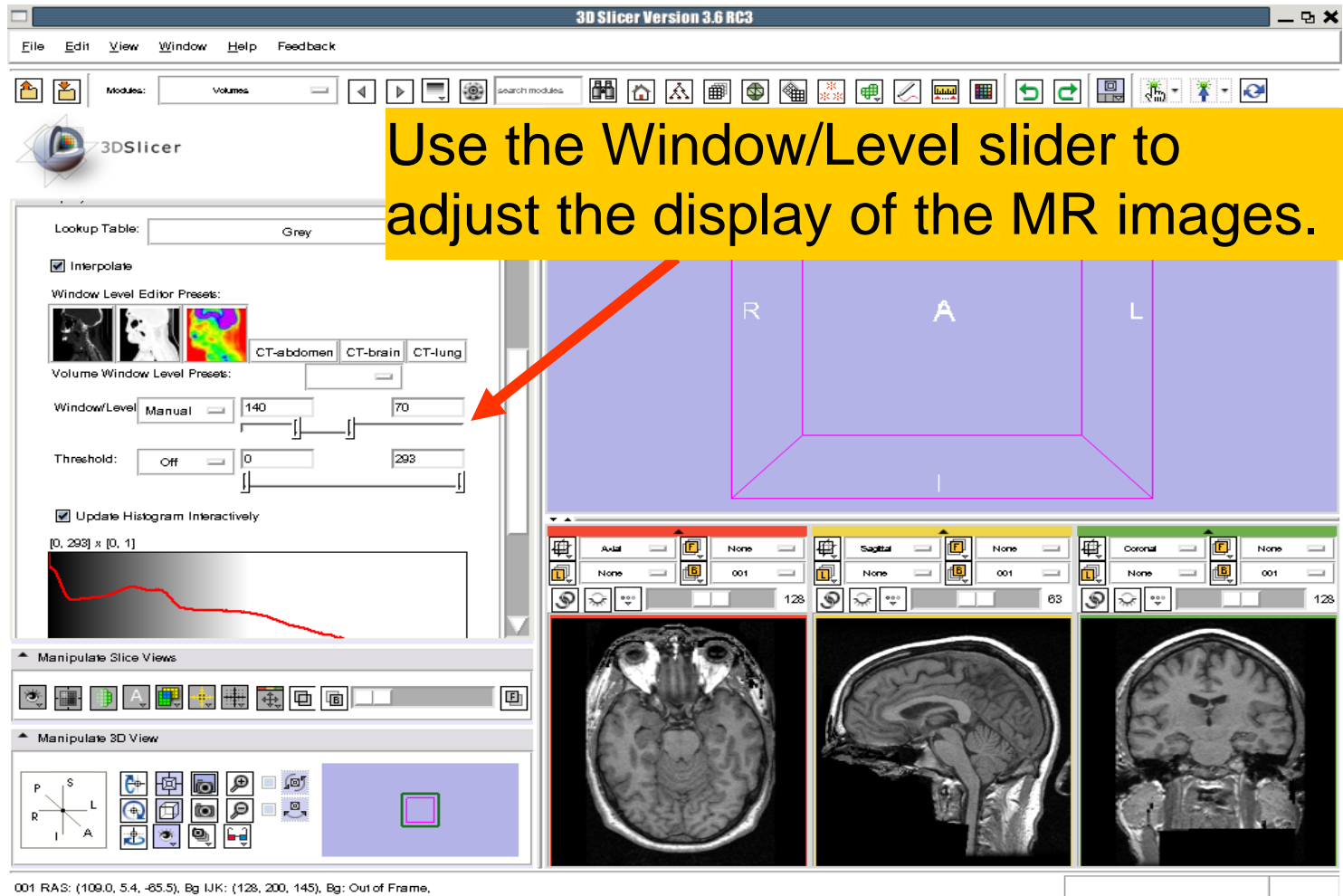
The panel of the module **Volumes** appears in the interface.

Click on the panel **Display**

001 RAS: (109.0, 5.4, -65.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

The screenshot shows the 3D Slicer interface with the Volumes module panel highlighted in a red box. The panel includes sections for 'Load', 'Display', 'Diffusion Editor', 'Info', 'Manipulate Slice Views', and 'Manipulate 3D View'. A red arrow points to the 'Display' section. The main 3D view shows a brain volume with a purple wireframe bounding box and labels R, A, L, I. Below the 3D view are three slice view panels: Axial, Sagittal, and Coronal, each showing a corresponding slice of the brain volume.

# Loading Volumes



3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: Volumes

Use the Window/Level slider to adjust the display of the MR images.

Lookup Table: Grey

Interpolate

Window Level Editor Presets:

Volume Window Level Presets:

Window/Level: Manual 140 70

Threshold: Off 0 293

Update Histogram Interactively

[0, 293] x [0, 1]

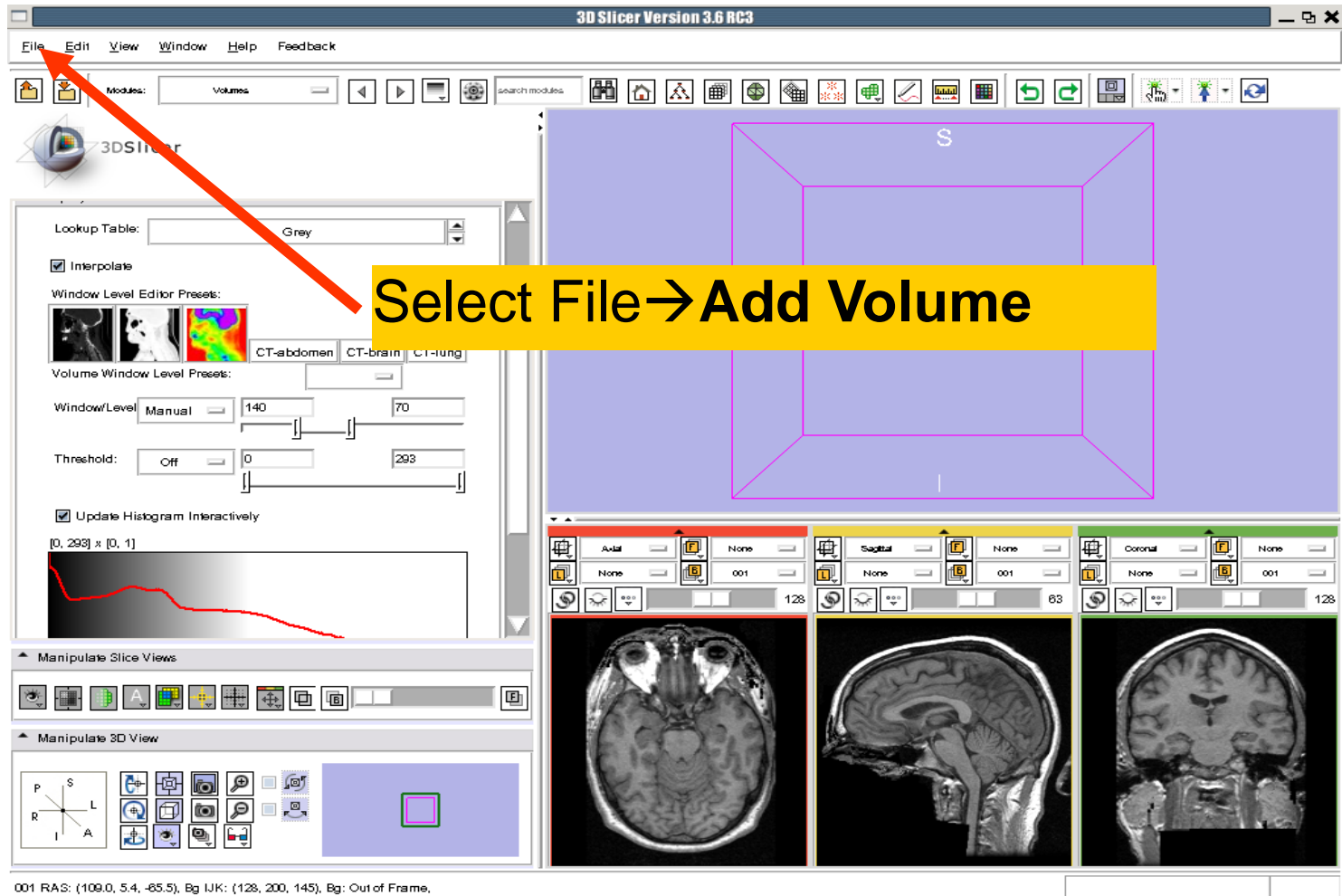
Manipulate Slice Views

Manipulate 3D View

001 RAS: (109.0, 5.4, -85.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

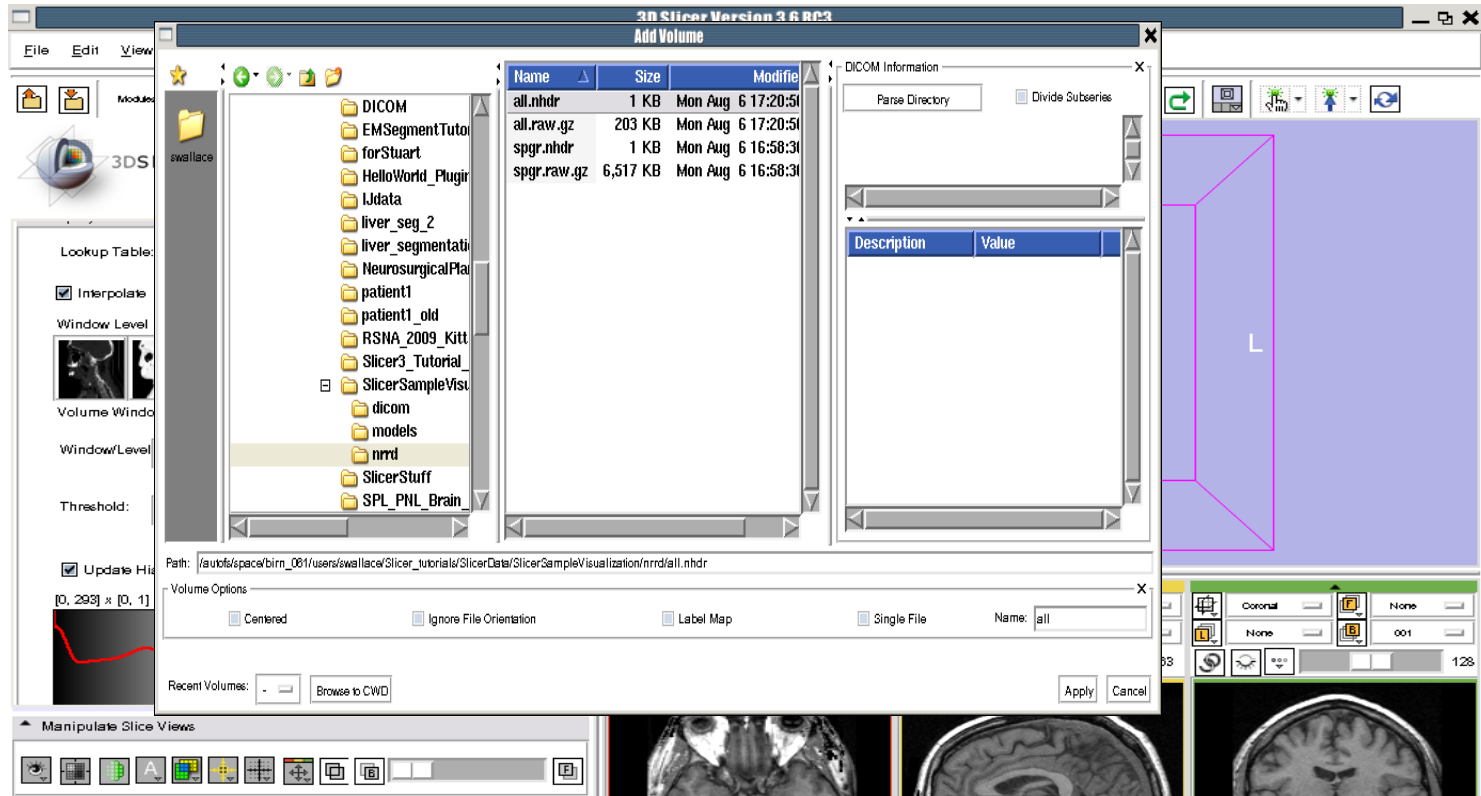
The screenshot displays the 3D Slicer interface. A yellow callout box with a red arrow points to the 'Window/Level' slider in the 'Volume Window Level Presets' section, which is set to 140 and 70. The main 3D view shows a brain slice with 'R', 'A', and 'L' orientation markers. Below the 3D view are three slice view panels: Axial, Sagittal, and Coronal. The status bar at the bottom shows the current volume's RAS coordinates: 001 RAS: (109.0, 5.4, -85.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

# Loading Volumes



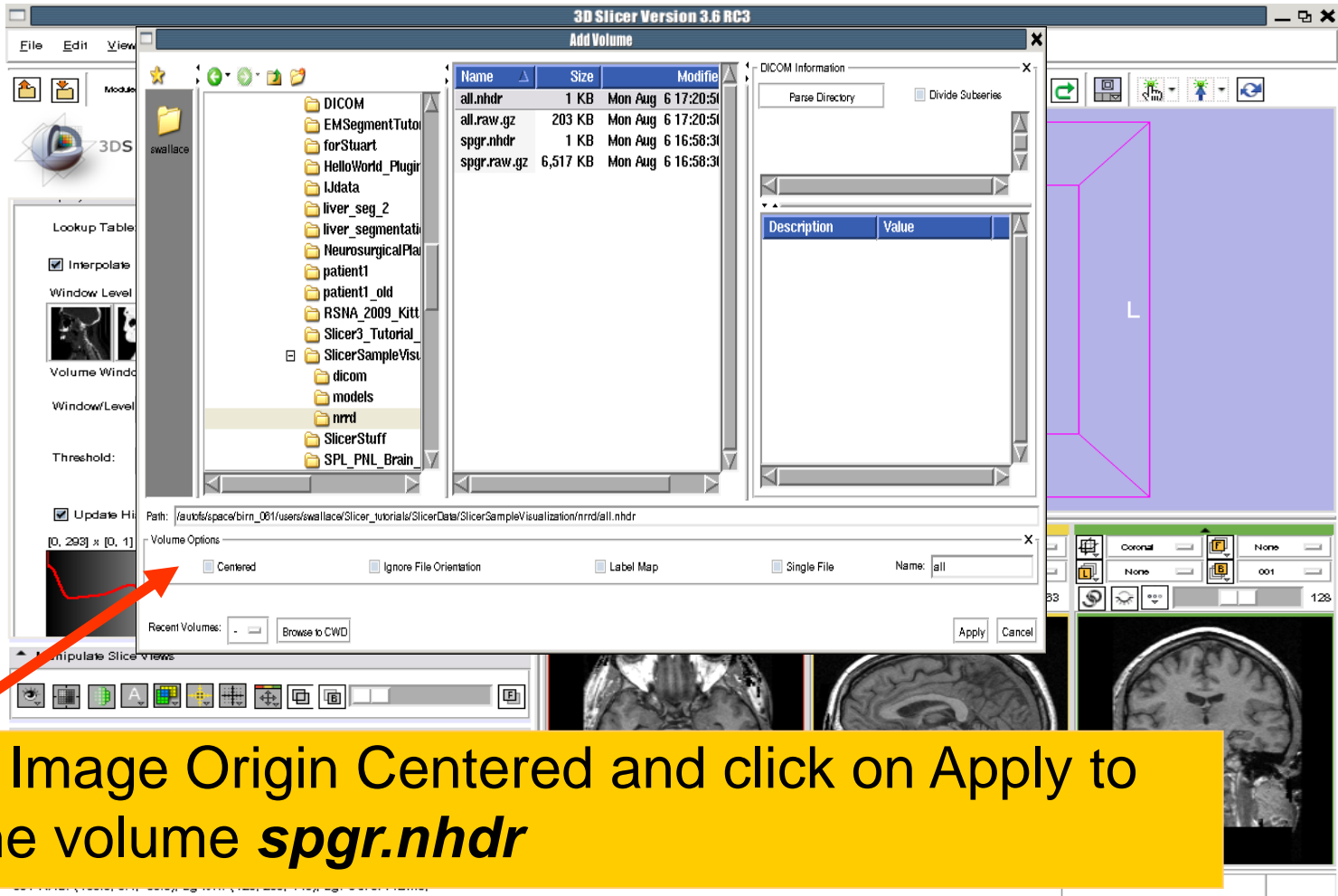
The screenshot displays the 3D Slicer software interface. The title bar reads "3D Slicer Version 3.6 RC3". The menu bar includes "File", "Edit", "View", "Window", "Help", and "Feedback". A red arrow points from the "File" menu to a yellow callout box that says "Select File → Add Volume". The main workspace shows a purple volume with a white bounding box labeled 'S'. Below the workspace are three slice view panels: Axial, Sagittal, and Coronal. The status bar at the bottom shows coordinates: "001 RAS: (109.0, 5.4, -85.5), Bg IJK: (128, 200, 145), Bg: Out of Frame."

# Loading Volumes



Browse to find the header file of the spgr volume ***spgr.nhdr*** located in the directory ***Slicer3VisualizationDataset/nrrd*** and click on **Open**.

# Loading Volumes



3D Slicer Version 3.6 RC3

Add Volume

Name	Size	Modified
all.nhdr	1 KB	Mon Aug 6 17:20:51
all.raw.gz	203 KB	Mon Aug 6 17:20:51
spgr.nhdr	1 KB	Mon Aug 6 16:58:31
spgr.raw.gz	6,517 KB	Mon Aug 6 16:58:31

Path: /autofs/pace/birn\_081/users/swallace/Slicer\_tutorials/SlicerData/SlicerSampleVisualization/nrrd/all.nhdr

Volume Options

Centered     Ignore File Orientation     Label Map     Single File    Name: all

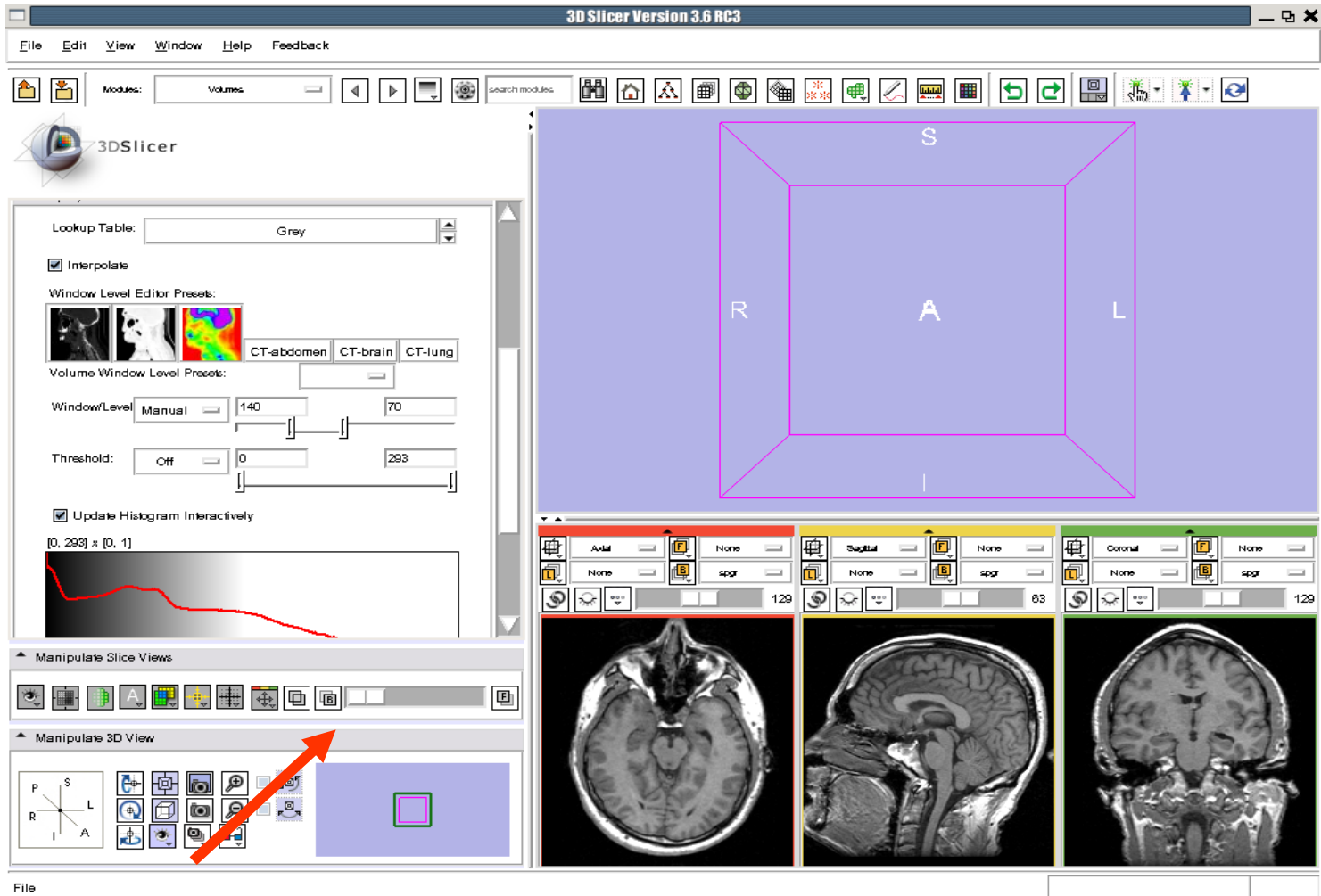
Recent Volumes: -    Browse to CWD

Apply    Cancel

Select Image Origin Centered and click on Apply to load the volume *spgr.nhdr*



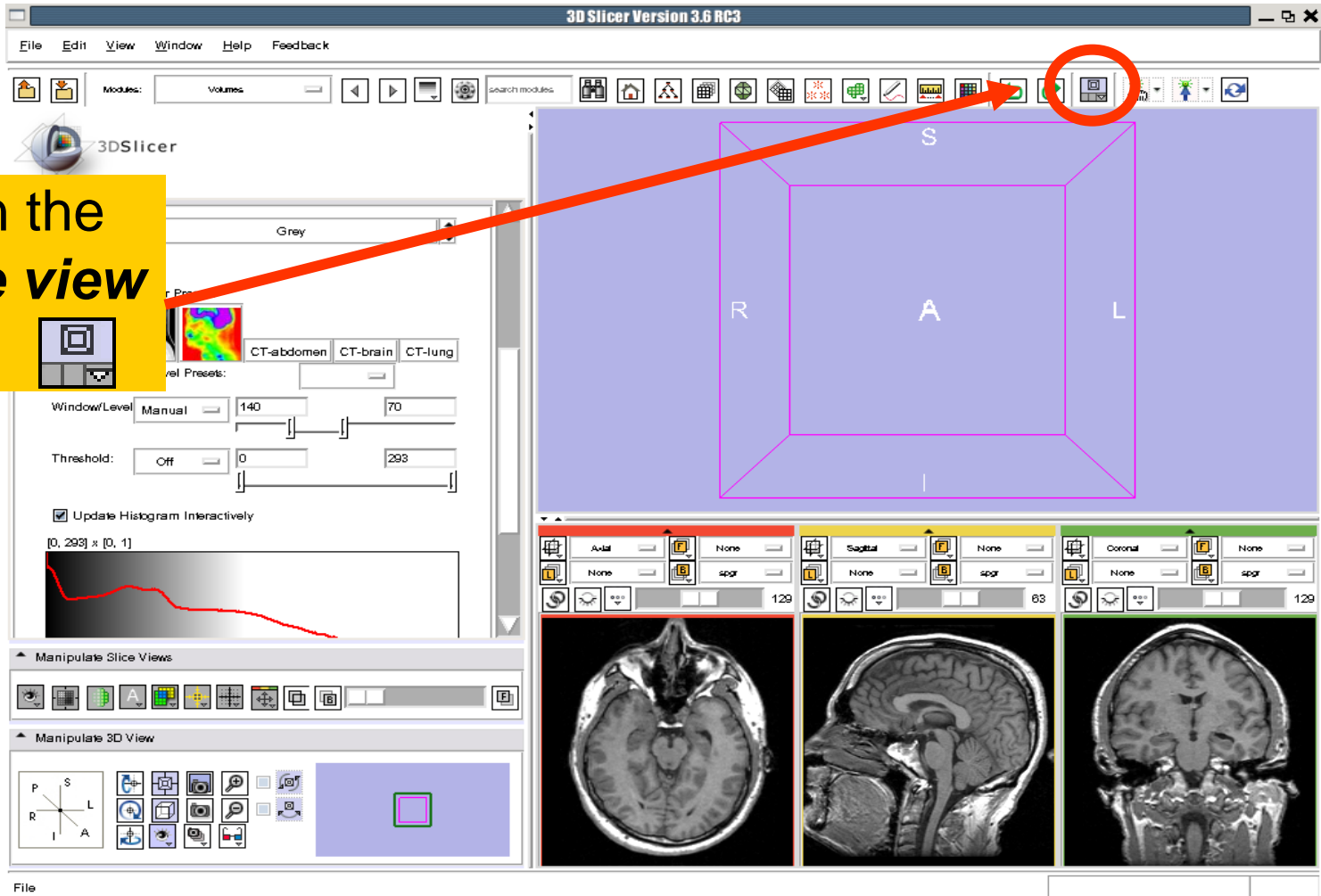
# Loading Volumes



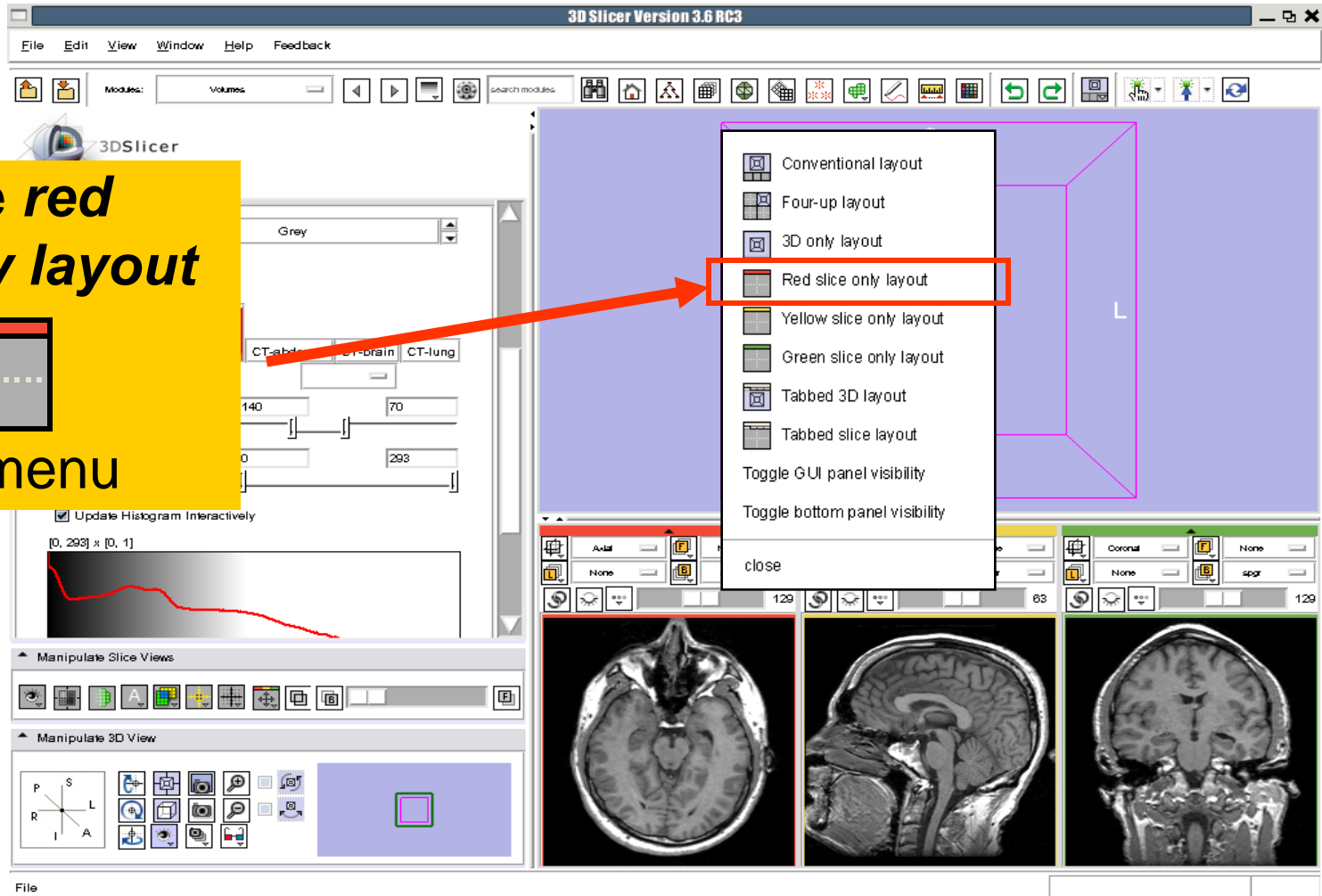
The spgr volume appears in the Background display of the 2D Viewer.

# Exploring the data

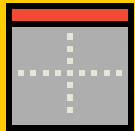
Click on the **choose view** icon



# Exploring the data

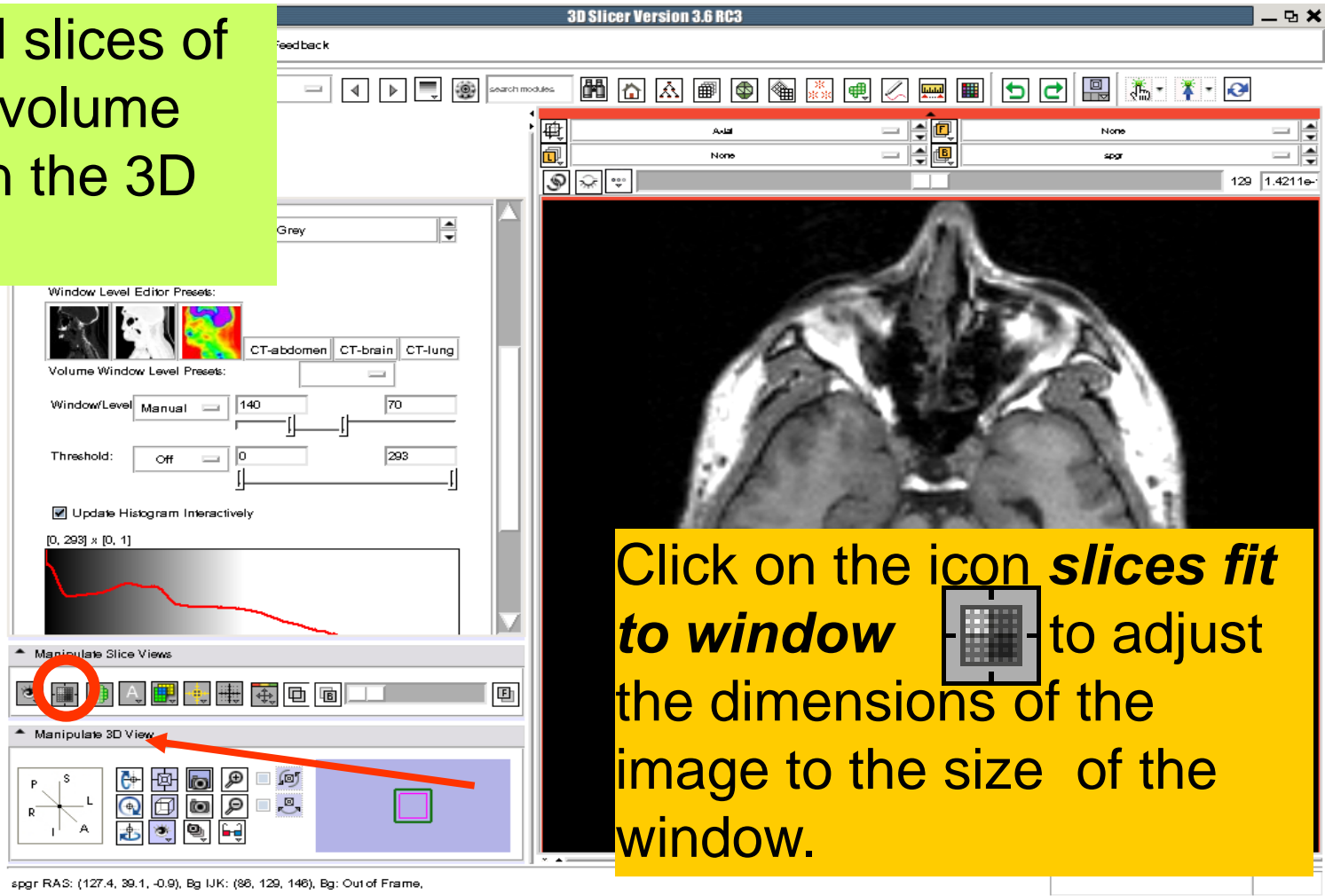


Select the *red slice only layout* from the menu




# Exploring the data

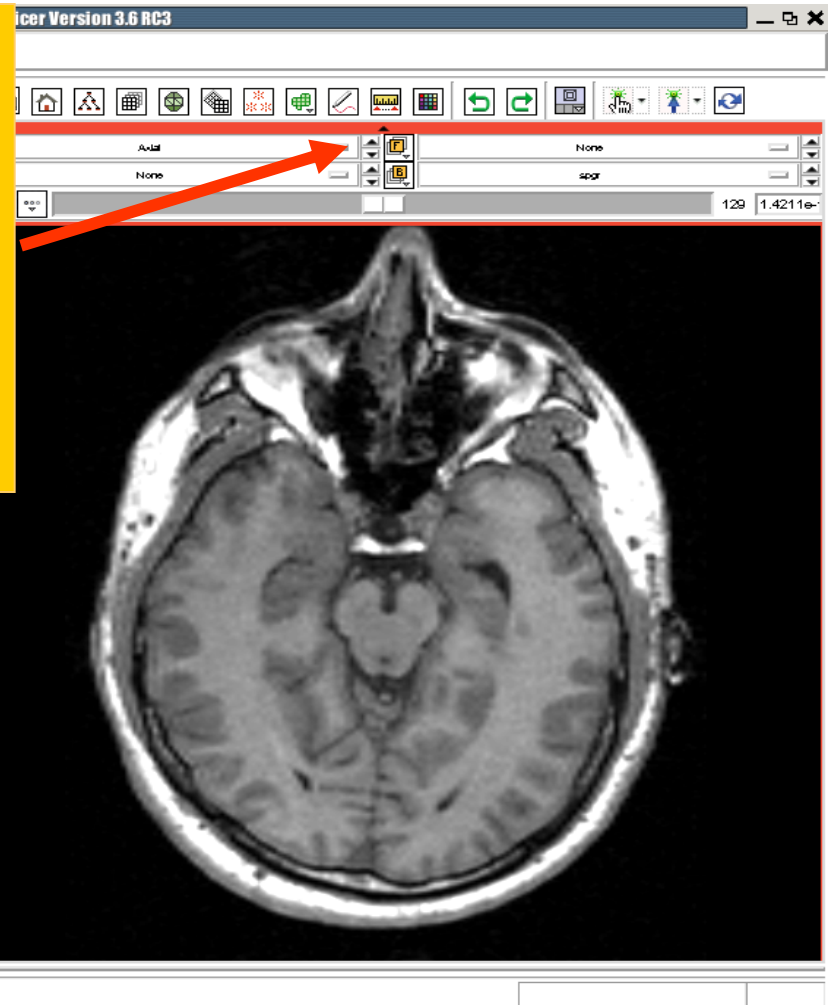
The axial slices of the spgr volume appear in the 3D viewer.





The screenshot shows the 3D Slicer Version 3.6 RC3 interface. On the left, the 'Window Level Editor' panel is visible, showing 'Window/Level' set to 'Manual' with values 140 and 70, and a 'Threshold' of 0 to 293. Below this is a histogram plot. The 'Manipulate Slice Views' panel has a red circle around the 'slices fit to window' icon. The 'Manipulate 3D View' panel has a red arrow pointing to the 'slices fit to window' icon. The main 3D viewer displays an axial MRI slice of a head. A yellow callout box with a red border contains the text: 'Click on the icon *slices fit to window* to adjust the dimensions of the image to the size of the window.' The icon is a grid of squares.

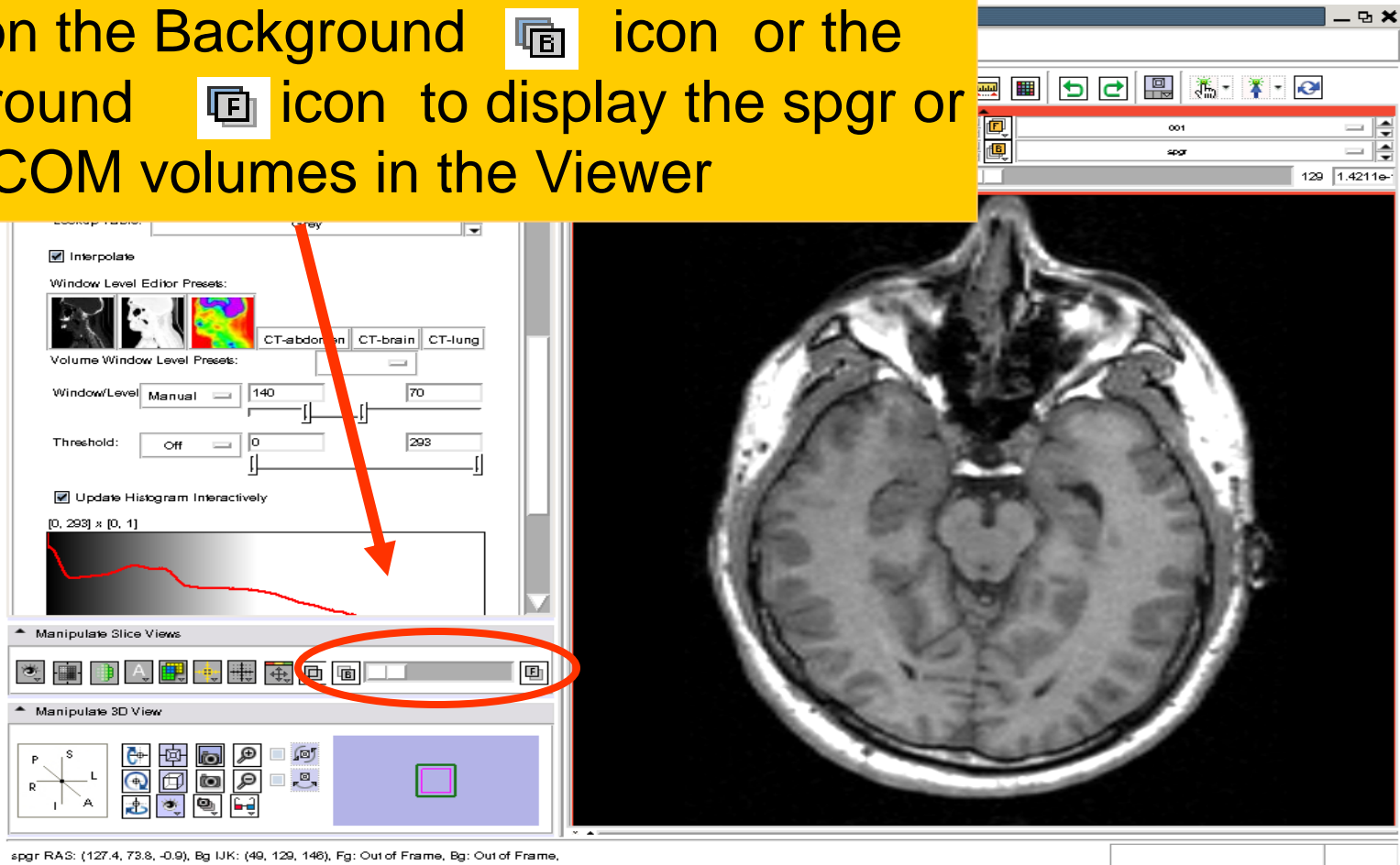
# Exploring the data

To simultaneously view the dicom and the nrrd volumes, left click on the drop-down menu to the right of the Foreground icon  select the image 001.dcm



# Exploring the data

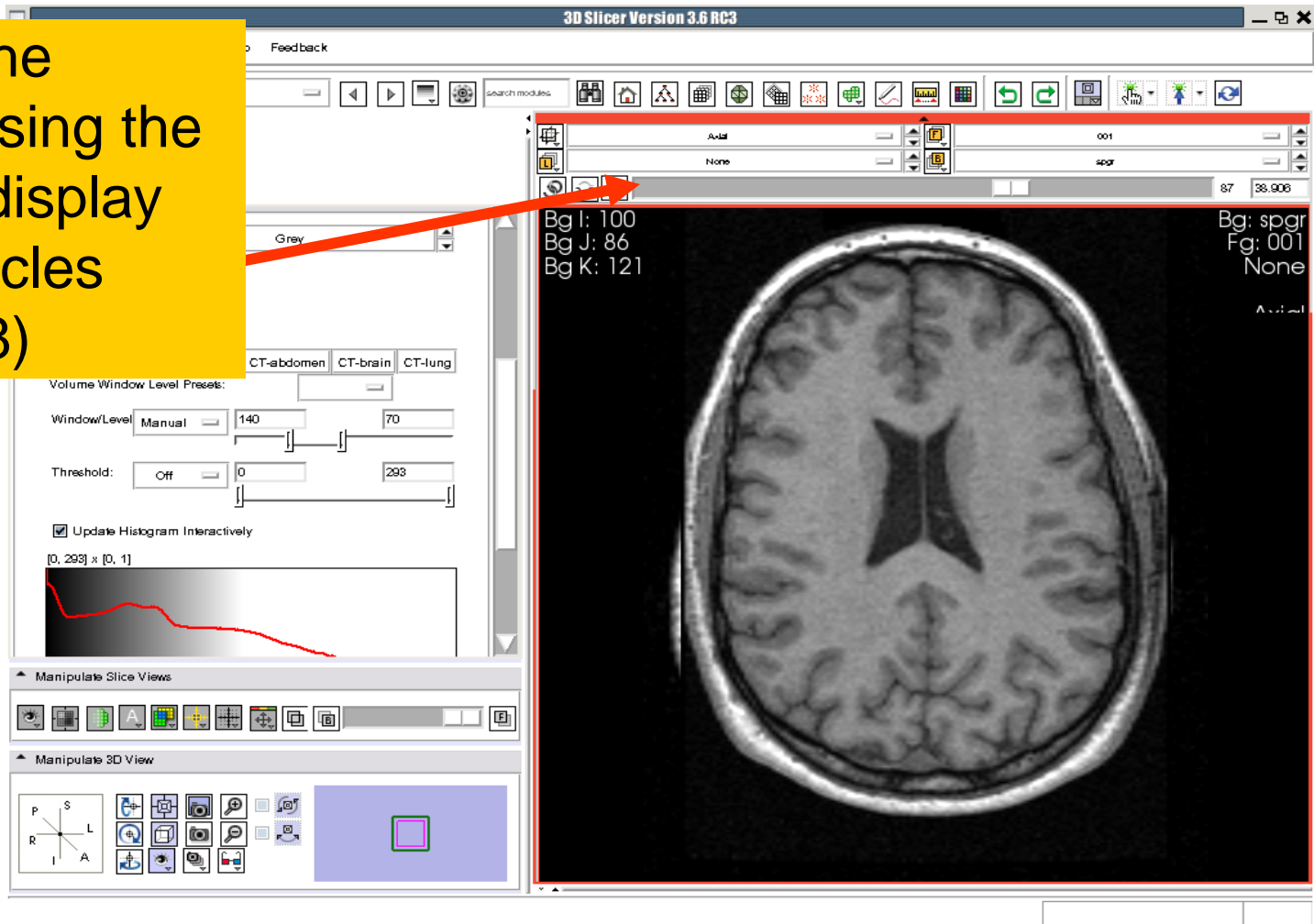
Click on the Background  icon or the Foreground  icon to display the spgr or the DICOM volumes in the Viewer




The screenshot displays the 3DSlicer software interface. On the right, a large window shows an axial MRI slice of a brain. On the left, there are several control panels. The 'Volume Window Level Editor' panel includes a histogram with a red curve and a red arrow pointing to the 'Background' icon in the 'Manipulate Slice Views' toolbar. The 'Manipulate 3D View' panel shows a 3D view of the slice with a green box. At the bottom, the status bar displays coordinates: 'spgr RAS: (127.4, 73.8, -0.9), Bg IJK: (49, 129, 146), Fg: Out of Frame, Bg: Out of Frame.'

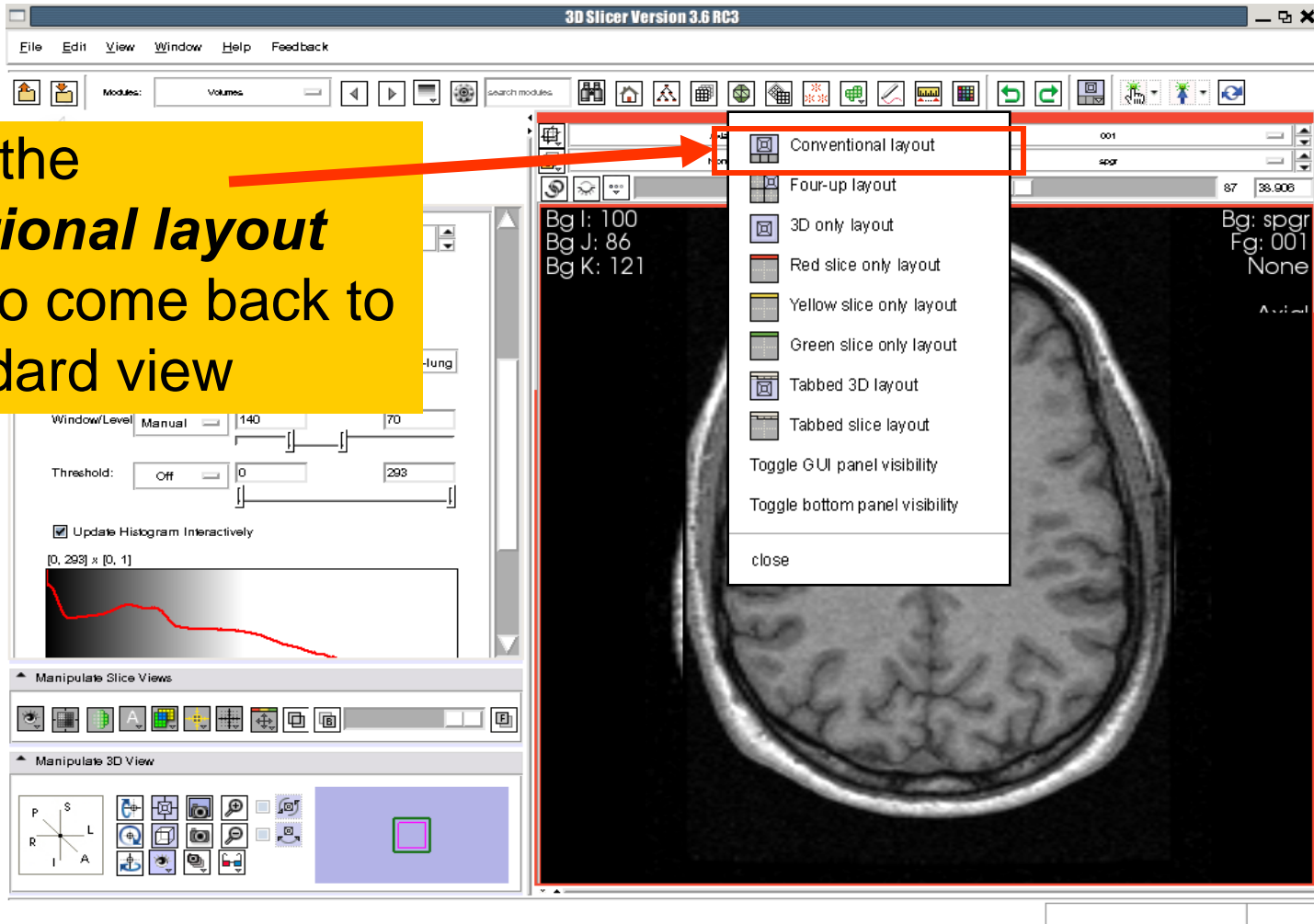
# Exploring the data

Browse the images using the slider to display the ventricles (~slice 38)




# Exploring the data

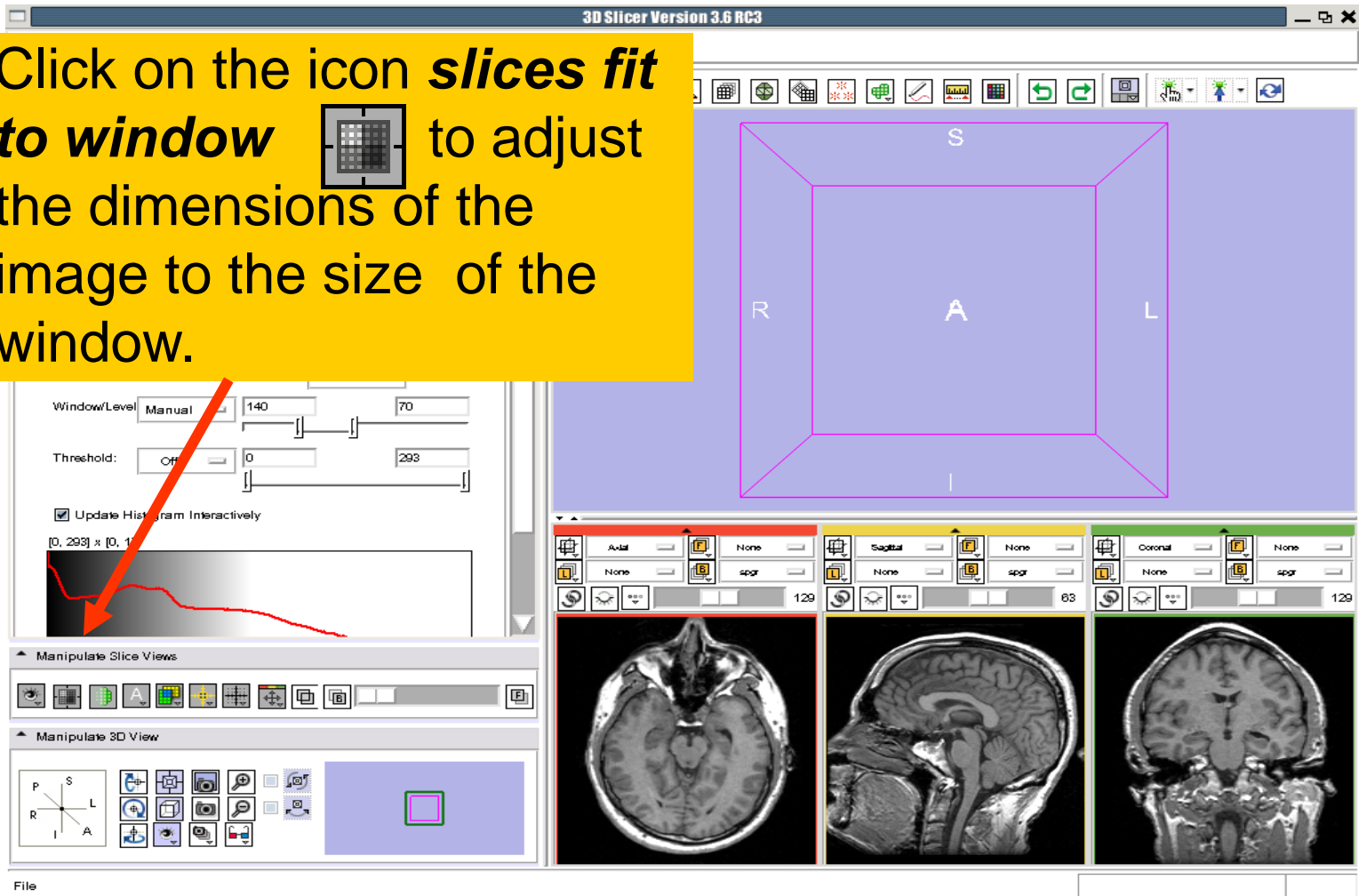
Click on the **conventional layout icon**  to come back to the standard view

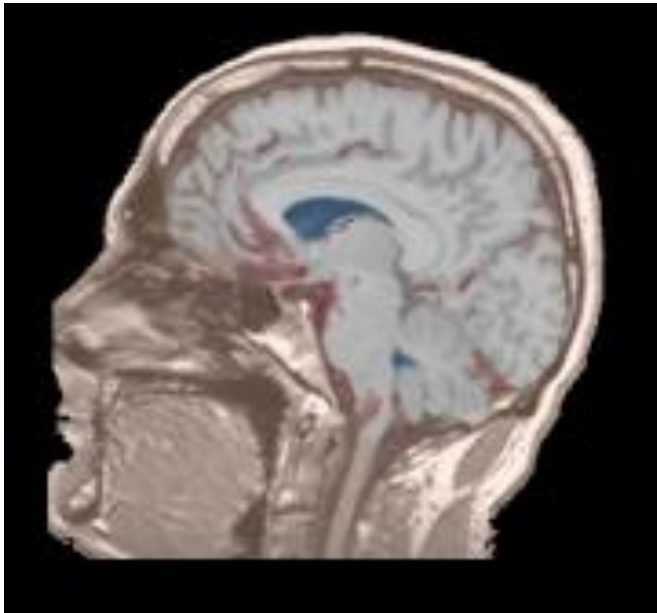




# Loading Volumes

Click on the icon **slices fit to window**  to adjust the dimensions of the image to the size of the window.



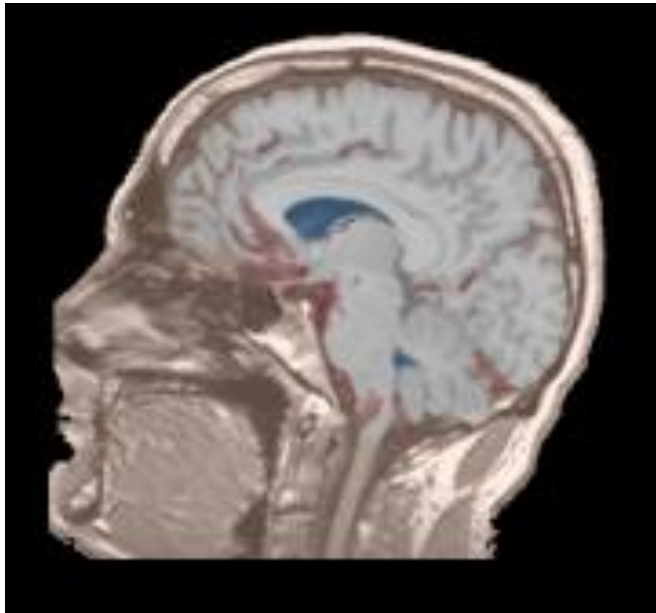


## Part 2: Loading and visualizing segmented structures overlaid on grayscale images

# Label map

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**Image segmentation** is the extraction of structural information of particular interest from surrounding image.

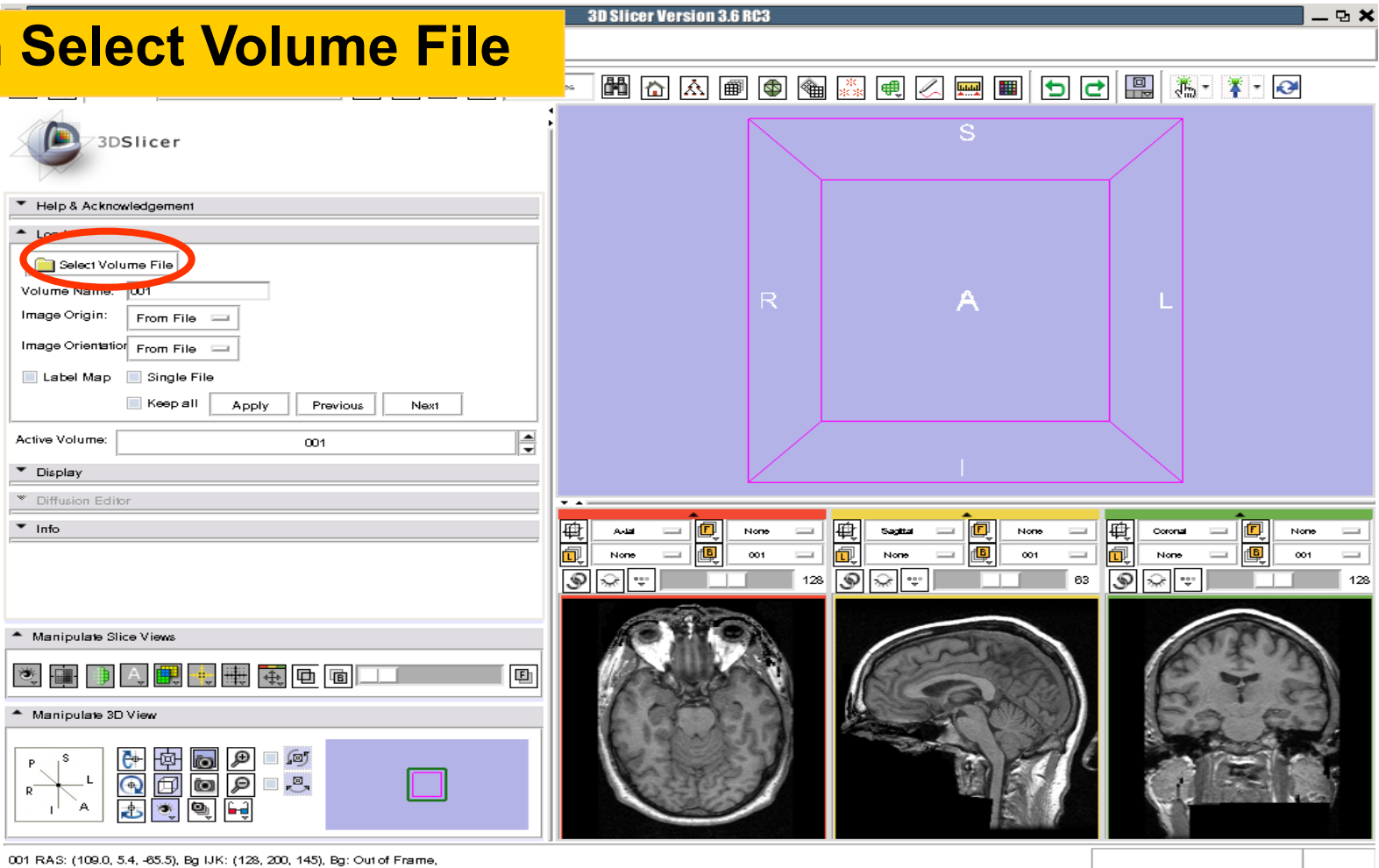


Each pixel is assigned a specific **label value** which corresponds to the anatomical structure that it belongs to.

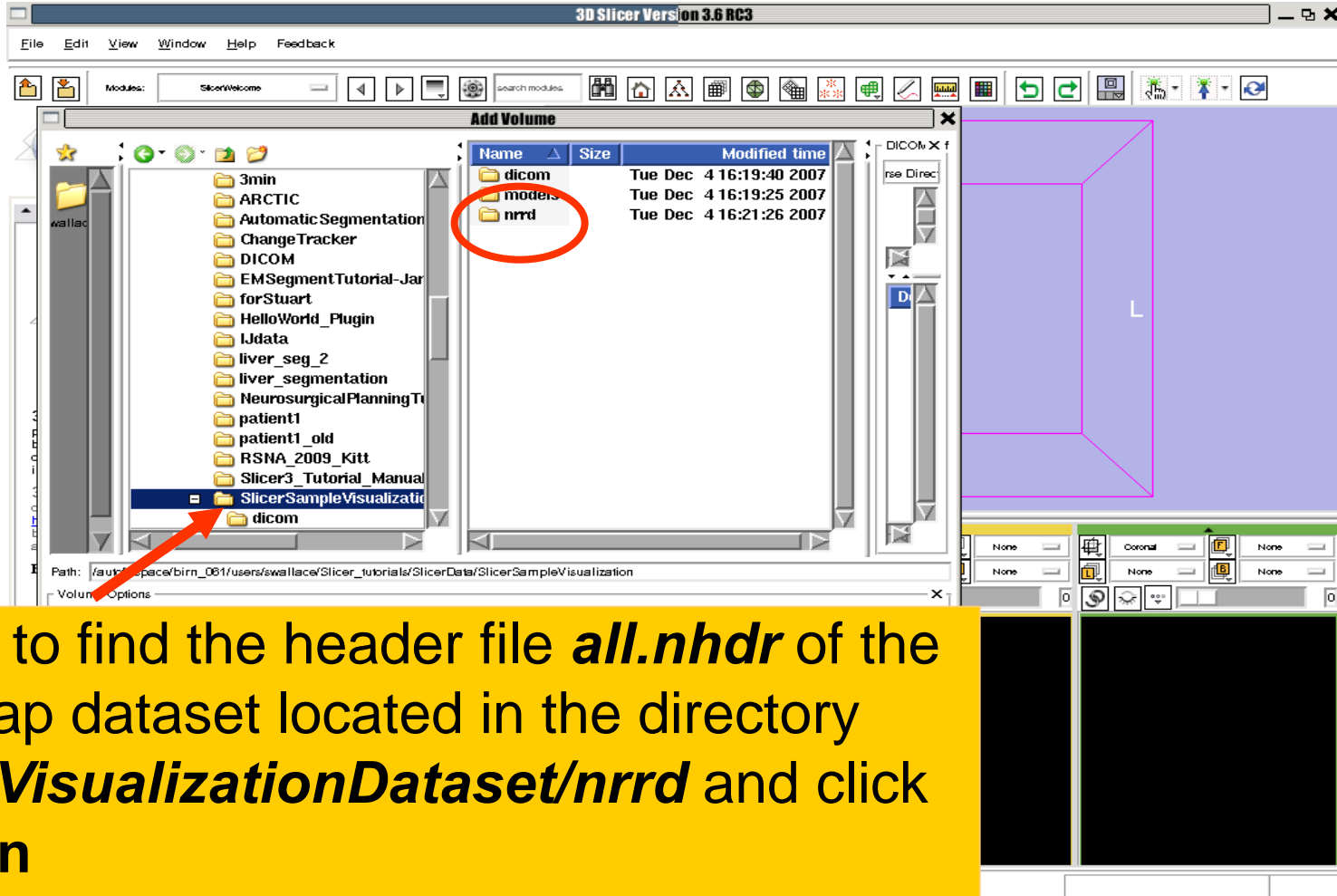
The three-dimensional result of the segmentation is a binary array called a **label map**.

# Loading a label map

Click on **Select Volume File**



# Loading a label map



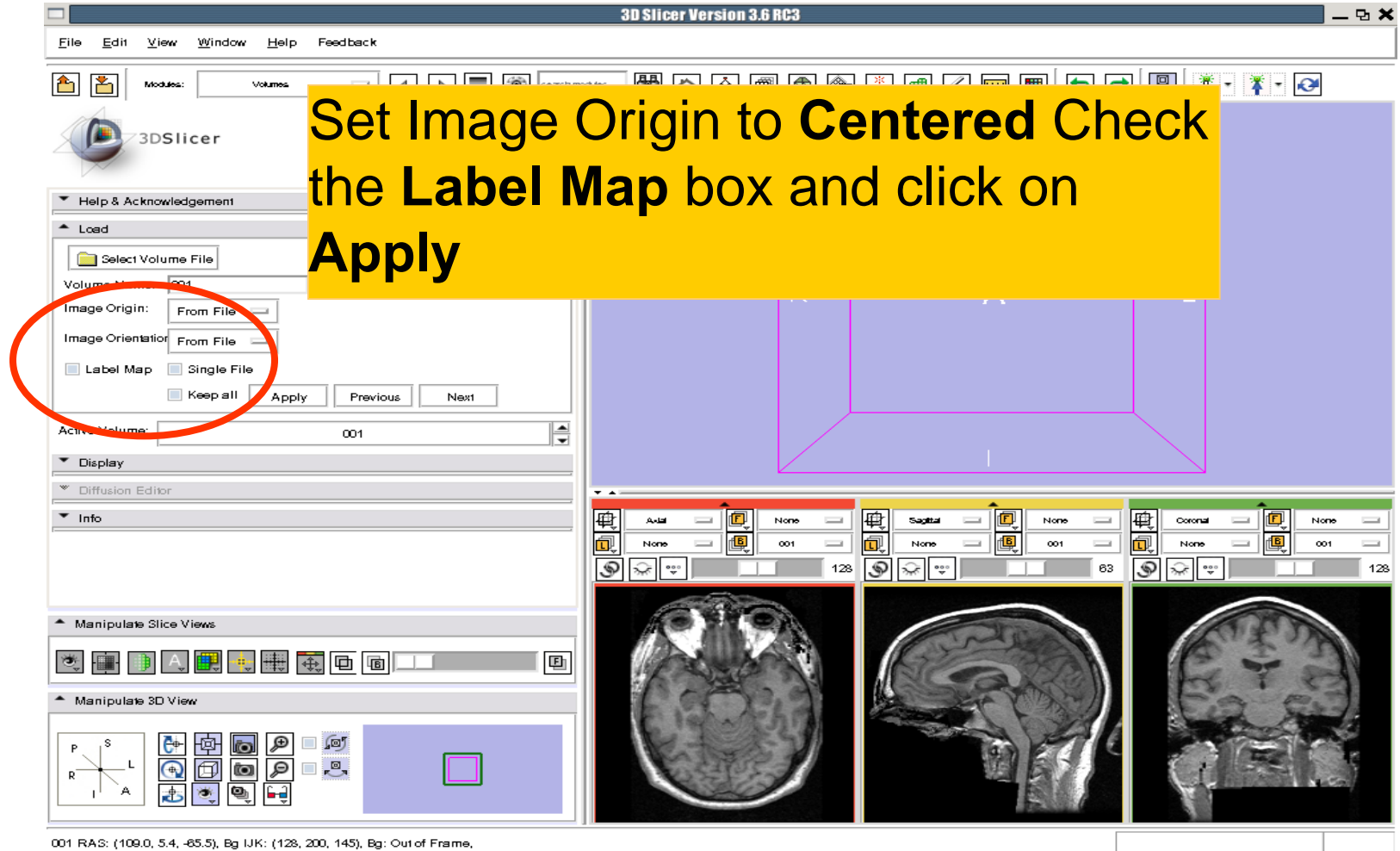
The screenshot shows the 3D Slicer interface with the 'Add Volume' dialog box open. The dialog box has a table with the following data:

Name	Size	Modified time
dicom		Tue Dec 4 16:19:40 2007
models		Tue Dec 4 16:19:25 2007
nrrd		Tue Dec 4 16:21:26 2007

The 'nrrd' folder is circled in red. A red arrow points to the 'SlicerSampleVisualization' folder in the left pane. The main window shows a 3D view of a brain slice with a purple bounding box.

**Browse to find the header file *all.nhdr* of the label map dataset located in the directory *Slicer3VisualizationDataset/nrrd* and click on **Open****

# Visualizing a label map



3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: Volumes

3DSlicer

Help & Acknowledgement

Load

Select Volume File

Volume Name: 001

Image Origin: From File

Image Orientation: From File

Label Map  Single File

Keep all Apply Previous Next

Active Volume: 001

Display

Diffusion Editor

Info

Manipulate Slice Views

Manipulate 3D View

001 RAS: (109.0, 5.4, -85.5), Bg IJK: (128, 200, 145), Bg: Out of Frame.

001

001

001

128 63 128

Axial Sagittal Coronal

None None None

None None None

None None None

001 001 001

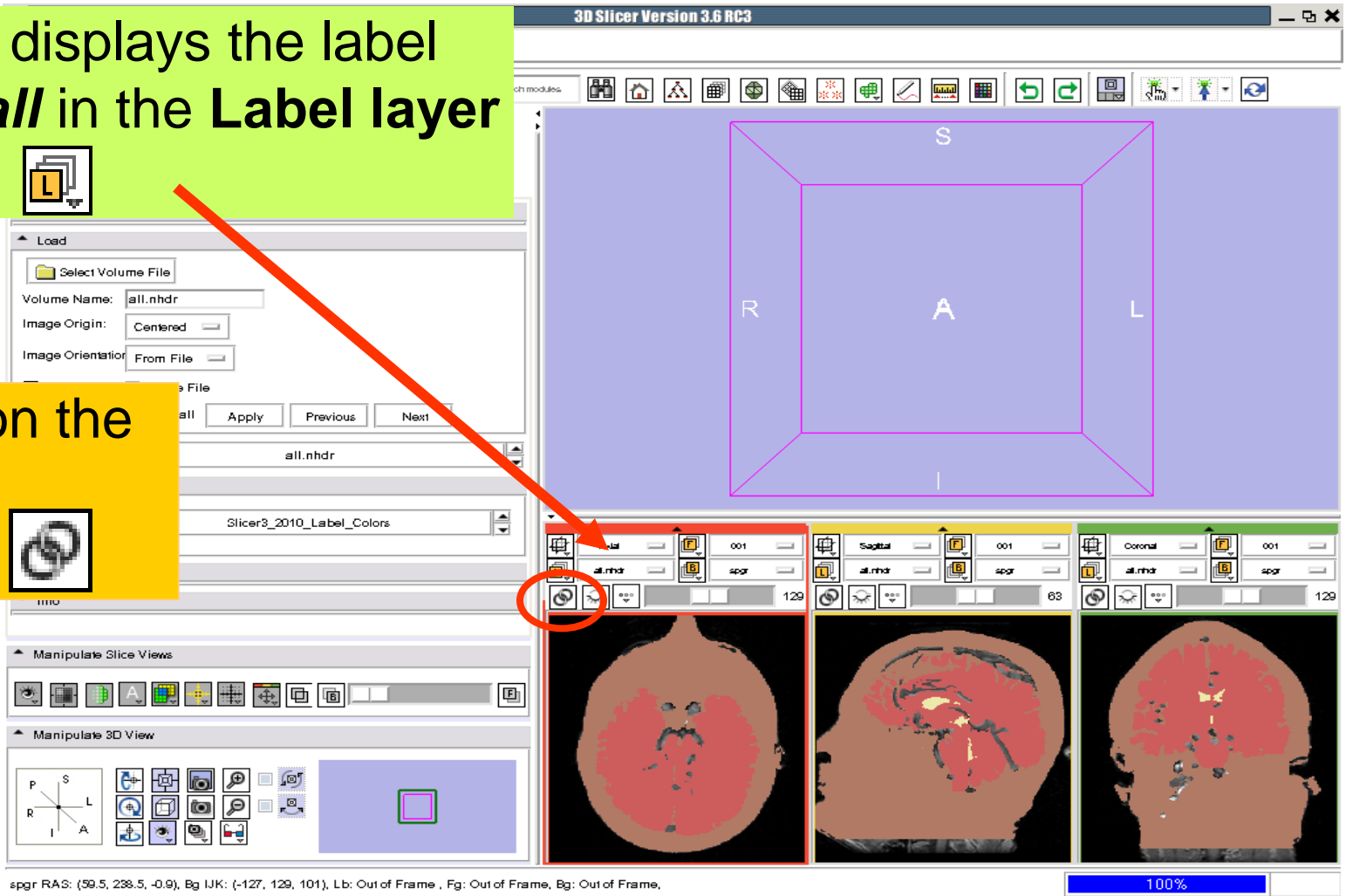
128 63 128

# Visualizing a label map

Slicer displays the label map *all* in the **Label** layer



Click on the *links* icon.

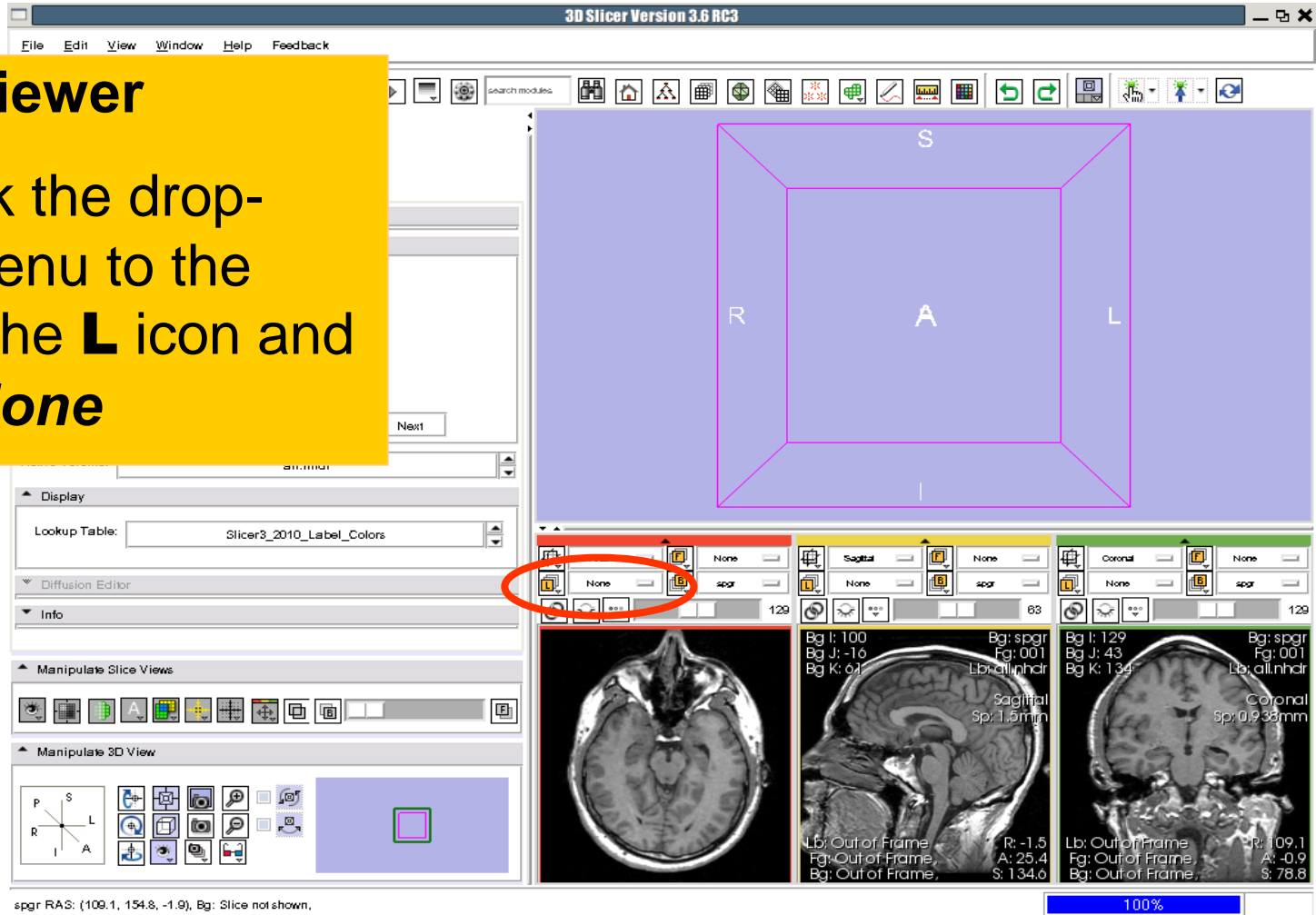


The screenshot shows the 3D Slicer interface with a label map visualization. The main window displays a 3D view of a brain slice with a purple bounding box and labels 'S', 'R', 'A', 'L', and 'I'. Below the main view are three slice views: Axial, Sagittal, and Coronal. The Axial slice view shows a red label map overlay on a grayscale brain slice. The Sagittal and Coronal slice views also show the red label map overlay. The interface includes a toolbar at the top, a Load panel on the left, and a Manipulate Slice Views panel at the bottom left. A red arrow points from the text 'Click on the links icon.' to the 'links' icon in the toolbar. The status bar at the bottom shows 'spgr RAS: (59.5, 238.5, -0.9), Bg IJK: (-127, 129, 101), Lb: Out of Frame, Fg: Out of Frame, Bg: Out of Frame' and a 100% zoom level.

# Visualizing Multiple Volumes

## Label Viewer

Left click the drop-down menu to the right of the **L** icon and select **None**

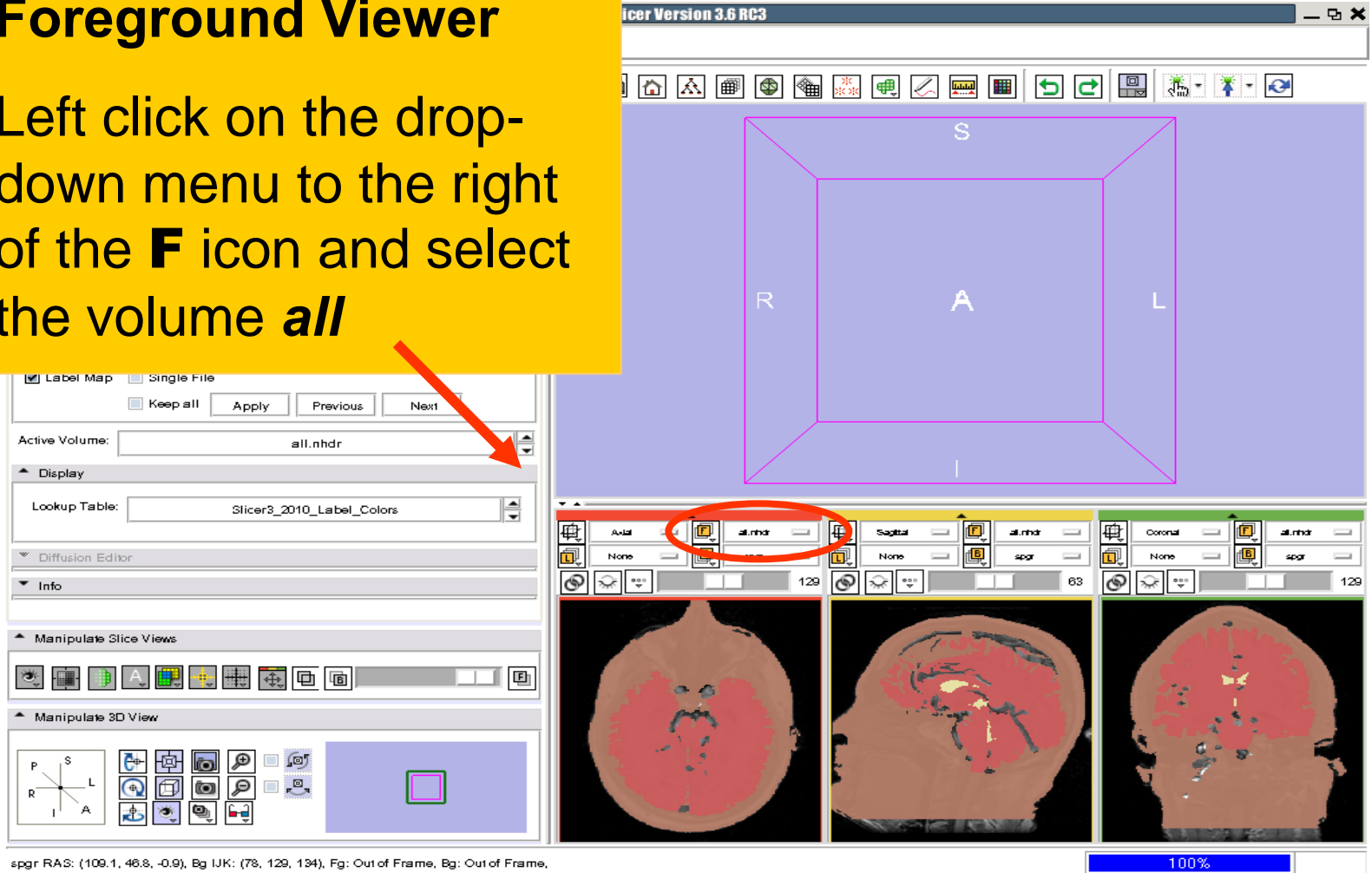




# Visualizing Multiple Volumes

## Foreground Viewer

Left click on the drop-down menu to the right of the **F** icon and select the volume *all*



The screenshot shows the 3DSlicer interface. The main window displays a 3D view of a brain volume with a purple bounding box. The foreground viewer is visible at the bottom, showing three slice views: Axial, Sagittal, and Coronal. The Axial slice view is currently selected and highlighted with a red circle. The slice views show the brain volume with a red overlay. The foreground viewer controls are visible on the left, including the 'Active Volume' dropdown menu, which is set to 'all.nhdr'. A red arrow points to the dropdown menu. The foreground viewer also shows the 'Manipulate 3D View' section with a 3D view of the brain volume.

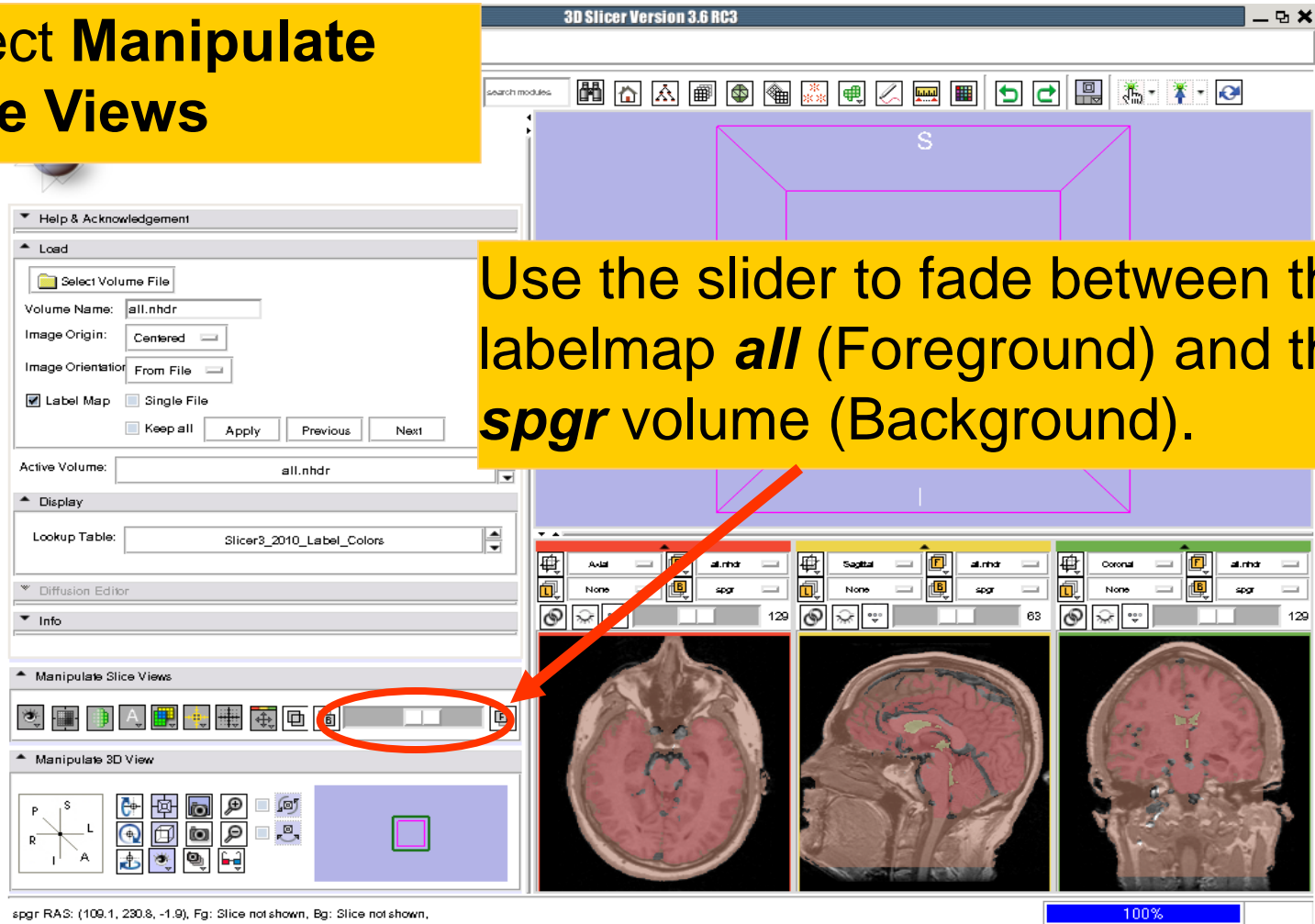
spgr RAS: (109.1, 48.8, -0.9), Bg IJK: (78, 129, 134), Fg: Out of Frame, Bg: Out of Frame, 100%



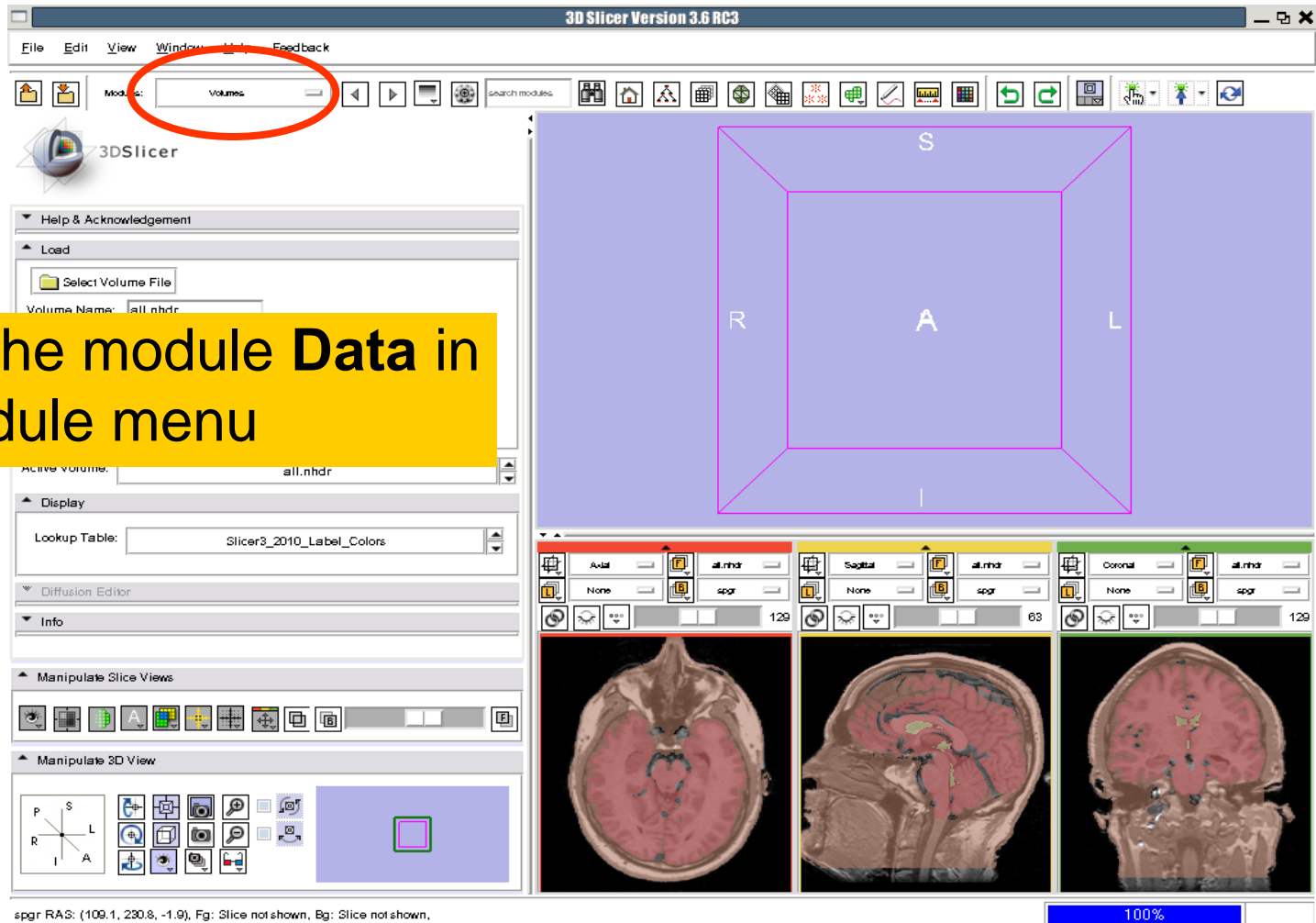
# Visualizing Multiple Volumes

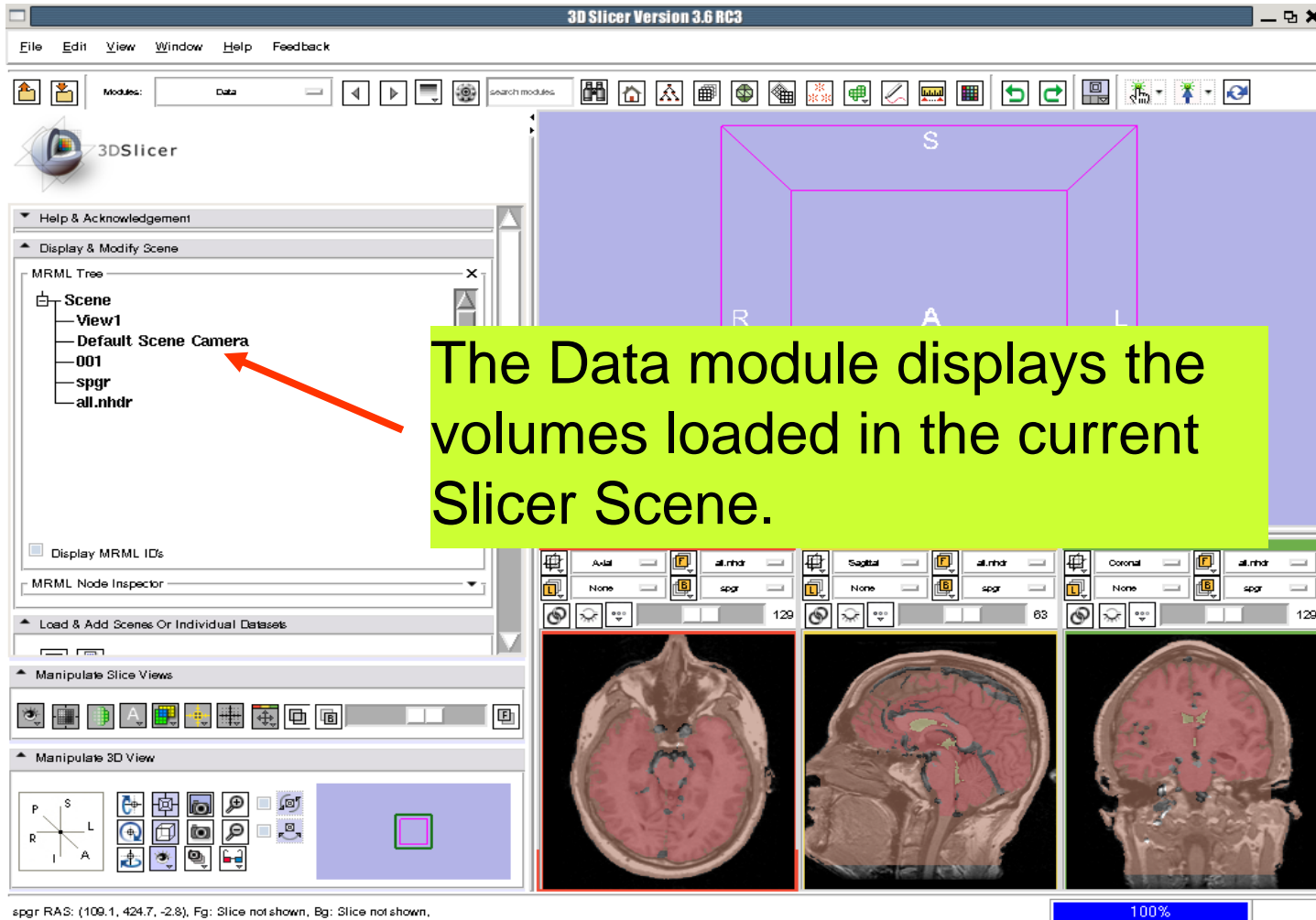
Select Manipulate  
Slice Views

Use the slider to fade between the labelmap *all* (Foreground) and the *spgr* volume (Background).



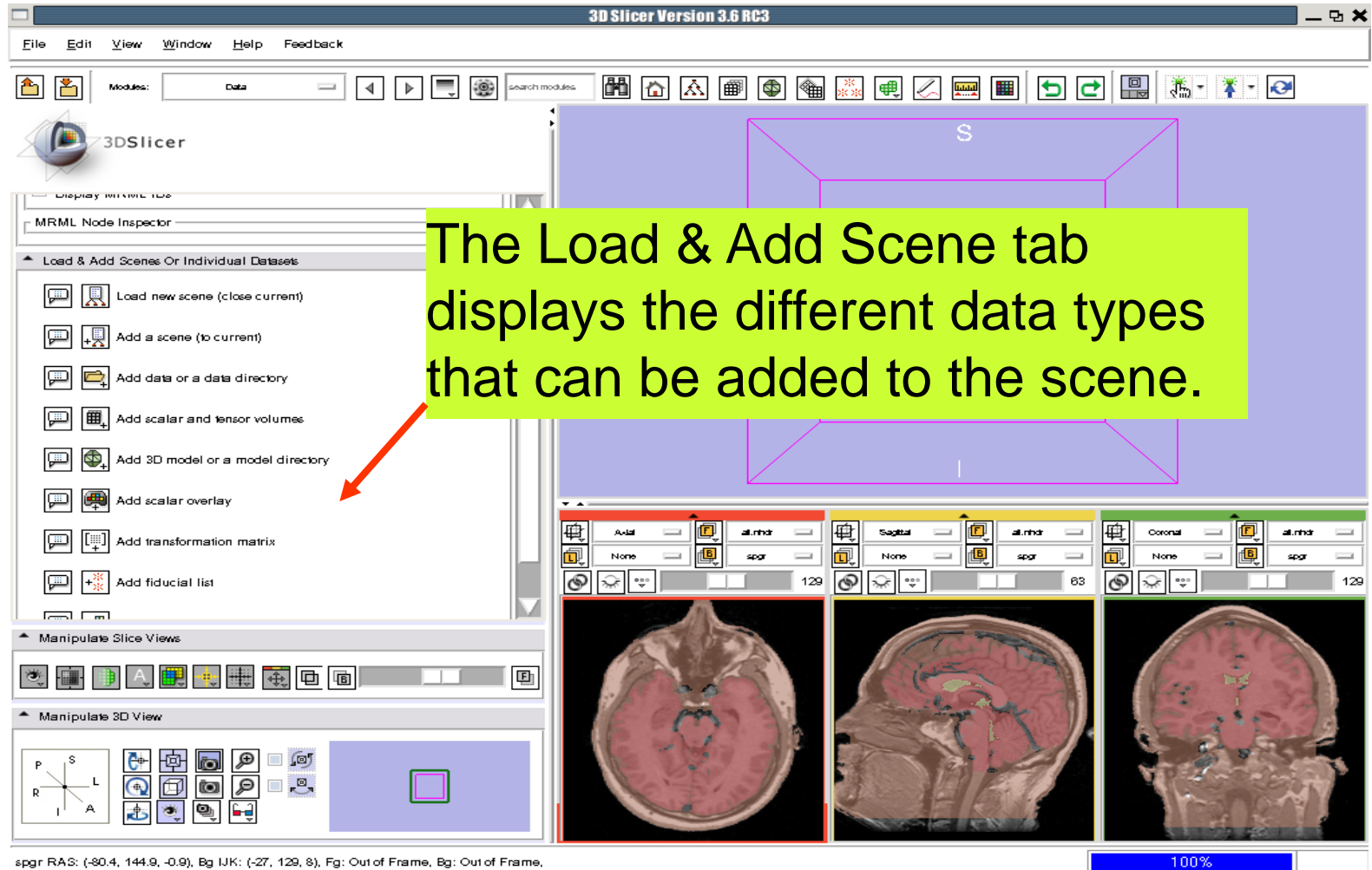
Select the module **Data** in the module menu





The screenshot shows the 3D Slicer Version 3.6 RC3 interface. The main window displays a 3D volume rendering of a brain scan with a yellow wireframe box overlaid, labeled with 'S' (Superior), 'R' (Right), 'A' (Anterior), and 'L' (Left). A yellow callout box with black text points to the 'Default Scene Camera' in the MRML Tree on the left. The MRML Tree shows a hierarchy: Scene -> View1 -> Default Scene Camera -> 001 -> spgr -> all.nhdr. Below the MRML Tree are panels for 'Display MRML IDs', 'MRML Node Inspector', 'Load & Add Scenes Or Individual Datasets', 'Manipulate Slice Views', and 'Manipulate 3D View'. The 'Manipulate 3D View' panel includes a 3D orientation diagram and a small 3D view window. At the bottom, there are three slice view windows (Axial, Sagittal, Coronal) and a status bar showing 'spgr RAS: (109.1, 424.7, -2.8), Fg: Slice not shown, Bg: Slice not shown' and a '100%' zoom level.

**The Data module displays the volumes loaded in the current Slicer Scene.**



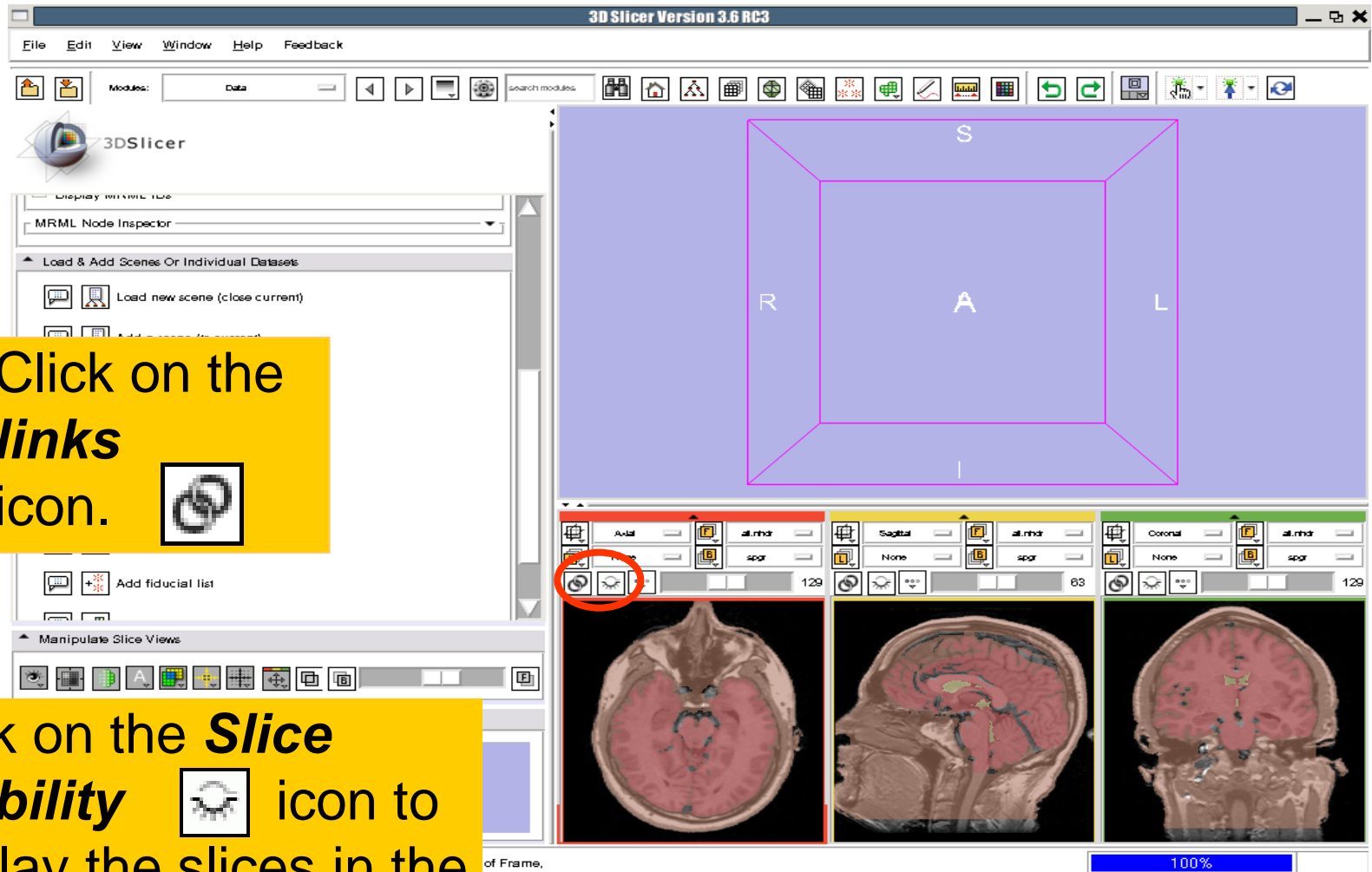
The screenshot displays the 3D Slicer Version 3.6 RC3 interface. The 'Load & Add Scene Or Individual Datasets' panel is active, showing various options for adding data to the scene. A red arrow points from a text box to this panel. The 3D visualization area shows a brain scan with a purple bounding box labeled 'S'. Below the 3D view are three slice views: Axial, Sagittal, and Coronal. The status bar at the bottom shows the current slice position and zoom level (100%).

**The Load & Add Scene tab displays the different data types that can be added to the scene.**

- Load new scene (close current)
- Add a scene (to current)
- Add data or a data directory
- Add scalar and tensor volumes
- Add 3D model or a model directory
- Add scalar overlay
- Add transformation matrix
- Add fiducial list

spgr RAS: (-80.4, 144.9, -0.9), Bg IJK: (-27, 129, 8), Fg: Out of Frame, Bg: Out of Frame.

# 3D Visualization

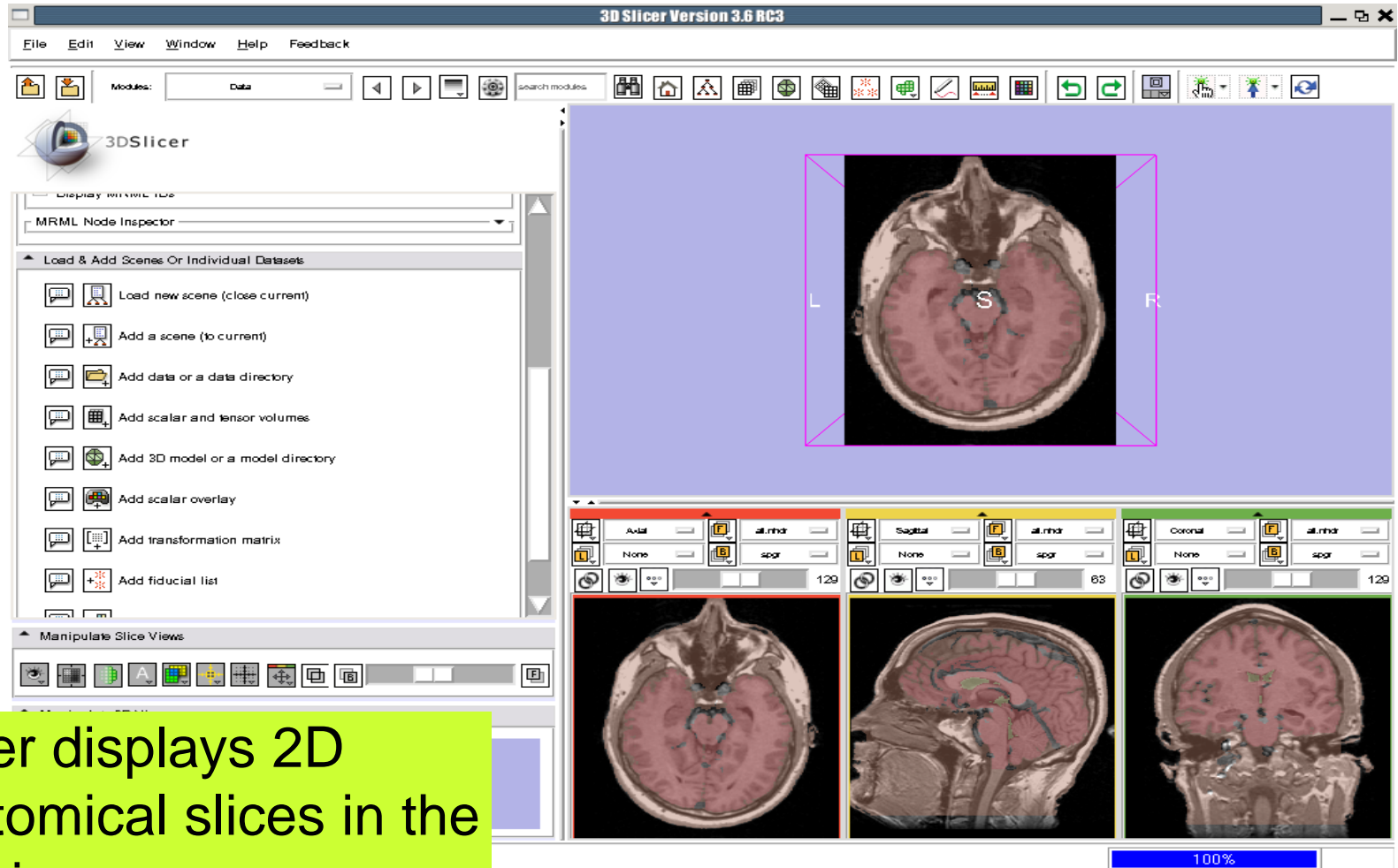


Click on the **links** icon.



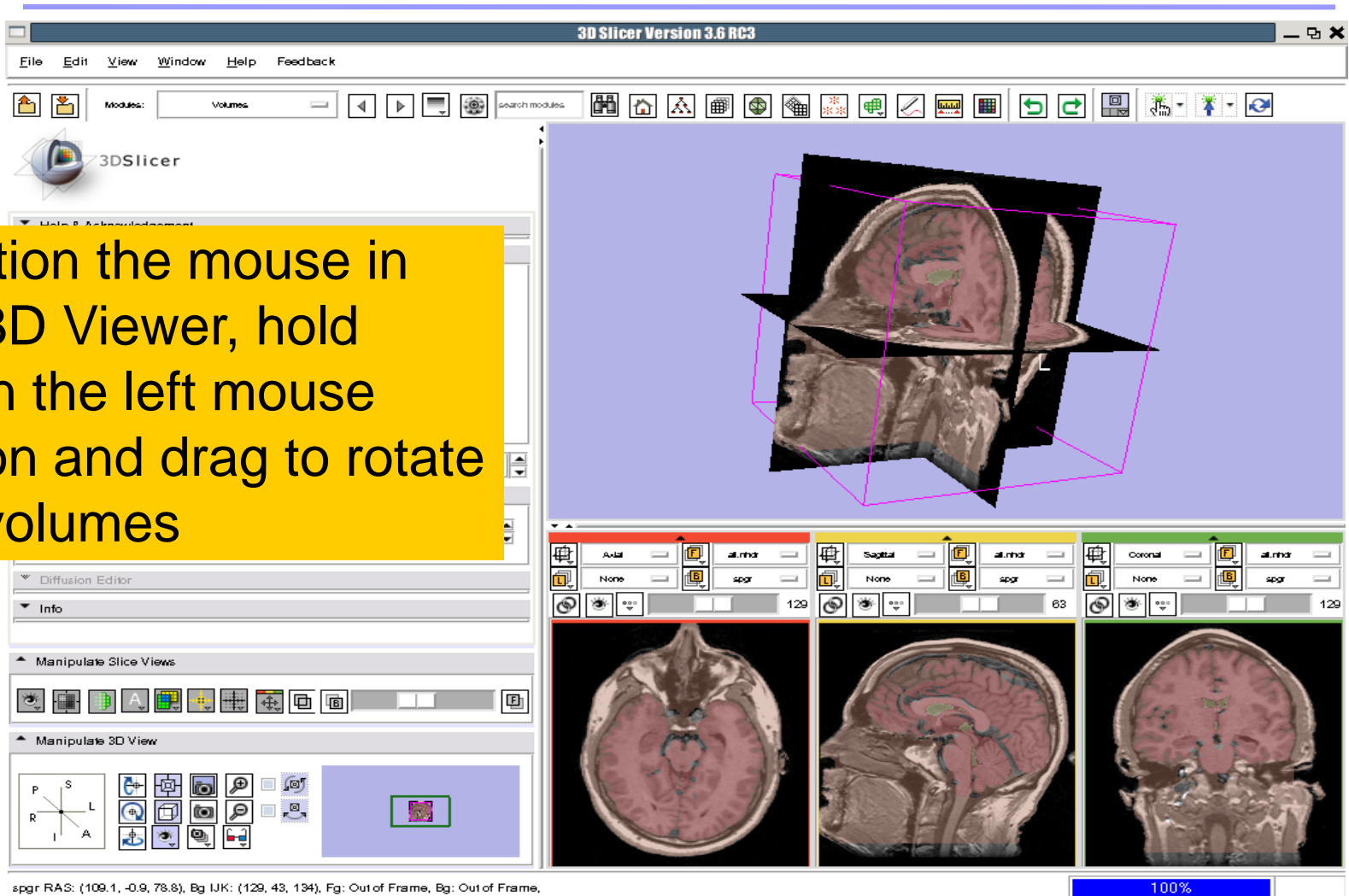
Click on the **Slice Visibility** icon to display the slices in the 3D Viewer



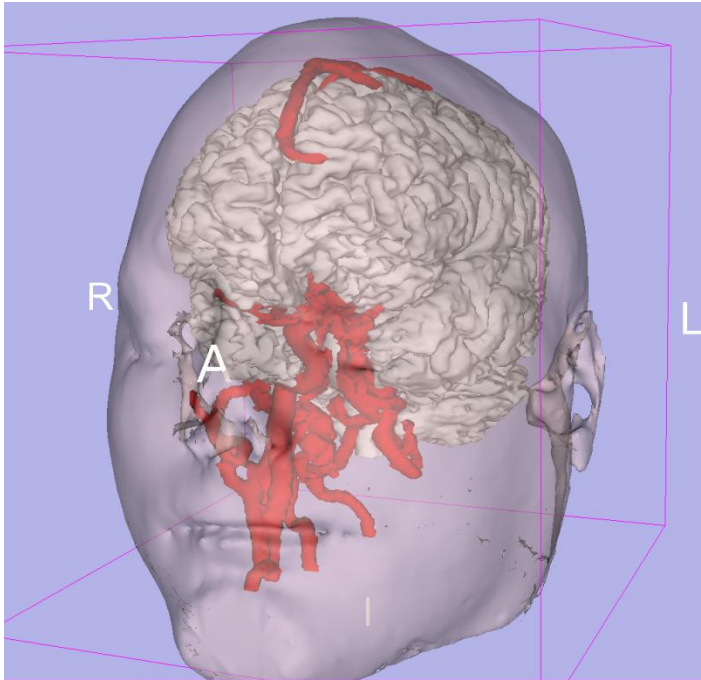


Slicer displays 2D anatomical slices in the 3D viewer

Position the mouse in the 3D Viewer, hold down the left mouse button and drag to rotate the volumes

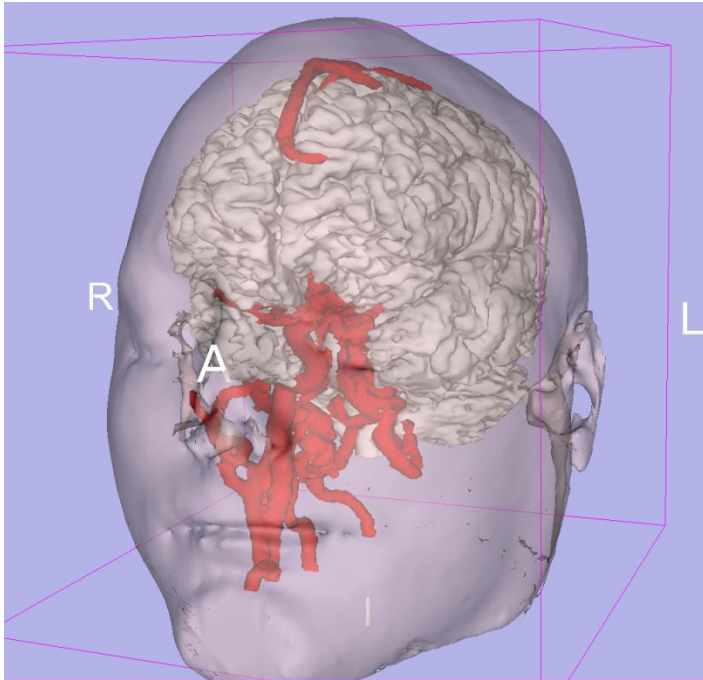






## Part 3: Loading and visualizing 3D models of the anatomy

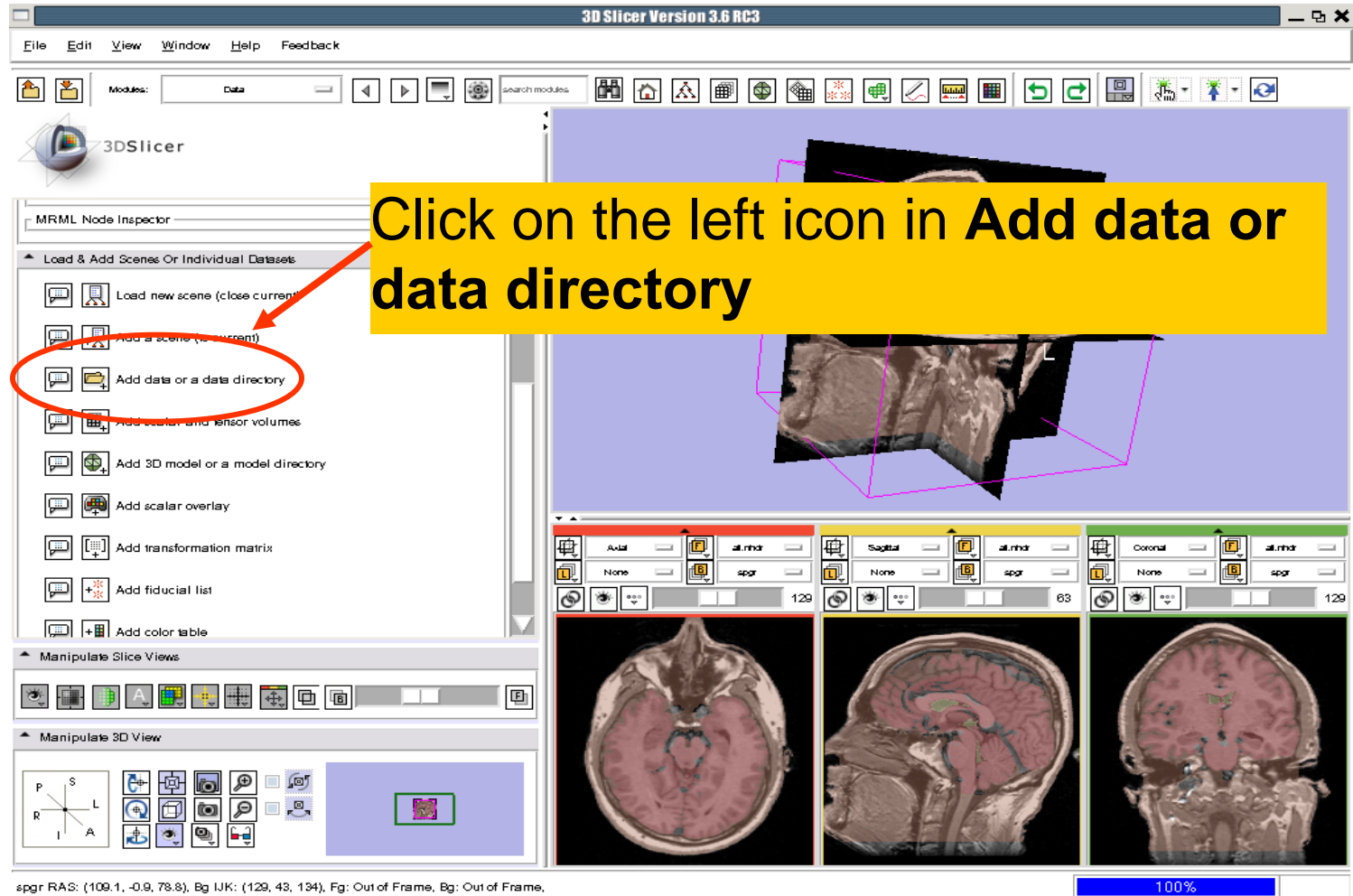
# 3D models



A **3D model** is a surface reconstruction of an anatomical structure.

The model is a **triangular mesh** that approximates a surface from a 3D label map.

The scalar values for surface models are integers which correspond to the **label** that had been assigned in the segmentation process.



3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: Data

MRML Node Inspector

Load & Add Scenes Or Individual Datasets

- Load new scene (close current)
- Add a scene (no current)
- Add data or a data directory**
- Add scalar and tensor volumes
- Add 3D model or a model directory
- Add scalar overlay
- Add transformation matrix
- Add fiducial list
- Add color table

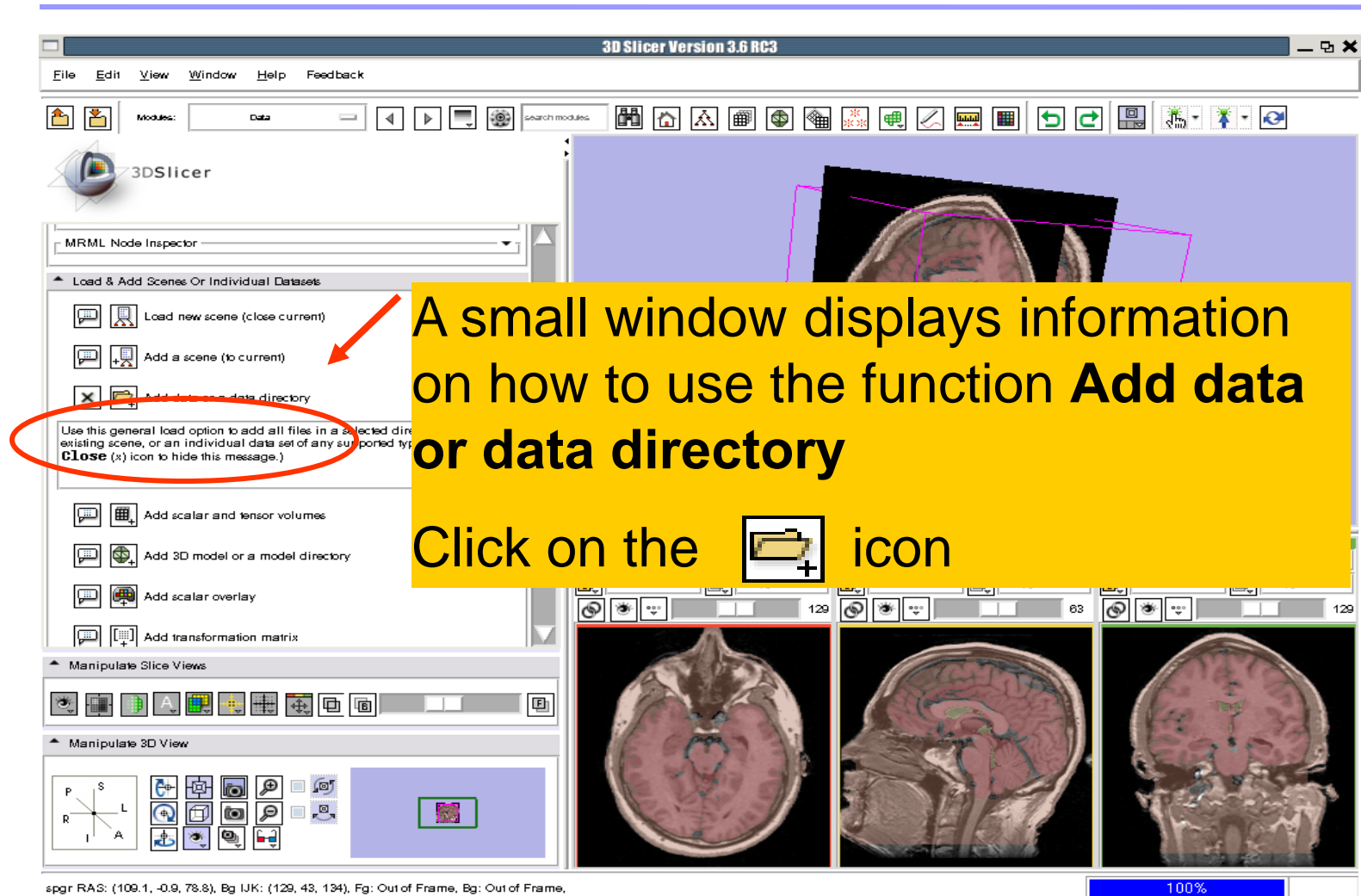
Manipulate Slice Views

Manipulate 3D View

spgr RAS: (109.1, -0.9, 78.8), Bg IJK: (129, 43, 134), Fg: Out of Frame, Bg: Out of Frame

100%

**Click on the left icon in Add data or data directory**



3D Slicer Version 3.6 RC3

File Edit View Window Help Feedback

Modules: Data

MRML Node Inspector

Load & Add Scenes Or Individual Datasets

- Load new scene (close current)
- Add a scene (to current)
- Add data or data directory**

Use this general load option to add all files in a selected directory to an existing scene, or an individual data set of any supported type. **Close** (x) icon to hide this message.)

Add scalar and tensor volumes

Add 3D model or a model directory

Add scalar overlay

Add transformation matrix


Manipulate Slice Views

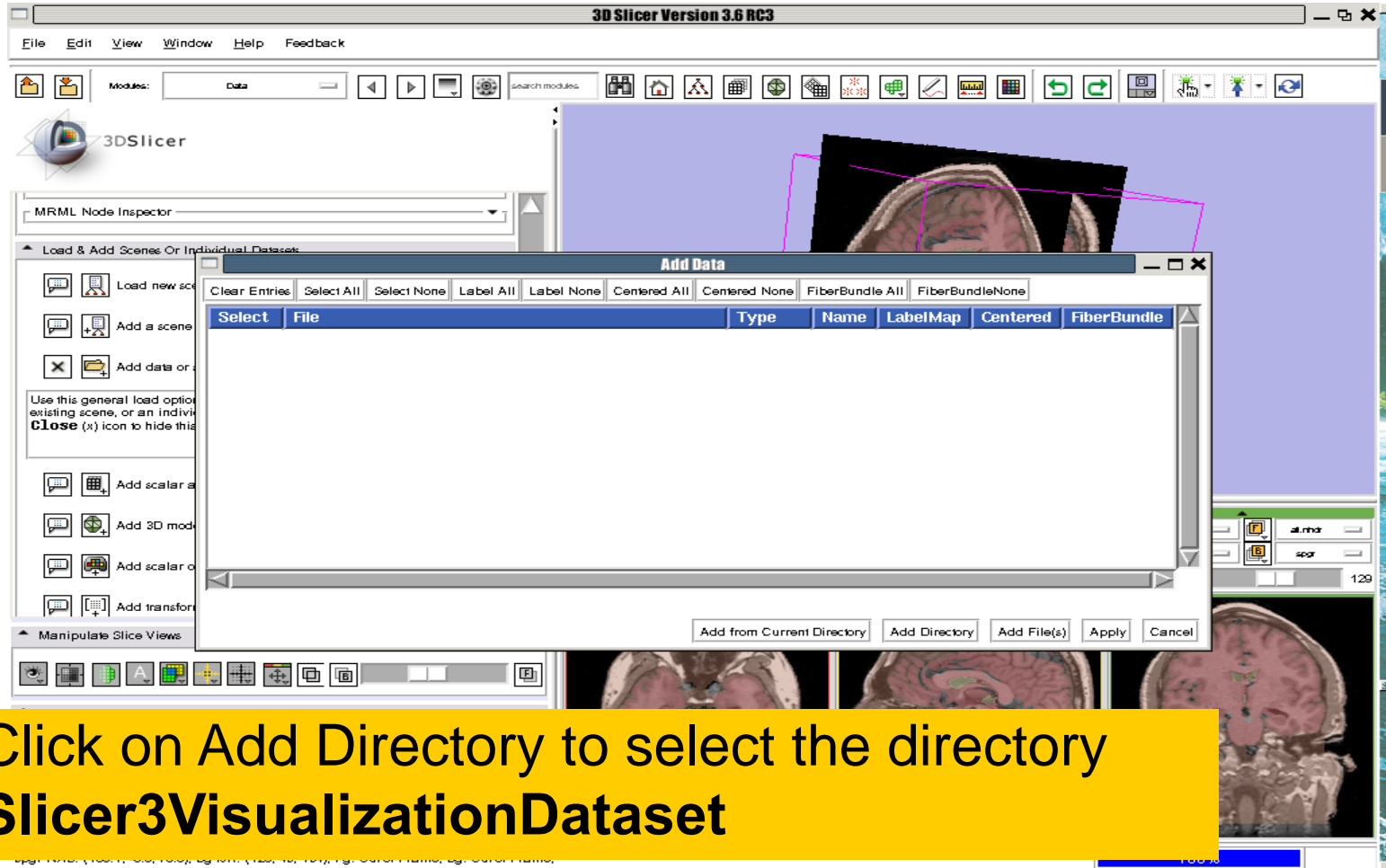
Manipulate 3D View

spgr RAS: (109.1, -0.9, 78.8), Bg IJK: (129, 43, 134), Fg: Out of Frame, Bg: Out of Frame.

100%

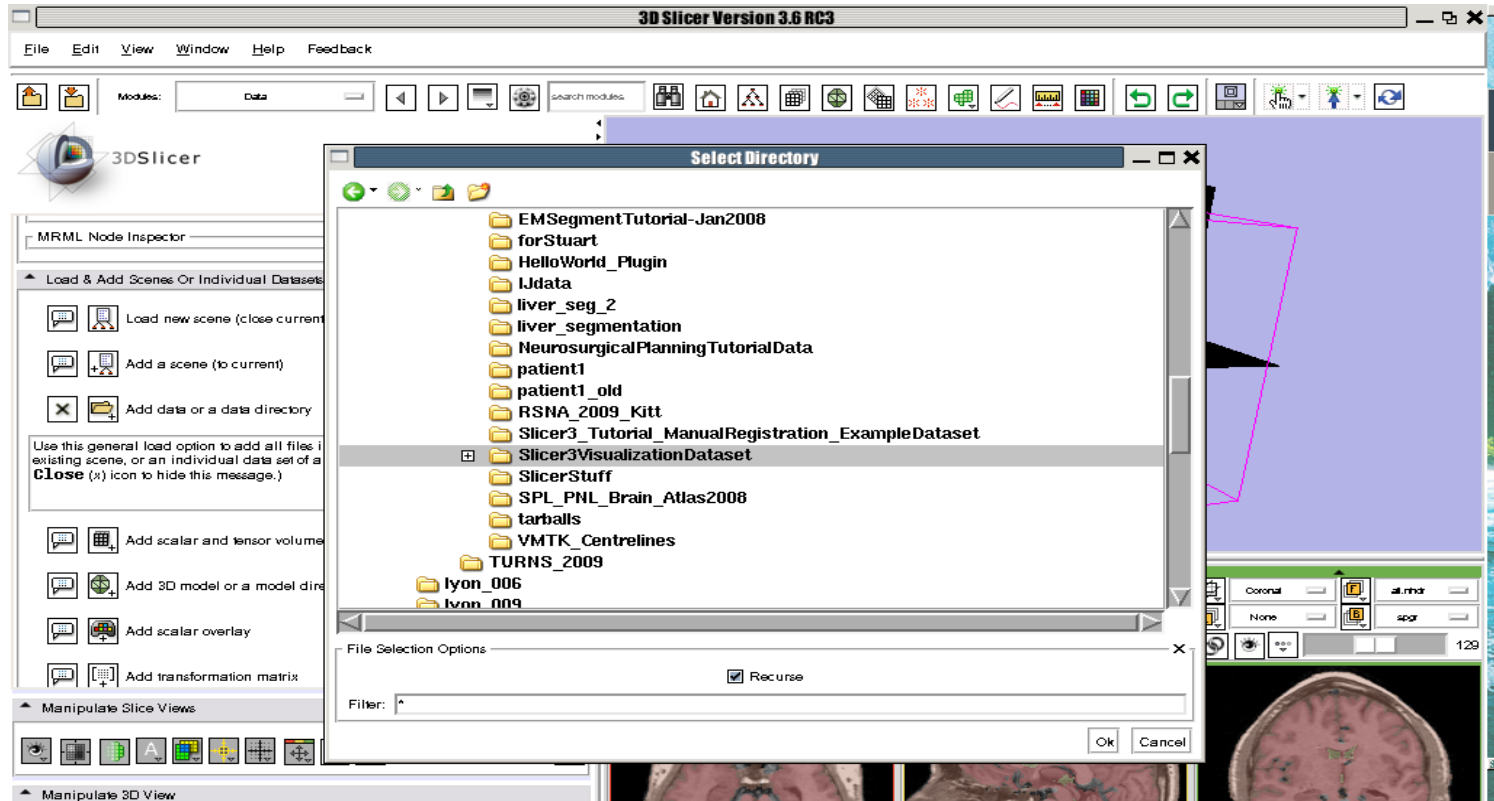
**A small window displays information on how to use the function **Add data or data directory****

**Click on the  icon**



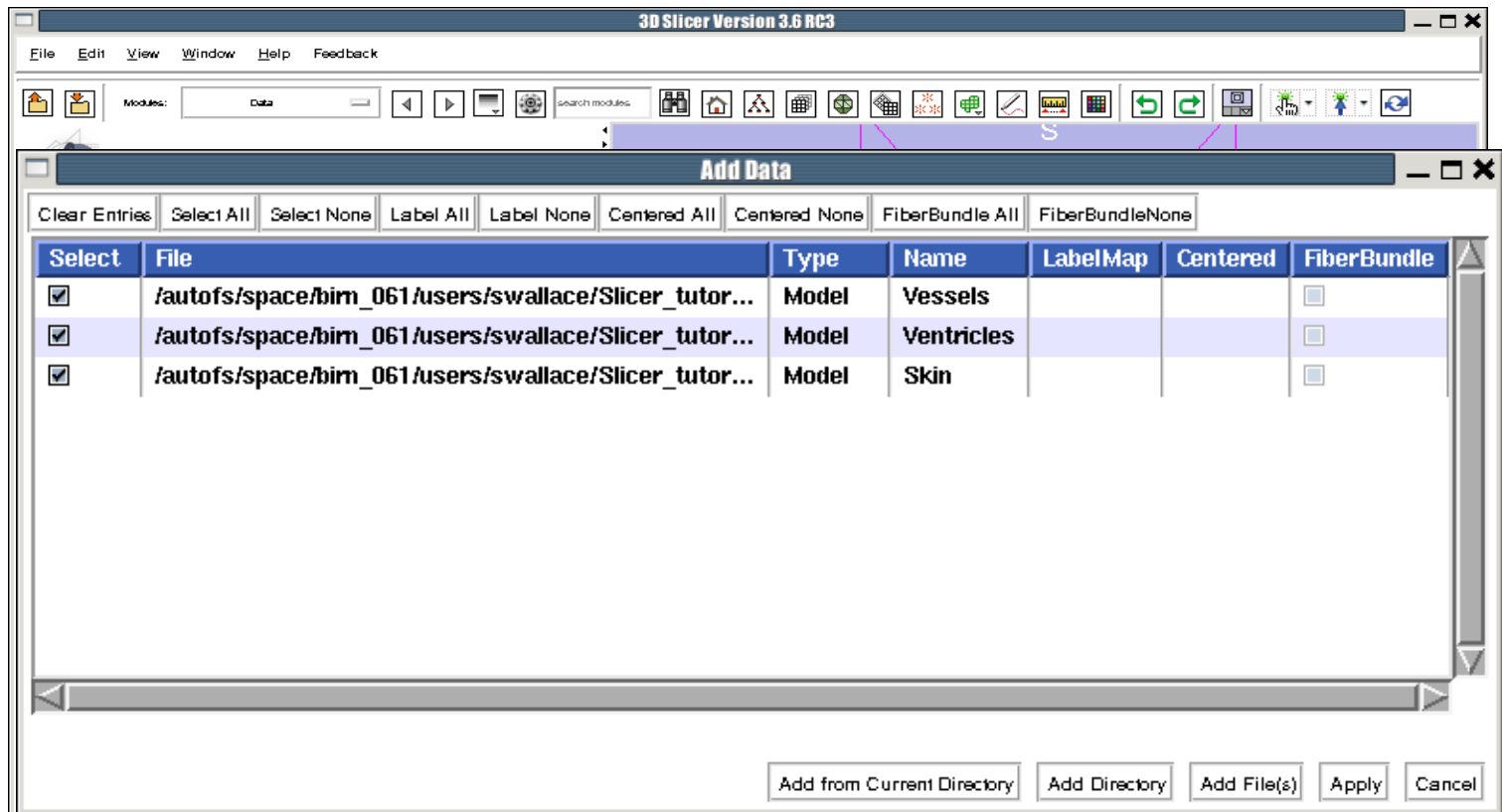
Click on Add Directory to select the directory  
**Slicer3VisualizationDataset**

# Loading 3D models



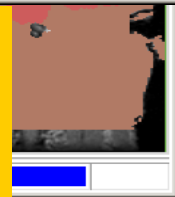
Select the directory **Slicer3VisualizationDataset/models** and click on OK

# Loading 3D models

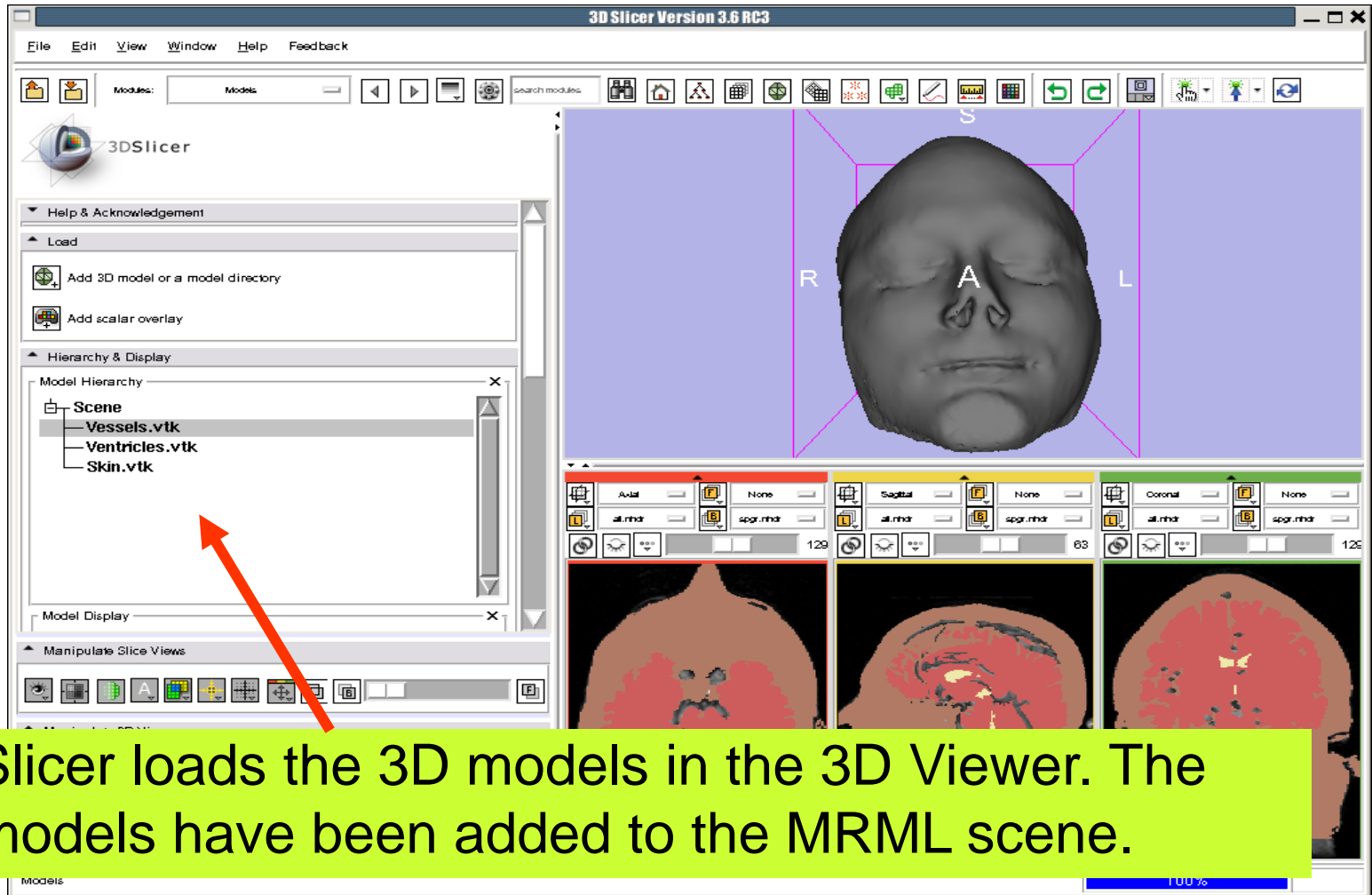


The list of elements present in the models directory appears in the Add Data window.

Click on **Apply** to load all the **3D models**.

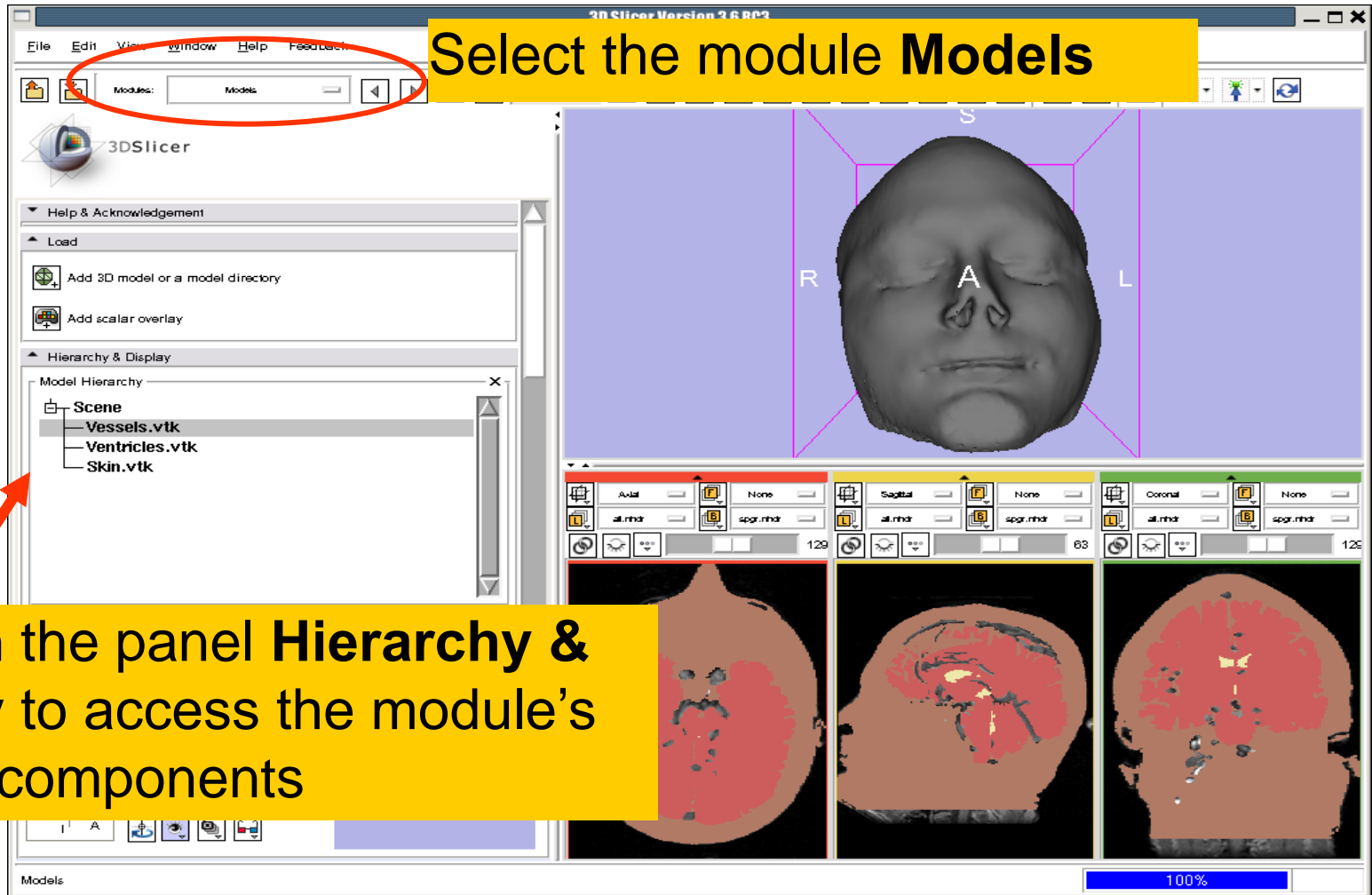


# Loading 3D models





# Loading a 3D model



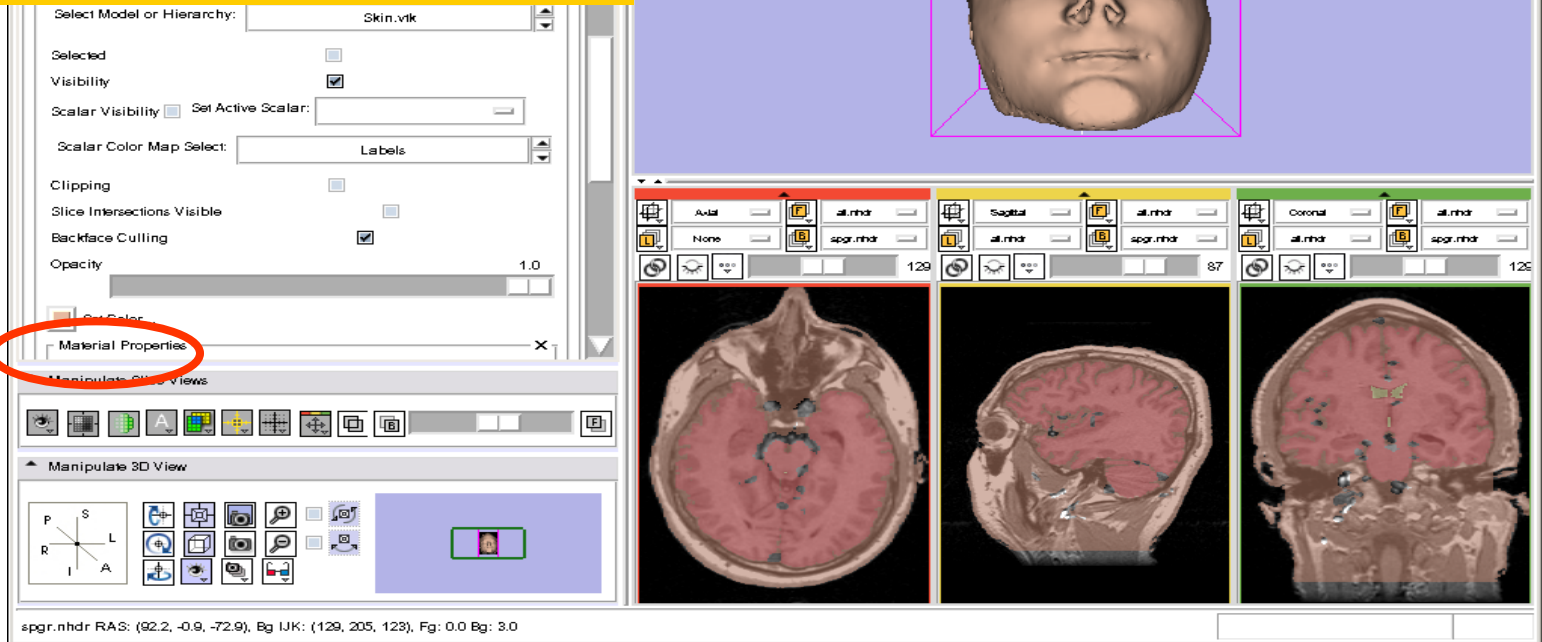
**Select the module Models**

**Click on the panel Hierarchy & Display to access the module's display components**

The screenshot shows the 3DSlicer interface with a 3D model of a face in the center. The 'Modules' dropdown menu is set to 'Models'. The 'Hierarchy & Display' panel on the left shows a tree structure with 'Scene' expanded, containing 'Vessels.vtk', 'Ventricles.vtk', and 'Skin.vtk'. The bottom right shows three orthogonal views (Axial, Sagittal, Coronal) of the face model.

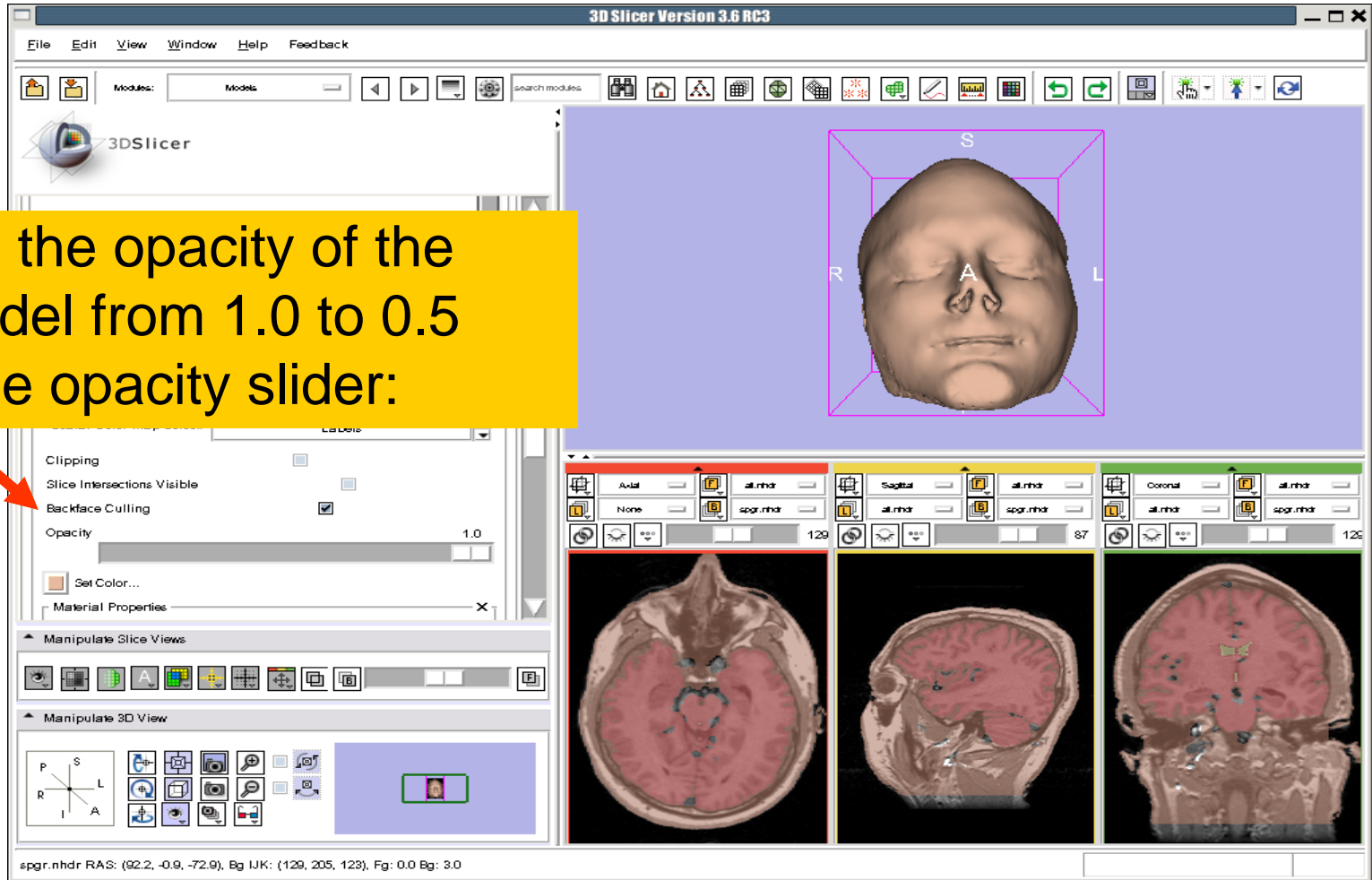
# Visualizing a 3D model

Select the model **Skin.vtk**  
Click on the icon **Set Color**  
and choose a new color for  
the 3D model of the head.



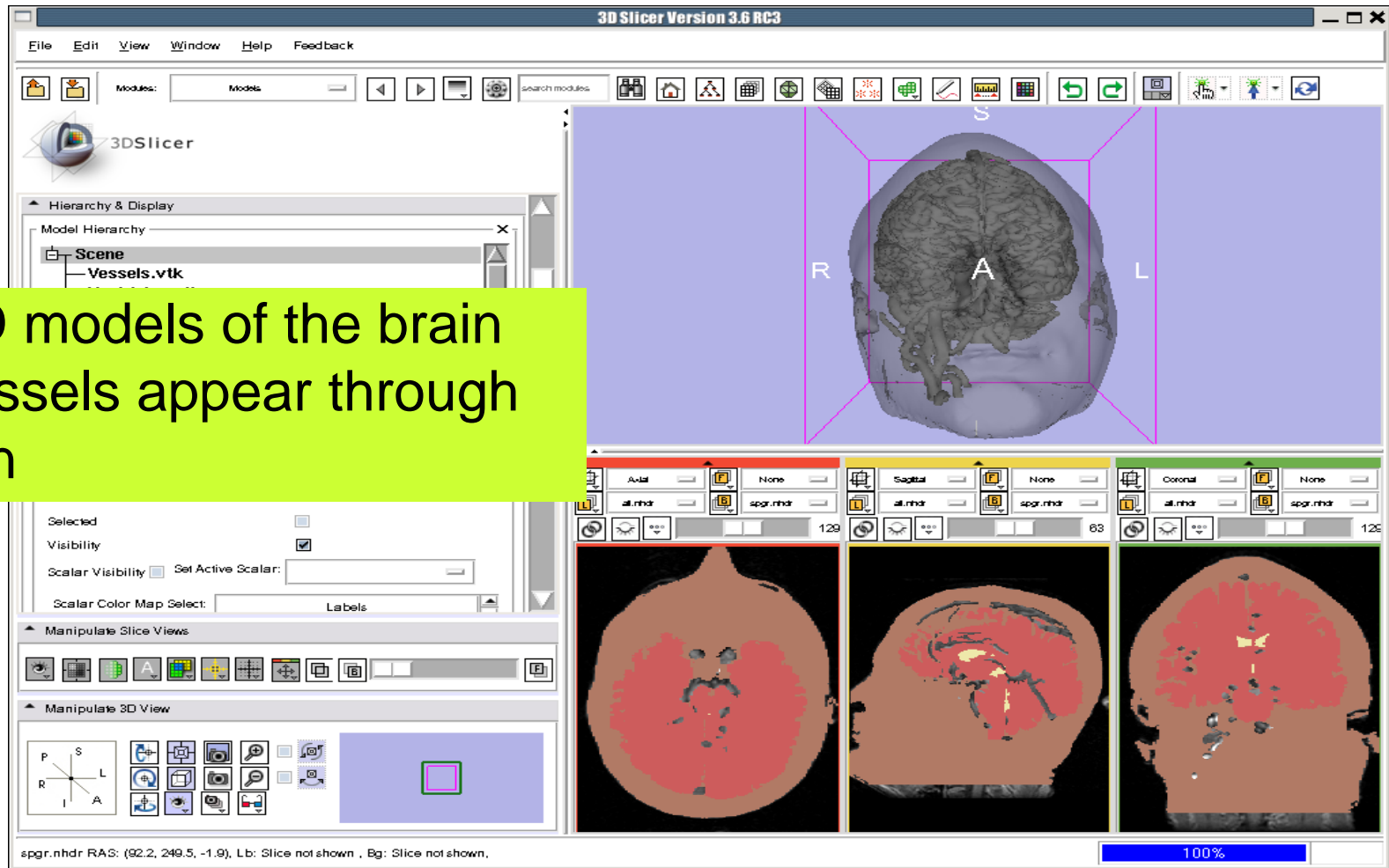
The screenshot displays the 3D Slicer software interface. The main 3D view shows a head model with a purple bounding box and orientation labels (S, R, A, L). The left sidebar contains the 'Material Properties' panel for the selected model 'Skin.vtk'. A red arrow points to the 'Set Color' button, which is circled in red. Below the 'Material Properties' panel is the 'Manipulate 3D View' section with a directional pad and various manipulation icons. The bottom of the interface features three 2D slice views: Axial, Sagittal, and Coronal, each with its own set of controls and a numerical value (129, 87, 125 respectively).

# Visualizing a 3D model

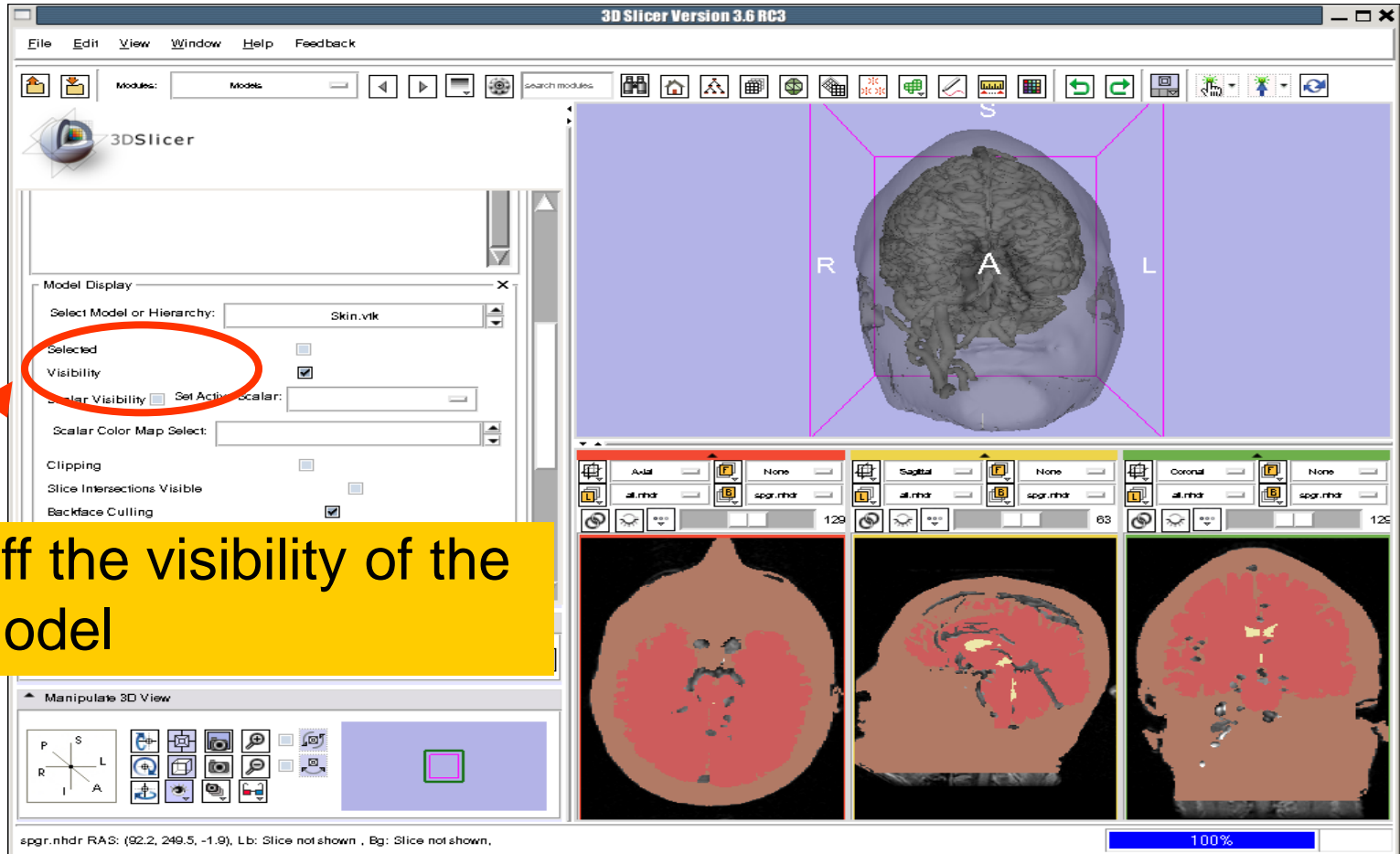


Change the opacity of the skin model from 1.0 to 0.5 using the opacity slider:

# Visualizing a 3D model

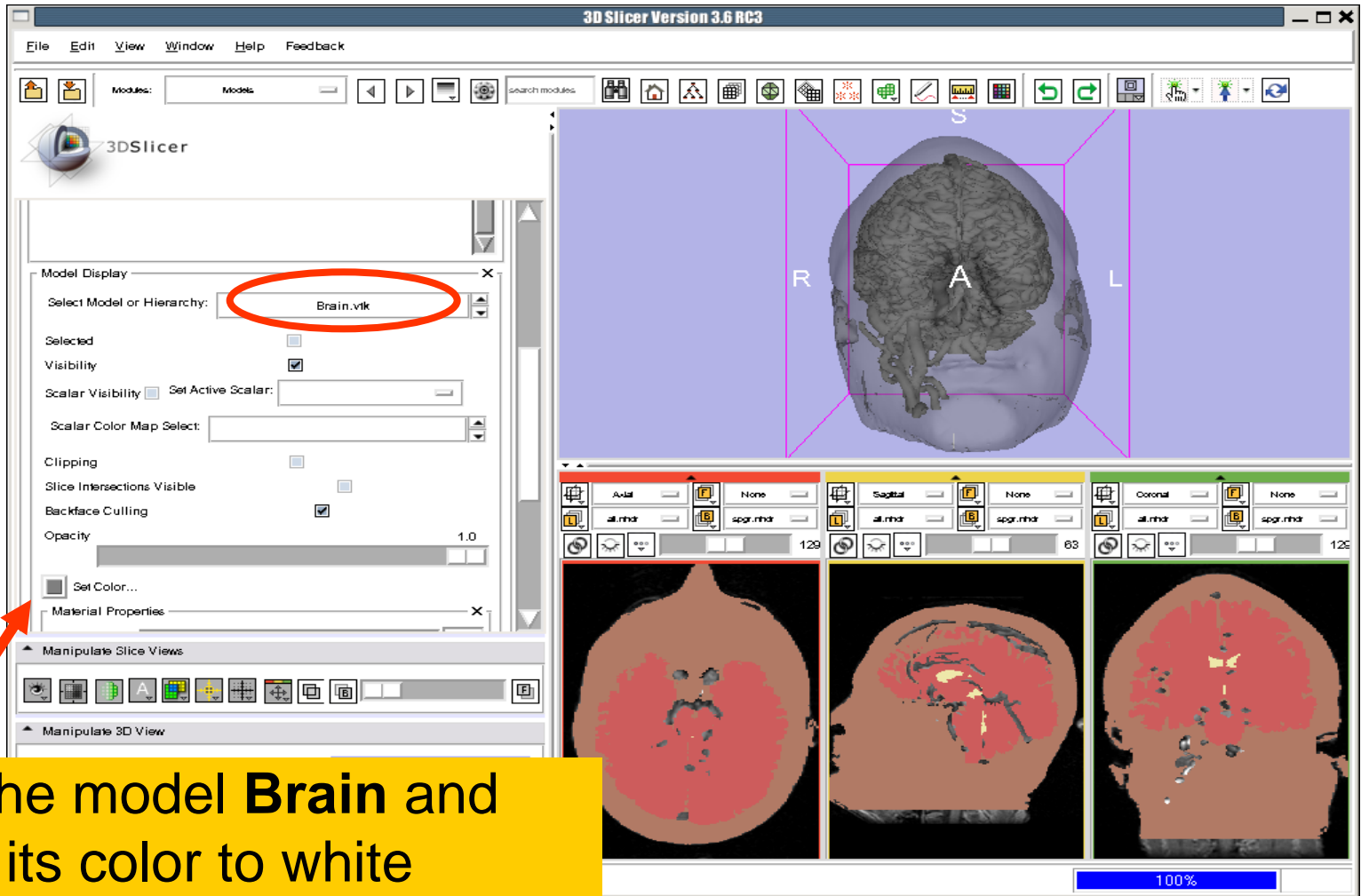


# Visualizing a 3D model



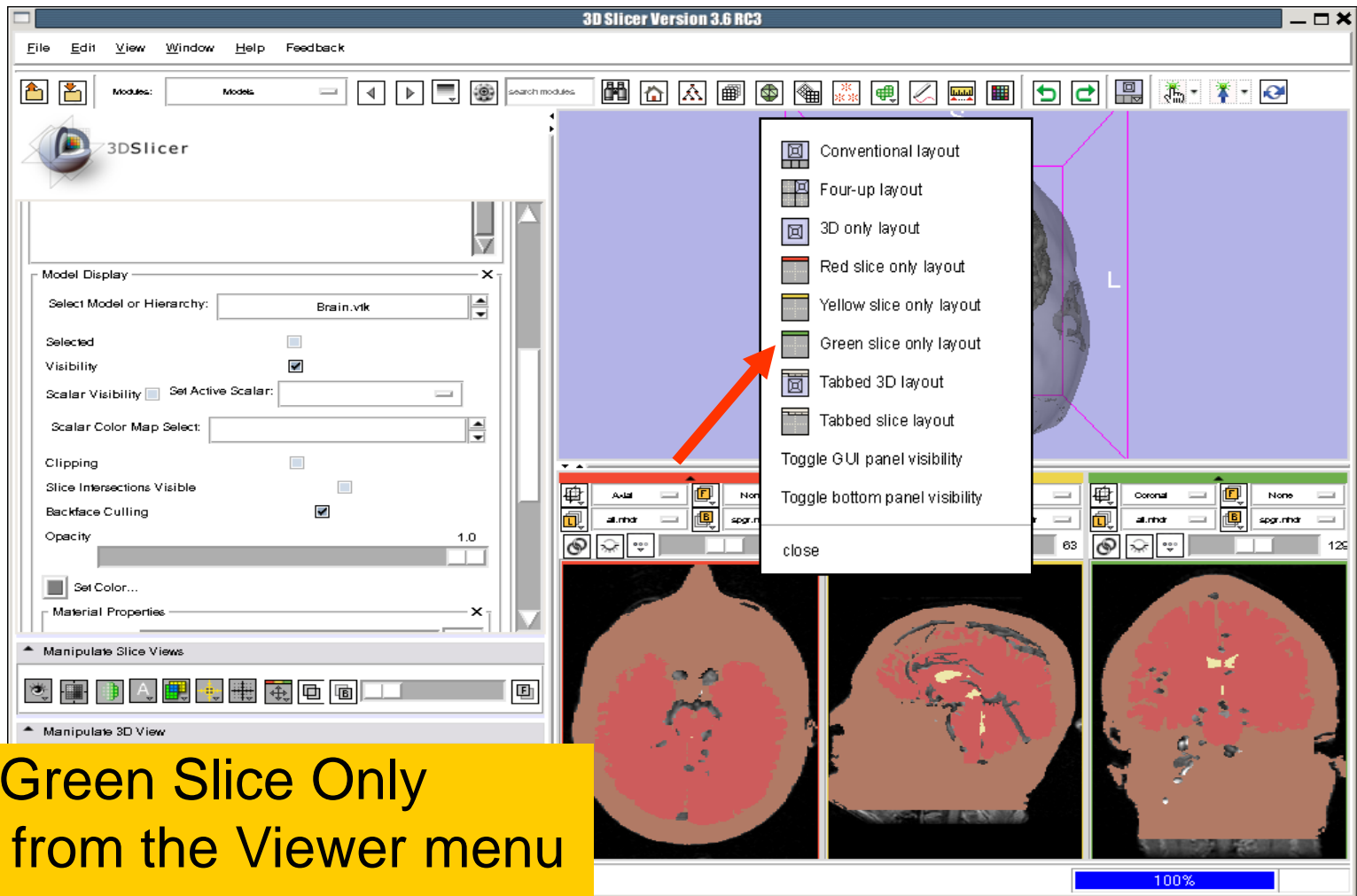
Turn off the visibility of the skin model

# Visualizing a 3D model



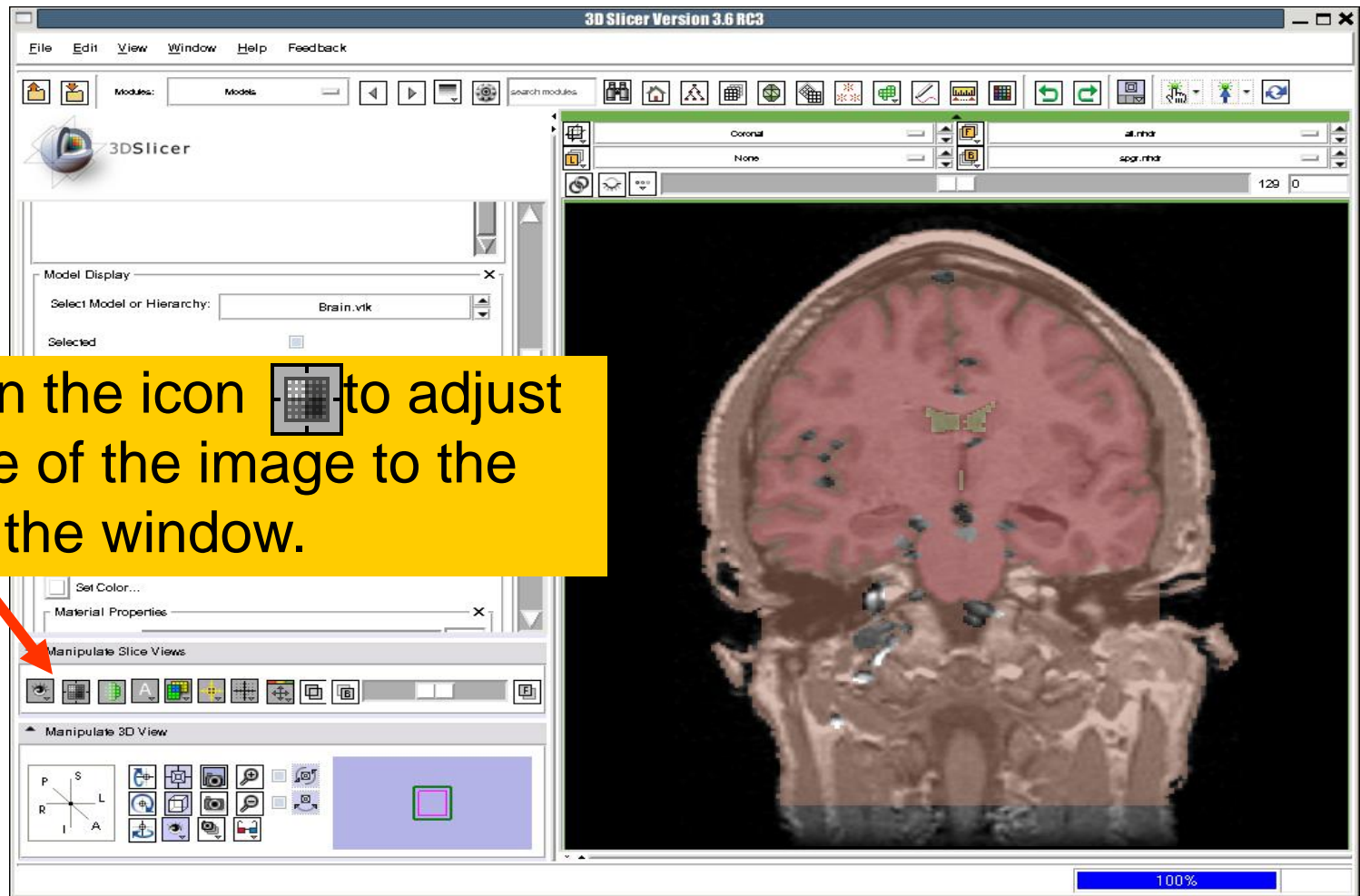
Select the model **Brain** and change its color to white

# Visualizing a 3D model



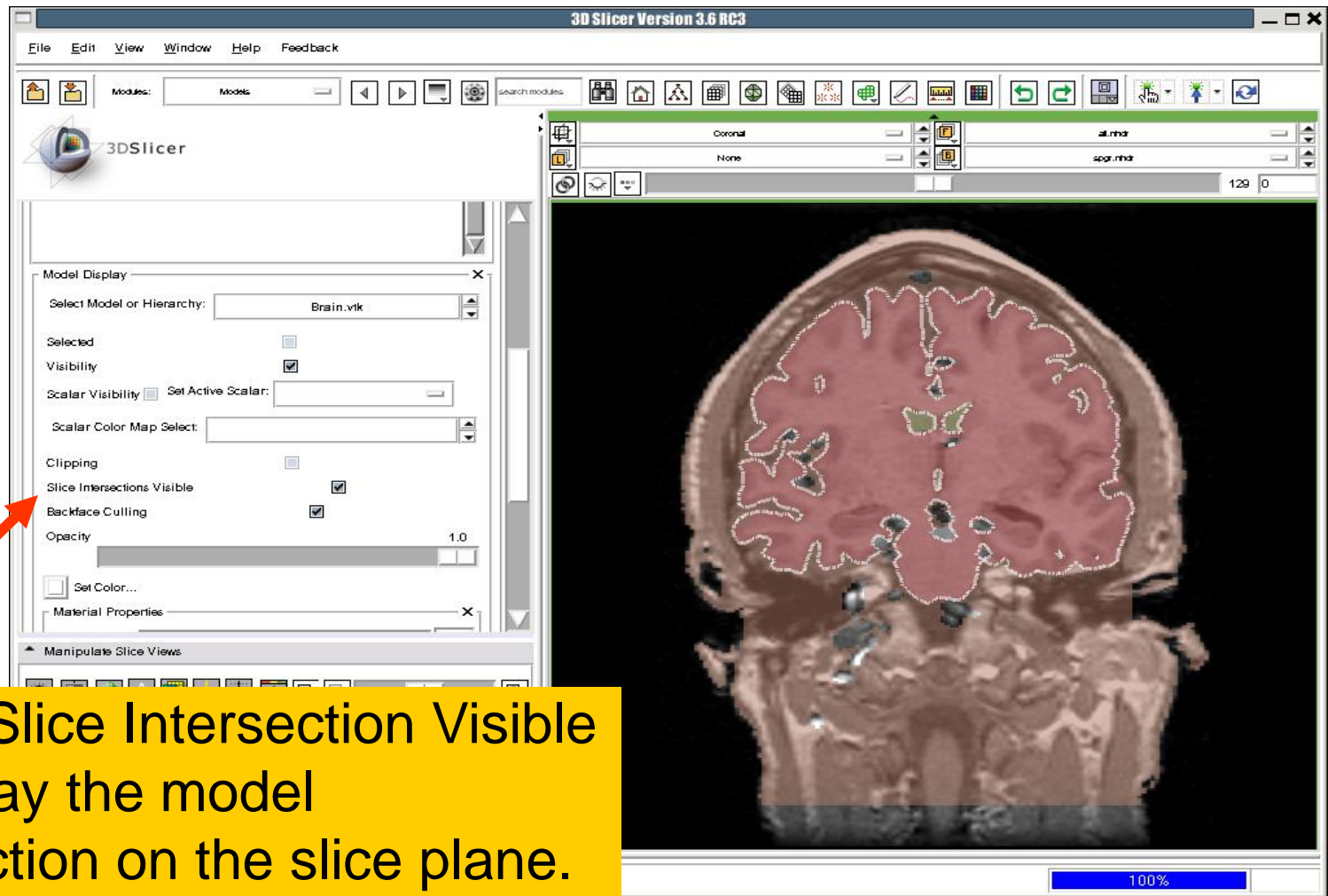
Select Green Slice Only  
Layout from the Viewer menu

# Visualizing a 3D model

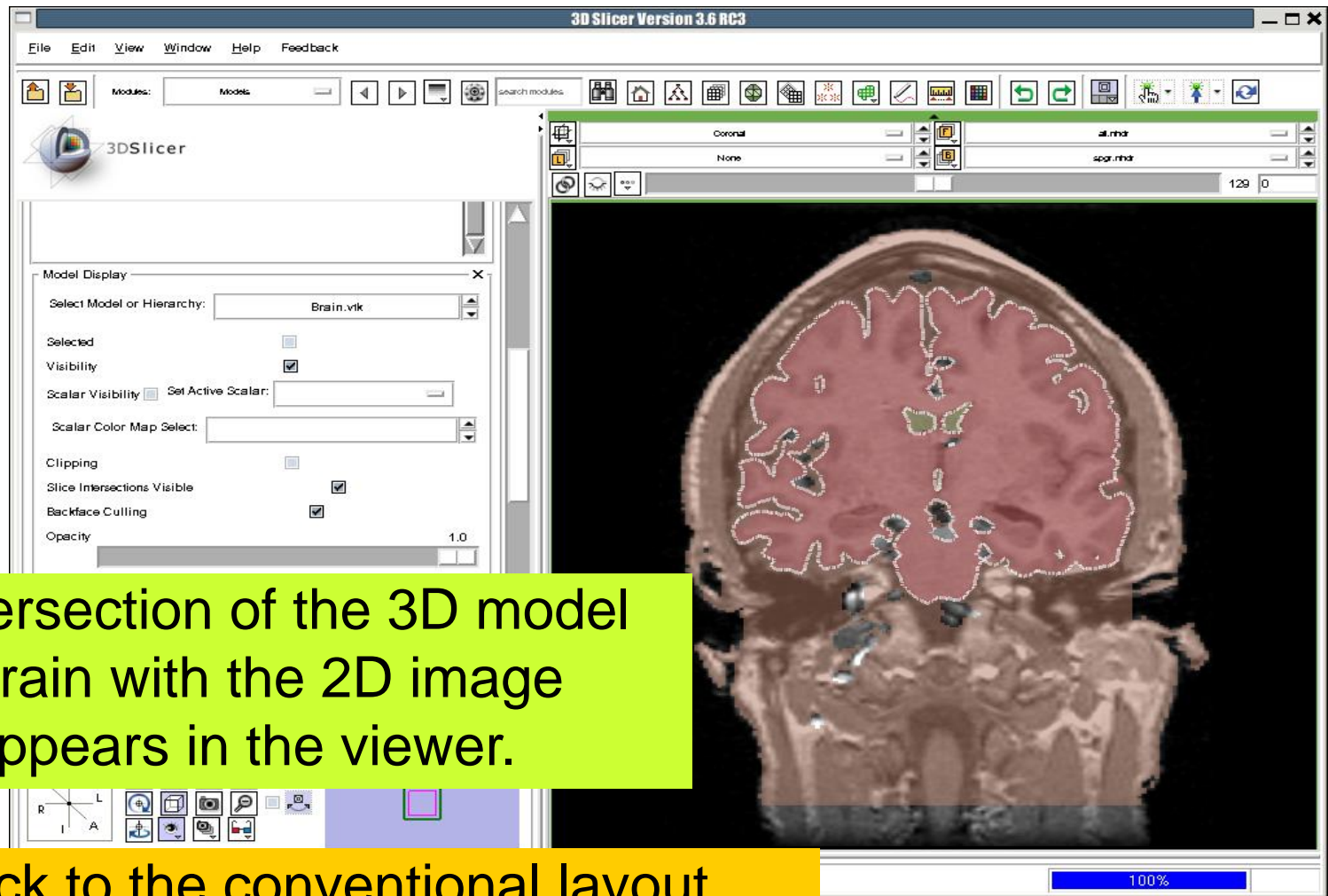




# Visualizing a 3D model



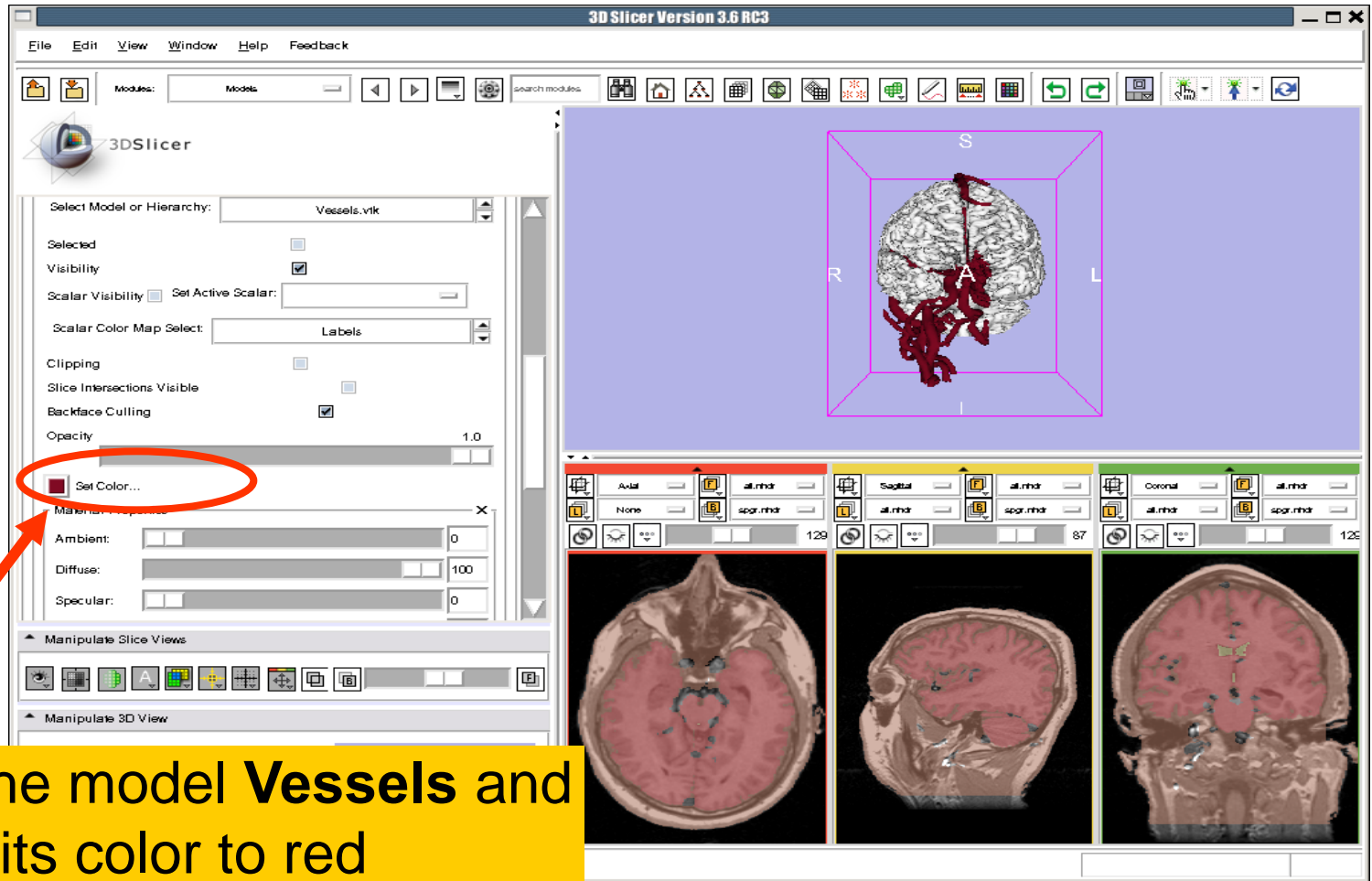
# Visualizing a 3D model



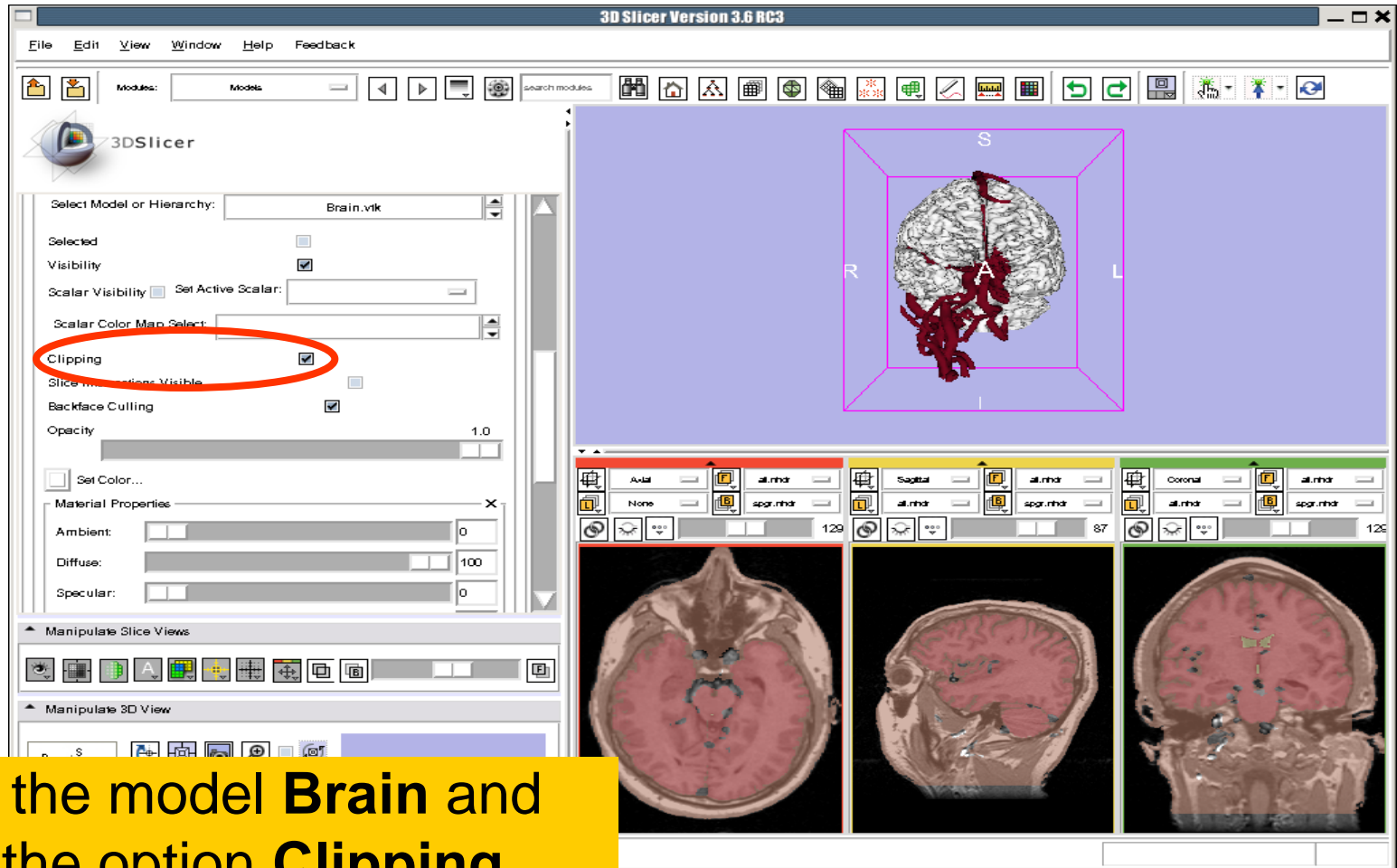
The intersection of the 3D model of the brain with the 2D image plane appears in the viewer.

Go back to the conventional layout

# Visualizing a 3D model

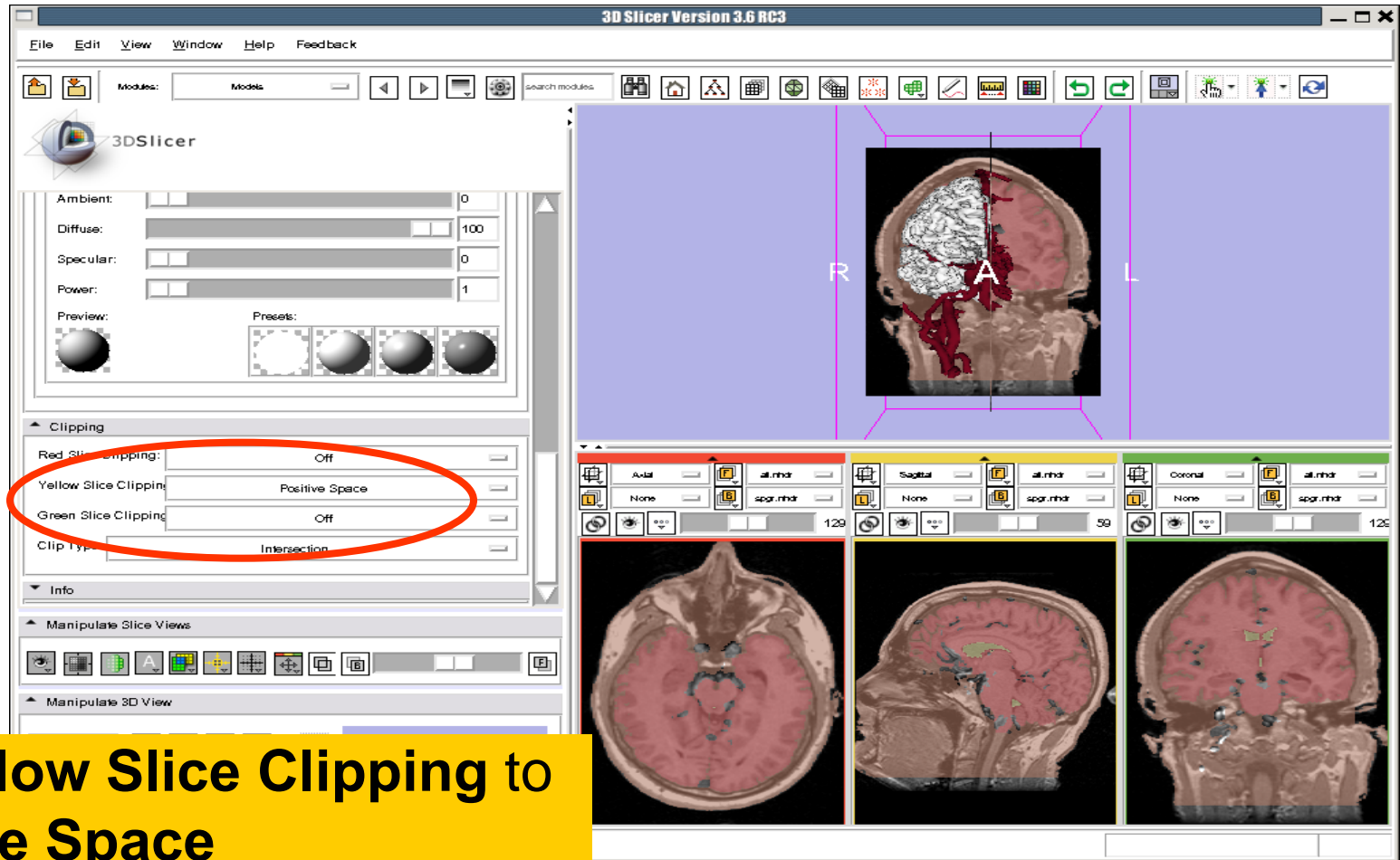


# Visualizing a 3D model

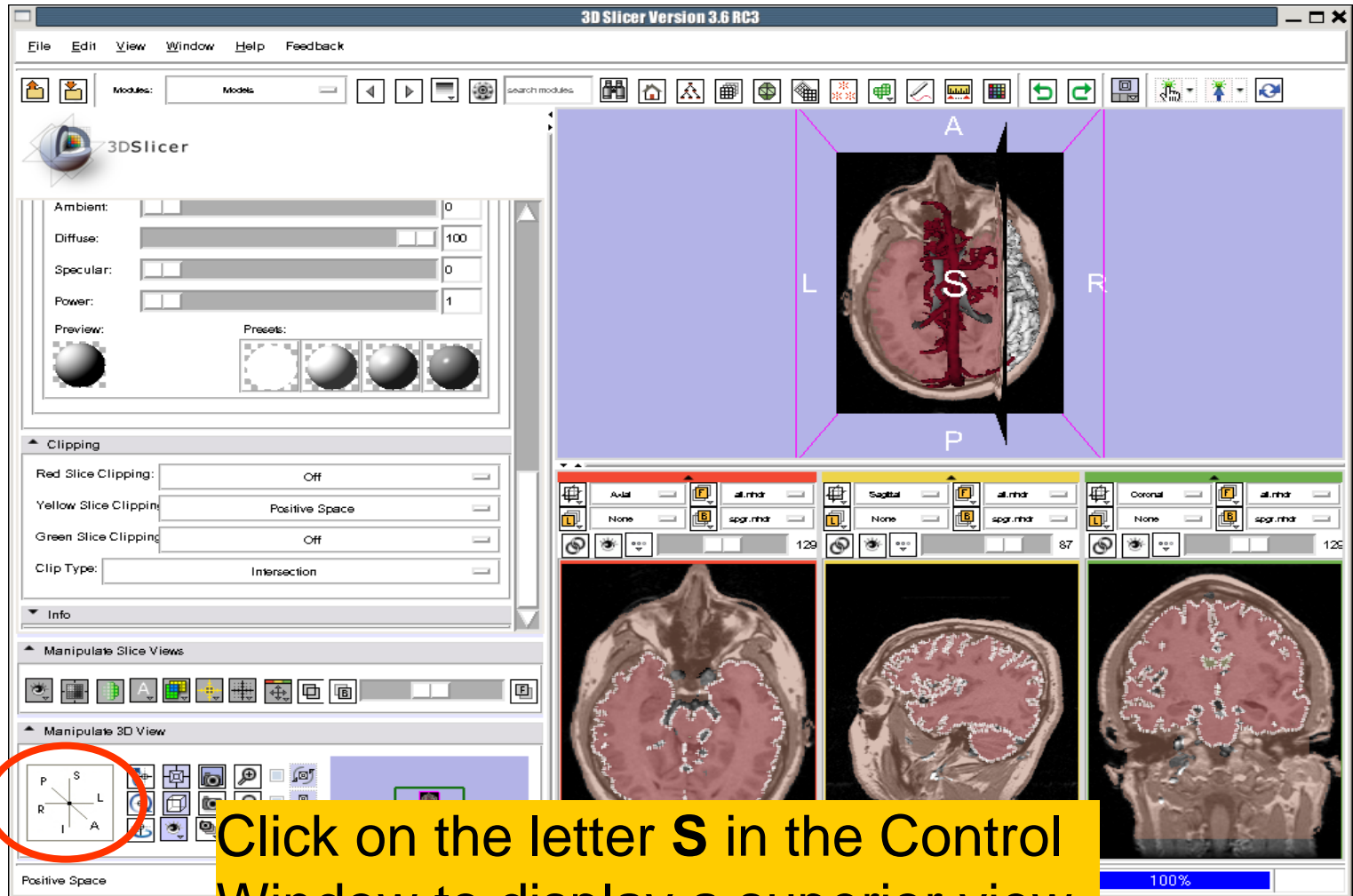


Select the model **Brain** and select the option **Clipping**

# Visualizing a 3D model

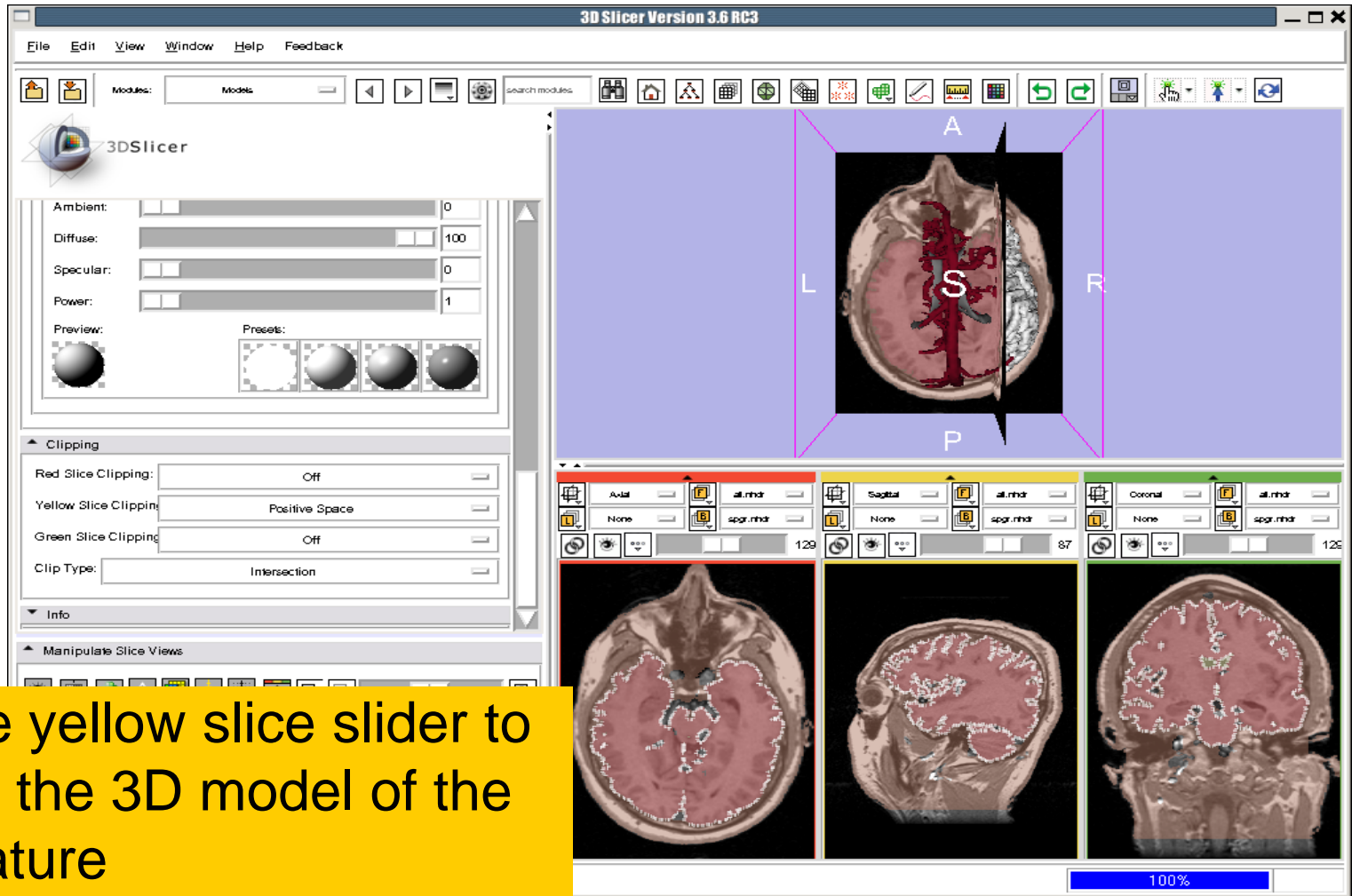


# Visualizing a 3D model

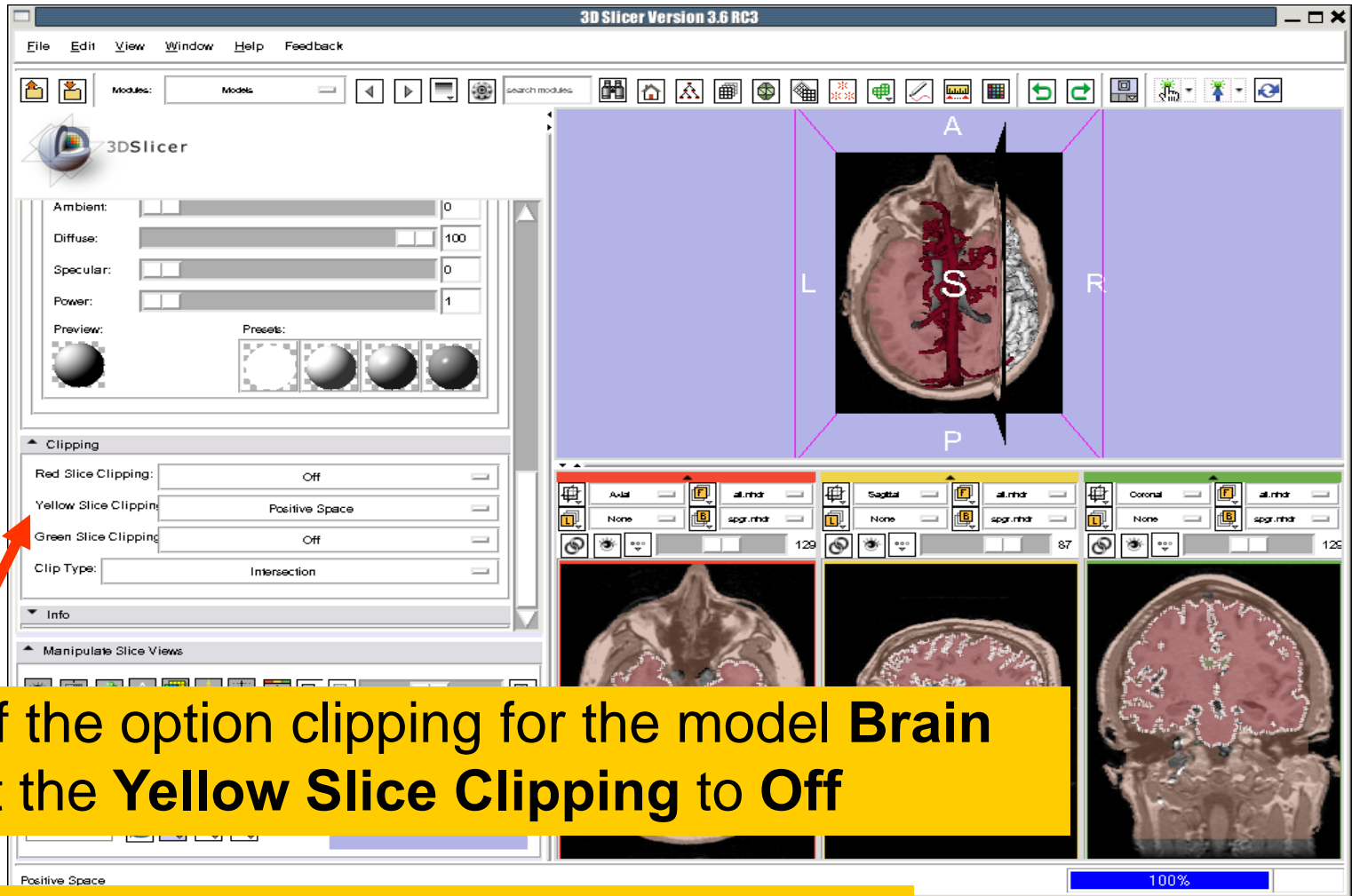


Click on the letter **S** in the Control Window to display a superior view of the 3D models

# Visualizing a 3D model



# Visualizing a 3D model

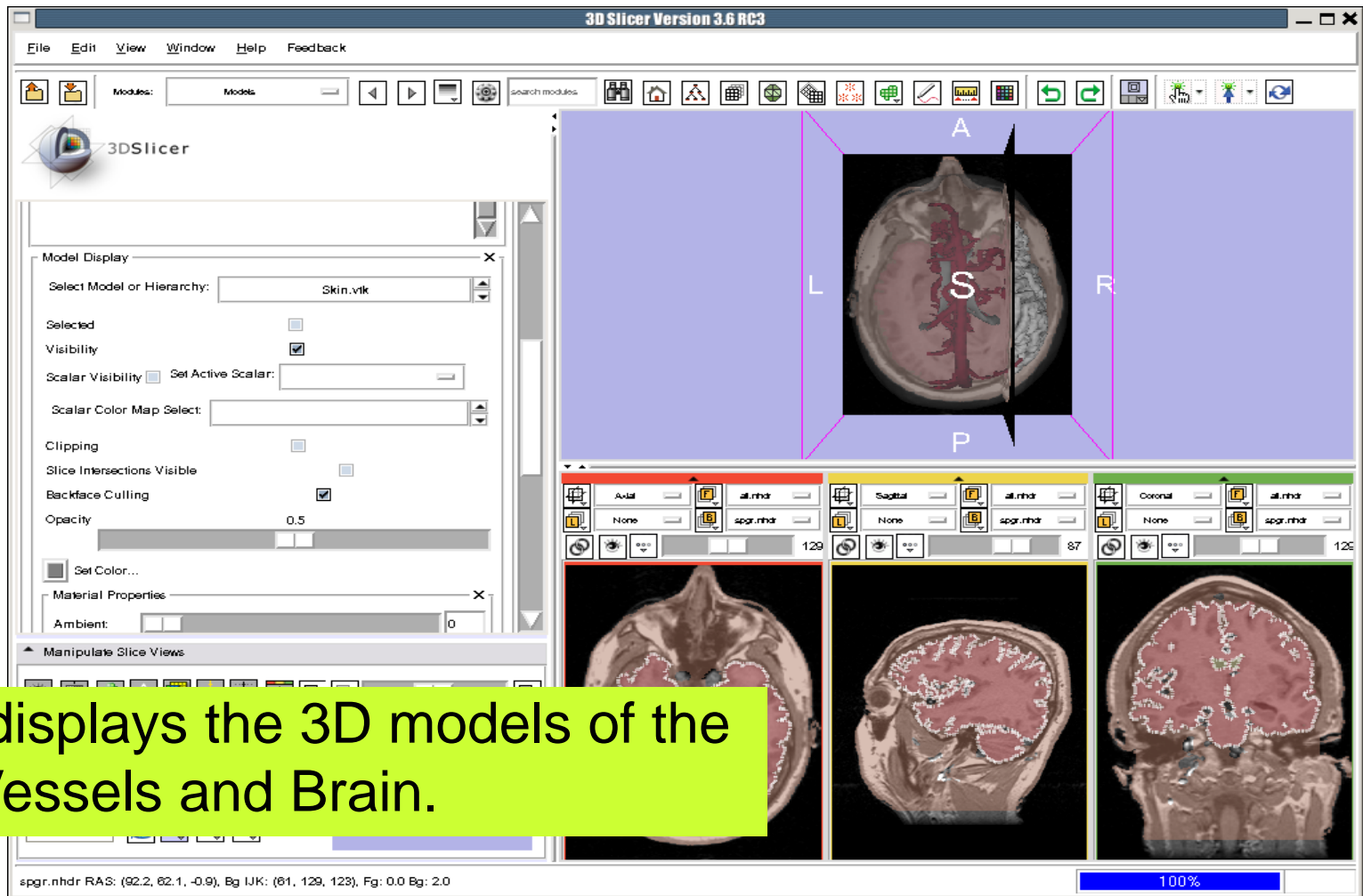


Turn off the option clipping for the model **Brain** and set the **Yellow Slice Clipping** to **Off**

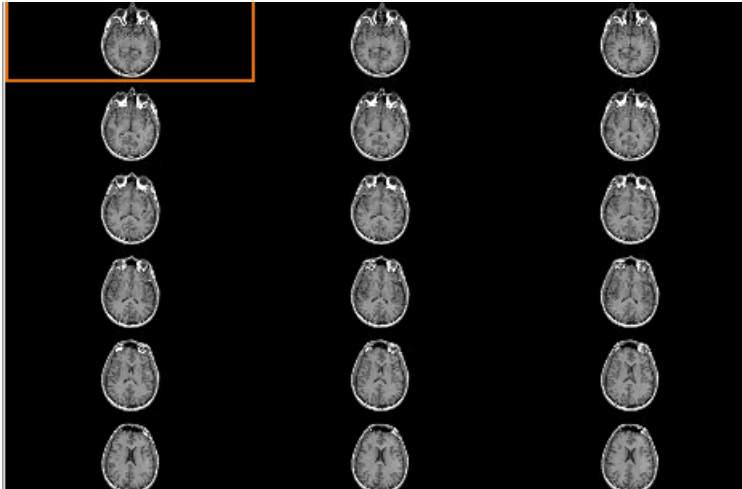
Turn on the visibility of the model **Skin**



# Visualizing a 3D model

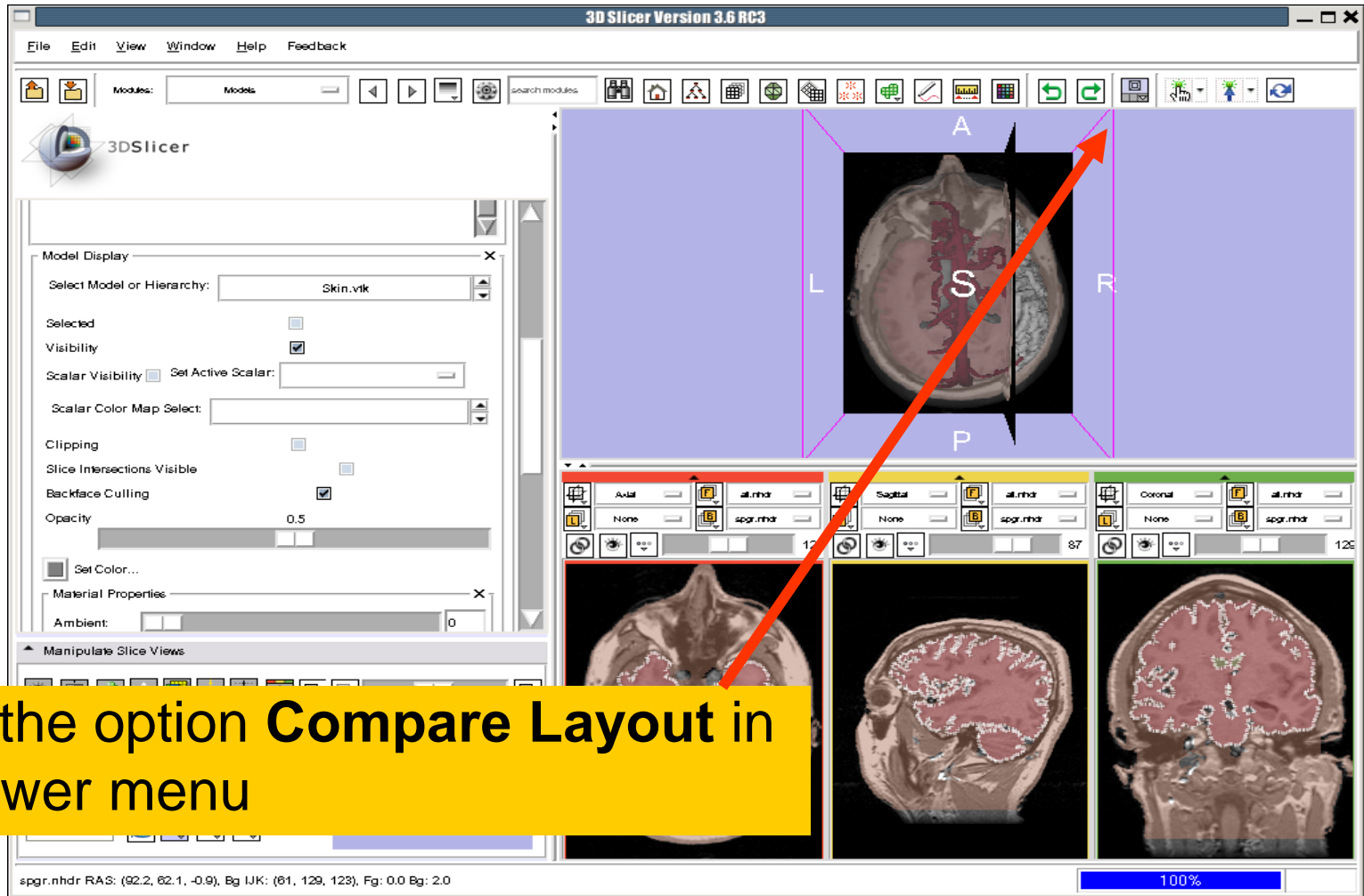


Slicer displays the 3D models of the Skin, Vessels and Brain.



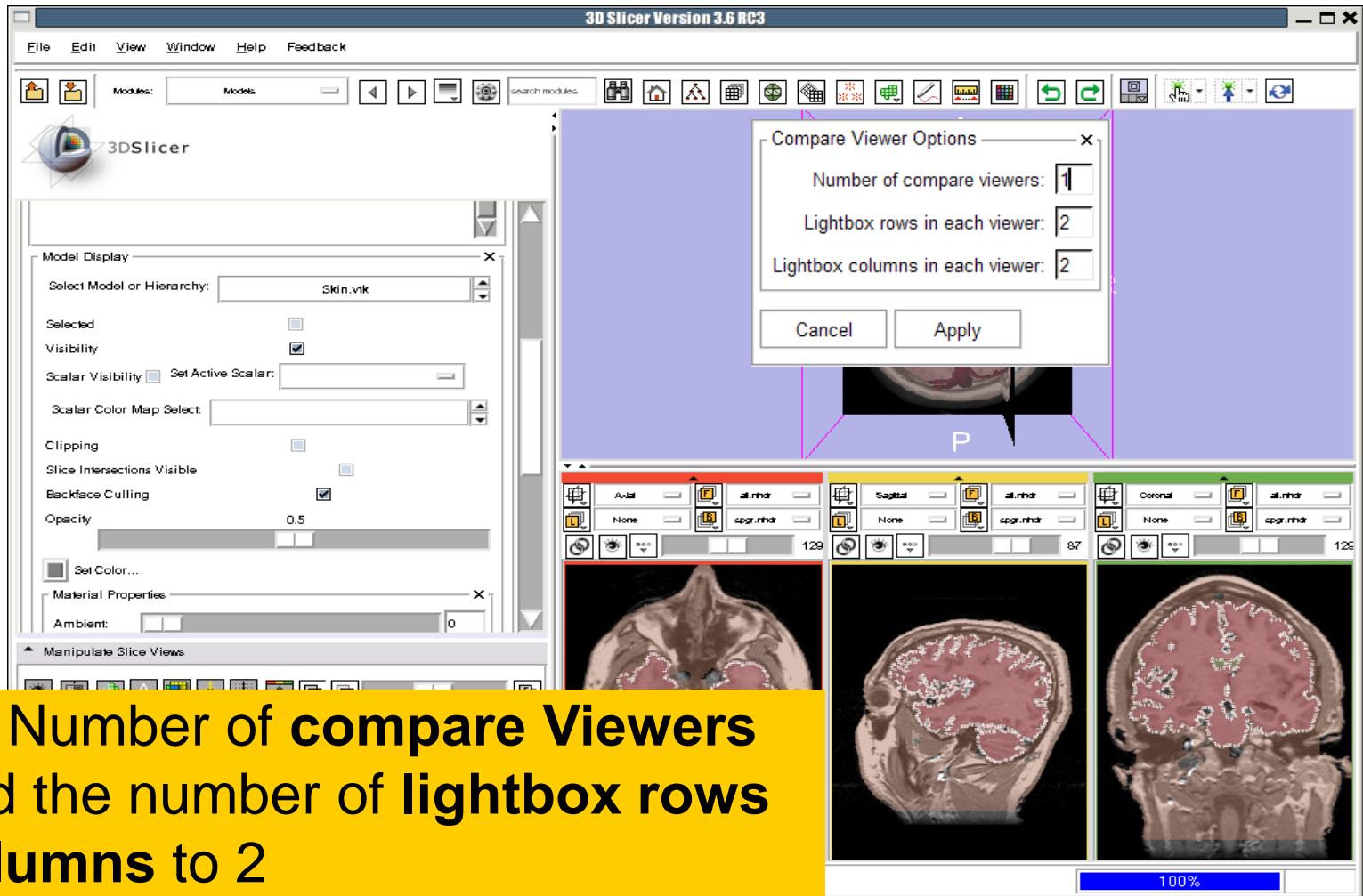
## Part 4: Lightbox viewer

# Visualizing a 3D model



Select the option **Compare Layout** in the Viewer menu

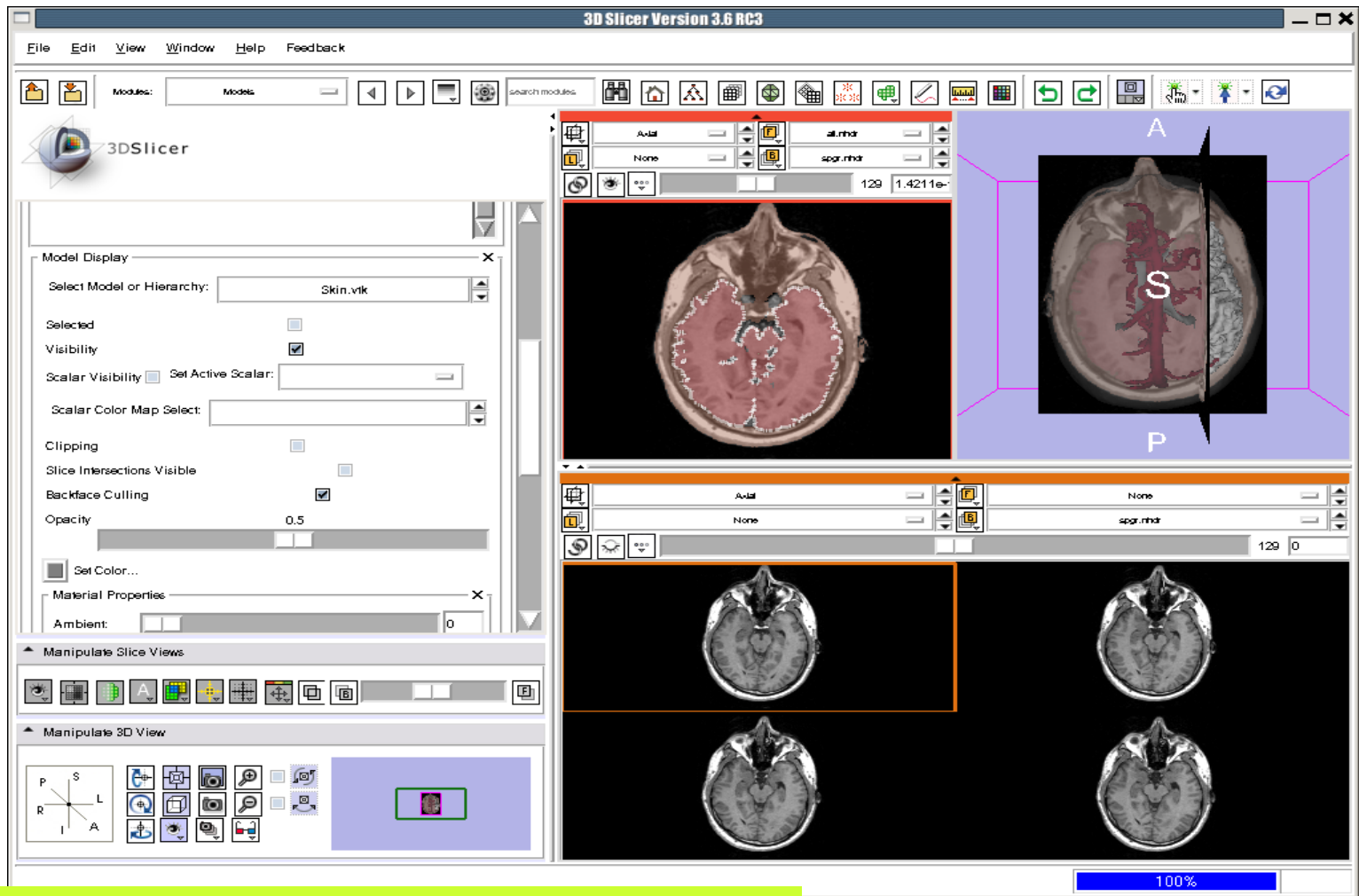
# Visualizing a 3D model



Set the Number of **compare Viewers** to 1 and the number of **lightbox rows** and **columns** to 2

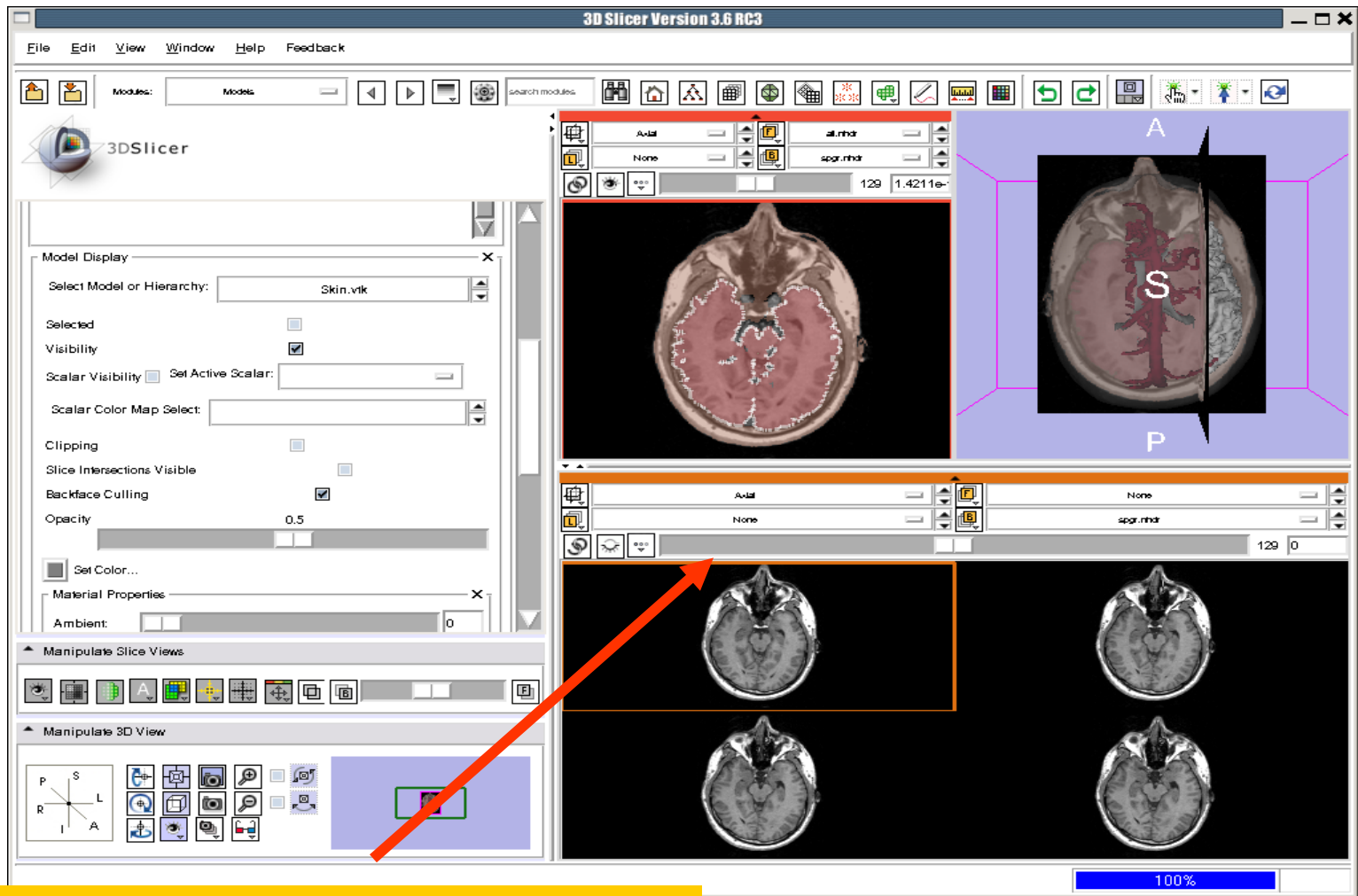
Click on **Apply**

# Lightbox viewer



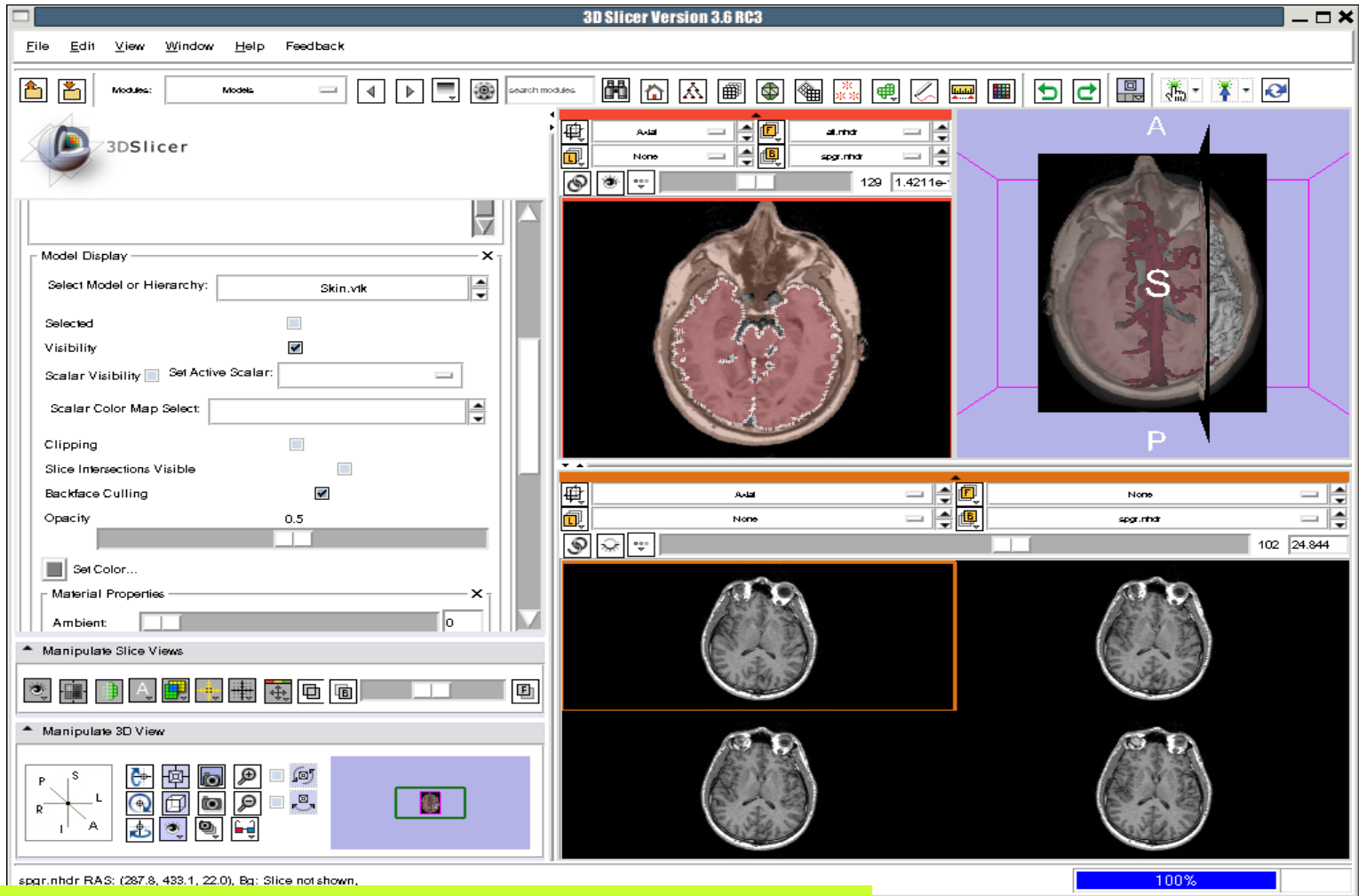
Slicer displays a lightbox view of the Background dataset.

# Lightbox viewer



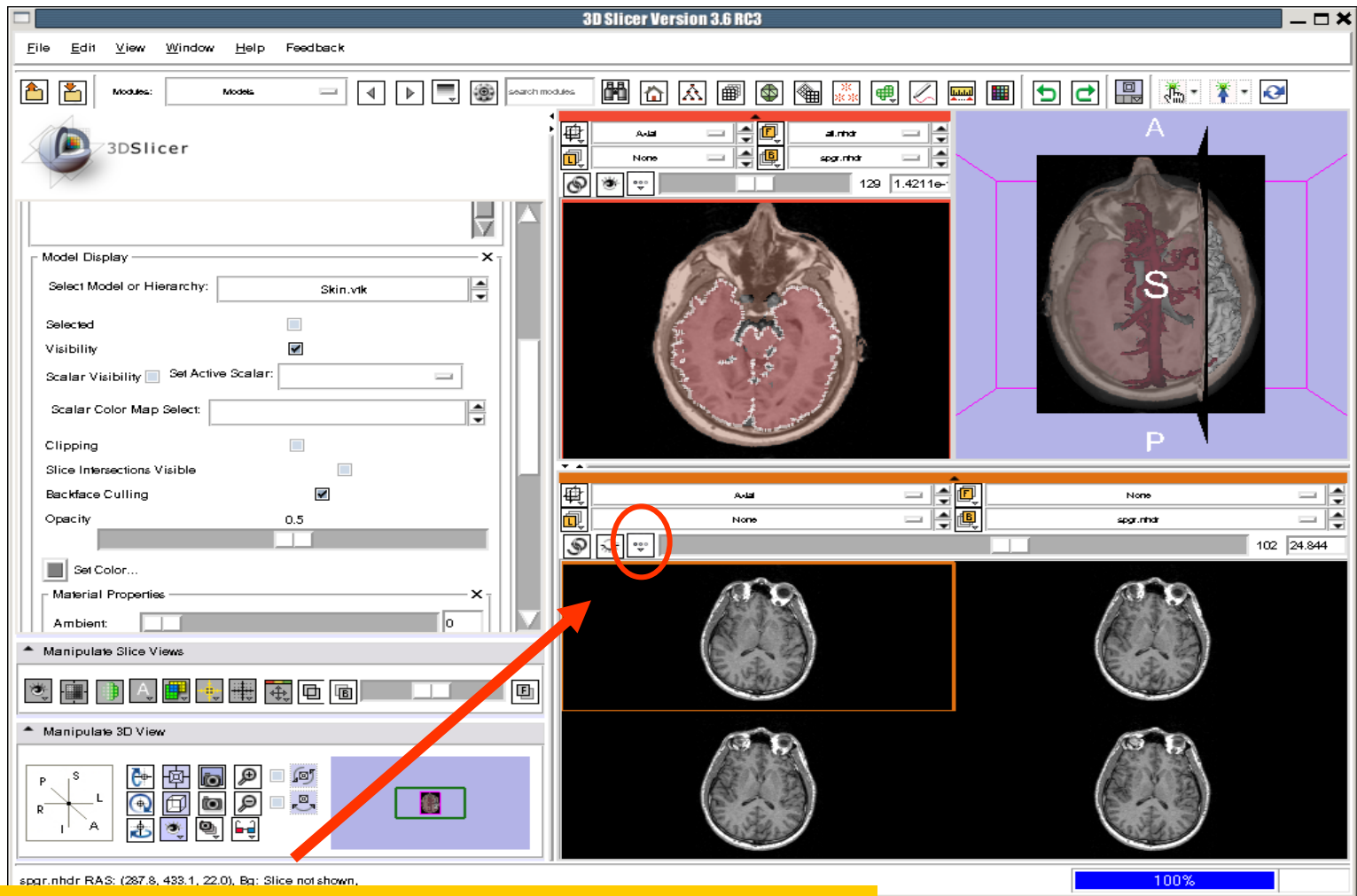
Browse through the spgr volume using the lightbox slider

# Lightbox viewer



Slicer displays 4 adjacent axial slices of the spgr volume simultaneously

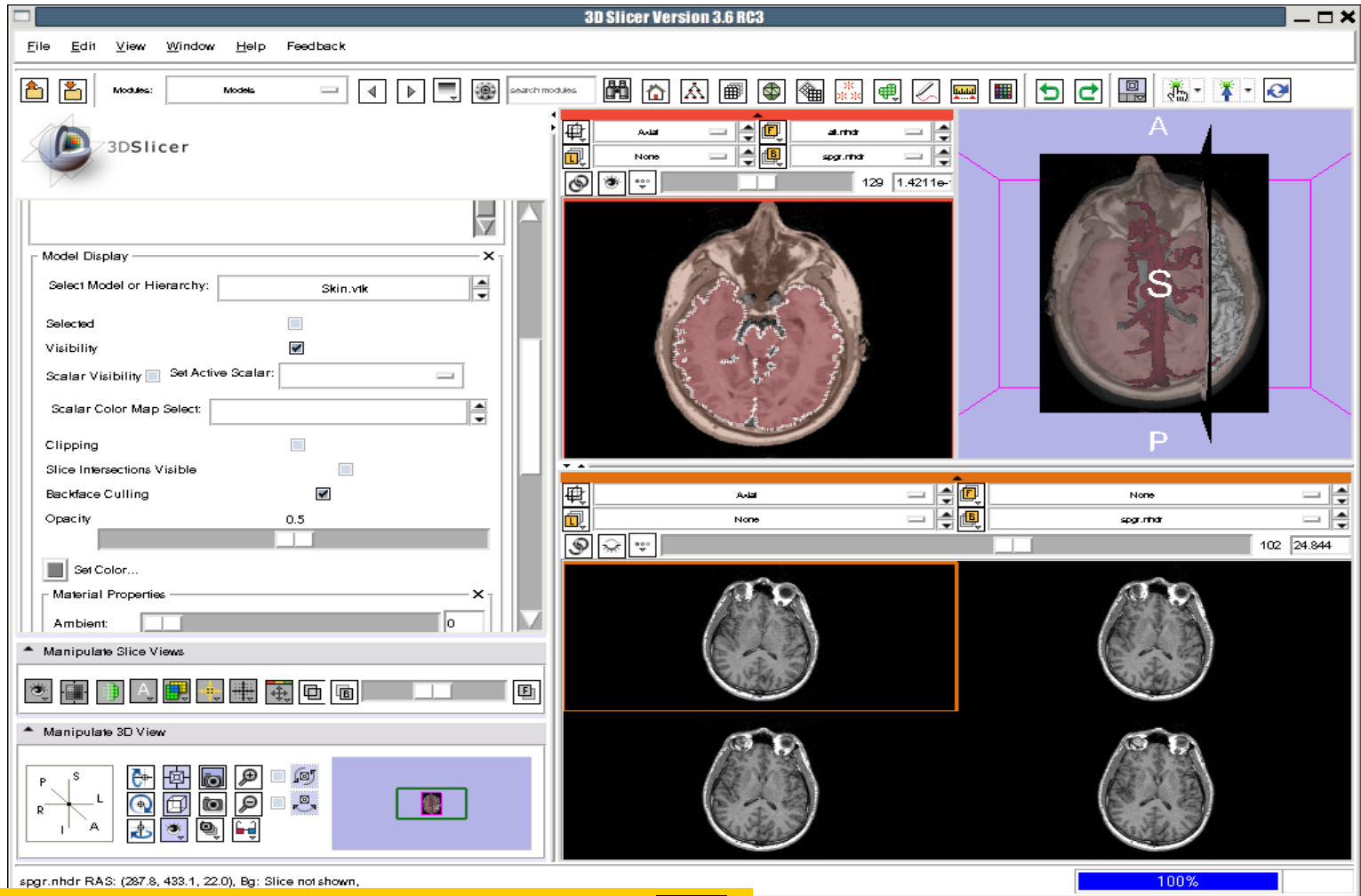
# Lightbox viewer



Left click on the Slice Viewer menu of the Compare Layout viewer



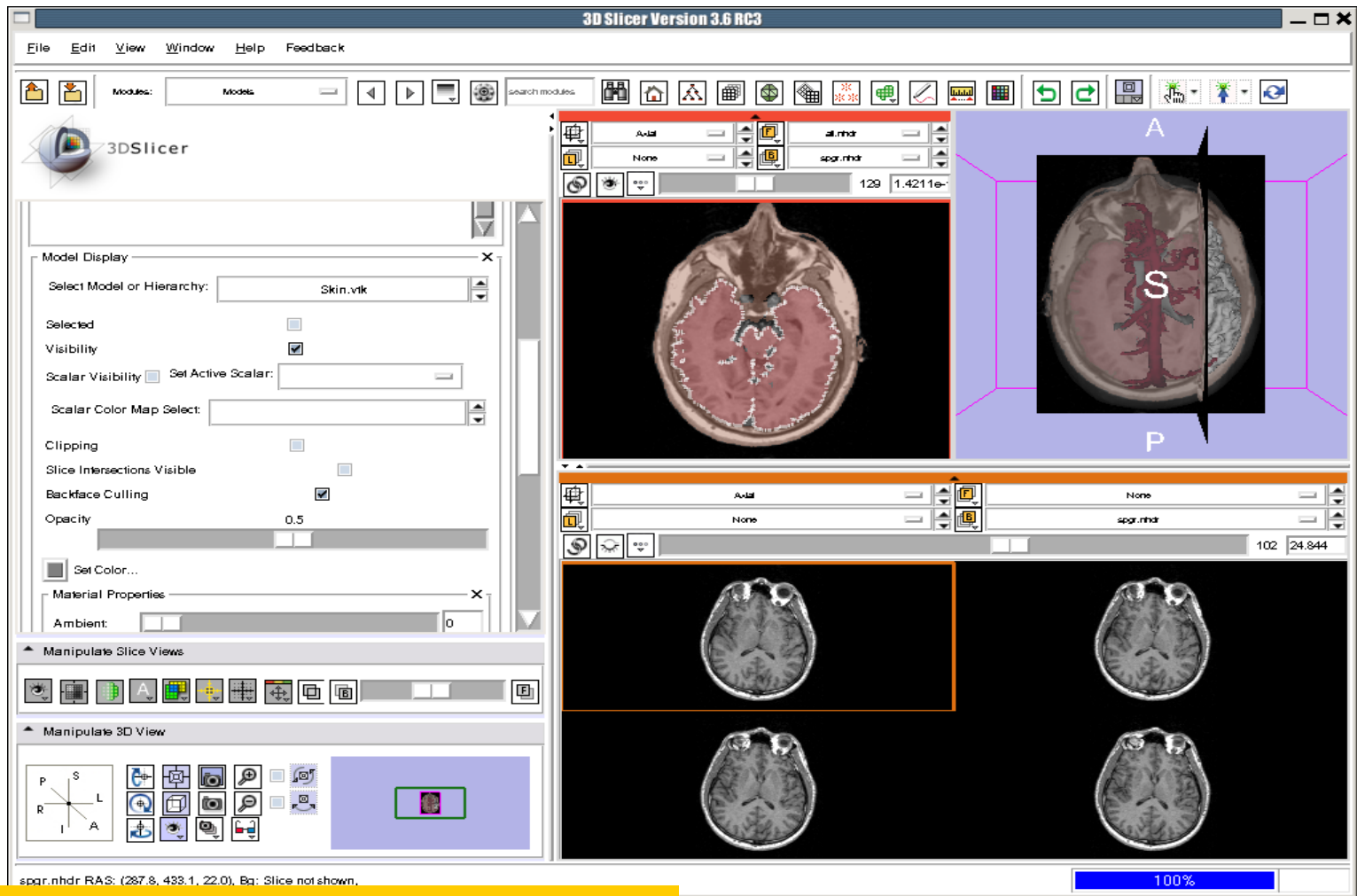
# Lightbox viewer



Select the **lightbox view** option

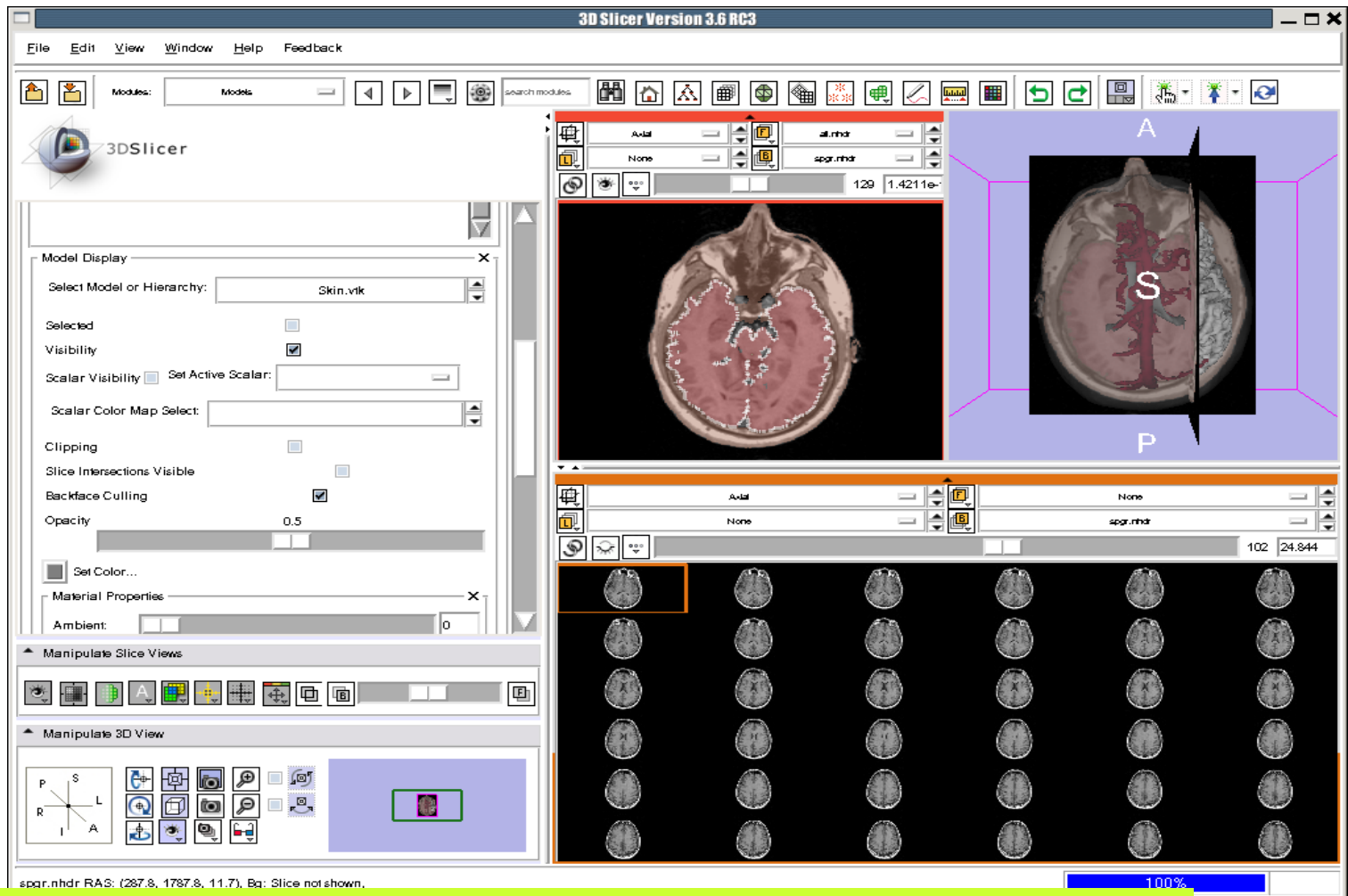


# Lightbox viewer



Set the configuration of the light box view to **6x6**

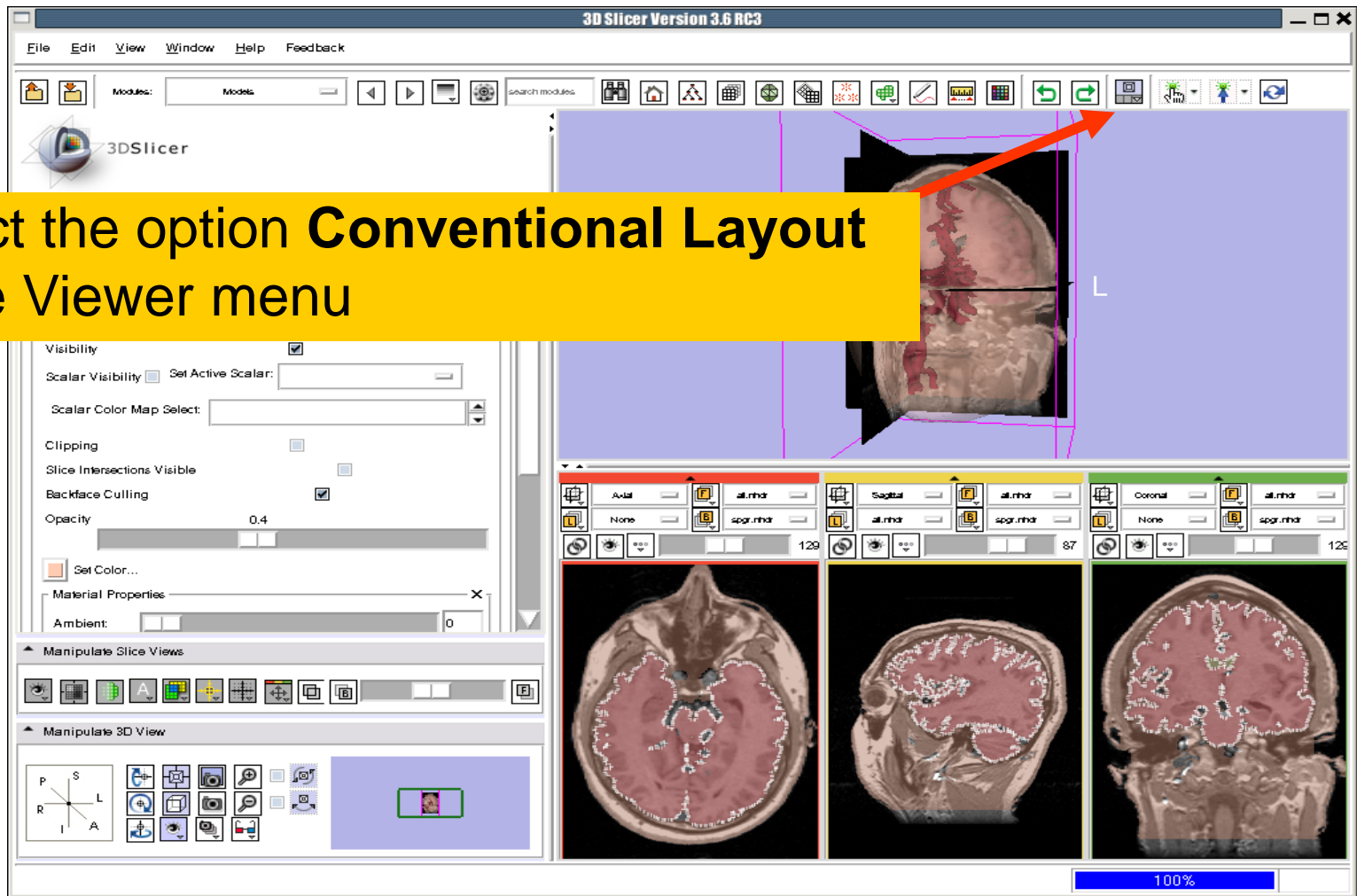
# Lightbox viewer

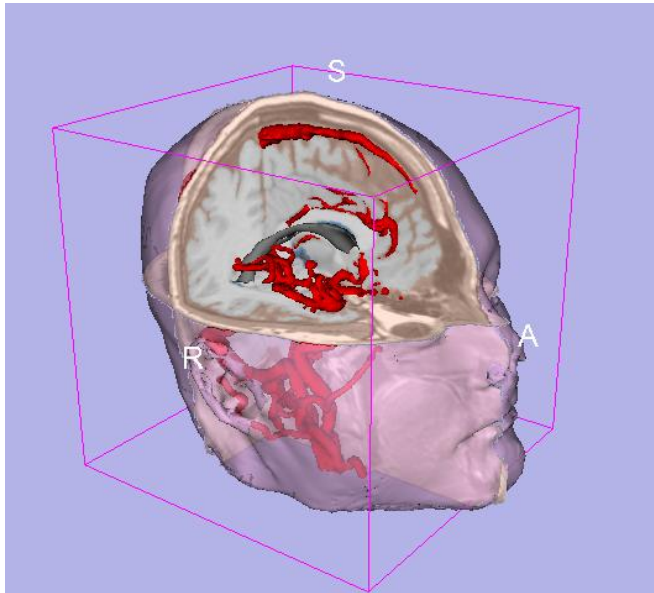


Slicer displays a matrix of 36 adjacent axial slices of the spgr volume.

# Lightbox viewer

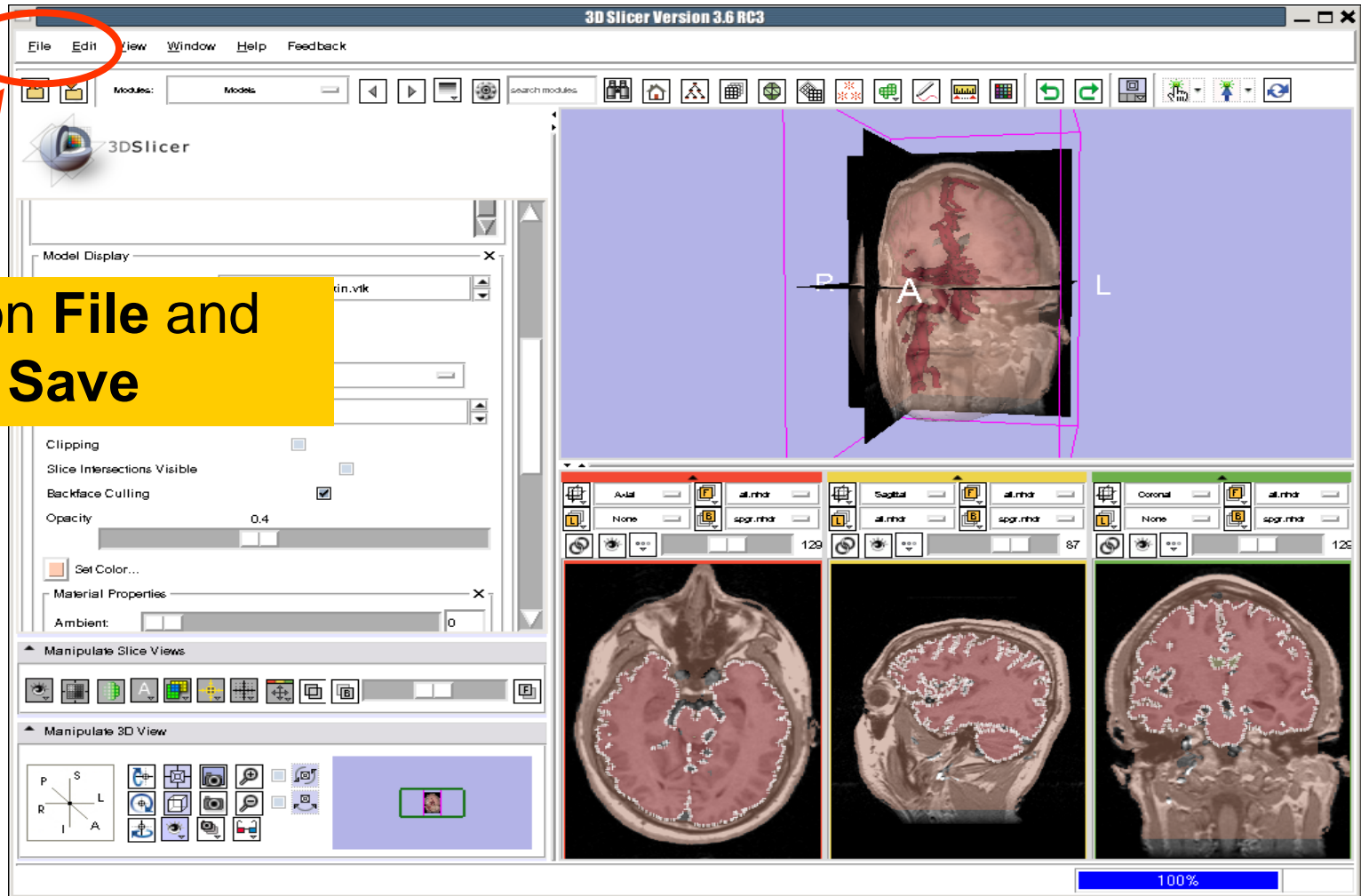
Select the option **Conventional Layout** in the Viewer menu





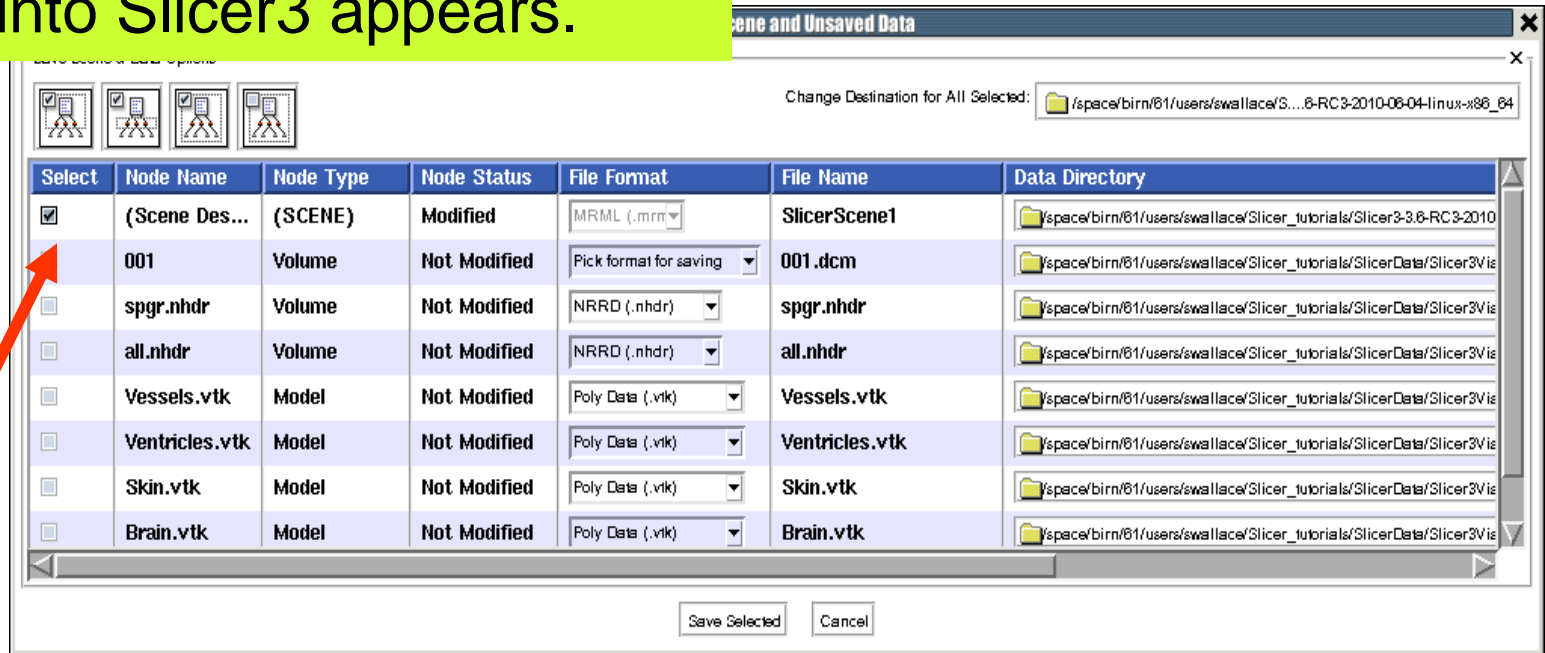
## Part 5: Loading and saving a Scene

# Saving Data



# Saving Data

The list of elements currently loaded into Slicer3 appears.

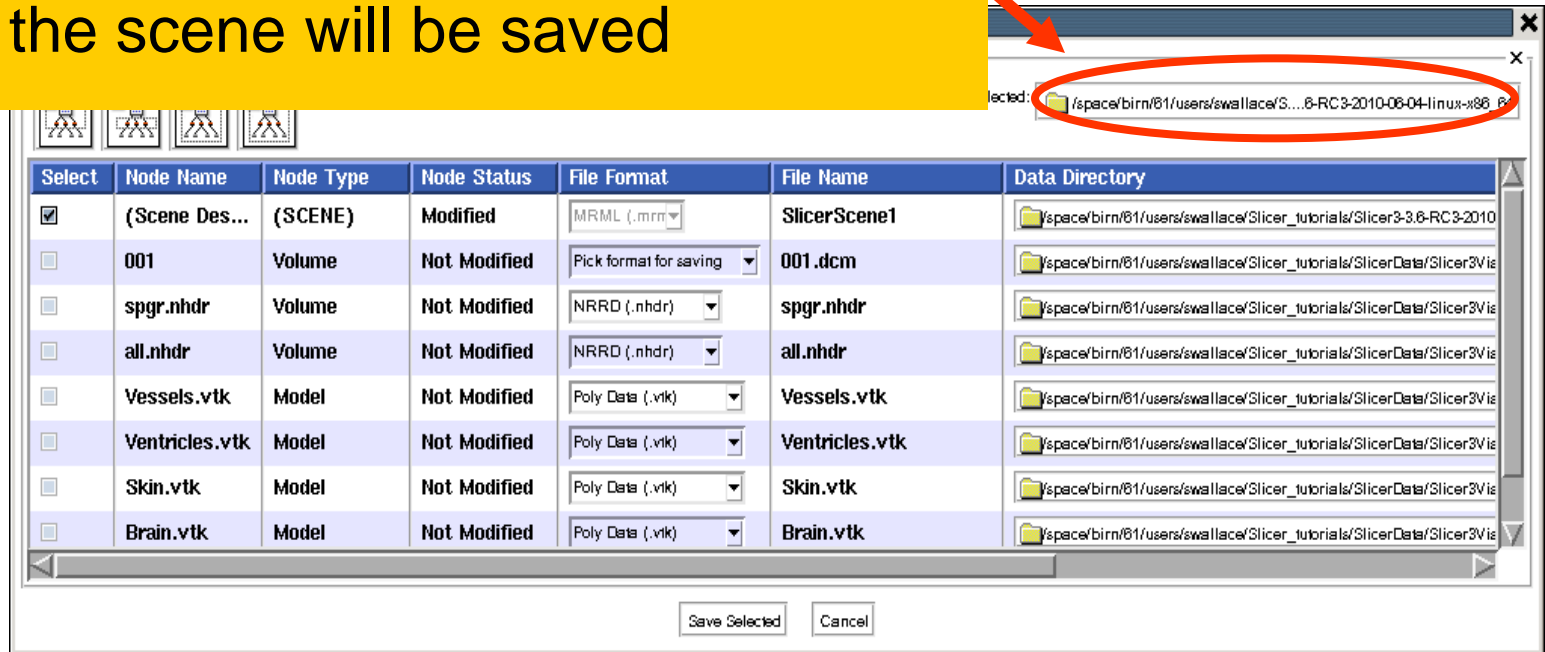


Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	(Scene Des...	(SCENE)	Modified	MRML (.mrm)	SlicerScene1	/space/birn/81/users/swallace/Slicer_tutorials/Slicer3-3.8-RC3-2010-06-04-linux-x86_64
<input type="checkbox"/>	001	Volume	Not Modified	Pick format for saving	001.dcm	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	spgr.nhdr	Volume	Not Modified	NRRD (.nhdr)	spgr.nhdr	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	all.nhdr	Volume	Not Modified	NRRD (.nhdr)	all.nhdr	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	Vessels.vtk	Model	Not Modified	Poly Data (.vtk)	Vessels.vtk	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	Ventricles.vtk	Model	Not Modified	Poly Data (.vtk)	Ventricles.vtk	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	Skin.vtk	Model	Not Modified	Poly Data (.vtk)	Skin.vtk	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	Brain.vtk	Model	Not Modified	Poly Data (.vtk)	Brain.vtk	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis

Make sure only the first check box is selected

# Saving Data

Click on **Change Destination for All Selected** and browse to the location where the scene will be saved



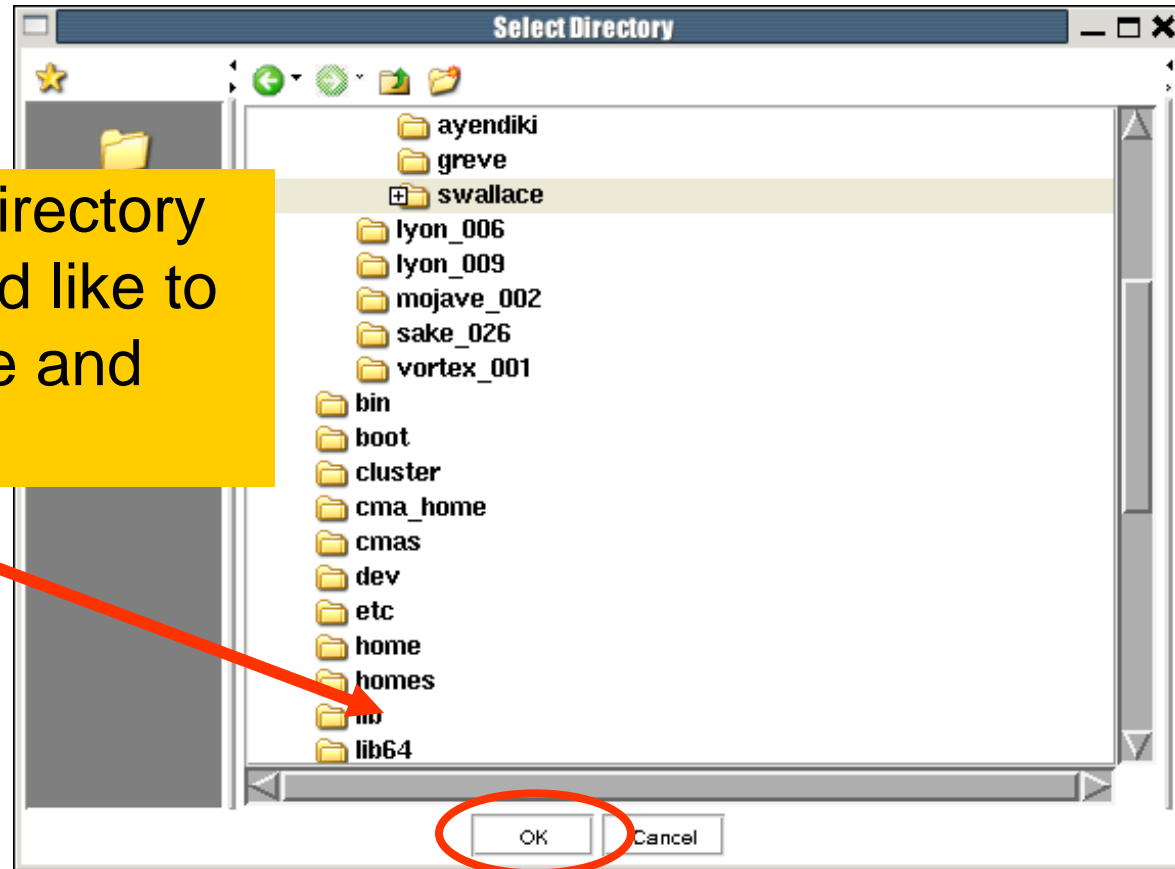
Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	(Scene Des...	(SCENE)	Modified	MRML (.mrm)	SlicerScene1	/space/birn/81/users/swallace/Slicer_tutorials/Slicer3-3.8-RC3-2010
<input type="checkbox"/>	001	Volume	Not Modified	Pick format for saving	001.dcm	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	spgr.nhdr	Volume	Not Modified	NRRD (.nhdr)	spgr.nhdr	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	all.nhdr	Volume	Not Modified	NRRD (.nhdr)	all.nhdr	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	Vessels.vtk	Model	Not Modified	Poly Data (.vtk)	Vessels.vtk	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	Ventricles.vtk	Model	Not Modified	Poly Data (.vtk)	Ventricles.vtk	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	Skin.vtk	Model	Not Modified	Poly Data (.vtk)	Skin.vtk	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis
<input type="checkbox"/>	Brain.vtk	Model	Not Modified	Poly Data (.vtk)	Brain.vtk	/space/birn/81/users/swallace/Slicer_tutorials/SlicerData/Slicer3Vis

Save Selected    Cancel



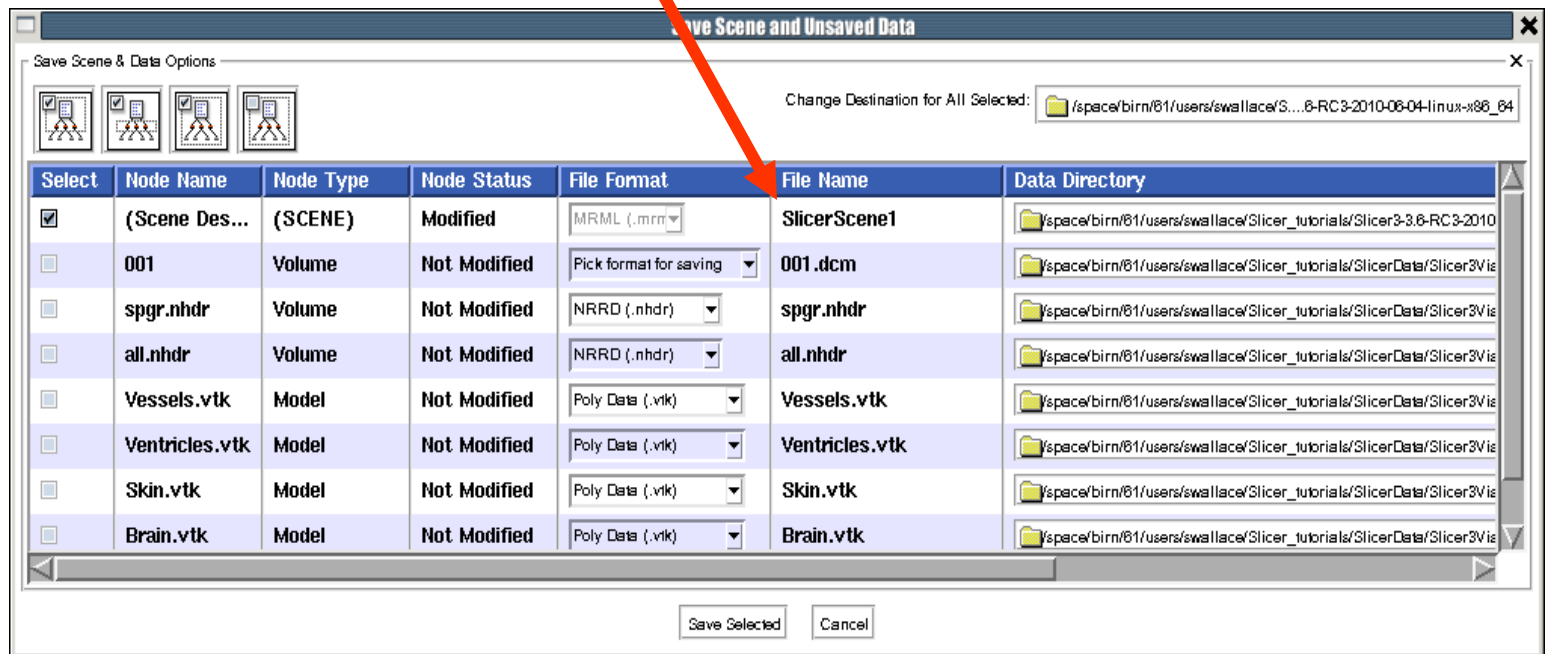
# Saving Data

Browse to the directory where you would like to save your scene and click OK

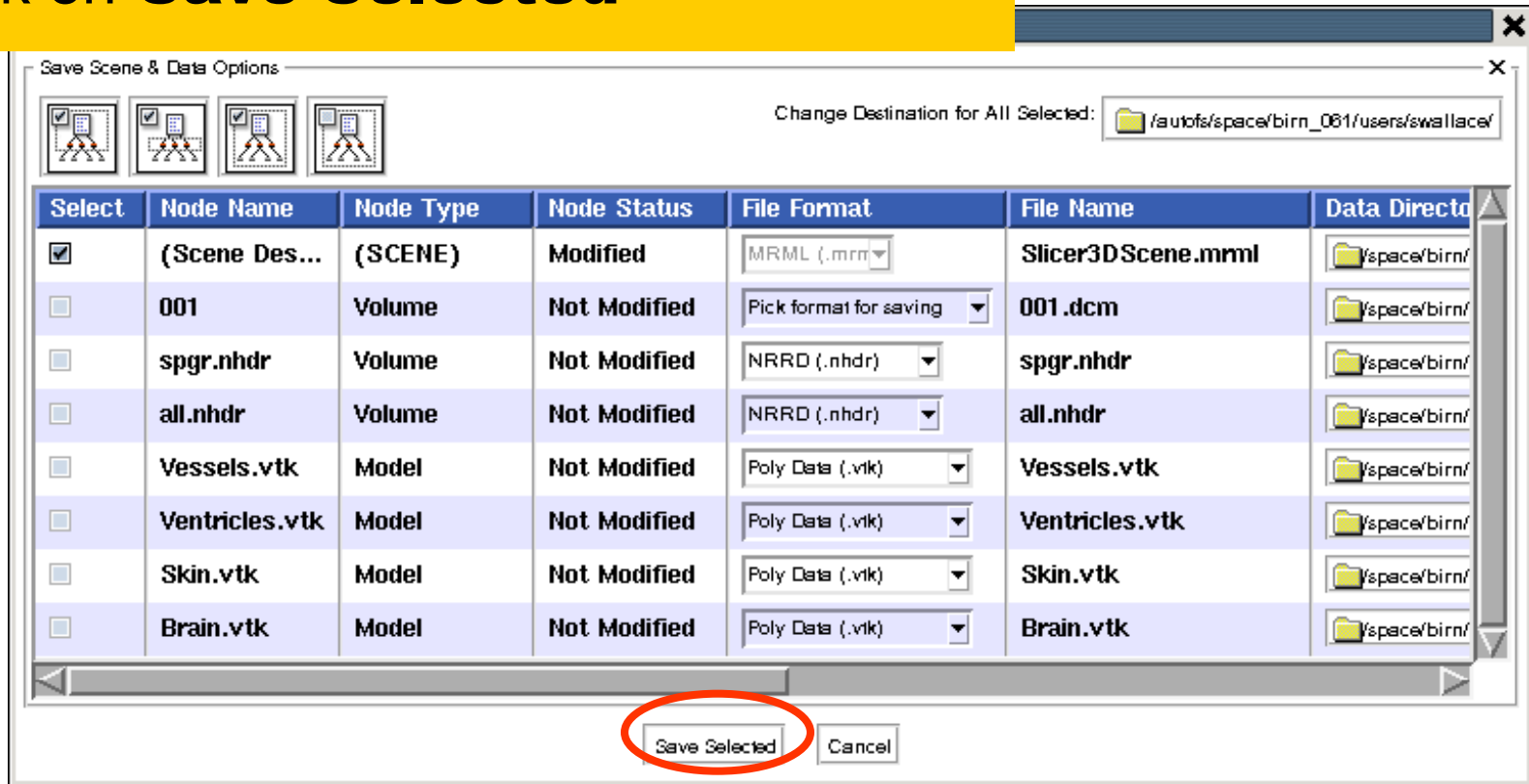


# Saving Data

Double click on the file name **SlicerScene1** and change it to **Slicer3DScene**

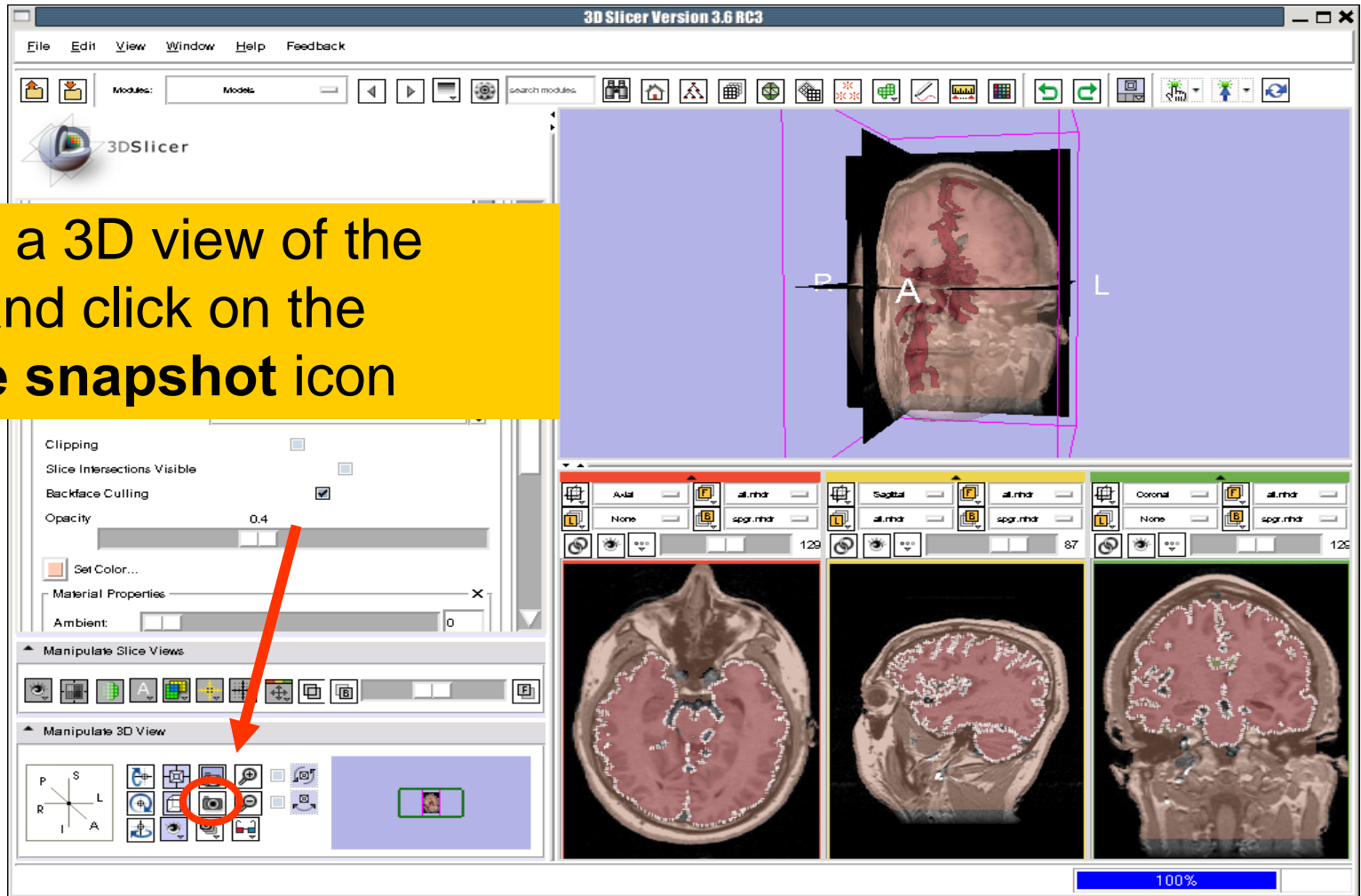


Click on **Save Selected**

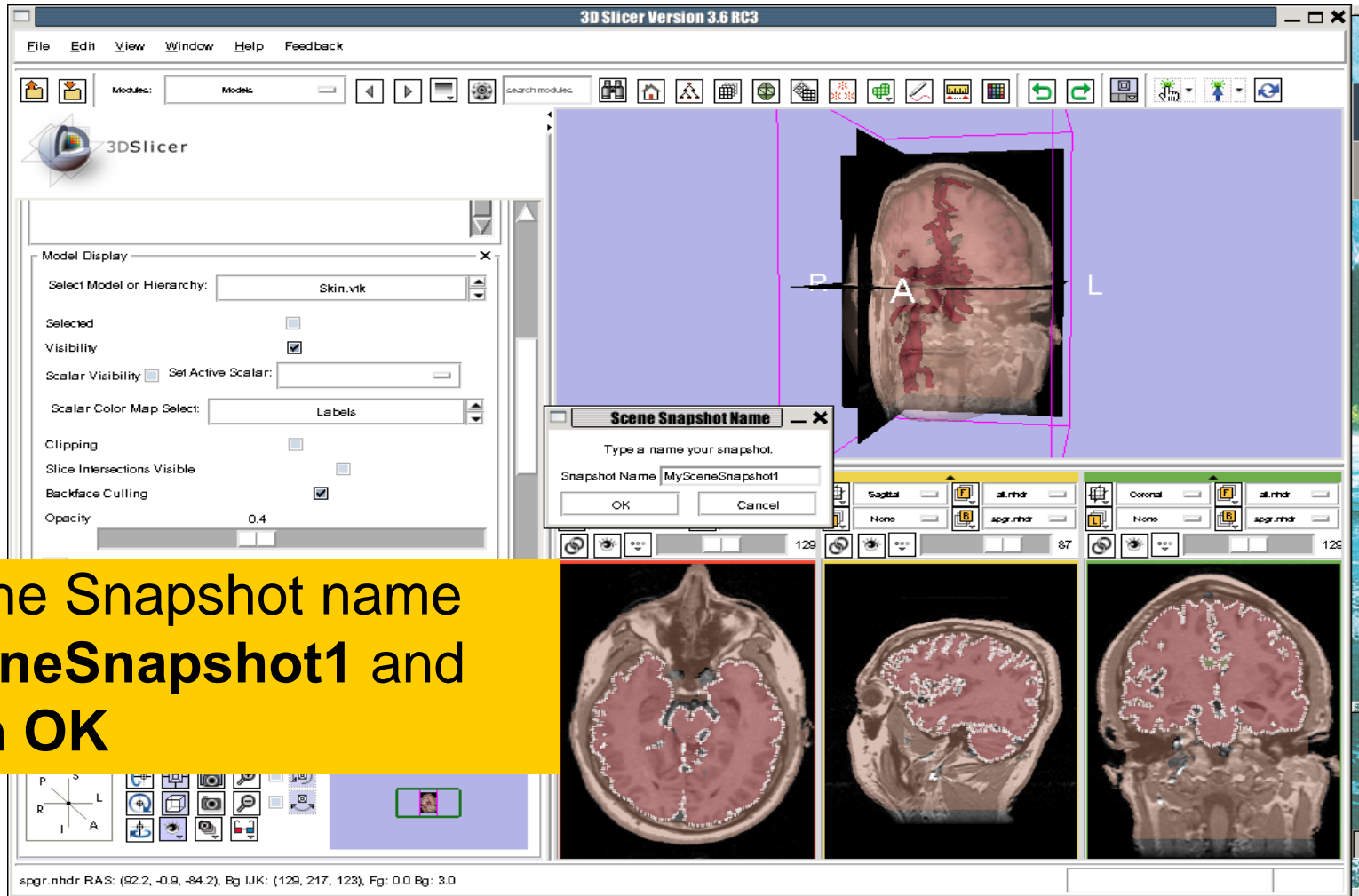


# Creating Scene Snapshots

Choose a 3D view of the scene and click on the capture snapshot icon

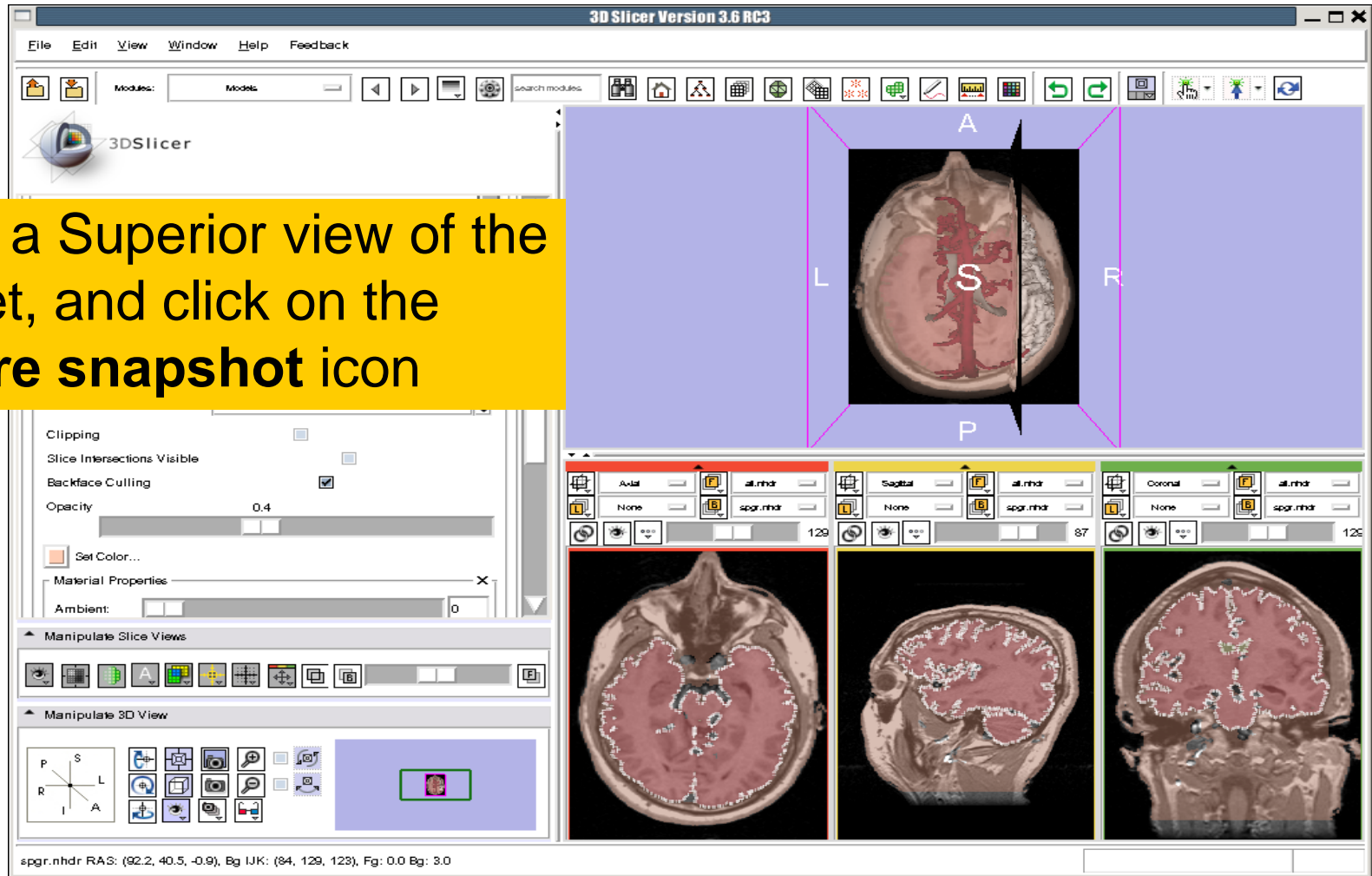


# Creating Scene Snapshots

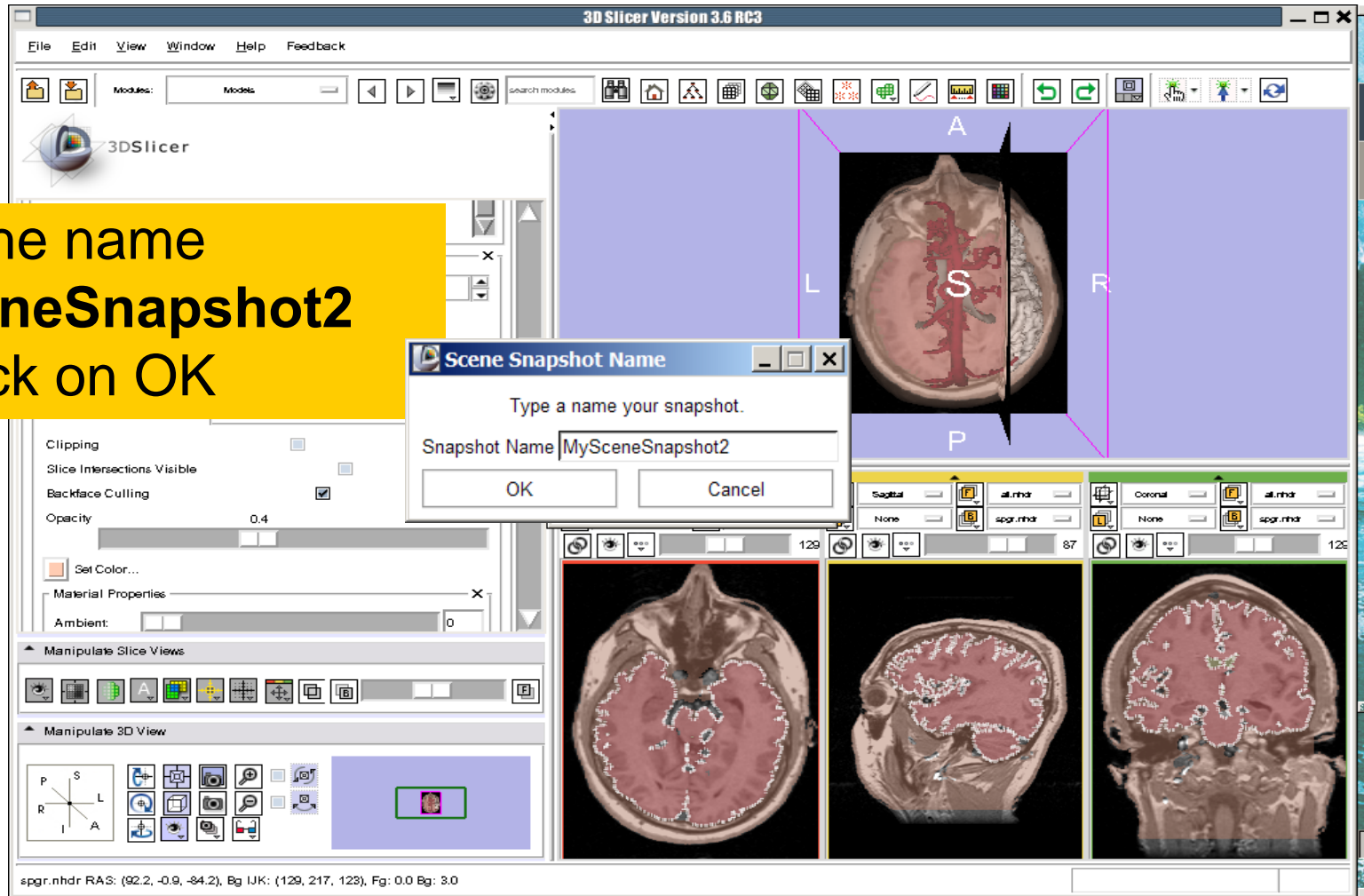


# Creating Scene Snapshots

Select a Superior view of the dataset, and click on the capture snapshot icon

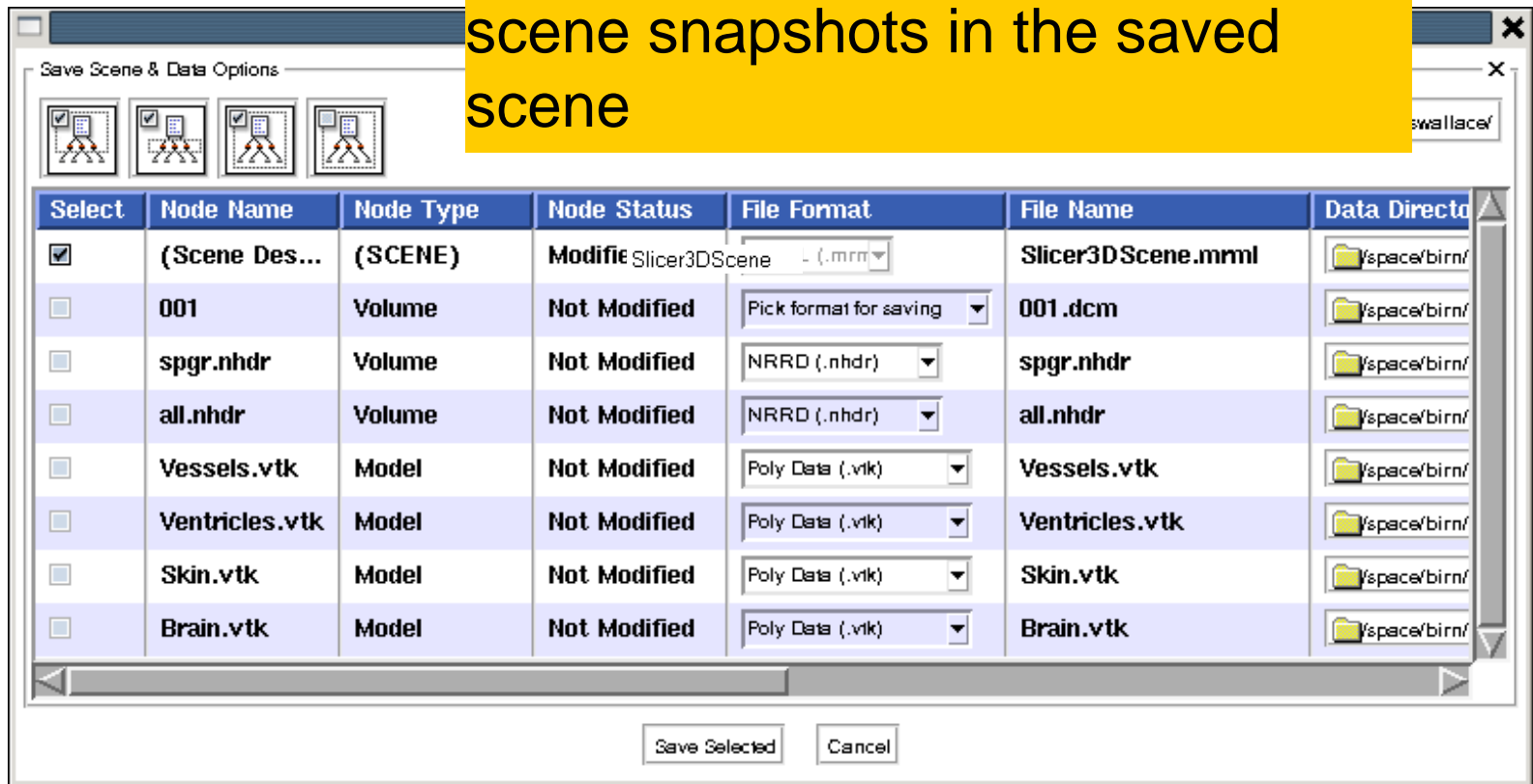


# Creating Scene Snapshots



# Creating Scene Snapshots

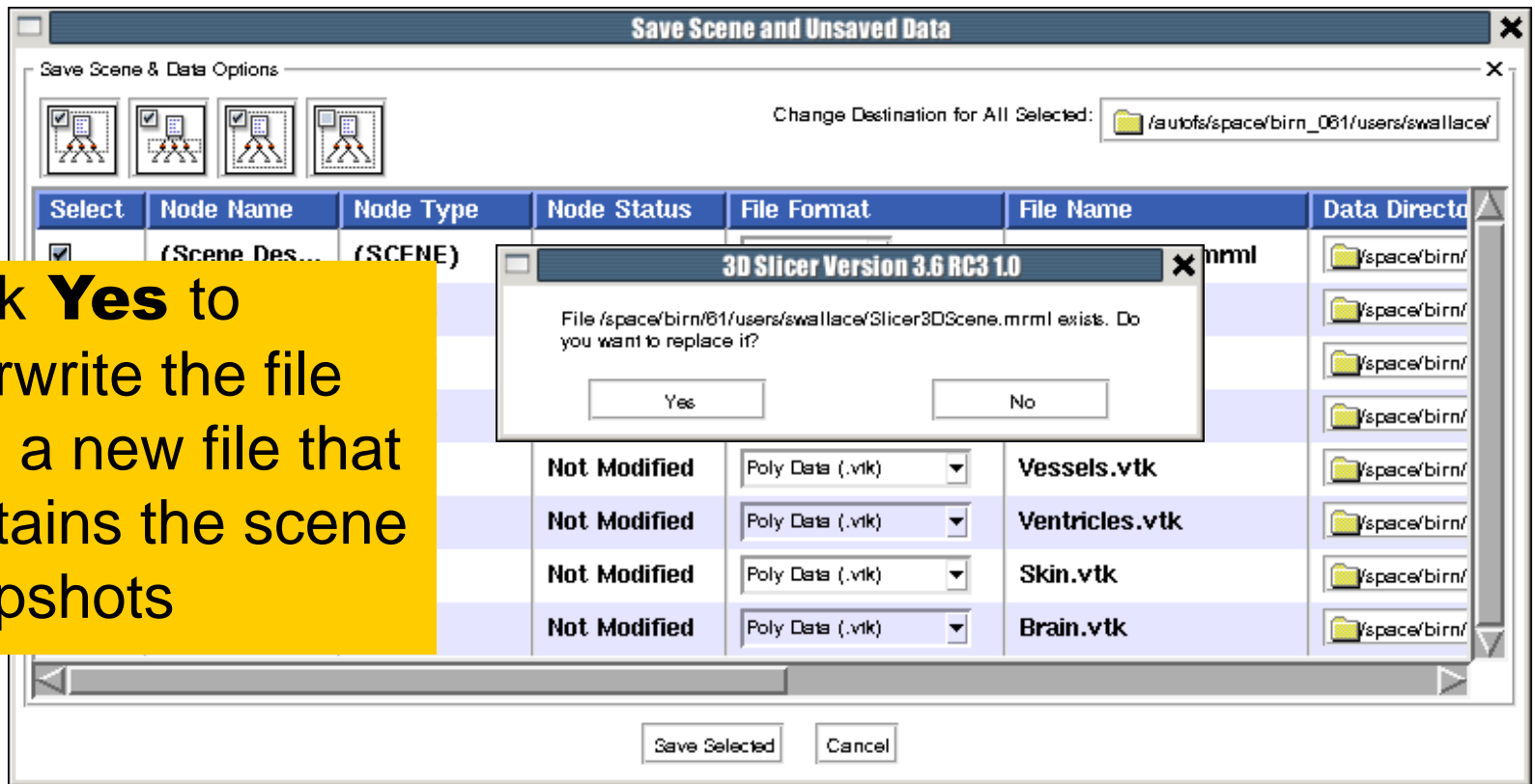
Select **File** → **Save** and click on **Save Selected** to include the two scene snapshots in the saved scene





# Creating Scene Snapshots

Click **Yes** to overwrite the file with a new file that contains the scene snapshots



Save Scene and Unsaved Data

Save Scene & Data Options

Change Destination for All Selected: /autofs/space/birn\_081/users/swallace/

Select	Node Name	Node Type	Node Status	File Format	File Name	Data Directory
<input checked="" type="checkbox"/>	(Scene Des...	(SCENE)				
			Not Modified	Poly Data (.vtk)	Vessels.vtk	/space/birn/
			Not Modified	Poly Data (.vtk)	Ventricles.vtk	/space/birn/
			Not Modified	Poly Data (.vtk)	Skin.vtk	/space/birn/
			Not Modified	Poly Data (.vtk)	Brain.vtk	/space/birn/

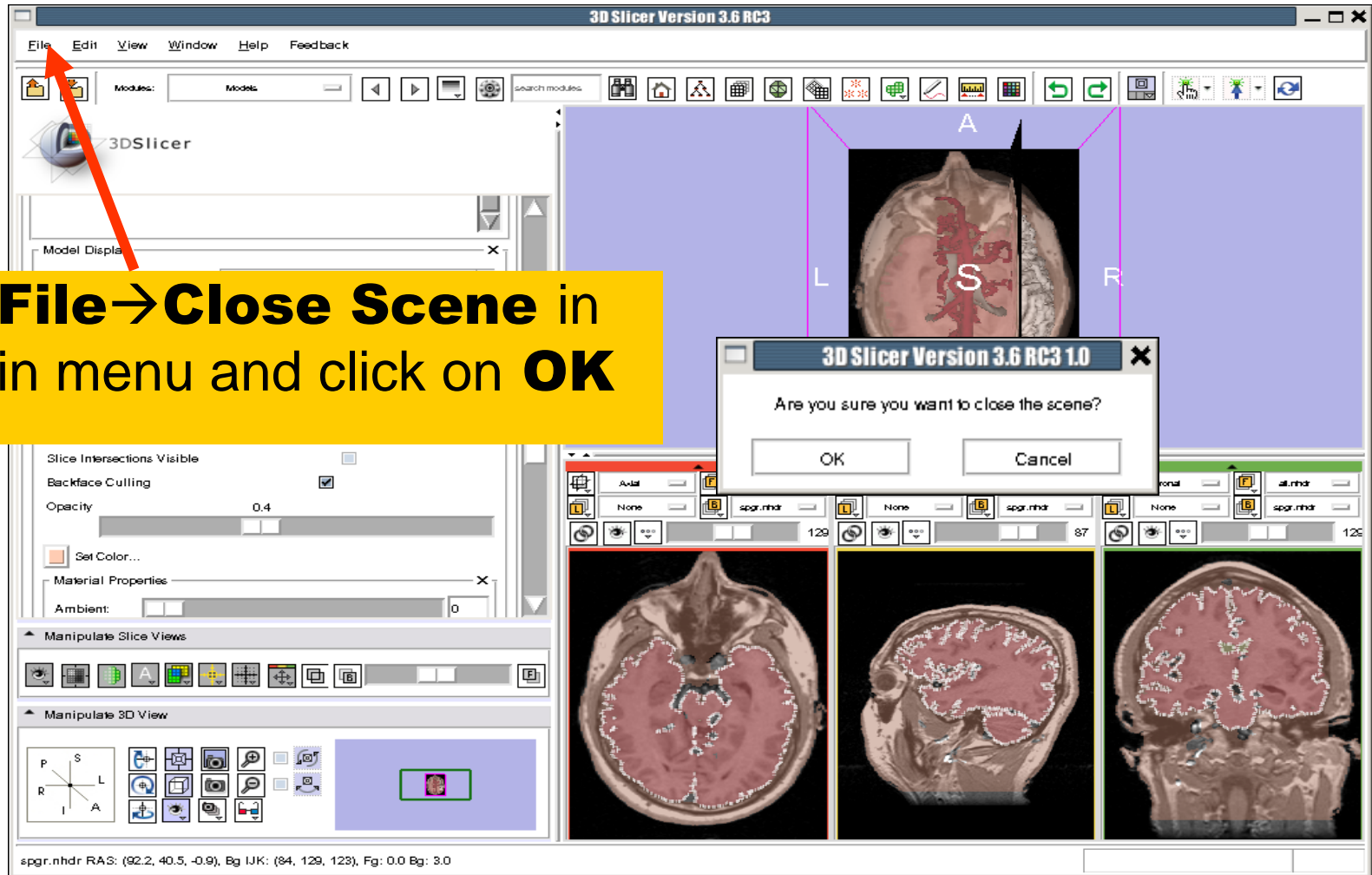
3D Slicer Version 3.6 RC3 1.0

File /space/birn/81/users/swallace/Slicer3DScene.mrml exists. Do you want to replace it?

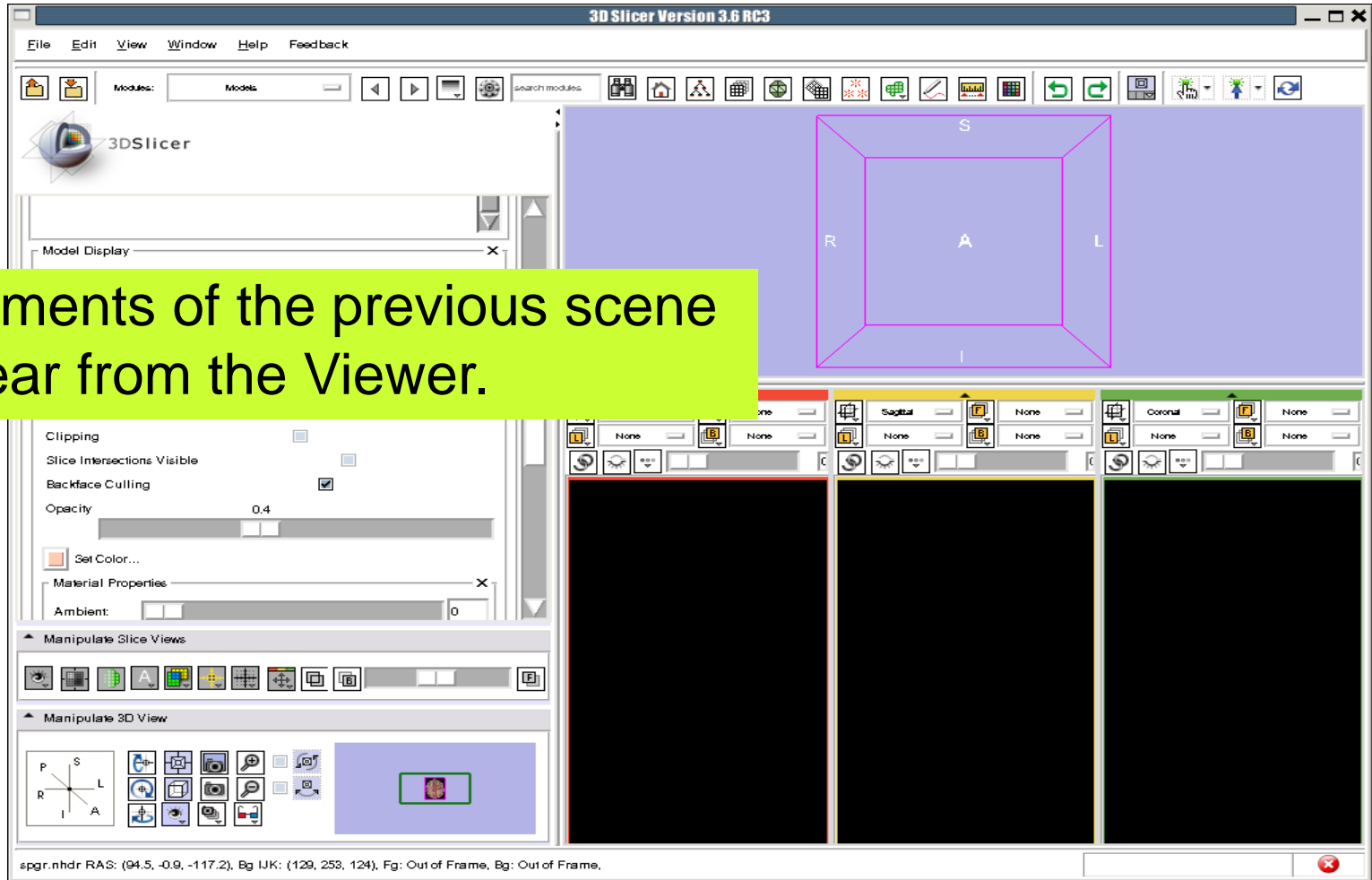
Yes No

Save Selected Cancel

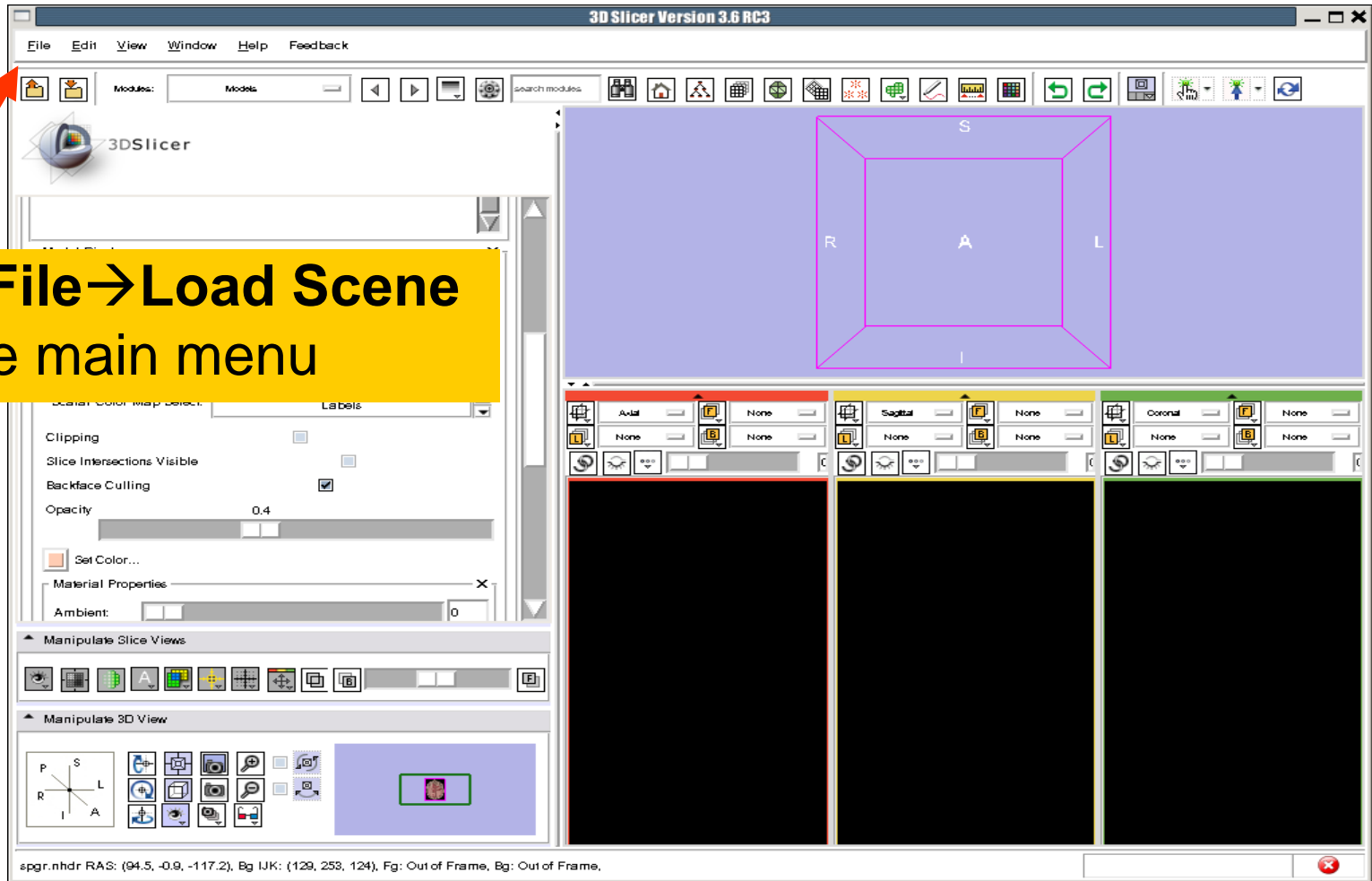
# Saving Data



# Saving Data

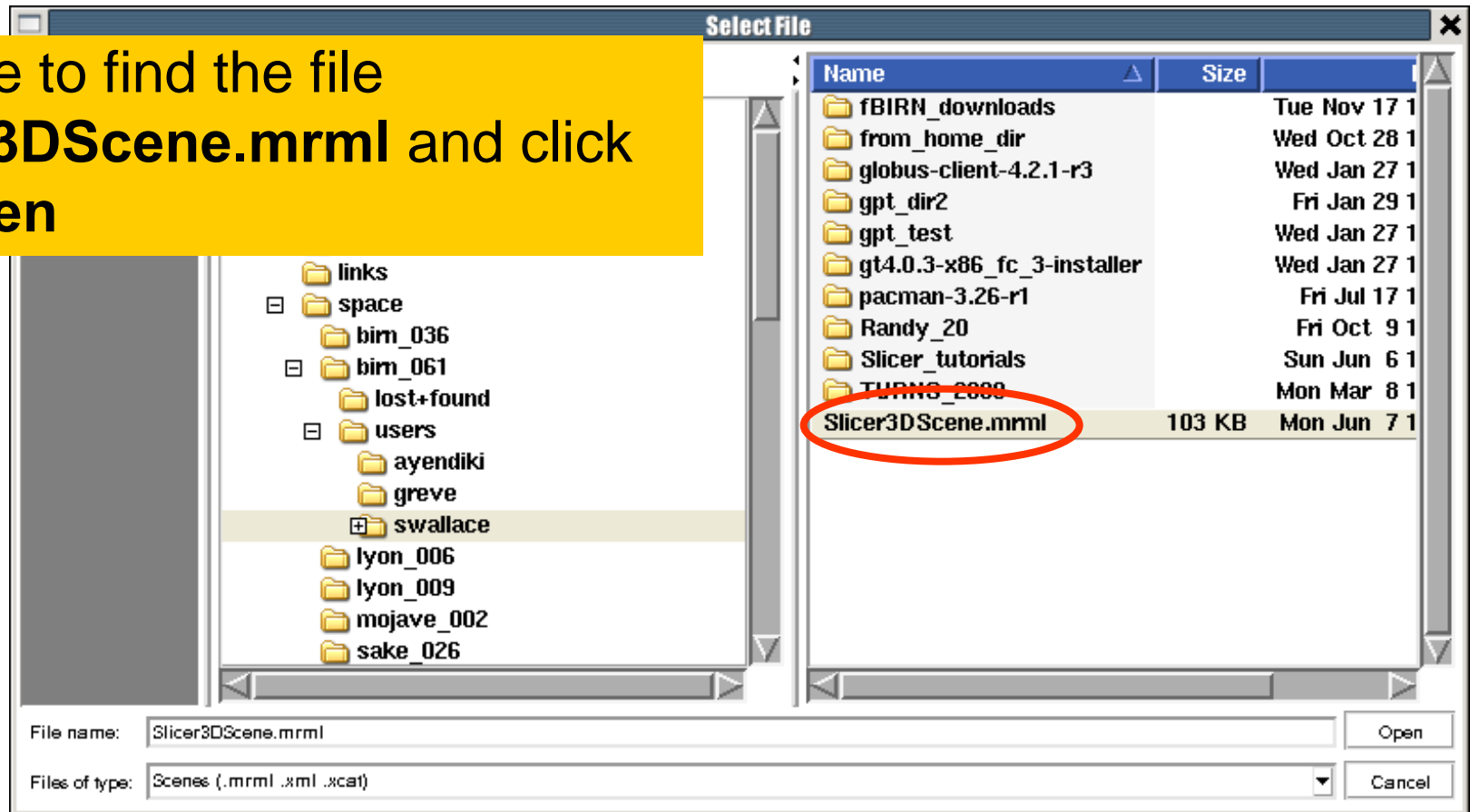


# Saving Data

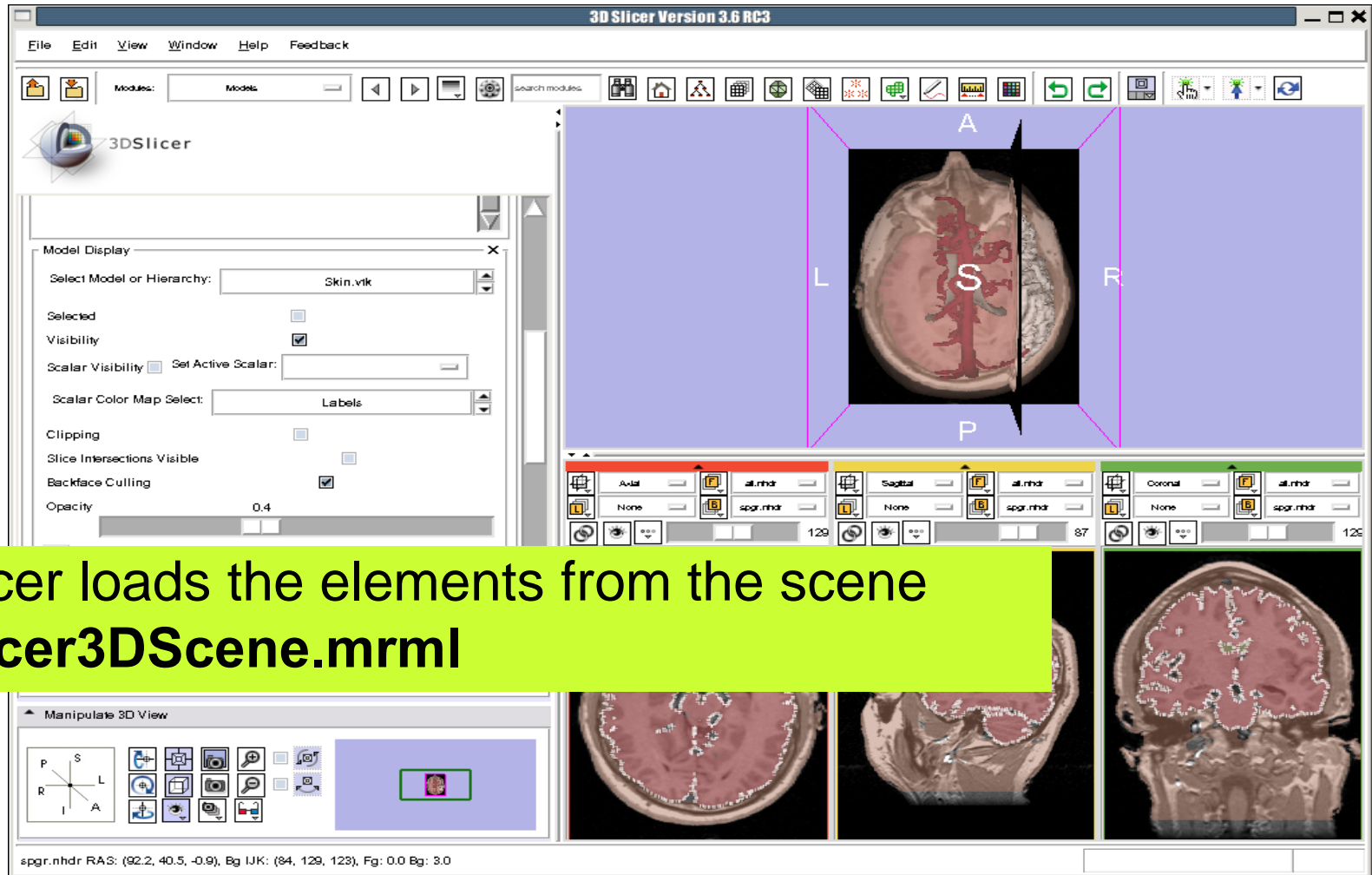


# Saving Data

Browse to find the file  
**Slicer3DScene.mrml** and click  
on **Open**



# Loading a Scene

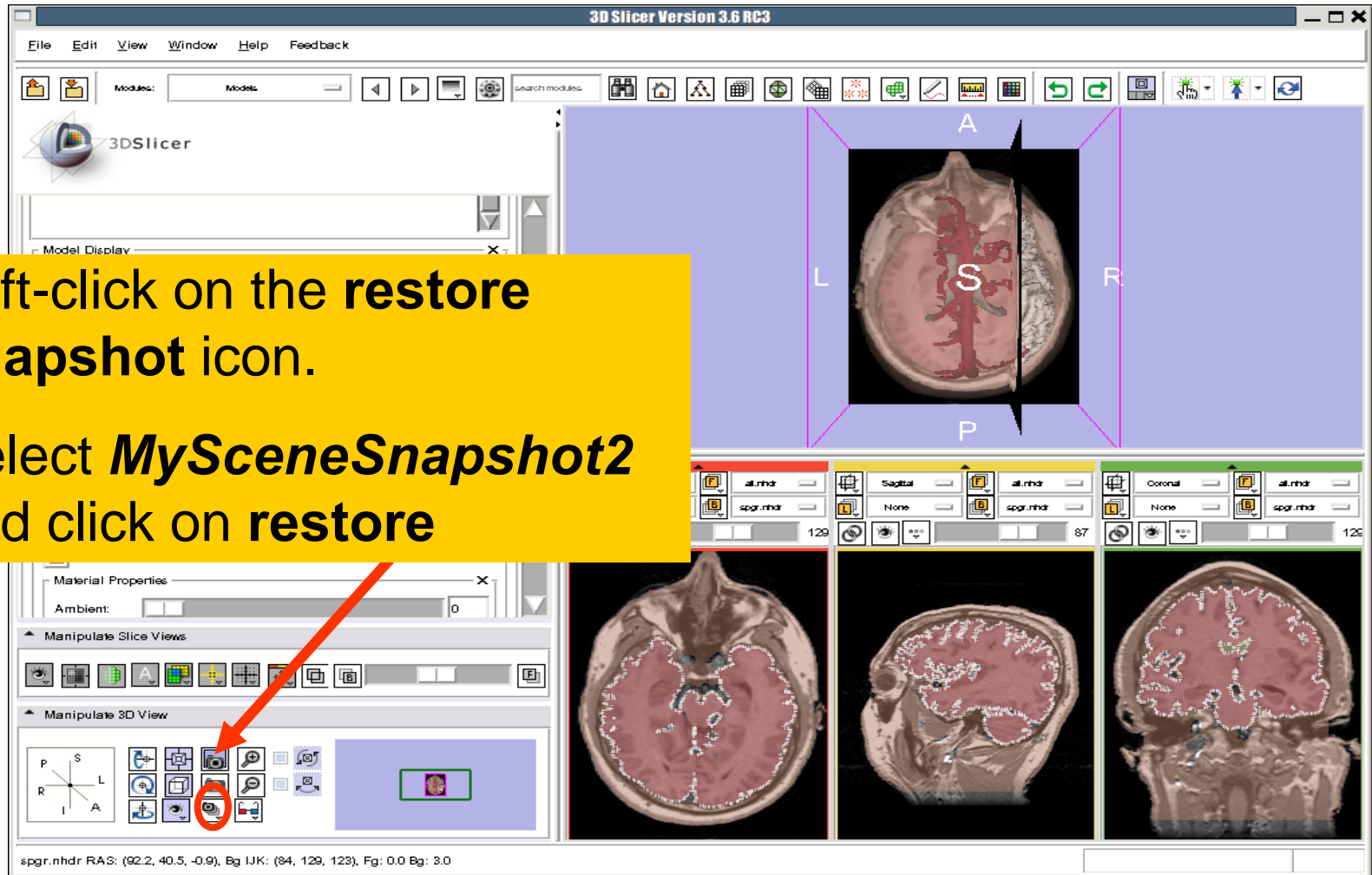


Slicer loads the elements from the scene  
**Slicer3DScene.mrml**

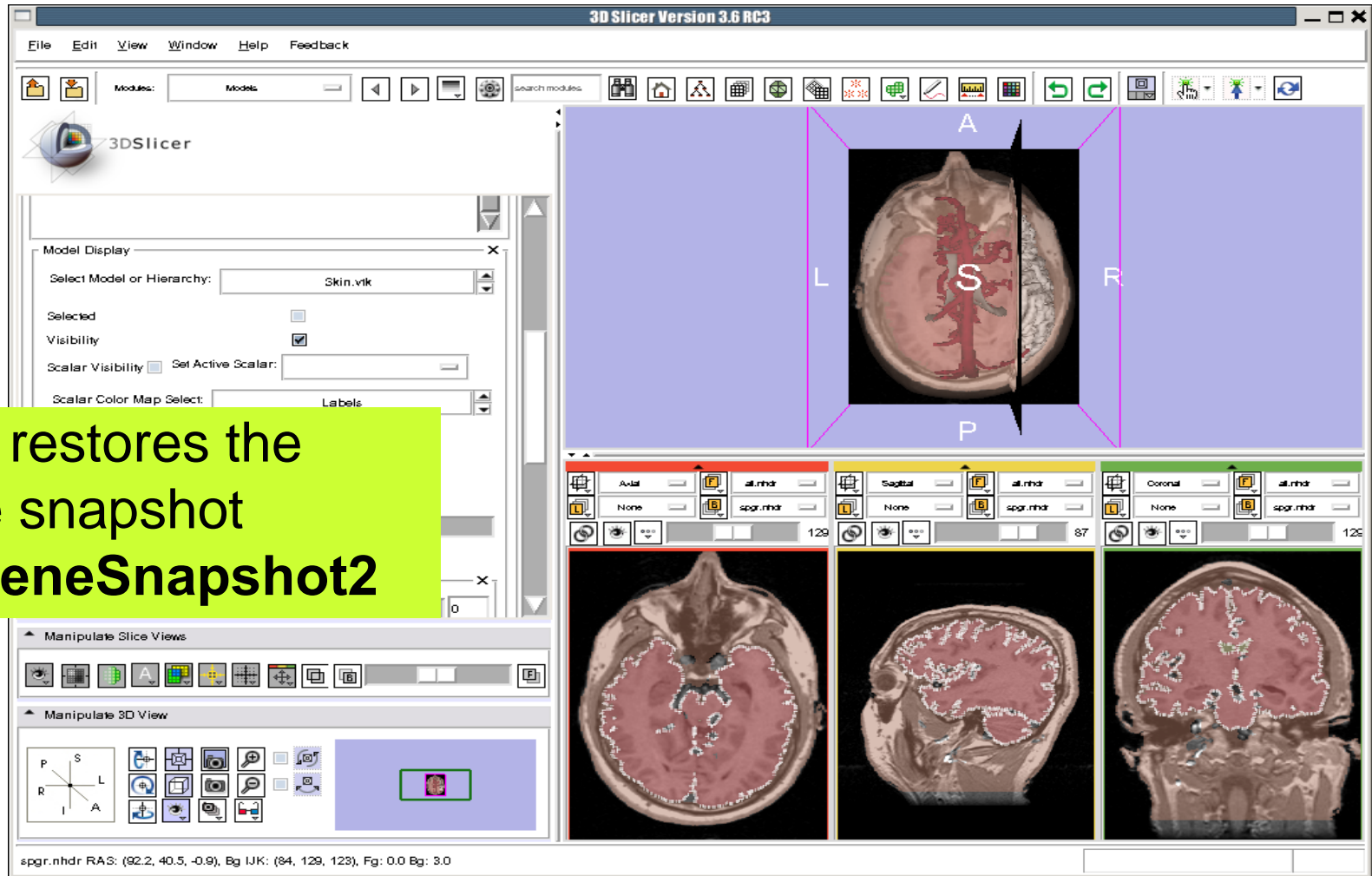
# Loading a Scene

Left-click on the **restore snapshot** icon.

Select ***MySceneSnapshot2*** and click on **restore**



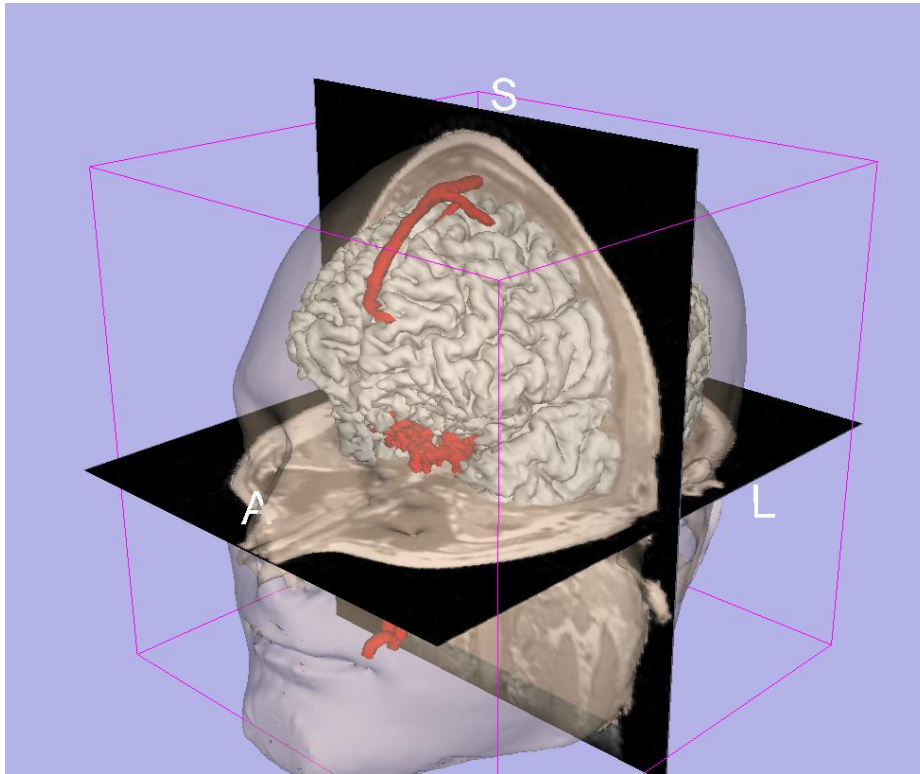
# Loading a Scene



Slicer restores the  
scene snapshot  
**MySceneSnapshot2**



# Conclusion



- 3D visualization of anatomical surface reconstructions
- 3D interaction with volumes and models
- Open-source platform



# Acknowledgments

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**National Alliance for Medical Image Computing**

NIH U54EB005149



**Neuroimage Analysis Center**

NIH P41RR013218