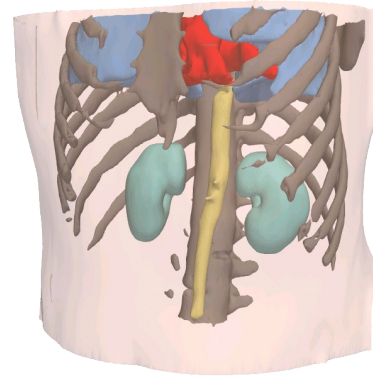
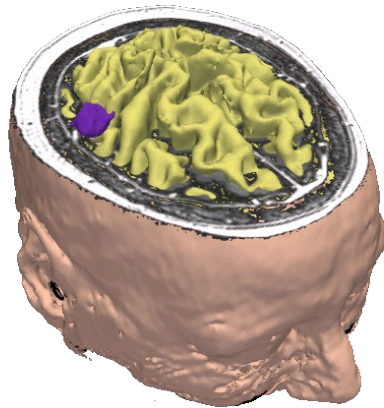




EMSegmenter Tutorial (Simple Mode)

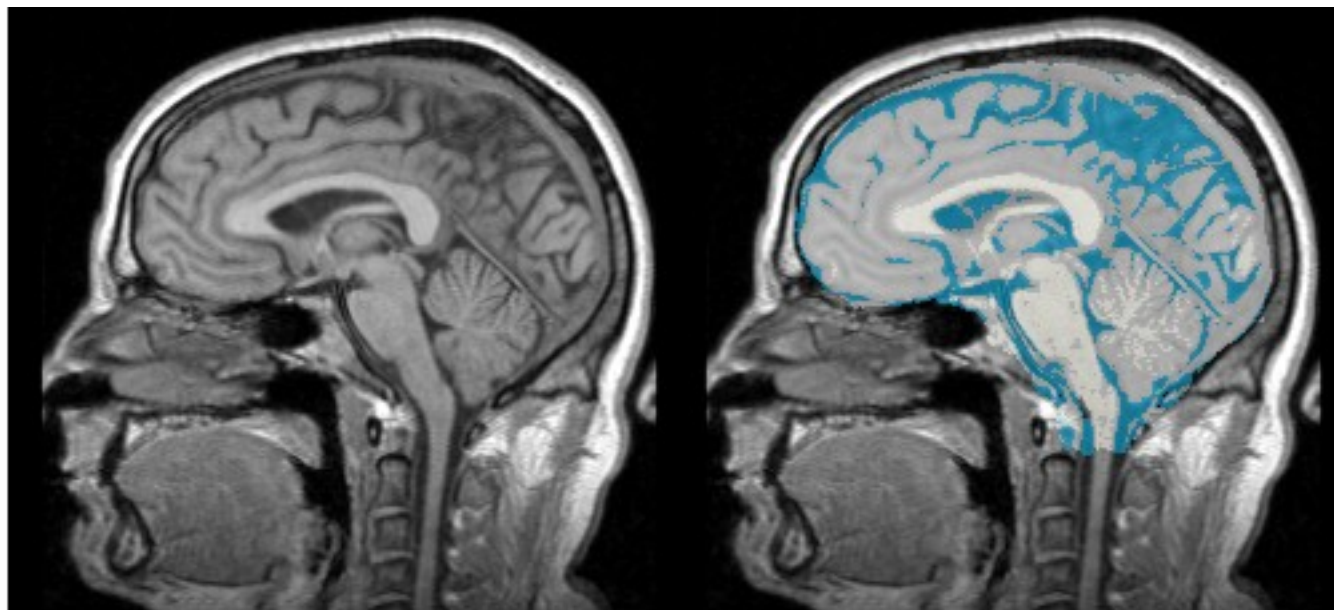


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Section of Biomedical Image Analysis
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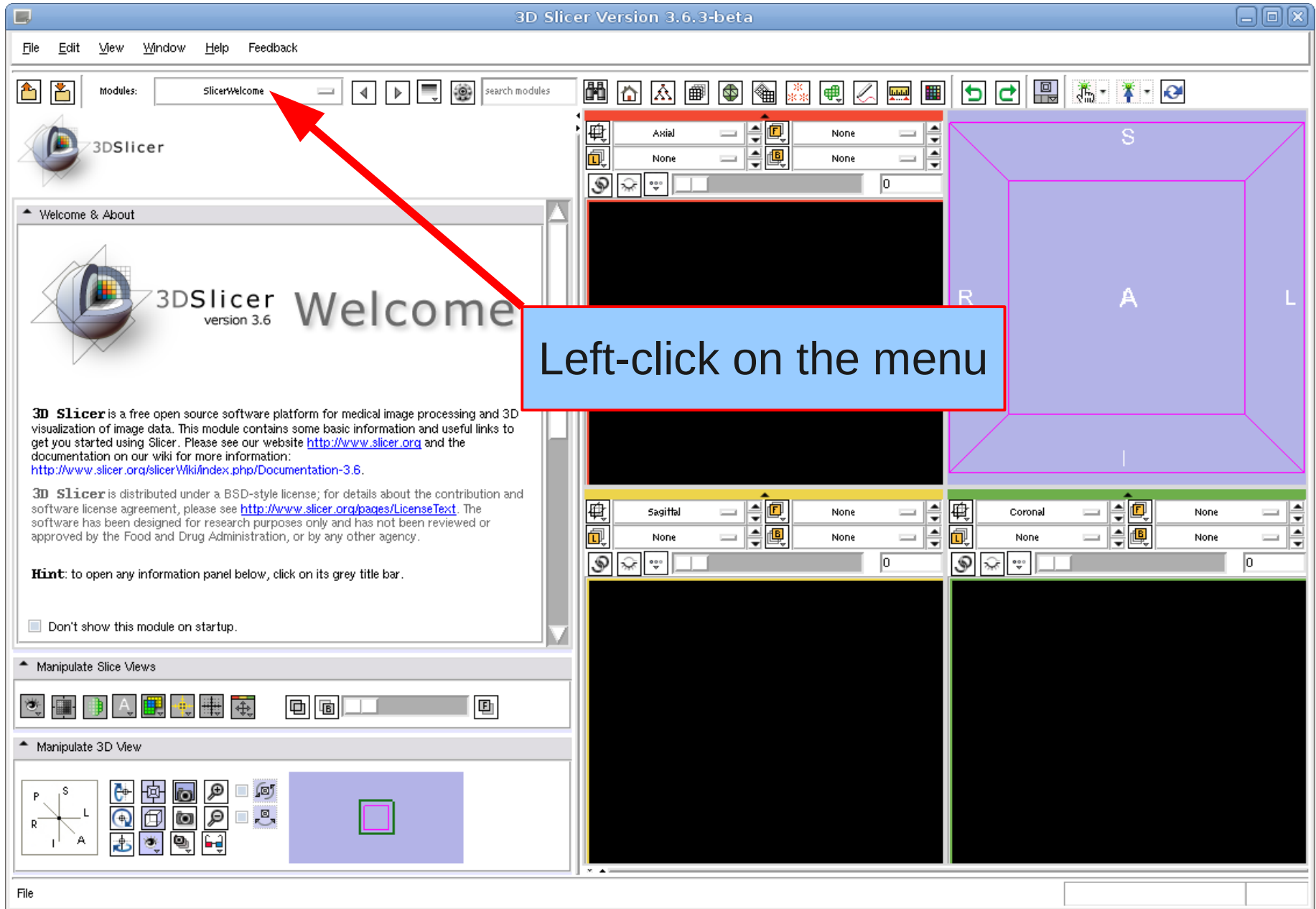
The goal of this tutorial is to apply the EMSegmenter to MRI brain scans. We will segment the clinical T1 scan shown below into **grey matter**, **white matter**, and **cerebrospinal fluid**.

The tutorial is based on Slicer 3.6.2 .



Before

After





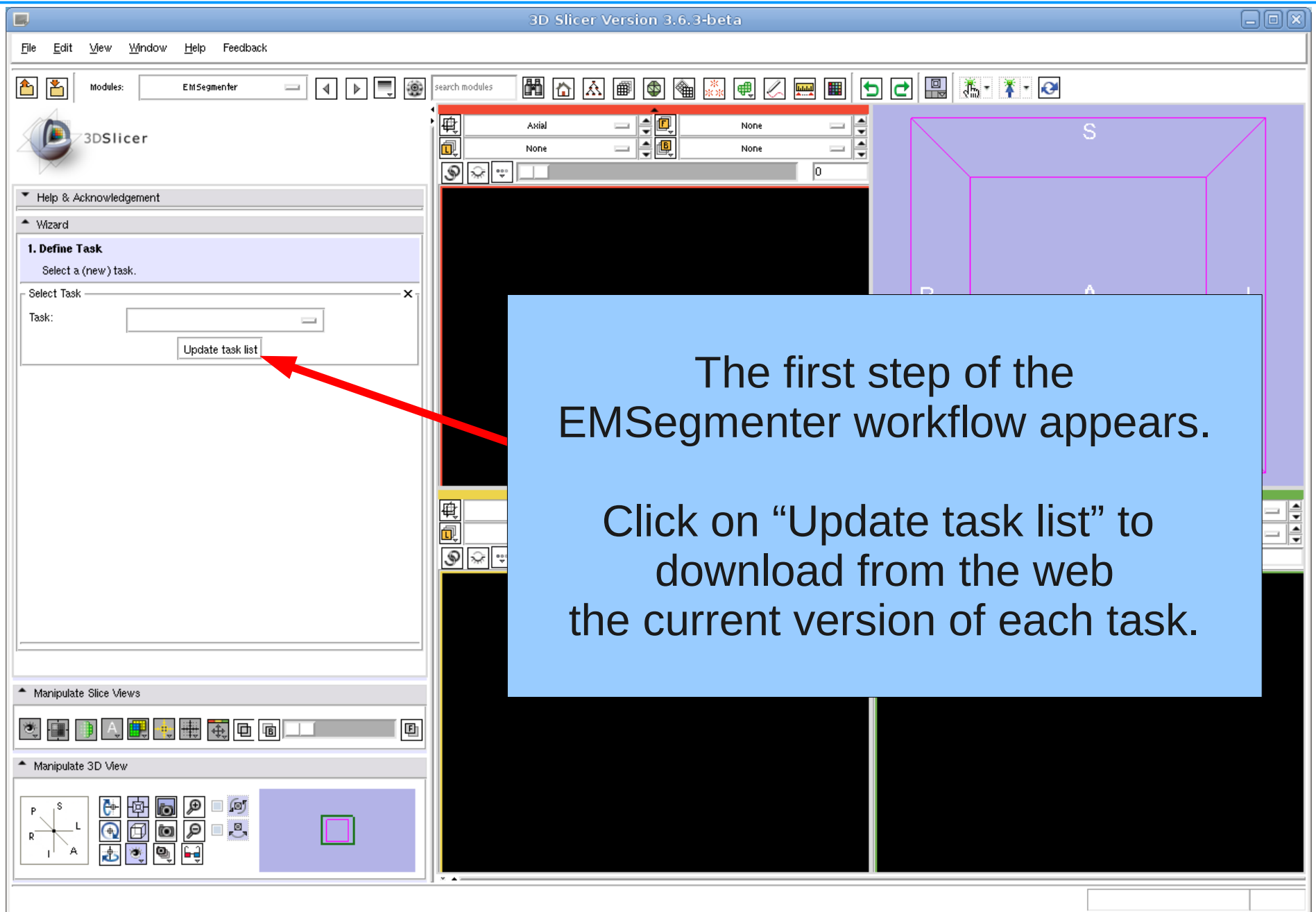
3DSlicer

Select EMSegmenter module



The screenshot shows the 3D Slicer Version 3.6.3-beta interface. On the left, the 'Module' list is expanded to 'Segmentation', and the 'EMSegmenter' module is highlighted. A red arrow points from a blue callout box to this module. The main window displays three orthogonal slice views: Axial (top), Sagittal (middle), and Coronal (right). The EMSegmenter module is also visible in the bottom status bar.

Select Segmentation
→ EMSegmenter



3D Slicer Version 3.6.3-beta

File Edit View Window Help Feedback

Modules: EM Segmenter

search modules

3DSlicer

Help & Acknowledgement

Wizard

1. Define Task
Select a (new) task.

Select Task

Task: [Dropdown Menu]

Update task list

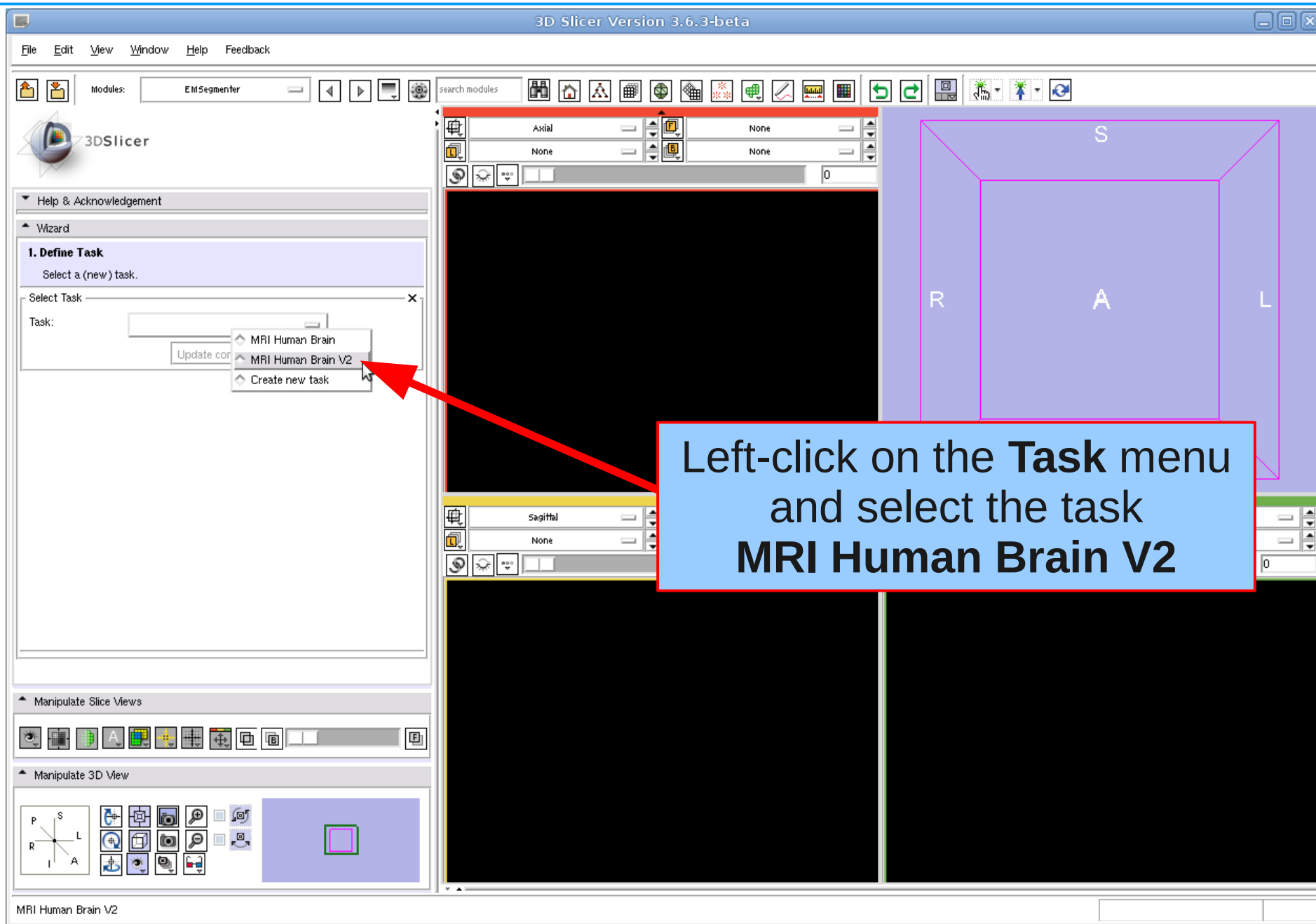
Manipulate Slice Views

Manipulate 3D View

P S
R L
I A

The first step of the EM Segmenter workflow appears.

Click on “Update task list” to download from the web the current version of each task.



3D Slicer Version 3.6.3-beta

File Edit View Window Help Feedback

Modules: EM Segmenter

search modules

3DSlicer

Help & Acknowledgement

Wizard

1. Define Task

Select a (new) task.

Select Task

Task:

- MRI Human Brain
- MRI Human Brain V2**
- Create new task

Update color

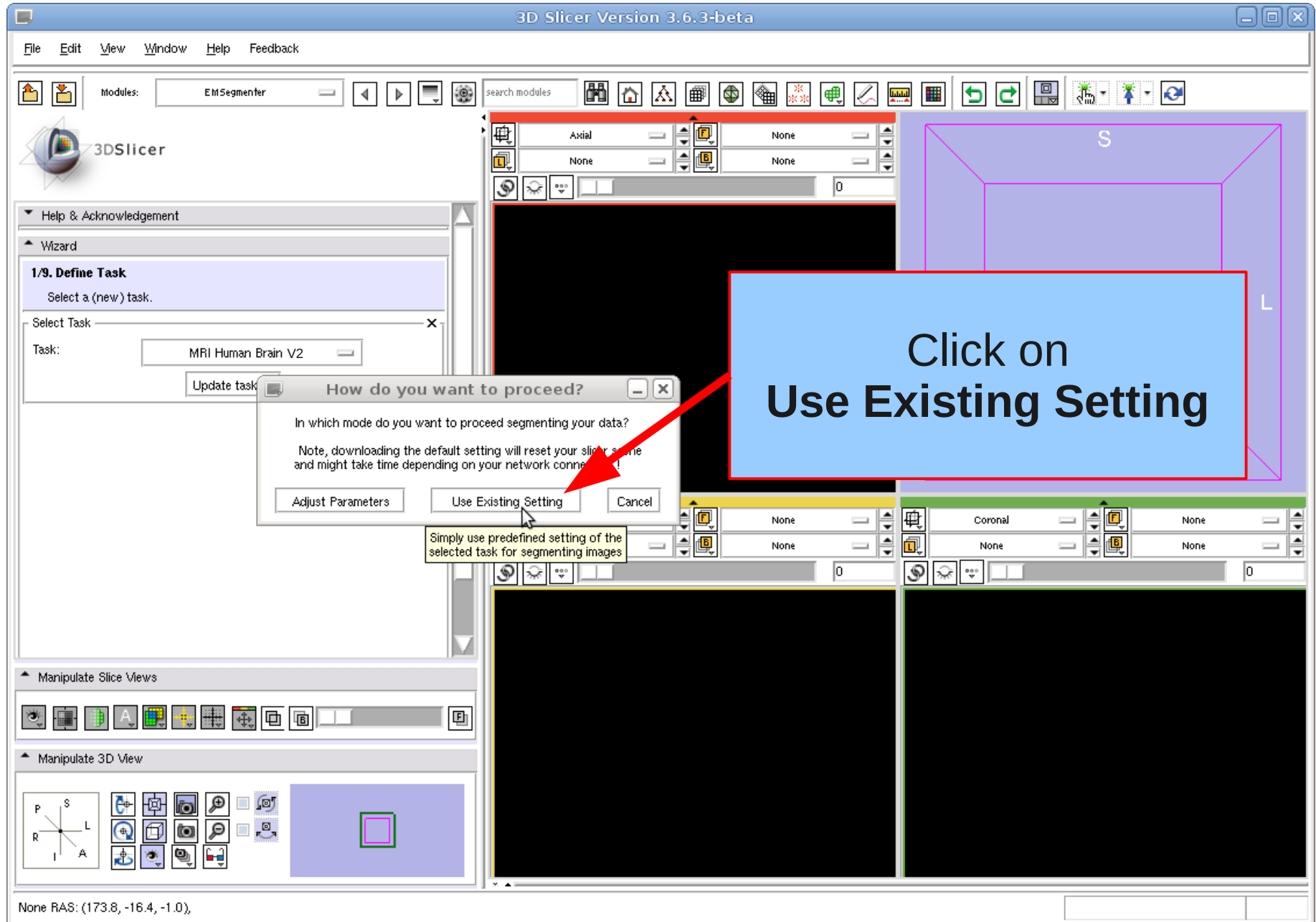
Manipulate Slice Views

Manipulate 3D View

MRI Human Brain V2

Left-click on the **Task** menu and select the task **MRI Human Brain V2**

Select Task



3D Slicer Version 3.6.3-beta

File Edit View Window Help Feedback

Modules: EM Segmenter

search modules

3DSlicer

Help & Acknowledgement

Wizard

1/9. Define Task

Select a (new) task.

Select Task

Task: MRI Human Brain V2

Update task

How do you want to proceed?

In which mode do you want to proceed segmenting your data?

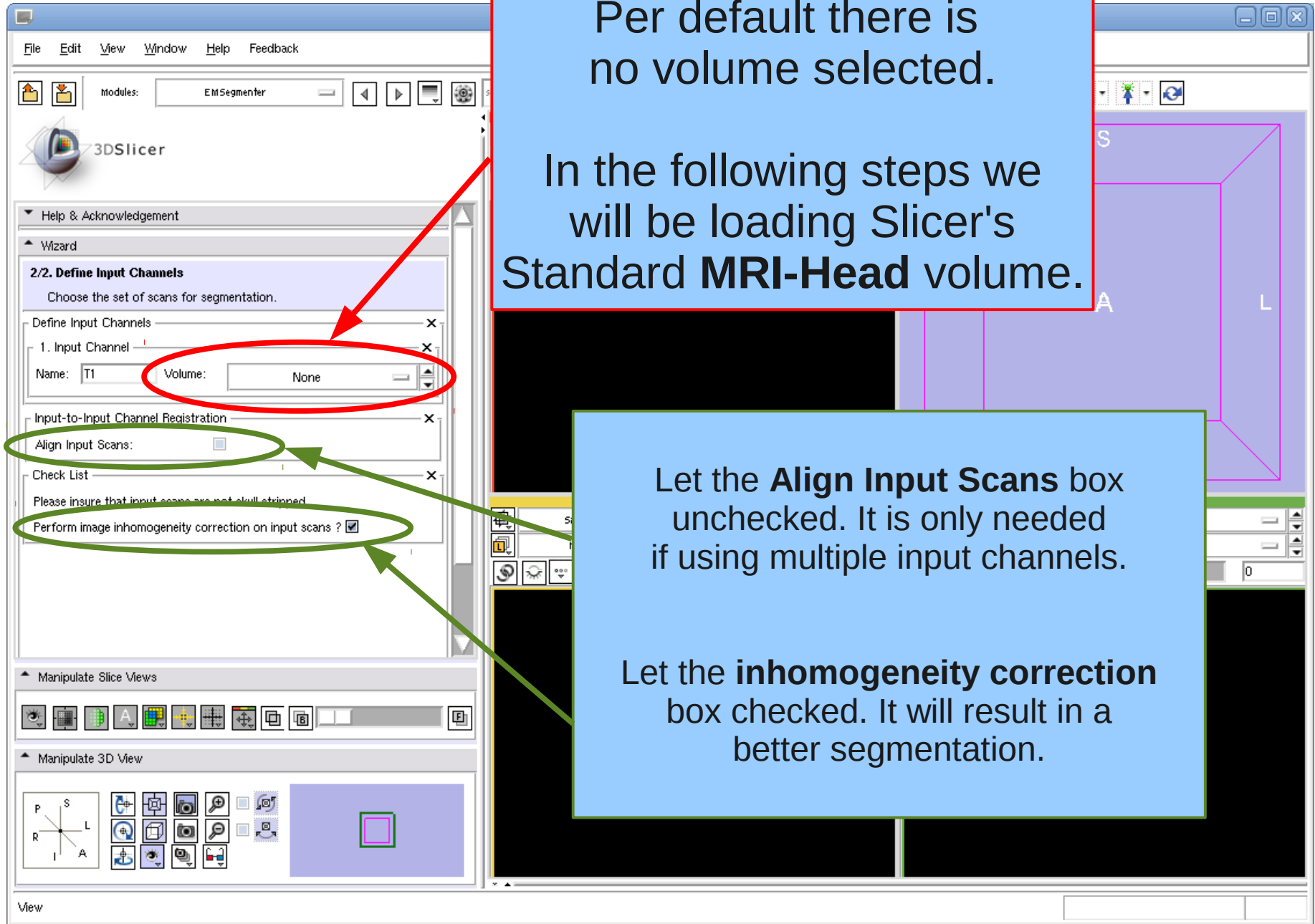
Note, downloading the default setting will reset your slicer scene and might take time depending on your network connection!

Adjust Parameters Use Existing Setting Cancel

Simply use predefined setting of the selected task for segmenting images

Click on Use Existing Setting

None RAS: (173.8, -16.4, -1.0)



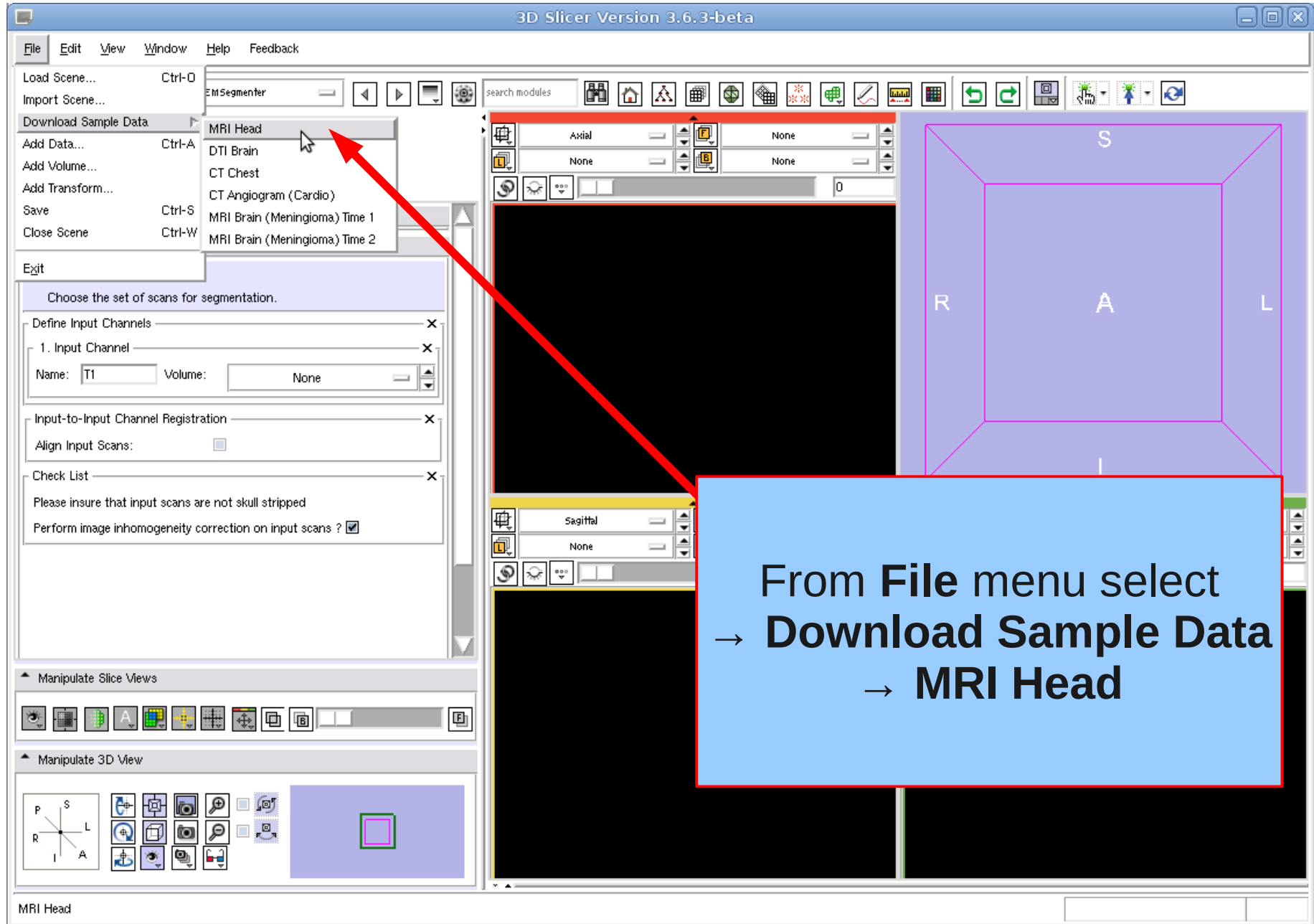
Per default there is no volume selected.

In the following steps we will be loading Slicer's Standard **MRI-Head** volume.

Let the **Align Input Scans** box unchecked. It is only needed if using multiple input channels.

Let the **inhomogeneity correction** box checked. It will result in a better segmentation.

Load subject volume



3D Slicer Version 3.6.3-beta

File Edit View Window Help Feedback

Load Scene... Ctrl-O
Import Scene...
Download Sample Data
Add Data... Ctrl-A
Add Volume...
Add Transform...
Save Ctrl-S
Close Scene Ctrl-W
Exit

EMSegmenter

search modules

Axial None
None None

S
R A L
I

Sagittal
None

Define Input Channels
1. Input Channel
Name: T1 Volume: None

Input-to-Input Channel Registration
Align Input Scans:

Check List
Please insure that input scans are not skull stripped
Perform image inhomogeneity correction on input scans ?

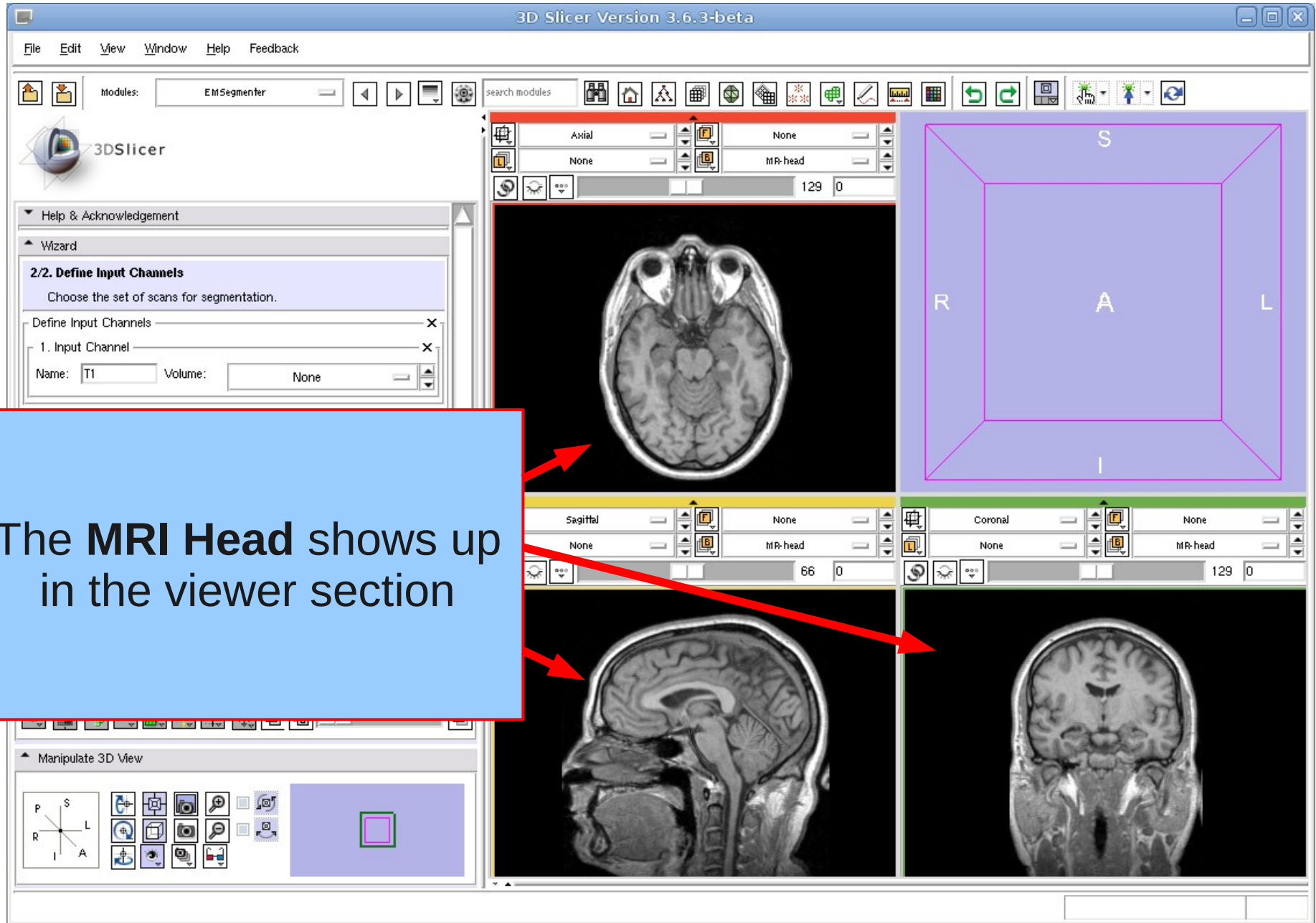
Manipulate Slice Views

Manipulate 3D View

MRI Head

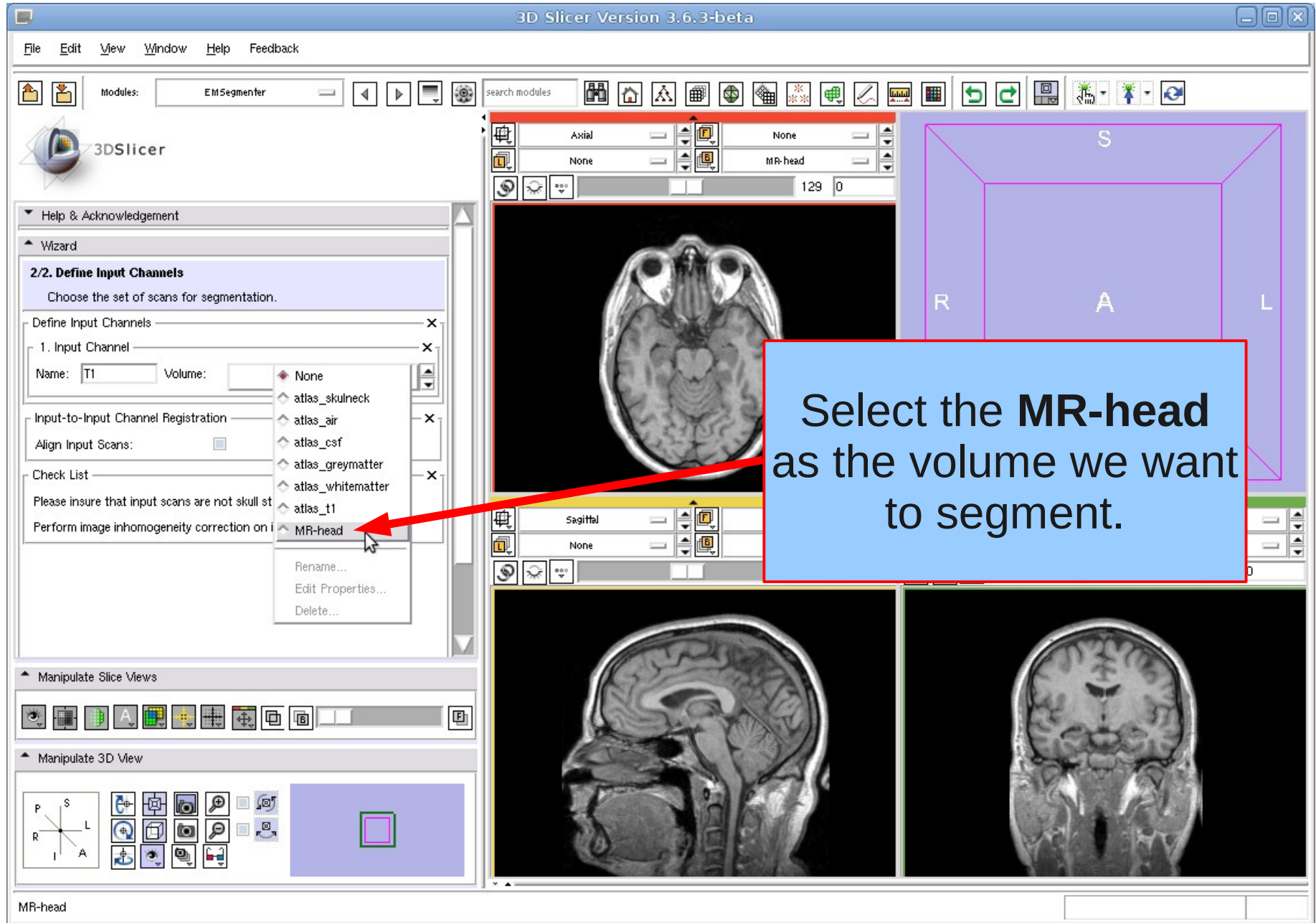
From **File** menu select
→ **Download Sample Data**
→ **MRI Head**

Display MRI Head



The MRI Head shows up in the viewer section

Define Input Channel



3D Slicer Version 3.6.3-beta

File Edit View Window Help Feedback

Modules: EM Segmenter

3DSlicer

Help & Acknowledgement

Wizard

2/2. Define Input Channels
Choose the set of scans for segmentation.

Define Input Channels

1. Input Channel

Name: T1 Volume: **MR-head**

- None
- atlas_skulneck
- atlas_air
- atlas_csf
- atlas_greymatter
- atlas_whitematter
- atlas_t1
- MR-head**

Input-to-Input Channel Registration

Align Input Scans:

Check List

Please insure that input scans are not skull st

Perform image inhomogeneity correction on i

Rename...
Edit Properties...
Delete...

Manipulate Slice Views

Manipulate 3D View

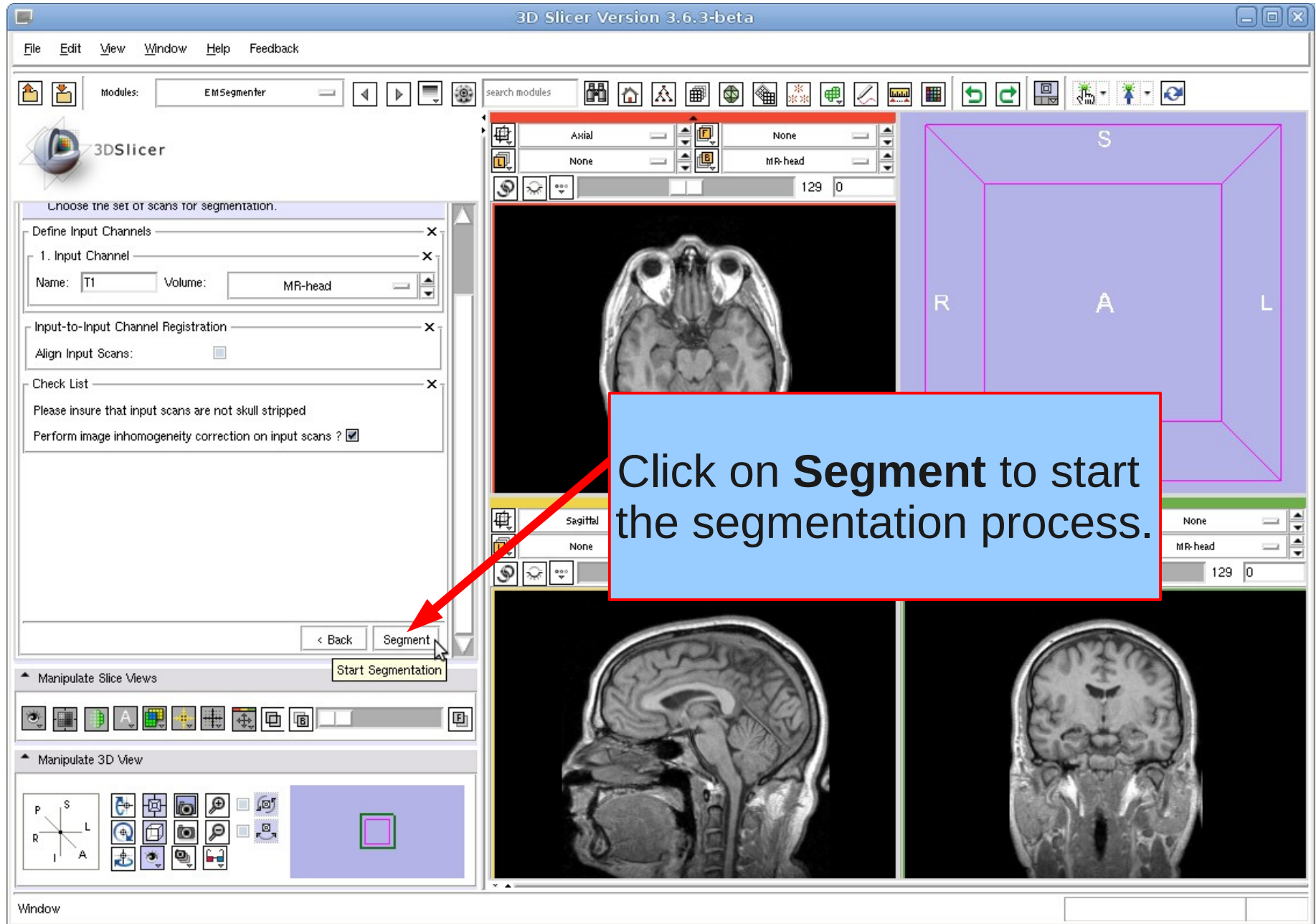
MR-head

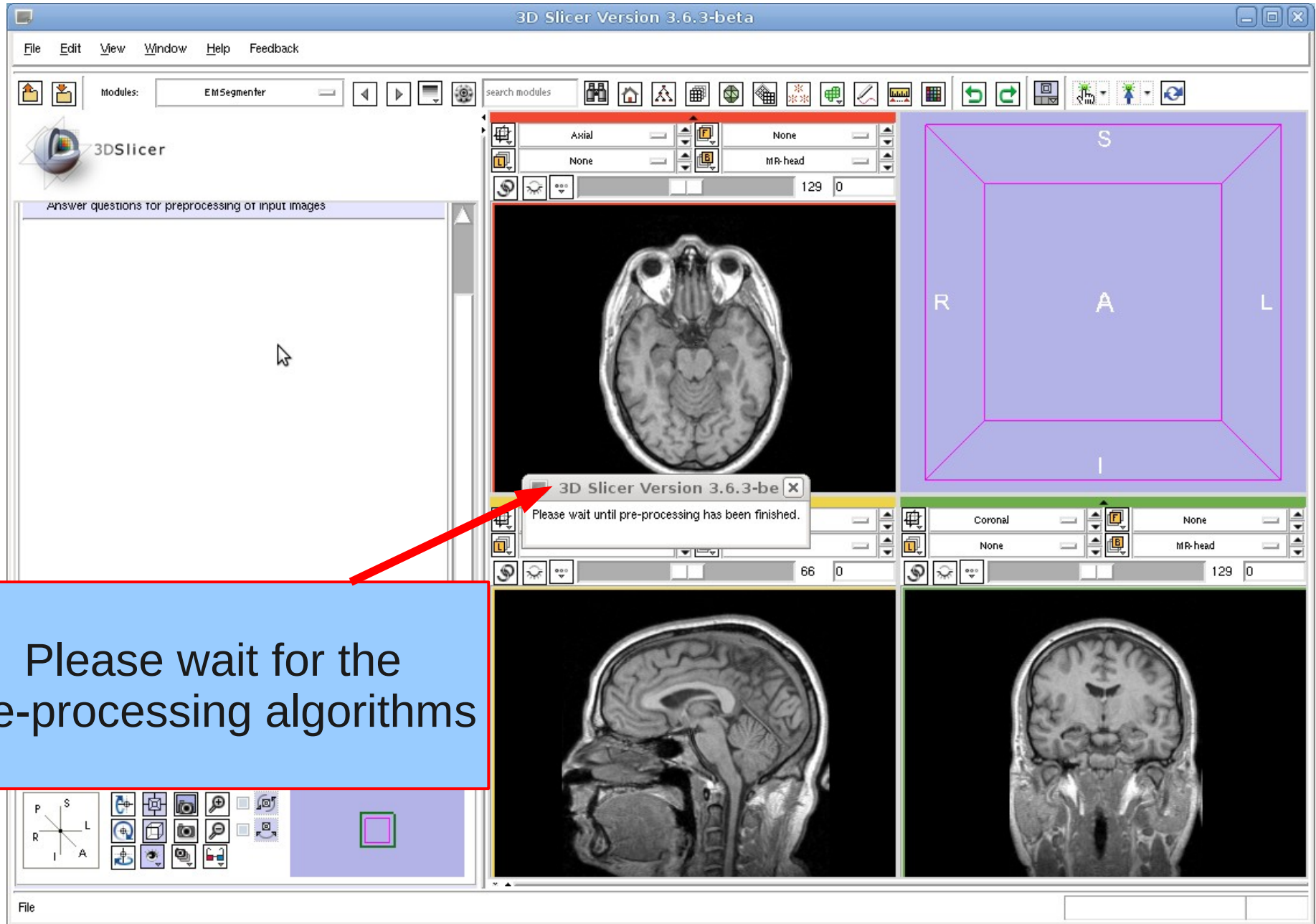
Axial None
 None MR-head
 129 D
 Sagittal None

S
R A L

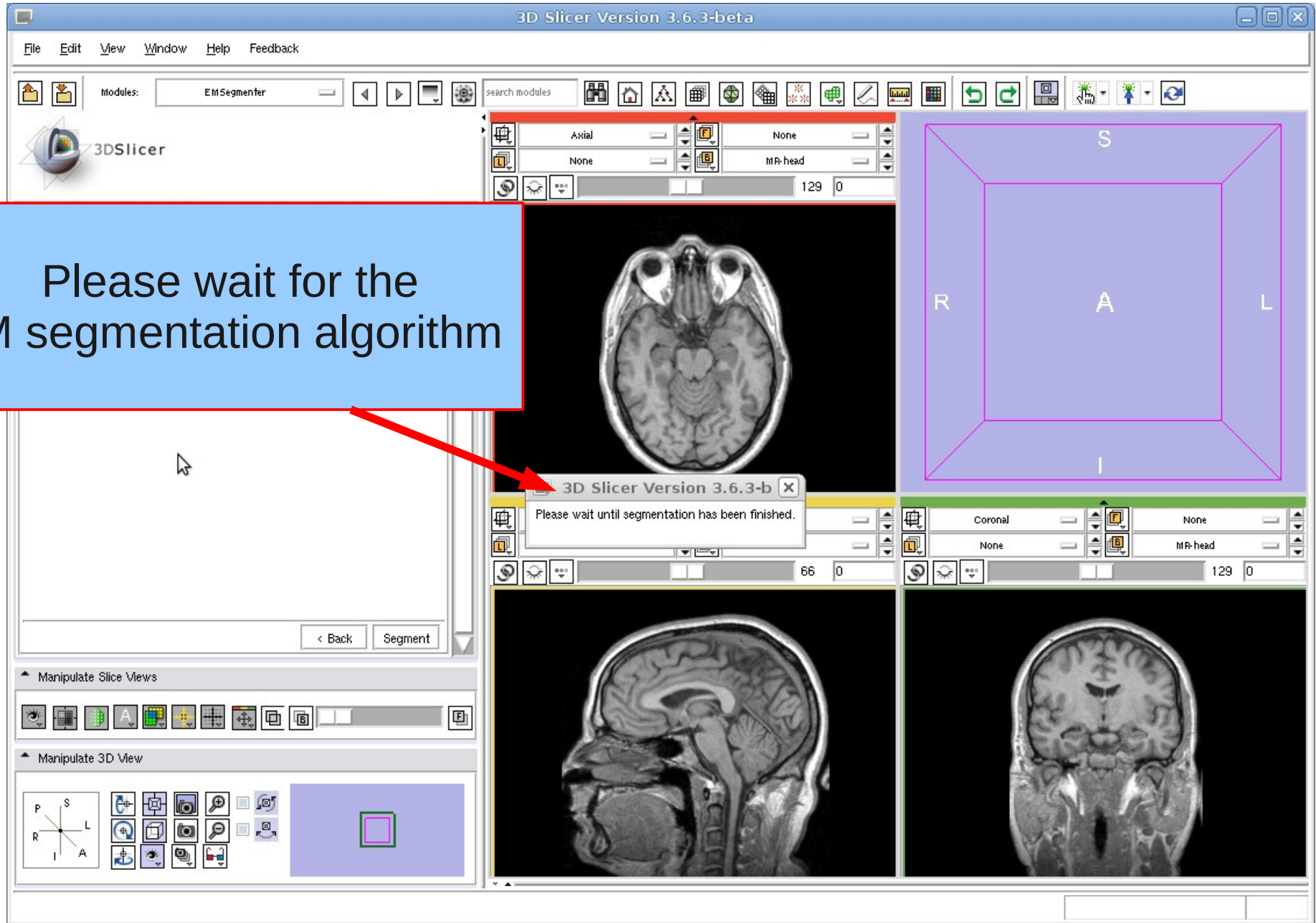
Select the **MR-head** as the volume we want to segment.

Start Segmentation

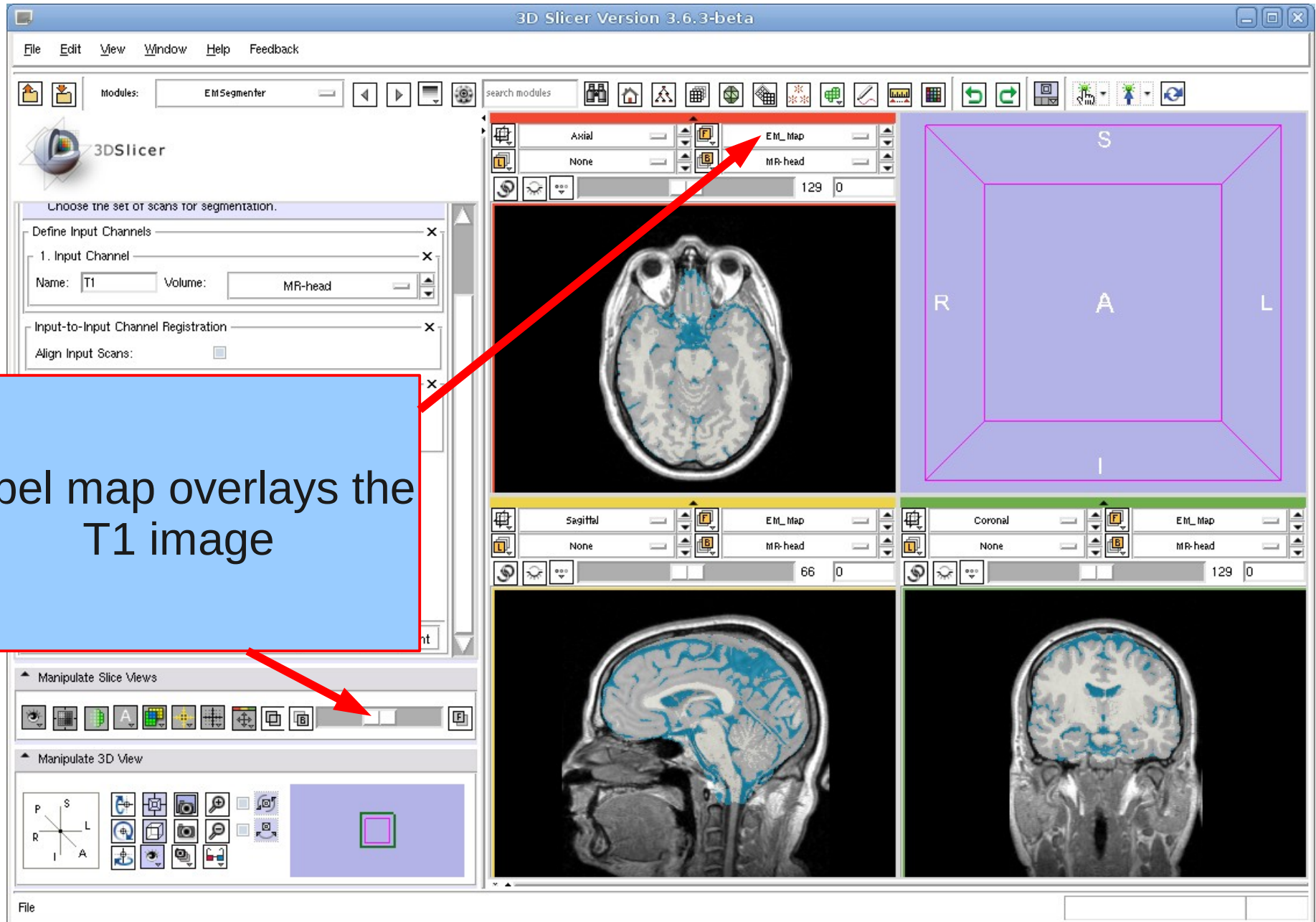




Please wait for the pre-processing algorithms



Result: Label map



Label map overlays the T1 image



Further Info & Acknowledgments



EMSegmenter Wiki Page:

<http://www.slicer.org/slicerWiki/index.php/EMSegmenter-Overview>

The EMSegmenter technology behind was reported in:

K.M. Pohl et. A hierarchical algorithm for MR brain image parcellation. IEEE Transactions on Medical Imaging, 26(9), pp 1201-1212, 2007.

We thank the following institutions for their support:

