

Brain Explorer

BRAIN EXPLORER® 2 3-D VIEWER

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The Brain Explorer 2 software is a desktop application for viewing human neuroanatomy and the Allen Human Brain Atlas microarray gene expression data in 3-D in the framework of the Magnetic Resonance Images of the sampled brains.

System Requirements

Windows Minimum Configuration

Operating System: Microsoft Windows 7
CPU: Intel Core Duo or AMD 1.8GHz
System Memory: 1GB
Graphics Card: Hardware 3D OpenGL accelerated AGP or PCI Express with 64MB RAM
Screen: 1024x768, 32-bit true color
Hard Disk: 200MB free space

Note: Brain Explorer is known to work with the following video chipsets: nVidia GeForce 9400/9600, nVidia Quadro FX 1800/3800/5600, AMD Radeon 9600, AMD Radeon HD 3200/4550, Intel Q35/Q45 Express



Important

Please install the latest drivers for your video card for best compatibility and performance.

Mac Minimum Configuration

Operating System: OS X 10.6.8
CPU: Intel 1.8GHz
System Memory: 1GB
Graphics Card: 3D-capable with 64MB RAM
Screen: 1024x768, 32-bit millions of colors
Hard Disk: 200MB free space



Important

Please install the latest system updates from Apple to ensure you have the latest video card drivers.

Installation

Windows

For the best performance, please check with your video card vendor for the latest available drivers before using Brain Explorer. The Windows version of Brain Explorer is available [here](#). Double-click the downloaded BrainExplorer2.msi file and follow the prompts.

Mac

The Mac version of Brain Explorer is available [here](#). Double-click the downloaded zip file to unpack Brain Explorer.

Installing Atlases

A one-time download containing anatomy files is needed following installation of the Brain Explorer application. The first time you open Brain Explorer, you will be asked to choose to download files for the Mouse Brain, Developing Mouse Brain and Human Brain atlases. Click on the atlases you would like to use and then click the Install button.

To download missing atlases on the PC, go to the Help menu and select Download Atlases. On the Mac, the command is in the Brain Explorer 2 menu.

Getting Updates

Brain Explorer will inform you when updates to the Brain Explorer application itself or its atlases are available. New data may not be available for viewing until you install the required updates.

Viewing Gene Expression

To load gene expression data into Brain Explorer: go to the Allen Human Brain Atlas and perform a [gene search](#). You can click on a gene category in the tag cloud or type in a gene in the search box. Your search returns a heat map showing gene expression profiles over different structures in the brain. Click on a cell in the heat map - this selects a sample in your probe of interest. To see the gene expression for the probe you selected in 3D click on the Brain Explorer link to be taken to the Brain Explorer with the sample automatically highlighted.



When the Brain Explorer 3-D Viewer opens, you will be taken to a screen that displays the [Image Viewer](#), the [Structure Ontology Viewer](#), and the [Gene List](#).

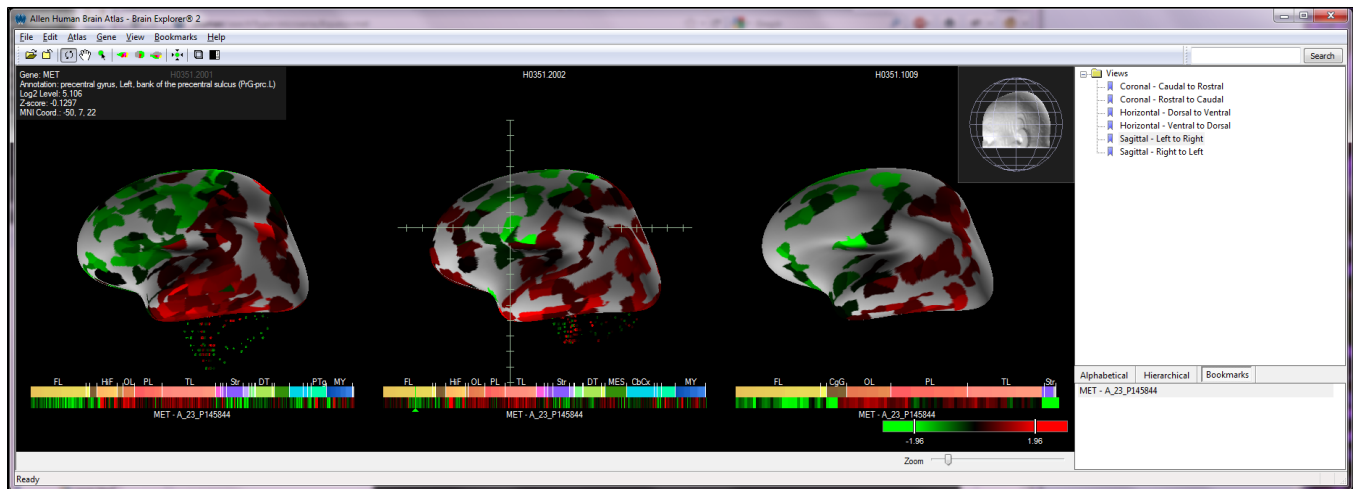



Image Viewer

The Image Viewer will automatically show the 3-D expression representations of your gene of interest on every sampled brain. Cortical gene expression is overlaid on an inflated white matter surface for each donor brain, with spots under the cortical surface representing gene expression in the subcortical regions of the brain. Under each representative brain is the heat map for the probe you selected. Clicking on that heat map will pinpoint the area in the brain from which the sample was taken.

The gene expression colors correspond to the settings in the Atlas with which you were viewing the original heat map. To change the gene expression representation, click on the "Gene" tab in the top left hand corner of your screen and choose either Z-score or raw colors.

A compass in the right hand corner of the image viewer depicted by a stylized head can be used to rotate the brains by clicking and dragging your cursor. You can look at a single brain by clicking on the magnifying glass above that brain. The magnifying glass will appear as you hover over the donor ID for

each brain. You can also remove a brain by clicking on the "x" next to the magnifying glass.  To restore all views, choose Show All Views from the View menu. Choosing a data point, either by clicking on the heat map below the brain or on a brain region itself, will bring up the gene symbol, the location of the sample and the expression level and z-score in the top left hand corner of the Image Viewer.

You can zoom using either the wheel on your mouse or using the Zoom scroll bar in the lower right hand corner of the Image Viewer.

Structure Ontology Viewer

The Structure Ontology Viewer shows the entire collapsible ontology for the human brain including the color coding used by our expert annotation team to visualize structural boundaries. Two columns to the right of the ontology determine the type of data displayed in the Image Viewer. "A" represents annotation and when checked, will show a visual representation of that structure in the Image Viewer. "G" represents gene expression and when checked, will show gene expression in that structural domain.










The default organization for the Structure Ontology is the Hierarchical View, but if you are unfamiliar with the ontology, you can click on the Alphabetical View to see the structure list in alphabetical order.

The Bookmarks tab is a space where you can create and save favorite views of the brain. Several default views are already saved that will rotate the brain back into common viewing frames.

Gene List

This section displays the gene probes you have selected and downloaded in this session. When more than one gene probe has been downloaded, clicking on one probe will show its gene expression profile in the image viewer. Right clicking on the gene probe name will bring up a menu where you can view the gene detail page (Get Info), be taken to the Planar View of the probe (View Images) or copy the gene information for use in another application.

Using the Toolbar

Button	Operation
	Selects cursor rotation tool mode
	Selects cursor pan tool mode
	Selects cursor selection tool mode
	Toggle Sagittal Atlas section viewing
	Toggle Coronal Atlas section viewing
	Toggle Horizontal Atlas section viewing
	Centers the Viewer on the current pinpointed expression data point
	Turns on the clipping planes
	Toggles the Structure Ontology and Gene List View

Advanced Features

Atlas Tab:

You can show opaque three dimensional structures of the brain by "showing" or "hiding" structures from this menu. The "Transparent" function allows you to see transparent views of the structures to view the anatomical relationships between them.

Selecting the sagittal, coronal or horizontal sections (or clicking on one of the section image buttons in the toolbar) will superimpose a single plane of the MRI images from each brain on your image space. These planes can be moved once the selection tool mode button in the toolbar is selected. Selecting "Show Annotation on Section" from this menu will color the MRI images according to the brain structure ontology.

Gene Tab:

When you have a gene selected, the Gene Tab menu allows to you to show all expression, hide all expression (for instance to then select a single structure) or toggle expression (for instance, unselect your region of interest then toggle to see expression in only that region).

You can also show or remove threshold controls and choose the visual representation of your data (raw data vs. z-score) from this menu.

To be taken to the gene detail page, select "Get Info". To see the Planar View, choose "View Images". These functions are also available by right-clicking on the gene name in the Gene List.

Clipping Planes:

When this function is selected, either by toggling the cutting tools button in the toolbar or selecting "Clipping Planes" from the View drop down menu, you can make coronal, sagittal or horizontal cuts in your view of the brain and related data. To cut in a particular plane, make sure the cursor is in selection tool mode, and then click and drag on the plane you are interested in clipping.

Troubleshooting

Windows

Graphics

If you are using a desktop computer, you should obtain drivers from the video card manufacturer. First, identify the video card. Go the Start menu and open the Control Panel. Open the Display control panel and go to the Settings tab. Click the Advanced button and go to the Adapter tab. Your video card vendor and model name will be displayed at the top of the window under Adapter Type. Please go to the manufacturer's web site, locate the driver download, and follow the instructions on the website or included with the downloaded file.

If you are using a laptop computer, you will need to go to your laptop manufacturer's web site to locate the latest video drivers.

You can also activate an alternate drawing mode in Brain Explorer. Go to the View menu and select Options. Check the Draw faster but at lower quality button and uncheck the Synchronize drawing with the monitor's vertical refresh button. Set the Multisample setting to Off.

If you are using multiple video cards from different vendors, the 3D display may not work correctly on all attached monitors.

Uninstalling

Use the Add/Remove Programs control panel or the uninstall link in the Brain Explorer folder in the Start menu. Additional data that are not automatically uninstalled are located at the following locations:

Windows XP

Atlas data: C:\Documents and Settings\userid\Local Settings\Application Data\Allen Institute\Brain Explorer 2
User settings: C:\Documents and Settings\userid\Application Data\Allen Institute\Brain Explorer 2

Windows Vista and Windows 7

Atlas data: C:\Users\userid\AppData\Local\Allen Institute\Brain Explorer 2
User settings: C:\Users\userid\AppData\Roaming\Allen Institute\Brain Explorer 2

Proxy Settings

If you use a proxy server, Brain Explorer will use the proxy settings from the Internet Options control panel in the Windows Start menu. Please refer to the Windows documentation for help on proxy settings.

Mac

Uninstalling

Drag the Brain Explorer 2 icon to the trash. Brain Explorer generates the following files, which can also be dragged to the trash.

- ~/Library/Application Support/Brain Explorer 2
- ~/Library/Preferences/org.alleninstitute.BrainExplorer2.plist

Performance

If Brain Explorer is not running smoothly, first try to free up as much memory as possible by quitting all other open applications. You can also activate an alternate drawing mode. Go to the Brain Explorer 2 menu and select Preferences. Check the Draw faster but at lower quality button and uncheck the Synchronize drawing with the monitor's vertical refresh button. Set Multisampling to Off.

Contact Us

If after reading this help file you still have questions or suggestions, please [Contact Us](#).