

ALLEN INSTITUTE
for BRAIN SCIENCE
Purdue University

[Home](#)
[Mouse Brain](#)
[Developing Mouse Brain](#)
[Human Brain](#)
[Mouse Connectivity](#)
[More](#)

[Welcome](#)
[Announcements](#)
[Tutorials](#)
[Search](#)
[Help](#)

ALLEN BRAIN ATLAS

A growing collection of online public resources integrating extensive gene expression and neuroanatomical data, complete with a novel suite of search and viewing tools

Getting Started

If you are new to the Allen Brain Atlas resources and want to get oriented, or if you are an experienced user and want to explore further, take a look at our [library of tutorials](#). These short videos offer introductory overviews as well as guided tours focused on specific data sets or tools.

ANNOUNCEMENTS - Updated November 3, 2011

What's New - Latest Data Release November 3, 2011

2011 Annual Symposium - Videos now on YouTube

Training on the Allen Brain Atlas Resources

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[MORE](#)

Mouse Brain

A genome-wide, high-resolution atlas of gene expression throughout the adult mouse brain

Developing Mouse Brain

A detailed atlas of gene expression across mouse brain development

Human Brain

A multi-modal, multi-resolution atlas detailing gene expression across the adult human brain

Developing Human Brain

A detailed atlas of gene expression across human brain development

Mouse Connectivity

A high-resolution map of neural connections in the mouse brain

Glioblastoma

A unique platform for exploring human glioblastoma at the cellular and molecular levels

Non-Human Primate

A detailed atlas of gene expression across postnatal primate brain development

Mouse Spinal Cord

A genome-wide, high-resolution atlas of gene expression throughout the mouse spinal cord

Mouse Diversity

Gene expression data in the mouse brain across genetic backgrounds and sex

Sleep

Gene expression data in the mouse brain for five conditions of sleeping and waking

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Welcome to the Allen Institute for brain science technical tool. This tutorial will show you the basic search and navigation features of the updated Allen Mouse brain atlas resource. To get to this Atlas from our portal page click on the mouse brain button or from any of our webpages click on the mouse brain tab.

Notes

Summary



☐ Gene Search
☒ Differential Search
☐ Fine Structure Search
☐ Bulk Search

Target Structure(s)
 Contrast Structure(s)
 Coronal data only: ☐ Expression threshold (1):

Browse by Differential Expression

Isocortex	Piriform area	Lateral septal complex	Midbrain
Cerebral cortex, layer 2-3	Hippocampal region	Pallidum	Periaqueductal gray
Cerebral cortex, layer 4	Field CA1	Cerebellum	Pons
Cerebral cortex, layer 5	Field CA3	Thalamus	Medulla
Cerebral cortex, layer 6a	Dentate gyrus	Reticular nucleus of the thalamus	Inferior olivary complex
Main olfactory bulb	Entorhinal area	Epithalamus	
Accessory olfactory bulb	Striatum	Hypothalamus	

With the March 2012 release you'll be taken to the "About" tab which describes this resource. But we'll get started with the search features on the ISH data tab. If you know the gene that you'd like to find the expression information for, type the gene name or identifier in the text box and click search. If you have a list of genes you can use the bulk search feature by selecting this radio button. I'm going to spend a little time on the differential search feature as this is a valuable tool to discover enhance gene expression in a brain structure or area you can choose from the pre-calculated large structure by clicking on a category in the tag cloud or you can choose from 75 manually curated smaller structures by first selecting the fine-structure radio button and selecting from the drop down menu.

Notes

Summary



ALLEN INSTITUTE
for BRAIN SCIENCE
Fueling Discovery

[Home](#)
[Mouse Brain](#)
[Developing Mouse Brain](#)
[Human Brain](#)
[Mouse Connectivity](#)
[More ▾](#)

[ISH Data](#)
[Reference Atlas](#)
[AGEA](#)
[Brain Explorer](#)
[API](#)
[Documentation](#)
[Help](#)
[About](#)

☐ Gene Search
 ☒ Differential Search
 ☐ Fine Structure Search
 ☐ Bulk Search

Target Structure(s)
 Contrast Structure(s)

☒ COApl2 Cortical amygdalar area, posterior part,
☒ COApl3 Cortical amygdalar area, posterior part,
☒ COApm Cortical amygdalar area, posterior part,
☒ COApm1 Cortical amygdalar area, posterior part,
☒ COApm2 Cortical amygdalar area, posterior part,
☒ COApm3 Cortical amygdalar area, posterior part,
☒ PAA Piriform-amygdalar area
☒ PAA1 Piriform-amygdalar area, molecular layer
☒ PAA2 Piriform-amygdalar area, pyramidal layer
☒ PAA3 Piriform-amygdalar area, polymorph layer
☒ TR Postpiriform transition area
☒ TR1 Postpiriform transition area, layers 1
☒ TR2 Postpiriform transition area, layers 2
☒ TR3 Postpiriform transition area, layers 3
☒ HPF Hippocampal formation

Browse by Differential Expression

[Isocortex](#)
[Cerebral cortex, layer 2-3](#)
[Cerebral cortex, layer 4](#)
[Cerebral cortex, layer 5](#)
[Cerebral cortex, layer 6a](#)
[Main olfactory bulb](#)
[Accessory olfactory bulb](#)

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To start a differential search first select a target structure or structures by selecting from the drop down menu.

Notes

Summary



☐ Gene Search
☒ Differential Search
☐ Fine Structure Search
☐ Bulk Search

Target Structure(s)
 Contrast Structure(s)
 Coronal data only: ☐ Expression threshold (1):

Search

Browse by Differential Expression

Isocortex	Piriform area	Lateral septal complex	Midbrain
Cerebral cortex, layer 2-3	Hippocampal region	Pallidum	Periaqueductal gray
Cerebral cortex, layer 4	Field CA1	Cerebellum	Pons
Cerebral cortex, layer 5	Field CA3	Thalamus	Medulla
Cerebral cortex, layer 6a	Dentate gyrus	Reticular nucleus of the thalamus	Inferior olivary complex
Main olfactory bulb	Entorhinal area	Epithalamus	
Accessory olfactory bulb	Striatum	Hypothalamus	

Click this icon once you're finished selecting your target structures you can select a contrast structure or structures the same way or you can use the default whole brain as your contrast structure. When you click the search button a list of genes will be returned which match your search criteria.

Notes

Summary



ALLEN INSTITUTE
for BRAIN SCIENCE

Feeling Discovery

Search

Publications Contact Us

Home

Mouse Brain

Developing Mouse Brain

Human Brain

Mouse Connectivity

More

ISH Data

Reference Atlas

AGEA

Brain Explorer

API

Documentation

Help

About

Gene Search

Differential Search

Fine Structure Search

Bulk Search

Target Structure(s)

HPF

Contrast Structure(s)

grey

Search

Coronal data only:

Expression threshold (1):

Showing page 1 of 403

Fold Ch...	Experm...	Gene Sym...	Gene Name	Probe Name	Orienta...	Plane	Expression S...
10.002	73620980	Prox1	prospero-related homeobox 1	RP_051017_04...	Antisense	coronal	
9.084	7225808	Crtf1	cytokine receptor-like factor 1	RP_051027_01...	Antisense	coronal	
7.861	74003393	Gpr161	G protein-coupled receptor 161	RP_060119_02...	Antisense	sagittal	
7.781	731	Hes2	nuclear receptor subfamily 3, group C, me...	RP_Baylor_103...	Antisense	sagittal	
7.683	74003403	Gpr161	G protein-coupled receptor 161	RP_050331_02...	Antisense	sagittal	
7.506	70218745	Ltd	lactase	RP_050524_01...	Antisense	sagittal	
7.434	73615573	logap2	IQ motif containing GTPase activating pro...	RP_050712_01...	Antisense	coronal	
7.426	70927813	Cyp7b1	cytochrome P450, family 7, subfamily b, p...	RP_050725_01...	Antisense	coronal	
7.104	69114085	Spin8	serine peptidase inhibitor, Kazal type 8	RP_050317_01...	Antisense	sagittal	
6.707	71924374	Clus2	clavesin 2	RP_050623_01...	Antisense	coronal	
6.702	69783296	Plp2	plakophilin 2	RP_050505_01...	Antisense	sagittal	
6.698	74363341	Avr15	ADP-ribosylation factor-like 15	RP_051005_03...	Antisense	coronal	
6.672	403	Epha7	Eph receptor A7	RP_Baylor_102...	Antisense	sagittal	
6.634	74822585	Sipa1l3	signal-induced proliferation-associated 1 li...	RP_051206_02...	Antisense	sagittal	
6.534	73997149	Plp2	plakophilin 2	RP_051214_03...	Antisense	coronal	
6.494	73931621	Ltd	lactase	RP_051214_04...	Antisense	coronal	
6.349	71587733	Glis3	GLIS family zinc finger 3	RP_050915_04...	Antisense	sagittal	
6.339	69608064	Crtf1	cytokine receptor-like factor 1	RP_050426_03...	Antisense	sagittal	
6.320	74272479	Nrp1	neuropilin 1	RP_050915_01...	Antisense	coronal	
6.283	72129241	Klhl8	kallikrein related-peptidase 8	RP_051017_03...	Antisense	coronal	
6.266	70528157	Clus2	clavesin 2	RP_050623_01...	Antisense	sagittal	
6.185	69736383	Il1r1	interleukin 1 receptor, type I	RP_050503_02...	Antisense	sagittal	

View Selections (0)

Clear Selections

NeuroBlast

Prox1

Basic cell groups and regions (grey)

Coronal data only

Search

BrainExplorer

View in 3D

Related Institute Data

MOUSE HUMAN ANP

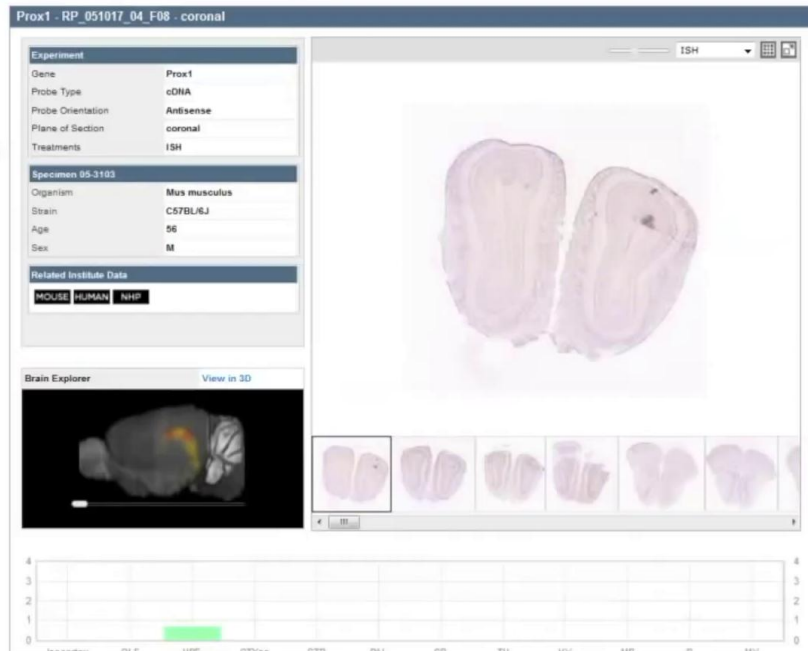
If you click on a gene name you can preview gene expression in the 3d view here. This image shows a 3-dimensional structure of the brain in grey and white with gene expression in color. Within the structure you can view this gene expression more interactively with our three dimensional brain Explorer viewer. By clicking this link, I invite you to visit our brain Explorer tutorial to learn more about that resource.

Notes

Summary

1m 30s



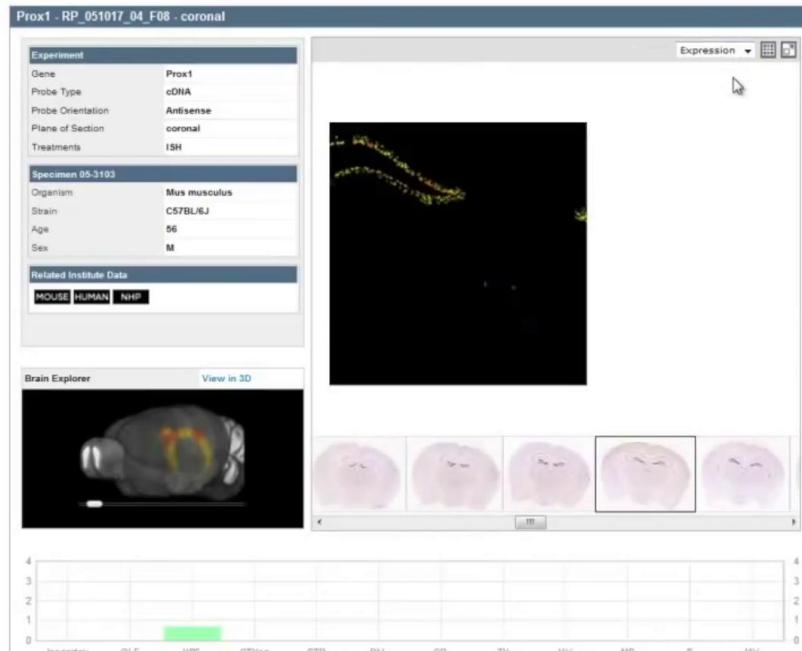


Notes

Summary



2m 00s

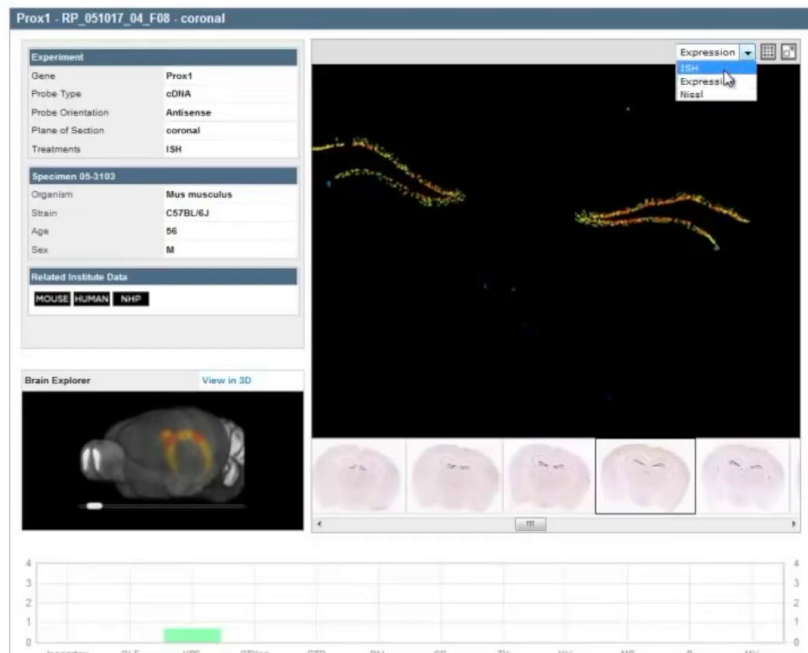


More detailed experimental information is available by clicking the experiment link the experimental detail page includes metadata as well as links to other Allen Institute projects on this gene. A 3d thumbnail view of the gene expression and an image viewer of the entire experiment. The thumbnails at the bottom of the image viewer allow you to select a selection to view and the selection image in the main viewing area and can be panned and zoomed in for greater detail. Zoom with the mouse wheel or the a and z keys.

Notes

Summary





To allow you to interpret the data you can view an expression mask which subtracts out the background signal and represents the expression in cool or low expressing colors to hot or high expressing colors.

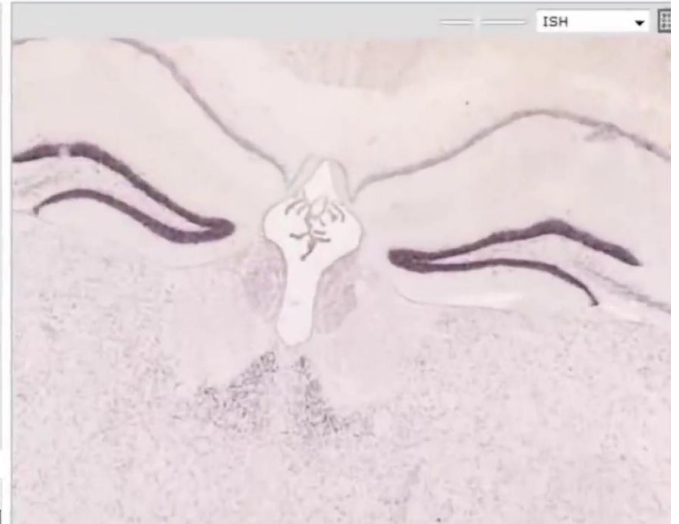
Notes

Summary



Prox1 - RP_051017_04_F08 - coronal

Experiment	
Gene	Prox1
Probe Type	cDNA
Probe Orientation	Antisense
Plane of Section	coronal
Treatments	ISH
Specimen 05-3103	
Organism	Mus musculus
Strain	C57BL/6J
Age	56
Sex	M
Related Institute Data	
MOUSE HUMAN NHP	



Brain Explorer

[View in 3D](#)

You can also open up your current image in a high-resolution image viewer in another window by clicking this icon.

Notes

Summary



2m 44s



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In the high resolution image viewer you can again pan and zoom the image. You can use the scale bar to measure distances in the image and you can download the image as a jpg file to your computer, also on the experiment detail page is a histogram that provides a quantitation of gene expression.

Notes

Summary



Gene Search Target Structure(s) HPF
Differential Search Contrast Structure(s) grey
Fine Structure Search
Bulk Search
Coronal data only: ☐ Expression threshold (1):

Showing page 1 of 403

Fold Ch...	Experm...	Gene Sym...	Gene Name	Probe Name	Orienta...	Plane	Expression S...
10.062	73520980	Pbox1	prospero-related homeobox 1	RP_051017_04...	Antisense	coronal	
9.084	72283808	Crrf1	cytokine receptor-like factor 1	RP_051027_01...	Antisense	coronal	
7.861	74003393	Gpr161	G protein-coupled receptor 161	RP_060119_02...	Antisense	sagittal	
7.781	731	Ne3a2	nuclear receptor subfamily 3, group C, me...	RP_Baylor_103...	Antisense	sagittal	
7.683	74003403	Gpr161	G protein-coupled receptor 161	RP_050331_02...	Antisense	sagittal	
7.566	70218745	Ltd	lactase	RP_050524_01...	Antisense	sagittal	
7.434	73615573	logap2	IQ motif containing GTPase activating pro...	RP_050712_01...	Antisense	coronal	
7.426	70827813	Cyp7b1	cytochrome P450, family 7, subfamily b, p...	RP_050726_01...	Antisense	coronal	
7.104	69114085	Spin8	serine peptidase inhibitor, Kazal type 8	RP_050317_01...	Antisense	sagittal	
6.707	71824374	Clvs2	clavesin 2	RP_050623_01...	Antisense	coronal	
6.702	69783250	Plp2	plakophilin 2	RP_050506_04...	Antisense	sagittal	
6.698	74363341	Avr15	ADP-ribosylation factor-like 15	RP_051006_03...	Antisense	coronal	
6.672	403	Epha7	Eph receptor A7	RP_Baylor_102...	Antisense	sagittal	
6.634	74822585	Sipa1i3	signal-induced proliferation-associated 1 li...	RP_051206_02...	Antisense	sagittal	
6.534	73997149	Plp2	plakophilin 2	RP_051214_03...	Antisense	coronal	
6.494	73931621	Ltd	lactase	RP_051214_04...	Antisense	coronal	
6.349	71587733	Glis3	GLIS family zinc finger 3	RP_050915_04...	Antisense	sagittal	
6.339	69600064	Crrf1	cytokine receptor-like factor 1	RP_050426_03...	Antisense	sagittal	
6.320	74272479	Nep1	neuropilin 1	RP_050915_01...	Antisense	coronal	
6.283	72129241	Klks8	kallikrein related-peptidase 8	RP_051017_03...	Antisense	coronal	
6.266	70528157	Clvs2	clavesin 2	RP_050623_01...	Antisense	sagittal	
6.185	69736383	Il1r1	interleukin 1 receptor, type I	RP_050603_02...	Antisense	sagittal	

View Selections (0) Clear Selections

NeuroBlast Pbox1
Basic cell groups and regions (grey)
☐ Coronal data only Search

BrainExplorer View in 3D


Related Institute Data
MOUSE HUMAN ANP

12 large structures are represented on this histogram and when you mouse over the structure gene expression values are indicated here. We also provide you with the information required to create your own in situ hybridization probes. Should you wish to repeat this experiment in your own system back on the search result page notice a gene link. Clicking this link will take you to the experiment detail page of all the experiments for this particular gene.

Notes

Summary



- ☐ Gene Search
- ☒ Differential Search
- ☐ Fine Structure Search
- ☐ Bulk Search

Target Structure(s) HPF

Contrast Structure(s) grey

Search

Coronal data only: ☐ Expression threshold (1):

Showing page 1 of 1147

Cor...	Experi...	Gene Sym...	Gene Name	Probe Name	Orientat...	Plane	Expression Su...
1.000	73520980	Prox1	prospero-related homeobox 1	RP_051017_04...	Antisense	coronal	
0.881	74425540	Tnfr2	TNFAIP3 interacting protein 2	RP_051214_02...	Antisense	coronal	
0.877	72283808	Crr1	cytokine receptor-like factor 1	RP_051027_01...	Antisense	coronal	
0.844	71152821	LOC432741	similar to ORF7	RP_050719_04...	Antisense	sagittal	
0.820	74047443	Dock10	dedicator of cytokinesis 10	RP_051214_01...	Antisense	coronal	
0.820	71717018	Tdo2	tryptophan 2,3-dioxygenase	RP_050623_04...	Antisense	coronal	
0.819	70662126	Trpa8	transient receptor potential cation channel, s...	RP_050331_04...	Antisense	coronal	
0.818	71587929	C1q2	complement component 1, q subcomponent...	RP_050725_03...	Antisense	coronal	
0.816	71924374	Clva2	clavesin 2	RP_050623_01...	Antisense	coronal	
0.815	70660321	Tdo2	tryptophan 2,3-dioxygenase	RP_050623_04...	Antisense	sagittal	
0.814	69009004	Crr1	cytokine receptor-like factor 1	RP_050426_03...	Antisense	sagittal	
0.810	71587733	Glt3	GLIS family zinc finger 3	RP_050515_04...	Antisense	sagittal	
0.809	73930852	Slc39a6	solute carrier family 39 (metal ion transporter...	RP_051214_04...	Antisense	coronal	
0.809	70525781	Vwa3b	von Willebrand factor A domain containing 3B	RP_050317_02...	Antisense	sagittal	
0.808	65289757	Ptdm5	PR domain containing 5	RP_050407_03...	Antisense	sagittal	
0.807	69783124	Phor4	per-hexamer repeat gene 4	RP_050505_04...	Antisense	sagittal	
0.806	70719033	C230030N0...	RIKEN cDNA C230030N03 gene	RP_050421_04...	Antisense	sagittal	
0.802	71808655	Slc26a10	solute carrier family 26, member 10	RP_050526_02...	Antisense	sagittal	
0.801	638729	Pqf6	polycomb group ring finger 6	RP_040831_02...	Antisense	sagittal	
0.793	74562206	Mmd2	monocyte to macrophage differentiation-ass...	RP_050208_02...	Antisense	sagittal	
0.785	74273116	Slc26a10	solute carrier family 26, member 10	RP_050526_02...	Antisense	coronal	
0.785	77910905	Pip5k1b	phosphatidylinositol-4-phosphate 5-kinase, ty...	RP_070208_04...	Antisense	sagittal	

View Selections (0) Clear Selections

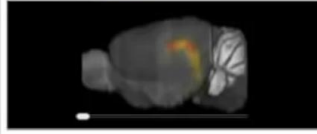
NeuroBlast Prox1

Basic cell groups and regions (grey)

☐ Coronal data only

Search

BrainExplorer View in 3D



Related Institute Data

MOUSE HUMAN ANP

Once you have found a gene of interest you may want to find other genes with similar expression patterns. This is accomplished using the neuroblast search once a gene has been selected clicking search will return a list of genes matching your selection criteria with similar expression profiles as your gene of interest.

Notes

Summary



Gene Search Target Structure(s) HPF
Differential Search Contrast Structure(s) grey
Fine Structure Search
Bulk Search
Coronal data only: ☐ Expression threshold (1):

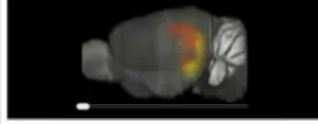
Showing page 1 of 403

Fold Ch...	Experim...	Gene Sym...	Gene Name	Probe Name	Orienta...	Plane	Expression S...
<input type="checkbox"/>	10.062	73520990	Pbox1	RP_051017_04...	Antisense	coronal	
<input type="checkbox"/>	9.084	72283808	Crtf1	RP_051027_01...	Antisense	coronal	
<input checked="" type="checkbox"/>	7.861	74003393	Gpr161	RP_050119_02...	Antisense	sagittal	
<input type="checkbox"/>	7.781	731	Nr3a2	RP_Baylor_103...	Antisense	sagittal	
<input type="checkbox"/>	7.683	74003403	Gpr161	RP_050331_02...	Antisense	sagittal	
<input type="checkbox"/>	7.566	70218745	Ltd	RP_050524_01...	Antisense	sagittal	
<input type="checkbox"/>	7.434	73615573	Iqgap2	RP_050712_01...	Antisense	coronal	
<input type="checkbox"/>	7.426	70927813	Cyp7b1	RP_050726_01...	Antisense	coronal	
<input type="checkbox"/>	7.104	69114085	Spinc8	RP_050317_01...	Antisense	sagittal	
<input type="checkbox"/>	6.707	71924374	Clus2	RP_050623_01...	Antisense	coronal	
<input type="checkbox"/>	6.702	69783250	Plp2	RP_050505_04...	Antisense	sagittal	
<input type="checkbox"/>	6.698	74363341	Avr15	RP_051006_03...	Antisense	coronal	
<input type="checkbox"/>	6.672	403	Epha7	RP_Baylor_102...	Antisense	sagittal	
<input type="checkbox"/>	6.634	74822595	Sipa1l3	RP_051206_02...	Antisense	sagittal	
<input type="checkbox"/>	6.534	73997149	Plp2	RP_051214_03...	Antisense	coronal	
<input type="checkbox"/>	6.494	73931621	Ltd	RP_051214_04...	Antisense	coronal	
<input type="checkbox"/>	6.349	71587733	Glis3	RP_050915_04...	Antisense	sagittal	
<input type="checkbox"/>	6.339	69600064	Crtf1	RP_050426_03...	Antisense	sagittal	
<input type="checkbox"/>	6.320	74272479	Nrp1	RP_050915_01...	Antisense	coronal	
<input type="checkbox"/>	6.283	72129241	Klhl8	RP_051017_03...	Antisense	coronal	
<input type="checkbox"/>	6.266	70528157	Clus2	RP_050623_01...	Antisense	sagittal	
<input type="checkbox"/>	6.185	69736383	Il1r1	RP_050503_02...	Antisense	sagittal	

View Selections (2) Clear Selections

NeuroBlast Gpr161
Basic cell groups and regions (grey) ▾
☐ Coronal data only Search

BrainExplorer View in 3D



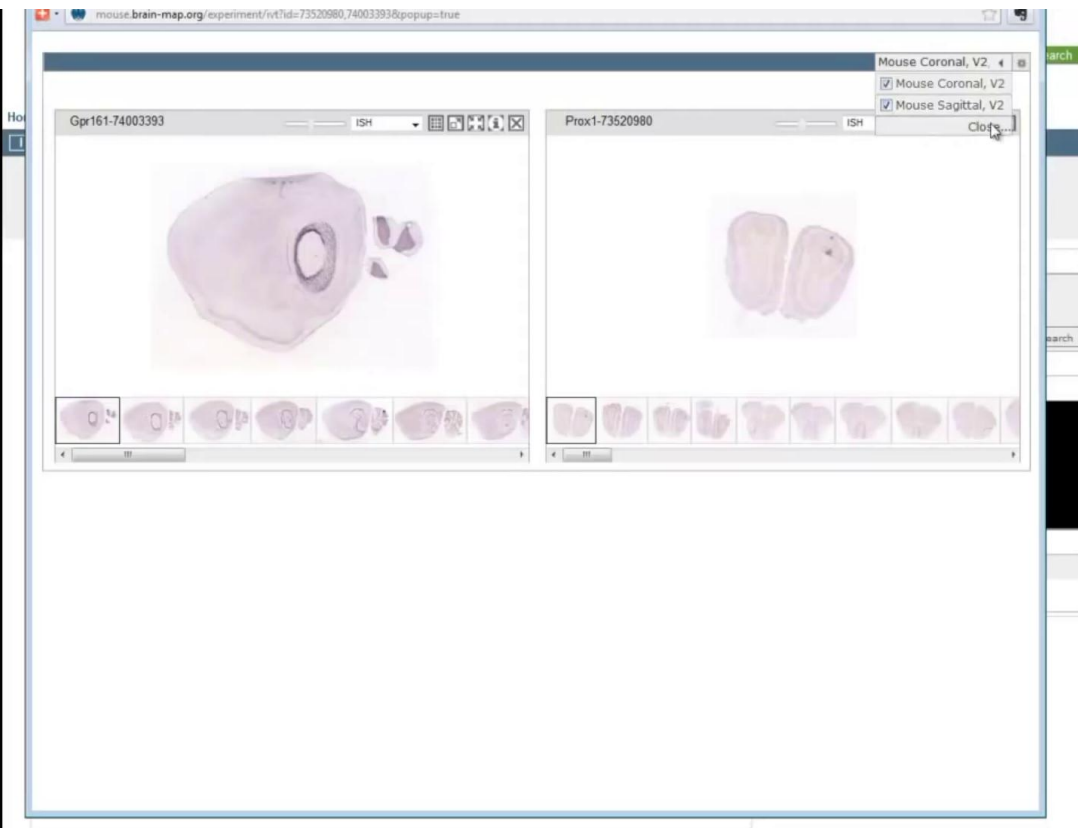
Related Institute Data
MOUSE HUMAN ANP

You may want to explore the expression patterns of several genes at the same time to do this select your genes by clicking the checkbox next to the experiment you would like to view and press view selections.

Notes

Summary





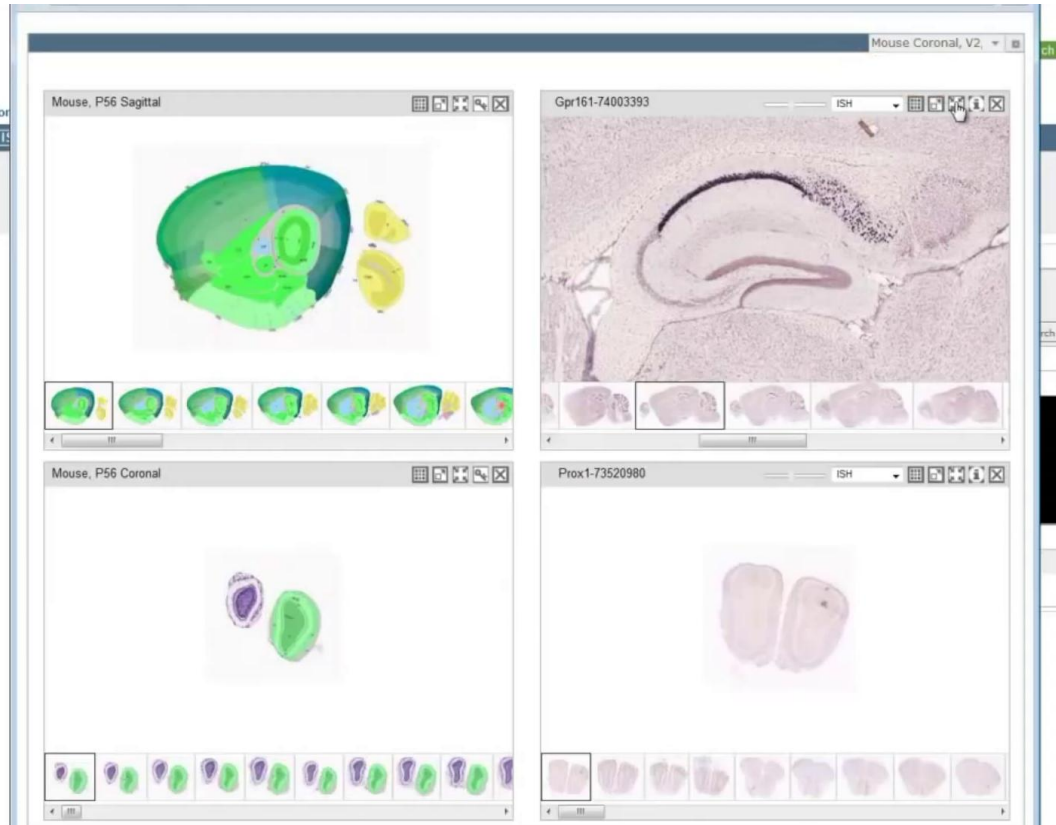
In the window that opens I recommend adding reference atlases to the selected genes like so.

Notes

Summary



4m 07s

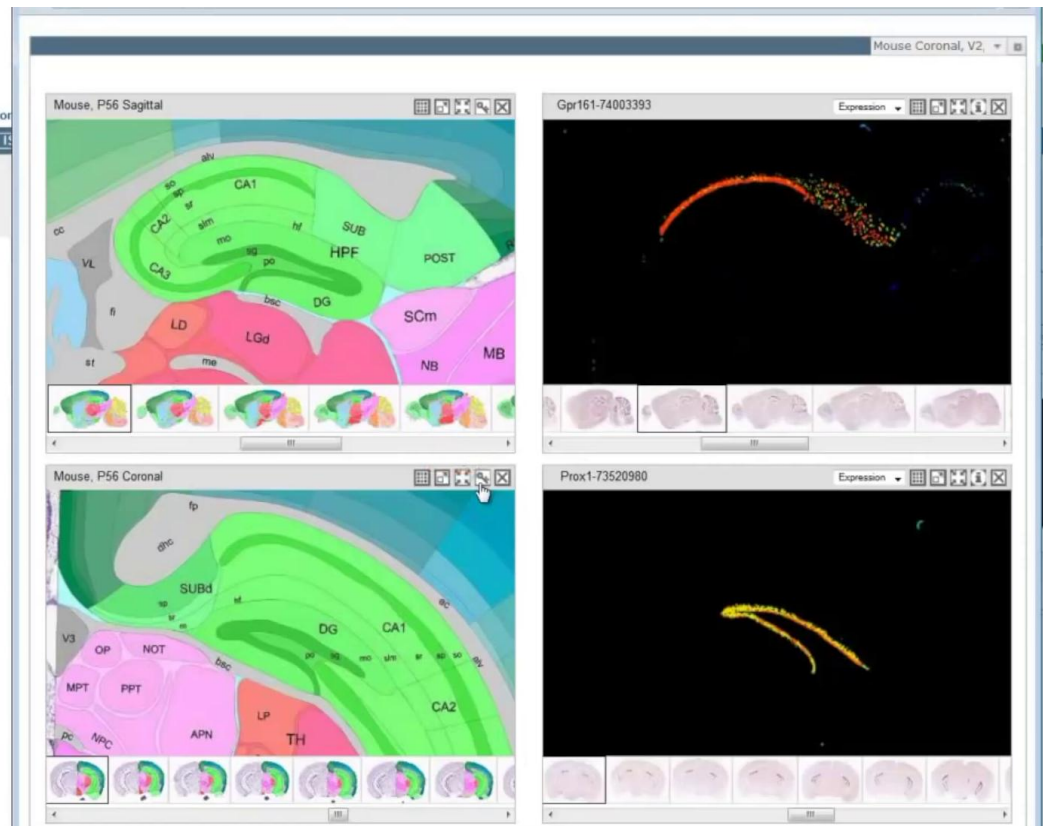


You can customize your workspace by moving image views into more appropriate positions. When you've found an image that shows interesting gene expression you can utilize the sync function from this icon here to synchronize all other windows for that brain region.

Notes

Summary





By having included the reference atlases you can see that GPR 161 is expressed selectively in Area C a1 and the subiculum of the hippocampus Prox-1 expression doesn't show as obvious a pattern. Utilizing the expression mask feature again shows that selective yet lighter expression resides in the dentate gyrus. If you're unfamiliar with the abbreviations in the reference atlas you can launch the interactive legend browser with the key icon in the reference atlas viewer.

- Notes

Summary



In this legend browser you can search for structures.

Notes

	Summary





