This document was created to introduce users to the Allen Brain Cell (ABC) Atlas and to provide an example use case of the tool and how to accomplish it.

Vignette Type: Experimental Design

Specific Example: Whole Mouse Brain

User:

Career: Undergraduate Students | **Graduate Students** | **Post-Docs** | Senior Scientists/PI | Teachers

Experience of Cell Types: Novice| **Advance Beginner** | Intermediate | Expert

Research: **Basic** | Translational

Research Type: Computational | **Molecular** | **Behavior**

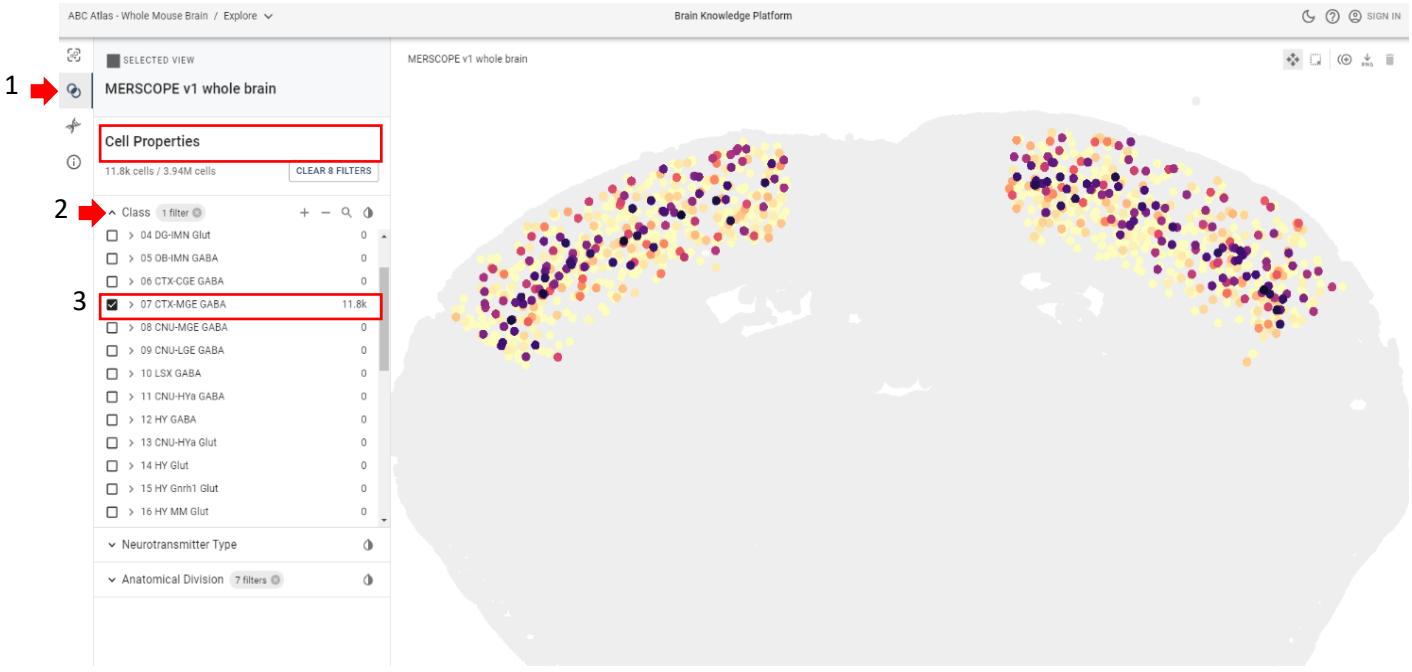
Experimental Model: **Mouse** | Rat | Non-Human Primate | Human | Invertebrate | Non-Traditional Vertebrate

Use case: A researcher wants to design an experiment to study how genes involved in opioid signaling affect sensory processing.

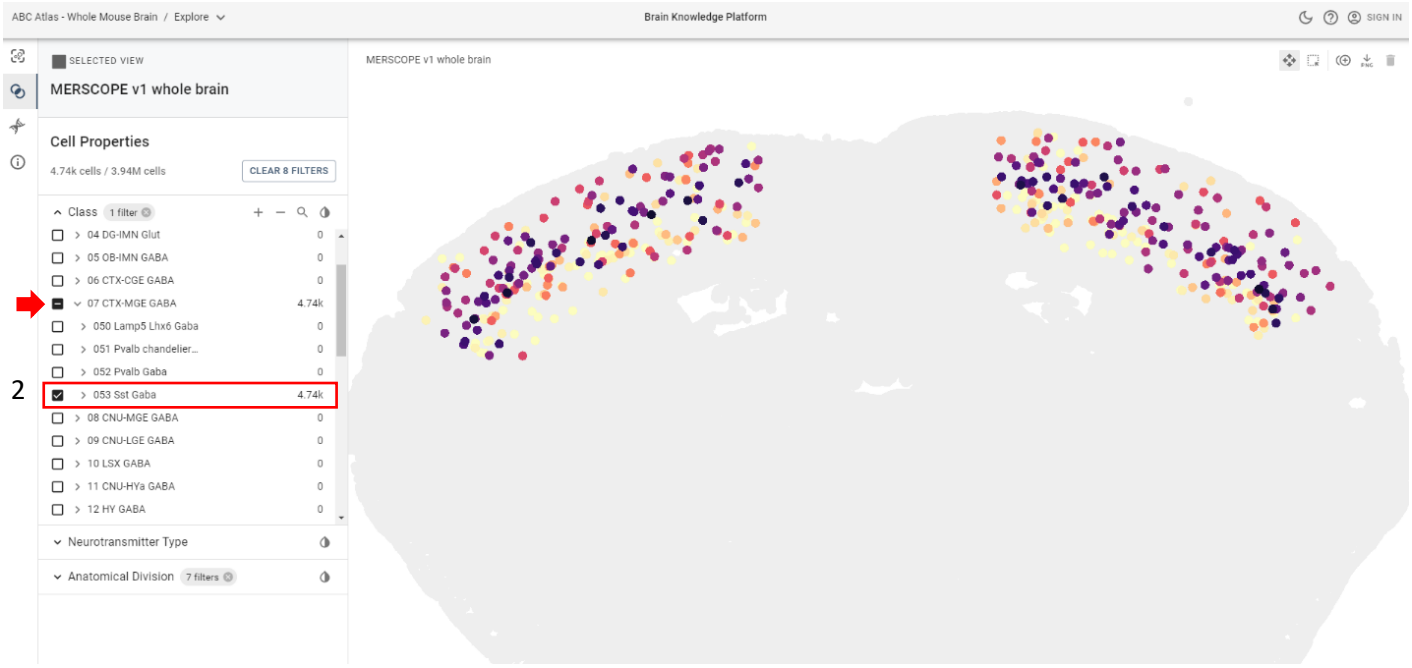
1. The researcher filters by brain region (e.g., to find primary somatosensory cortex, click “Cell Properties” tab, search for “SSp” areas under “Anatomical Division” and check the boxes, click ink drop symbol to color by anatomical division).

2. The researcher can search for different genes in the ABC Atlas to look at their expression levels and spatial distributions (e.g., to find *Pdyn*, which produces the opioid polypeptide hormone prodynorphin, click on the "Genes" tab, search *Pdyn,* and color cells by expression level by clicking on ink drop symbol ( ).

3. To determine which classes of cells are expressing a gene, the researcher can filter cells based on cell class (e.g., click on the "Cell Properties" tab, then click through the different classes to see where the *Pdyn* is highly expressed; we discover that *Pdyn* cells with the highest expression levels (darkest colors) belong to the CTX-MGE-GABA class).



4. To determine if gene expression within a class is subclass specific, the researcher can then filter by subclasses (e.g., under the CTX-MGE-GABA class, click through the different subclasses to see where *Pdyn* is highly expressed; we discover that *Pdyn* cells with the highest expression levels (darkest colors) belong to the Sst-Gaba subclass).



5. Now that the researcher knows that *Pdyn* is highly expressed in Sst GABAergic cells in the primary somatosensory cortex, they can design experiments using transgenic mouse models, genetic tools, etc., to test the function of these cells in opioid signaling and/or sensory processing.