



# **Instructor Guide:**

## *The Importance of Basic Research in Brain Science*

### **Estimated Lesson Timeline:**

#### **60 minutes total**

- 20 minutes--Activity 1: Evaluating funding decisions between basic and applied research proposals
- 10 minutes--Activity 2: Learning how and why dendrograms are constructed
- 10 minutes--Activity 3: Using heatmaps to visualize gene expression between cell types
- 20 minutes--Activity 4: Students analyze real basic transcriptomic data gathered from healthy brain tissue

### **Learning Objectives:**

- Students will be able to articulate what transcriptomic data is and how it is gathered
- Students will be able to articulate how dendrograms and heatmaps can be used in conjunction with transcriptomic data in order to further differentiate cell types from one another
- Students will be able to apply basic principles of interpreting data visualization to complex transcriptome datasets
- Students will explore the nuanced differences between basic and applied research
- Students will be able to defend the importance of both basic and applied research within the field of biomedical science

### **Using this lesson:**

This lesson can either be assigned as an independent assignment for students or as an in-class lesson where students work in groups. Activity 1 encourages students to debate with one another the potential benefits of different research proposals. Activity 2 explains to students what dendrograms are and how they can be interpreted. Activity 3 introduces students to heat maps and how they can be used in conjunction with dendrograms to differentiate cell types. Activity 4 walks students through the Allen Institute for Brain Science's Brain Cell Atlas and its associated data tools. Students have the opportunity to interact and interpret the data available through this resource.

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