

Neurobiology

with Dr Matthew Johnson and
Dr Beth Stevens

Talking points

Knowledge & Comprehension

1. What is C4A, and what role does it play in synaptic pruning?
2. What are microglia, and what role do they play in synaptic pruning?
3. What are the challenges of using mice to study schizophrenia in humans?
4. Why is synaptic pruning an important process during normal brain development?

Application

5. How do you think excessive synaptic pruning might lead to the symptoms of schizophrenia?

Analysis

6. Why might it be problematic to prevent or treat schizophrenia by reducing C4A in a patient? What side effects do you think might occur?

Evaluation

7. To what extent do you agree that it is essential to use animal models to understand human diseases? In what ways do you think technical advances could reduce scientists' reliance on animal models?
8. Why is perseverance such a key quality for scientists to have? How well are you able to persevere when you face challenges?

Activities

Many genetic and environmental factors have been suggested to contribute to the development of schizophrenia. Using Matthew and Beth's article and reliable online sources, investigate a range of potential contributing factors.

For each factor, record whether it is genetic or environmental, what evidence exists to suggest it may be linked to schizophrenia, and what the significance of this factor is for developing treatments for the disease.

For example: C4A expression is a genetic factor; evidence comes from the fact that people with more C4A in their brain have a higher risk for schizophrenia, and mouse models show links between C4A overexpression in adolescence and schizophrenia symptoms; the significance is that new therapeutics could target C4A expression.

Once you have completed your list, choose the factor that most interests you and design a short research proposal that scientists could use to investigate this factor further. Create a presentation that introduces the topic and its importance and explains what research could be conducted and what the implications of any findings might be.

Deliver your presentation to a small group of classmates and listen to their research ideas. Which inspires you the most, and why?

More resources

- Backyard Brains contains a wealth of neuroscience experiments you can do at home and in the classroom: backyardbrains.com
- Brainfacts host a wealth of fascinating articles all about neuroscience: brainfacts.org
- Cherish recommends following [@neuro_melody](https://www.instagram.com/neuro_melody) and [@science.sam](https://www.instagram.com/science.sam) on Instagram for interesting neuroscience-related content.
- Neuroscientifically Challenged hosts a range of short, accessible videos about a range of neuroscience topics: youtube.com/@neurochallenged