

Mission Myelin: Model, Damage, Repair

“TELEPHONE”

- Stand in a line.
- Whisper the message you heard to the next person.
- Say it only once; no repeats.
- Say only the message, no other words or explanations allowed.



Is the final message correct?

What was easy or difficult about this game?

What would make the game
of Telephone easier to play?

What could be done to make sure
the correct message gets to each person?

LET'S TRY AGAIN!

- New message
- Read the message from the paper to the next person in line. Hand them the paper.

Is the final message correct?

What was easy or difficult about this version of the game?

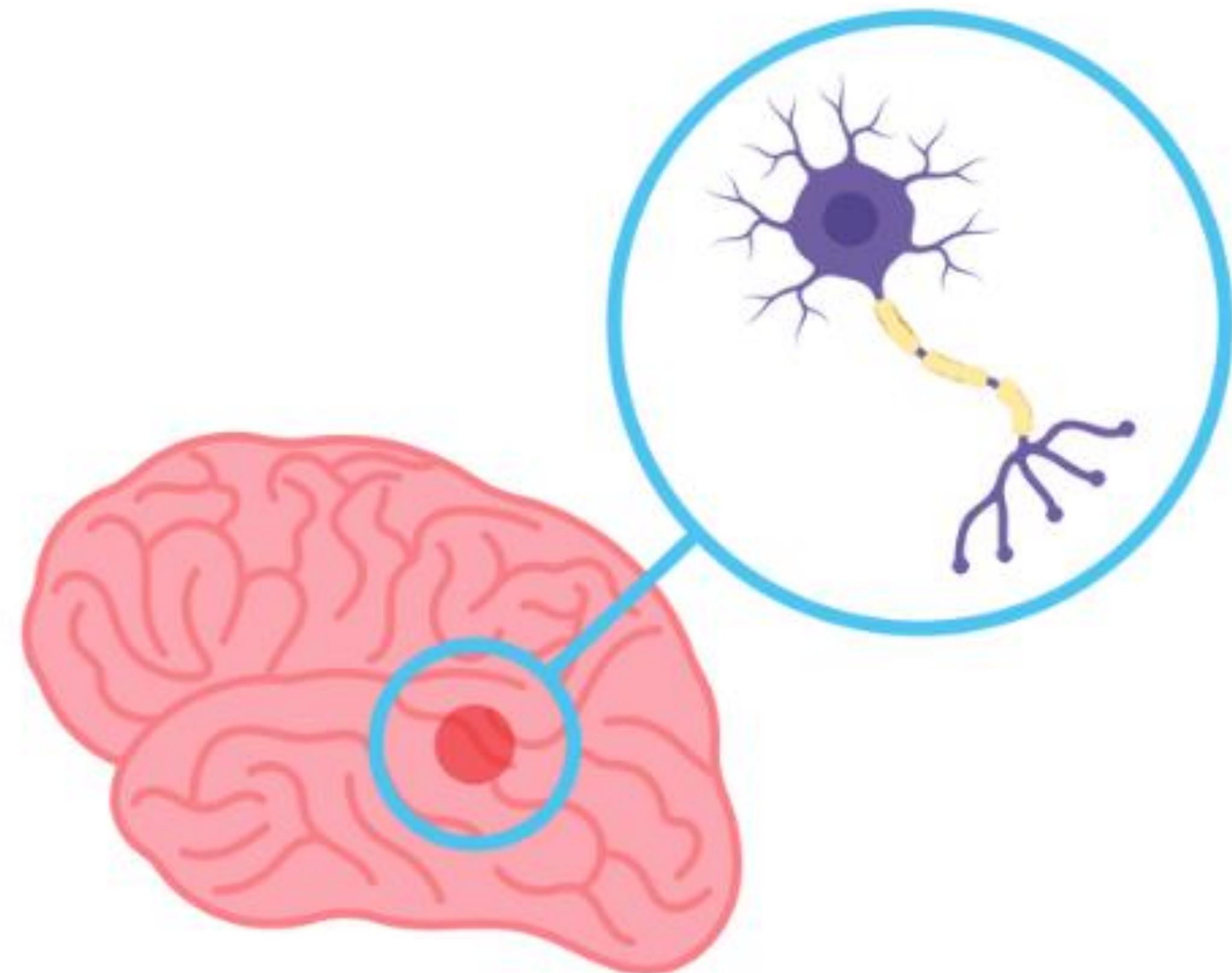
LET'S PLAY ONE MORE TIME!

- New message
- With some extra directions
(follow the directions on the
card you are given)

Is the final message correct?

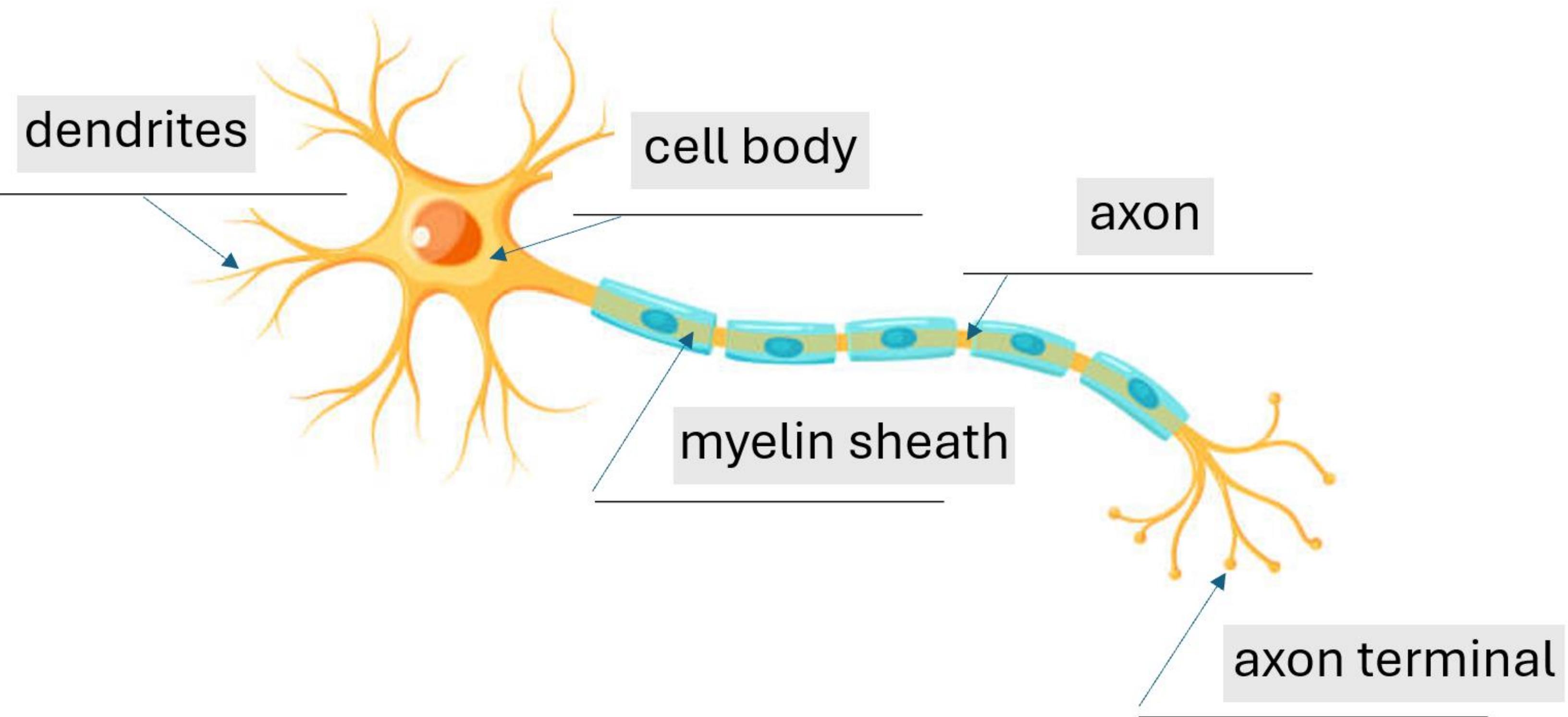
What was easy or difficult about this version of the game?

neuron

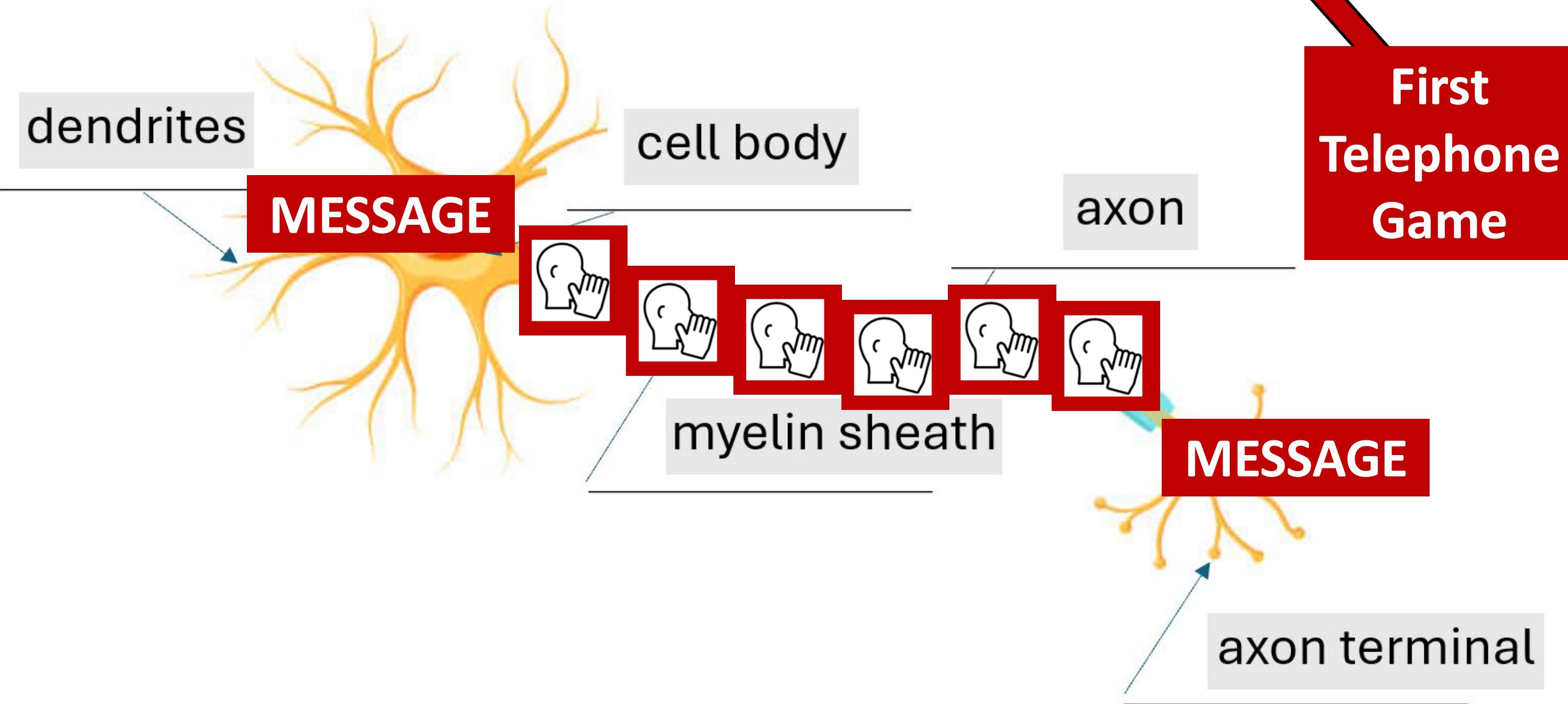


brain

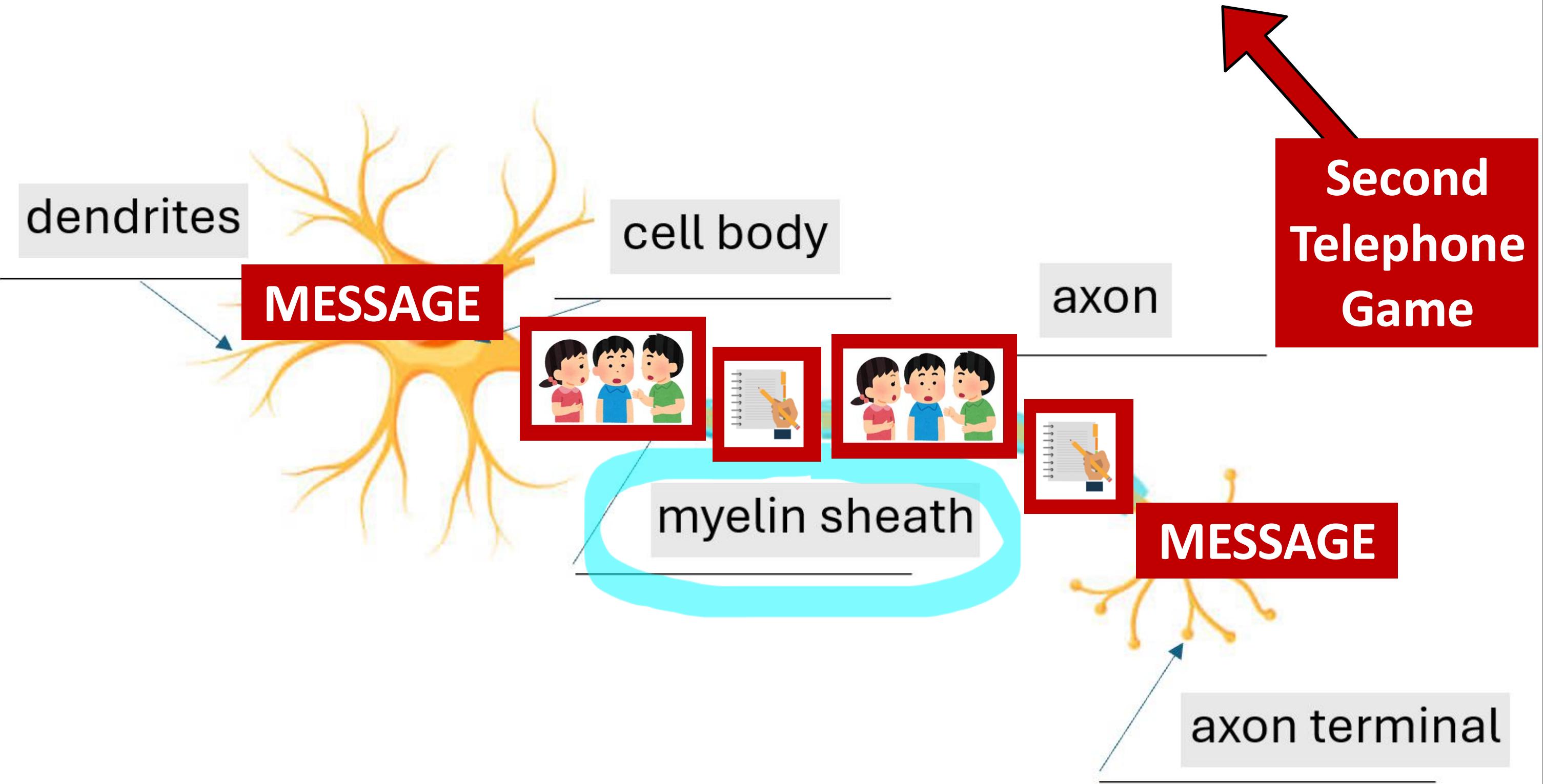
NEURON – Nerve Cell - (special cells in the brain and spinal cord that send messages to the body)



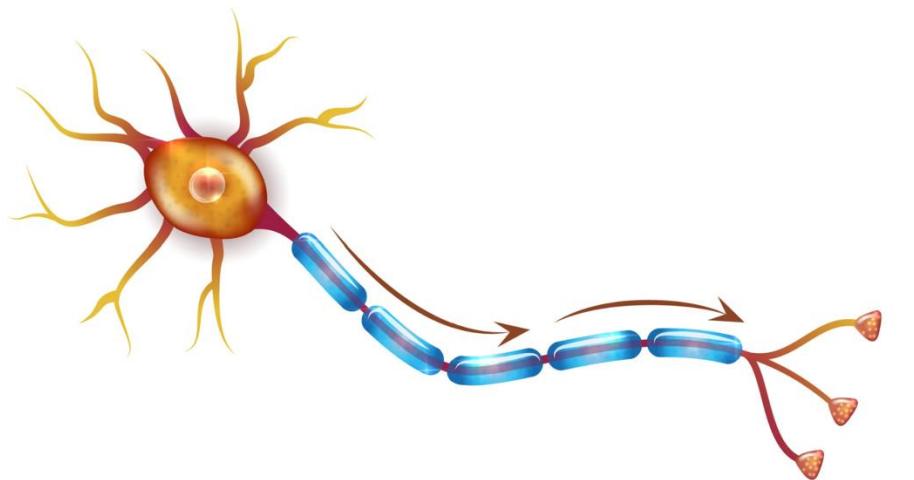
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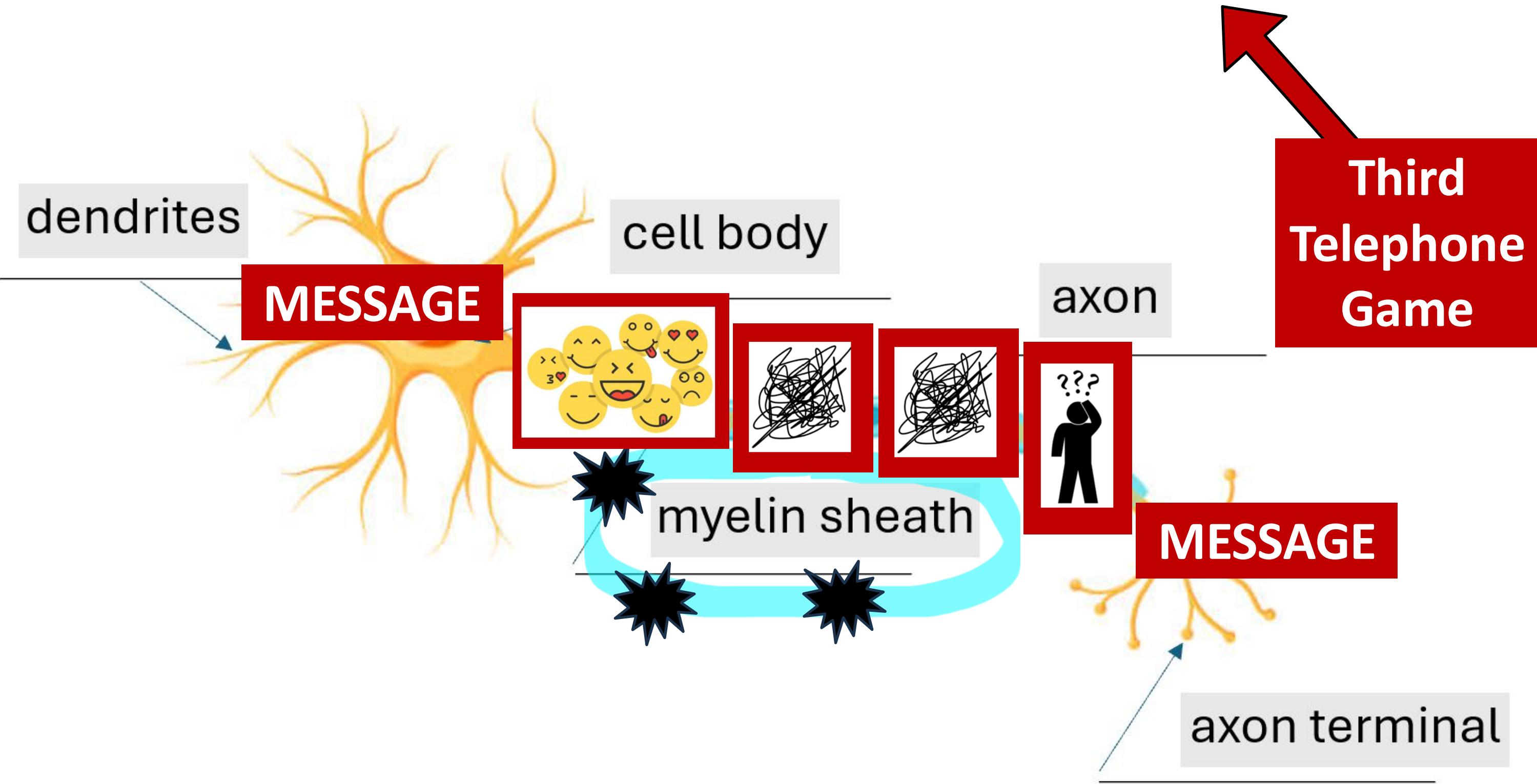
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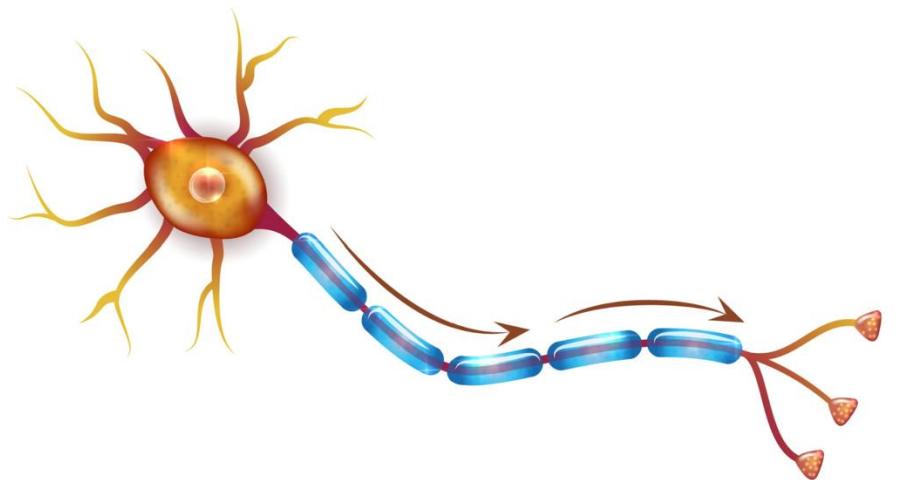
Myelination



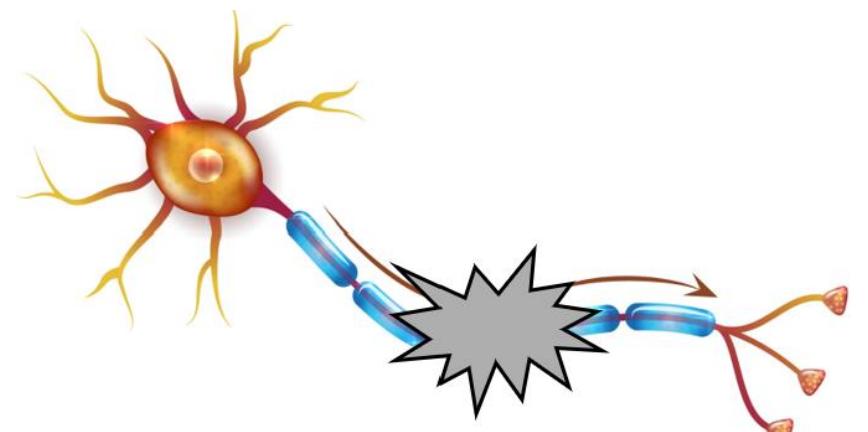
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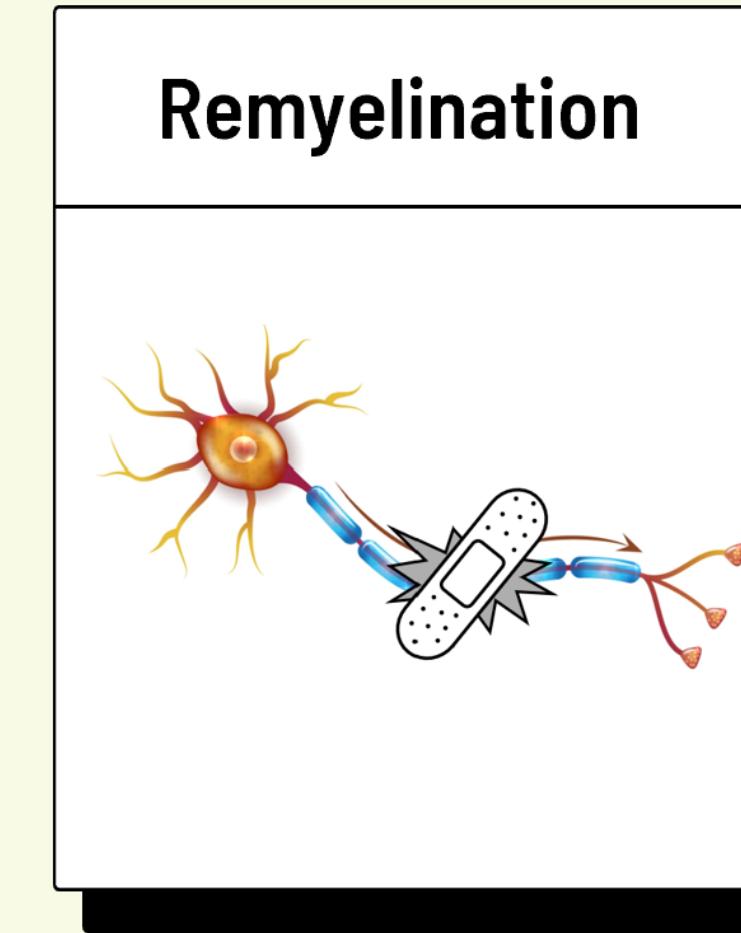
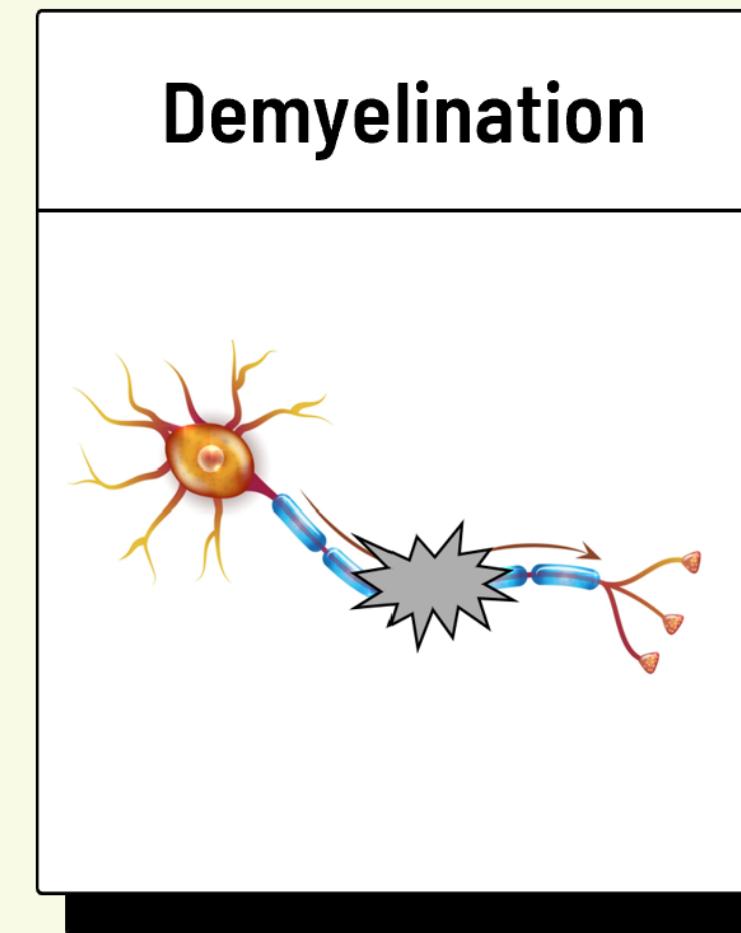
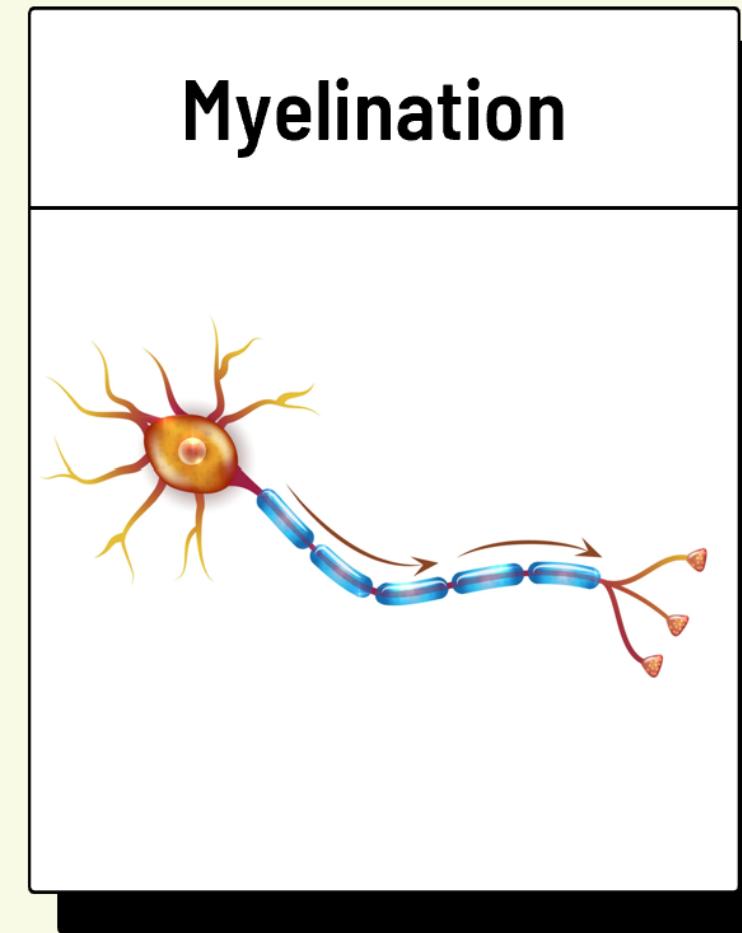


Myelination



Demyelination





Damage to the myelin can slow down, disrupt, or block signals to/from the brain. This can cause various health issues involving vision, muscles, coordination, balance, memory, concentration, thinking, and more. A commonly known demyelination disorder/disease is multiple sclerosis (MS). There is no known cure, but scientists are working to protect myelin from damage and also learning how to repair or replace damaged or missing myelin. The Hartley lab is exploring the roles of hormones and lipids in the myelination and remyelination processes.

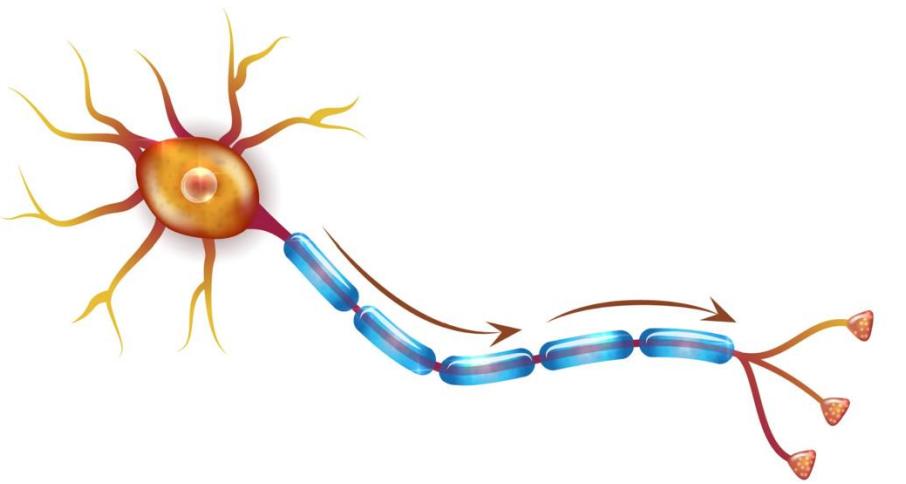


Welcome to the Hartley Laboratory located at the University of Kansas in the Chemistry Department! We are a multidisciplinary lab at the interface of chemistry and biology exploring the roles of hormones and lipids in neurological physiology and pathophysiology.

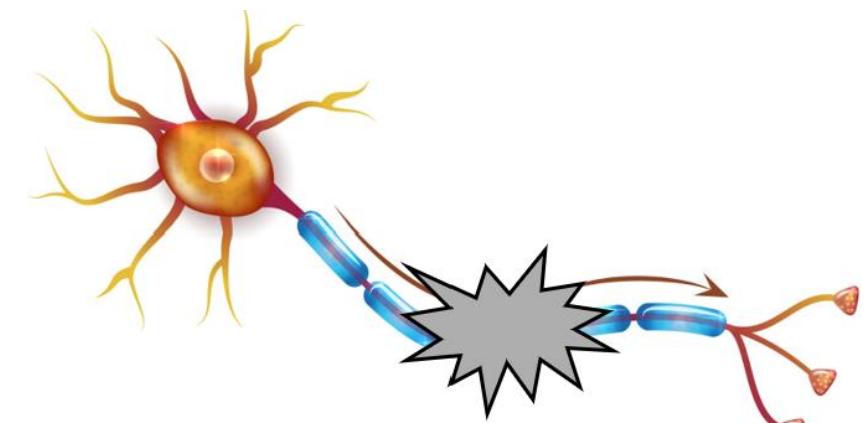
THE UNIVERSITY of KANSAS



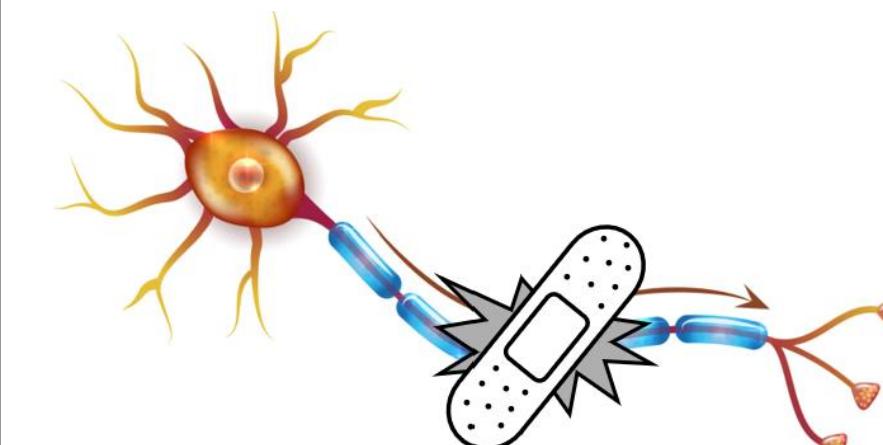
Myelination



Demyelination



Remyelination



Phenomenon

- Reflexes (hot stove)
- How messages travel and are communicated to/from the brain/body
- The importance of quick, efficient, and correct information

Challenge

Mimic the design of a neuron (axon with myelin) to engineer a quick and efficient pathway for a message to be sent.

high and low friction material options = myelin

foam tube = axon

board (ramp) to keep
tube at consistent angle



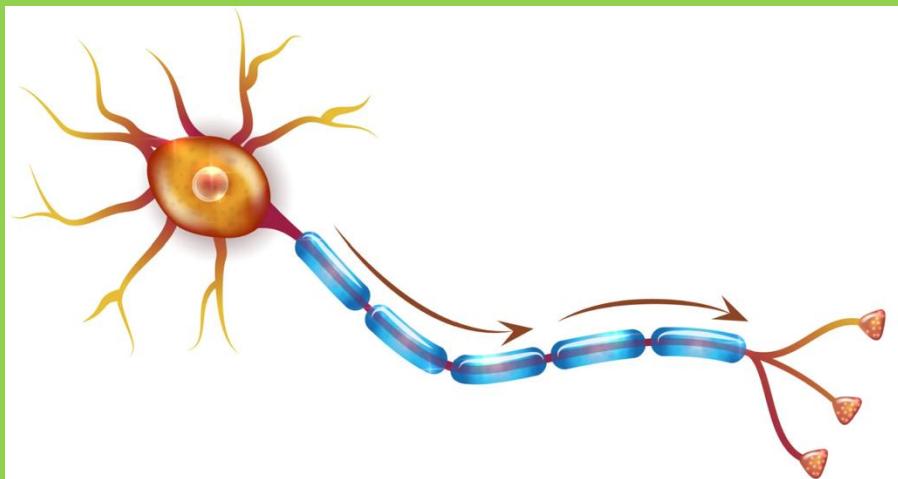
time to nearest
tenth of a second



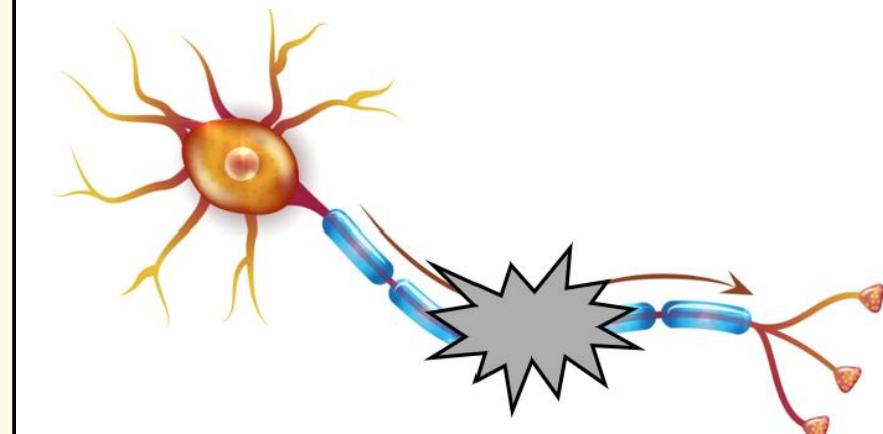
marble or wooden ball= message



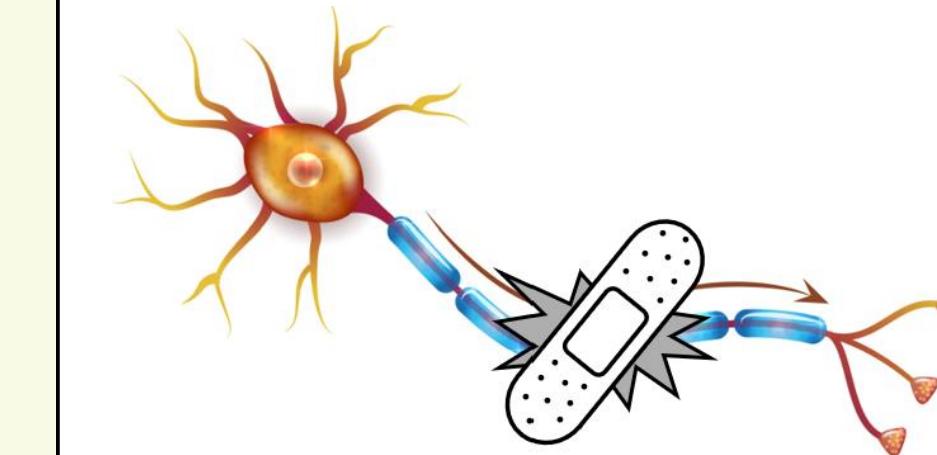
Myelination



Demyelination

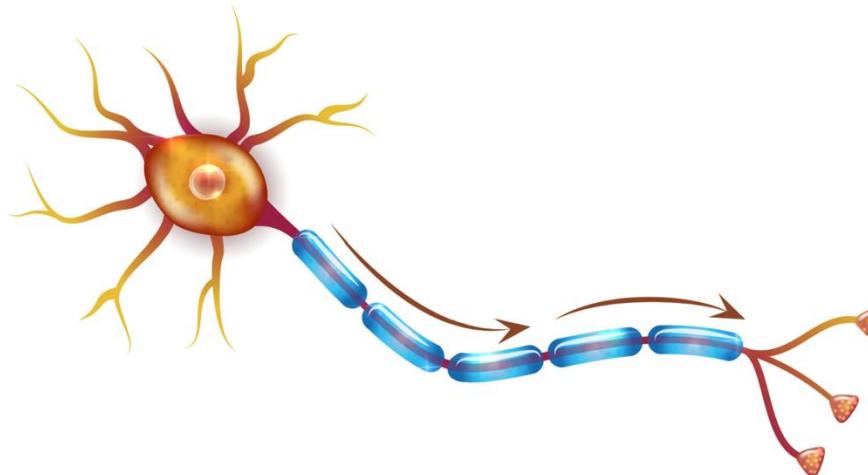


Remyelination

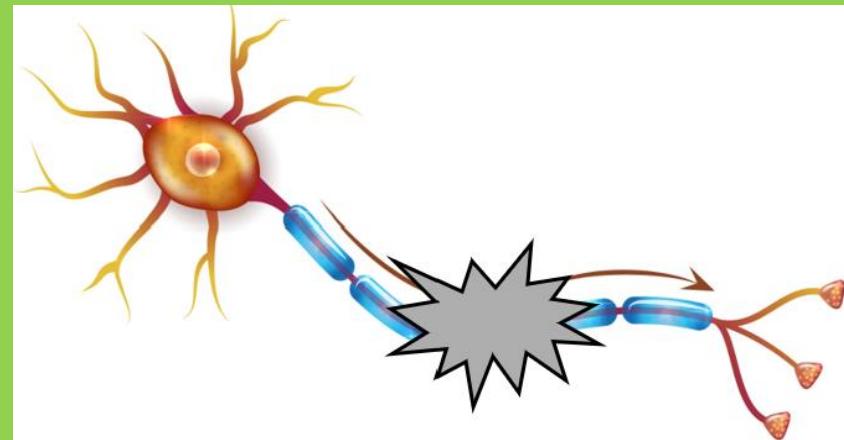


- View and test out sample materials.
- Cover the axon with myelin.
- Conduct 5 timed trials.

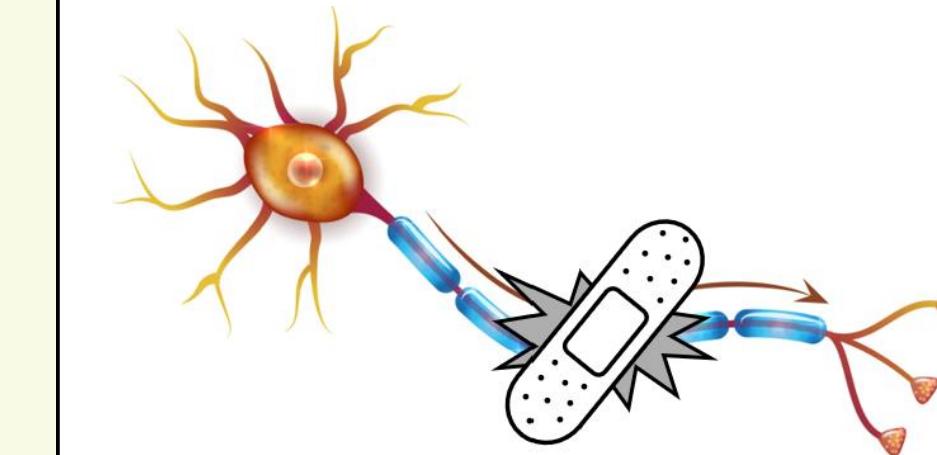
Myelination



Demyelination

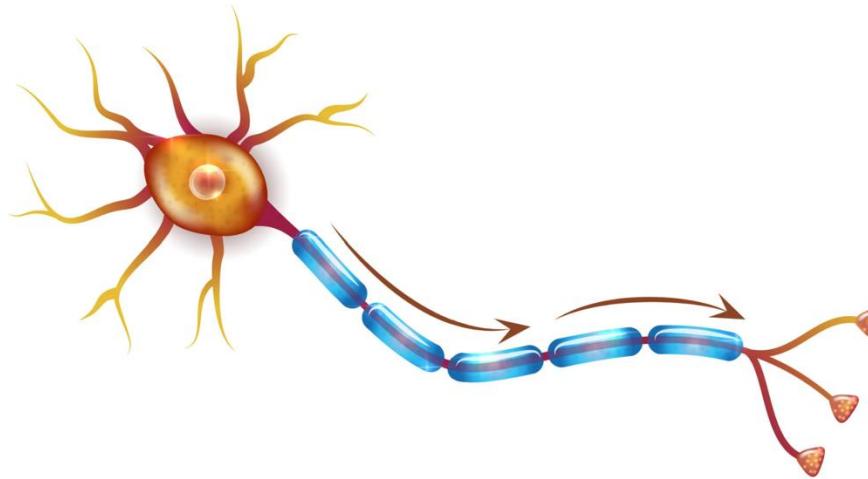


Remyelination

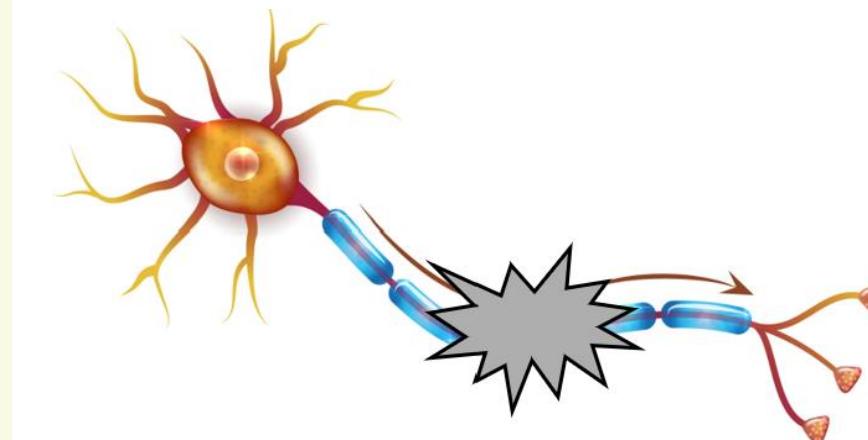


- Oh no! Damaged myelin discovery
- Conduct 5 timed trials.
- Compare to myelinated axon time.

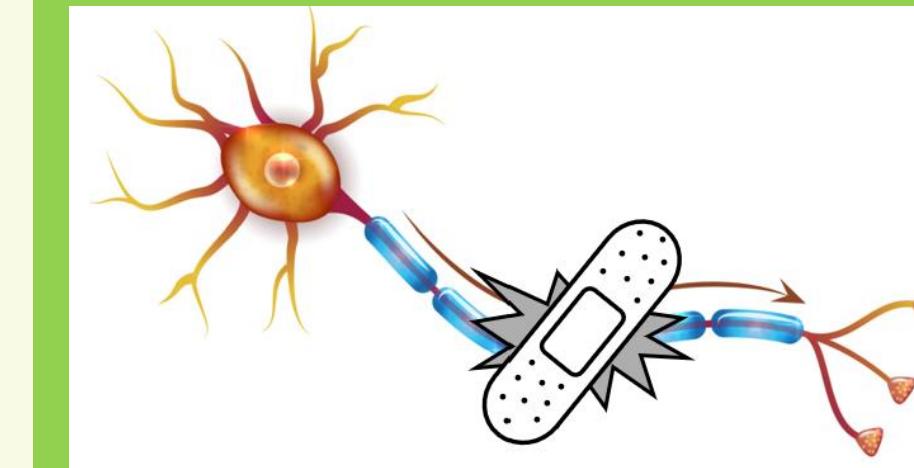
Myelination



Demyelination



Remyelination



- Repair myelin.
- Conduct 5 timed trials.
- Compare to myelinated axon time.
- Compare to demyelinated axon time.

Day 6

40 minutes

- “RESULTS” (results, analysis, assessment, reflection)
- Conduct a final discussion.
- Compare results.
- Revisit the connection to Hartley Lab, biochemistry, engineering, potential career pathway.

First: _____ Last: _____ Hour: _____

Mission Myelin: RESULTS

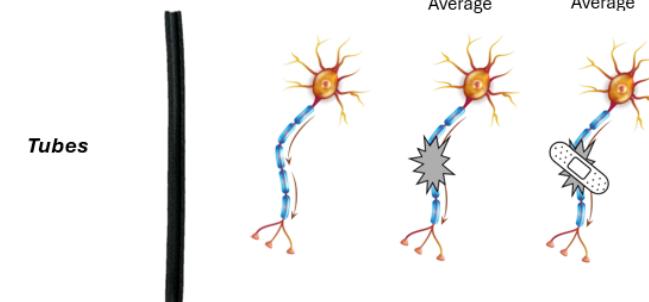
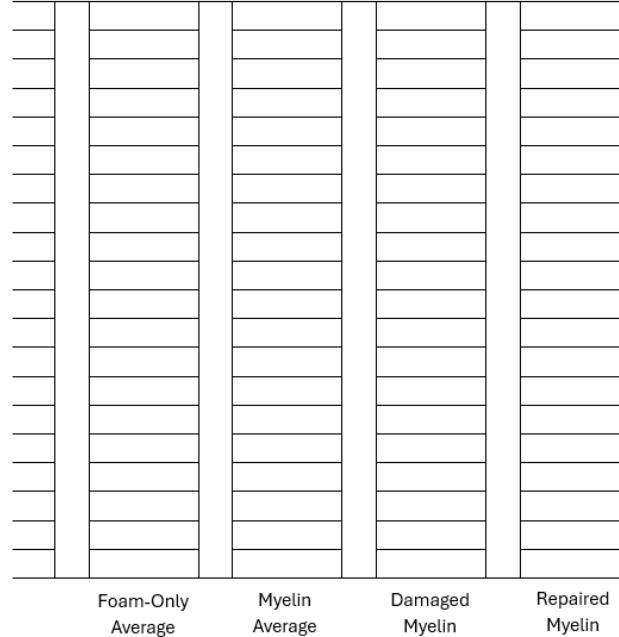
Complete this sheet with your partner. Have these materials ready:

- pencil
- Mission Myelin: Model sheet
- Mission Myelin: Damage sheet
- Mission Myelin: Repair sheet

GRAPH

1. Graph the average time for each version of your Myelin tube.

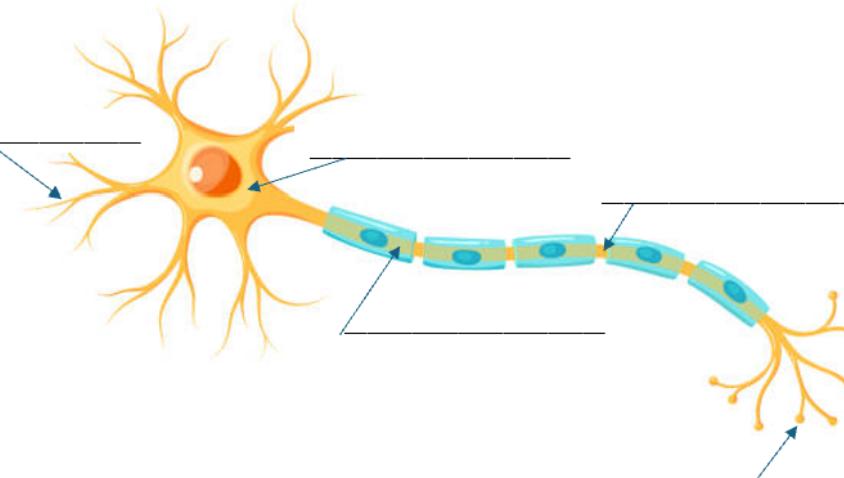
Mission Myelin



ANALYSIS and ASSESSMENT and REFLECTION

2. How do the four averages compare?

3. Label the neuron below using the words: **axon, axon terminals, cell body, dendrites, myelin**
NEURON – Nerve Cell



4. What do the objects used in class represent in the brain?

foam tube: _____

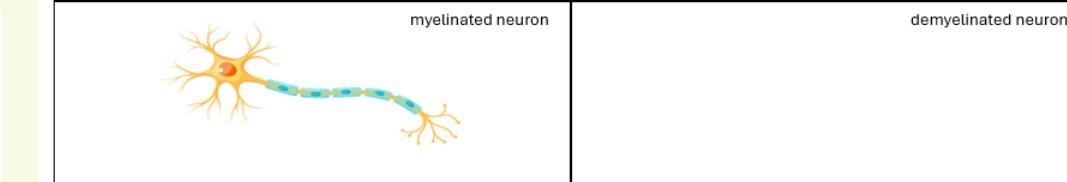
material that lined the tube: _____

marble: _____

5. What is myelin and what does it do? _____

6. What does demyelinate mean and what is one issue could it cause a person? _____

7. The first box shows a myelinated neuron. Draw a representation of what a demyelinated neuron might look like in the second box.



8. What does remyelinate mean and what is one way it can help a person? _____

9. Have scientists discovered or invented ways to protect and/or repair myelin?
A. Yes, scientists have discovered and invented ways for myelin to be protected and/or repaired.
B. Yes, scientists have discovered how to protect myelin, but they haven't shared that knowledge yet.
C. No, scientists are not even studying how to protect or repair myelin.
D. No, scientists have not discovered or invented ways for myelin to be protected and/or repaired, but they are working on it.

10. What is an engineer?
A. A person who studies plants and animals to understand how they live.
B. A person who helps people save and invest their money.
C. A person who uses science and math to design, build, or improve things that solve problems and make life better.
D. A person who uses their hands and tools to build homes and businesses.

11. Do you have an interest in engineering? Explain. _____

12. List skills someone would need to have (or develop) to be a person who studies myelin:

13. Describe one challenge you experienced while working on Mission Myelin.

14. What would you change or do differently if you repeated Mission Myelin?
