

This is Your Brain on Alzheimer's: An Interactive Learning Simulation

Supplies needed: 5 beach balls

This activity requires the participation of 9 people. If you have less, adjust as needed.

1. Instruct 5 audience members to form a straight line

Explain: Inside of our brain we have billions of neurons – about 100 billion! Neurons are the workhorse of the brain and they send information to each other through electrical signals. These electrical signals enable you to think, move, maintain homeostasis, feel emotions, and more. Today, each of you in this line are going to be a neuron and the beach balls are going to be the electrical signal which passes through our neurons and allows them to communicate.

2. Pass the balls!

Instruct the 5 participants to toss the balls down the line. The person at the end of the line will toss it back to the beginning of the line. Allow them to pass the balls for about a minute – make it fun!

Then discuss: How easy was it for the neurons to communicate? This is how a normal, healthy brain operates!

3. Introduce tangles

Explain: There are two main culprits of Alzheimer's disease: tangles and plaques. Tangles are made up of a protein called tau (*rhymes with wow*). In healthy areas, tau keeps the information transportation system working well. But, when tau starts to tangle, it causes interruption and eventual breakdown of the information transportation system.

Now I need 2 people to be tangles. Today, you are going to try to tangle up the neurons by limiting their ability to pass the electrical signal – the balls. To do so, stand behind a neuron and grab their arms at the elbow to limit their range of motion.

4. Pass the balls!

Then discuss: How did the tangles impact your abilities to toss and catch the balls? This is the same way that tangles impact our neurons' abilities to communicate. But, this is only one component of Alzheimer's and you can clearly see the impact that it has on the neurons' ability to communicate.

5. Introduce plaques

Explain: The second culprit of Alzheimer's are plaques. Plaques are abnormal, sticky clumps of protein called beta-amyloid (*pronounced beta am-a-loid*). These clumps form in between the neurons and block the electrical signal from reaching other neurons.

Now I need 2 of you to be plaques! To do so, you are going to swat down the electrical signals between the neurons – so swat down the balls as they're being passed along.

6. Pass the balls!

Then discuss: How did the plaques affect how well the neurons were able to communicate? Do you see how plaques can inhibit your brain's ability to function?

7. Introduce cell death

Explain: Have you ever heard the phrase "if you don't use it, you'll lose it?" The same is true with neurons in your brain. When tangles and plaques inhibit the communication between neurons, these cells will become disabled and die.

So, let's pass the balls again – with the tangles and plaques doing their interruptions. Neurons, if you are unable to catch a ball when it's passed to you, you'll be considered dead – so sit down.

8. Pass the balls!

Let the participants pass the balls until the only people left standing are the tangles and plaques.

Then discuss: This is your brain on Alzheimer's! The tangles and plaques' ability to inhibit the communication between cells allows for the continual destruction of the brain. That's why Alzheimer's is called a progressive and degenerative disease. As more and more tangles and plaques build up, more and more neurons will be unable to communicate and will die. You might have heard before that a brain with Alzheimer's physically shrinks in size – this is primarily due to the neuron death that you just experienced.

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