Follow-up Activity Demonstrating How Nicotine Use Leads to Addiction and Priming the Brain for Future Drug Use

Objective: Demonstrate how neurons respond and change over time in the presence of nicotine and how these changes facilitate the development of an addiction.

Supplies:

Bite Size or Fun Size Candy *(1-2 bags per class)*

Plan:

1. Without priming or telling students what they will be doing, ask for volunteers.
2. Ask the volunteers to stand.
3. Toss a piece of candy to each volunteer, they can and should eat the candy right away.
4. Ask the volunteers to share how it felt to get a piece of candy, then ask them to sit down.
5. Explain: The candy simulates a neurotransmitter (NT) that is passed between the sending neuron (teacher) and the receiving neuron (students). Students in this case are actually playing the role of receptors on the receiving neuron. Neurons in your brain communicate via chemical signaling. No actual physical contact is made. The space between the sending and receiving neurons (space between teacher and student) is called the synaptic cleft. Normally, the NT is acetylcholine (ACH). ACH helps regulate heart rate, pulse, learning memory, and stimulates some release of dopamine. Ask volunteers to revisit how it felt to get and eat candy → pleasureable. Dopamine is the pleasure or feel good NT. Nicotine mimics ACH but in much higher than normal levels.
6. Ask for volunteers again and repeat the process above reinforcing the key concepts from the explanation.
7. Ask for volunteers a third time. This time, do not give candy to each volunteer that stands up. Intentionally skip one or a few students who had volunteered the two previous rounds.
8. Ask volunteers who only stood up for the third round why they chose to volunteer? Did they expect to receive candy?
9. Ask volunteers that did not receive candy how they felt? Agitated? This is the development of addiction.
10. Compare: How many “receptors” do we have after round three compared with round one?
11. Nicotine use stimulates the development of receptors within the neural connections of the brain. These neurons are effectively primed for future drug use and susceptibility leading to nicotine as a gateway drug for future drug use, specifically cocaine.
12. Closing Video https://vimeo.com/105080373 Denise and Eric Kandel talking about thier studies.