Multiple Sclerosis (MS) is an immune-mediated disease that attacks the central nervous system (CNS). The body’s immune system will attack certain structures in the CNS including the myelin, oligodendrocytes and the underlying nerve fibers. Myelin is the protective sheath that covers the nerve fibers and consists of lipids and proteins. In the CNS, the oligodendrocytes give rise to myelin. It is a main component in communication between the brain and the body. When the myelin sheath is damaged, it results in disruption of communication. In the instance of MS, the immune system detects the myelin as a hazard to the body and begins to attack it. I decided to build a neuron using sweet sensations! I used octopus sour patch for the cell body or soma. The nucleus of the neuron is located in the soma, and this is shown by the “body” of the octopus candy. The legs of the octopus depict the dendrites of the neuron. The dendrites receive information from surrounding neurons at the synapse. For the synapse, I used clear gummy worms. I used sweet tart rope for the axon. The axon is a structure that projects off the soma and reaches other cells. The axon is responsible for emitting the nerve impulse. At the very top of the rope, the part that attaches to the soma is called the axon hillock. Further down the neuron, I used twizzler nibs to showcase the oligodendrocytes and myelin. The gaps we see between each oligodendrocyte are the node of Ranvier, we can see this by the whitish material within the sweet tart rope. These nodes are very important when it comes to signal conduction down the neuron. When it comes to MS, the candy was an easy material to deteriorate to showcase how the disease affects the neuron. As stated, MS causes demyelination of the axons and that is where we see the most damage. The nibs represent the oligodendrocytes and the myelin sheath. The insulation is damaged, and scarring becomes imminent. This scarring is what gives the disease its name as sclerosis simply means hardening of a tissue. This is primarily how the disease is detected. The individual will get an MRI to detect any the scar tissue or lesions. On the nibs, we can see the destruction the disease has caused, breaking down the sheath, deteriorating holes and exposing the axon within. This damage will lead to significantly slow signal conduction and communication. In severe cases, it may halt communication all together. MS produces a variety of neurological symptoms that include numbness or weakness of the limbs, an electric shock sensation with certain bodily movements, tremors, coordination deficits or unsteady gait. There can also be issues with vision and speech impairment, fatigue and impaired bladder and bowel function. Some may not know that there are actually 4 types or phenotypes of MS. Clinically isolated syndrome (CIS) that is the persons first episode of neurologic symptoms. Not everyone who experiences CIS will develop full onset MS. Relapsing-remitting MS (RRMS) is the most common course, is characterized by frequent, reoccurring attacks of neurologic symptoms. Almost 85% of people with MS are diagnosed with RRMS first. Secondary progressive MS (SPMS) follows RRMS. In this stage, there is a significant deterioration of neurologic symptoms. The final phenotype is primary progressive MS (PPMS). PPMS is characterized by a worsening of symptoms following the initial onset of neurologic symptoms. Unfortunately, there is no cure for any type of MS yet, but there are multiple types of therapies and clinic trials/testing. Research is always developing new forms of treatment with hopes of a cure in the near future!

Citations

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