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## Multiple Sclerosis

Multiple sclerosis is a chronic and often very debilitating condition that affects the nervous system of the human body. Severity of the condition varies and it affects every individual afflicted with it to a different degree. Through my research for this STEAM project, I have learned some interesting details about what causes multiple sclerosis, how it can be a risk factor for people who are exposed to COVID-19, and the prevalence of it in different groups of people. I have also created an art project made of clay that represents the difference between a multiple sclerosis affected neuron, and a healthy neuron.

Firstly, multiple sclerosis is caused by a breakdown of the nervous system. According to scientists, there is a fatty substance known as myelin that surrounds many of the nerves in our brain and spinal cord. (Zawada, 2019) In people who have multiple sclerosis, they experience an autoimmune reaction that breaks down that myelin sheath. (Zawada, 2019) This sheath is important because it speeds up and helps facilitate the signals that travel along the nerve fibers. When the sheath becomes damaged or destroyed, nerve impulses can be slowed dramatically. (Zawada, 2019) Some symptoms that occur because of this degradation of the immune system include numbness, tingling, slurred speech, blurred or double vision, loss of coordination, and muscle weakness. Over time the symptoms can worsen and become more severe, evolving into increased muscle fatigue and even paralysis. (Zawada, 2019) Multiple sclerosis can also cause cognitive functions to be dampened, by causing atrophy in the gray matter of the brain, leading

to things like short term memory loss. (De-la-Peña, 2020) For many patients these symptoms seem to be very unpredictable and often change frequently throughout the course of their affliction. (Zawada, 2019)

I would also add that the prevalence of multiple sclerosis is estimated to be between 16.6 and 357.6 per 100,000 population in North America. (Cutter, 2015) That is approximately between 0.2 and 3.6 percent of Americans. Although having multiple sclerosis can be a debilitating disability to have, it has been shown that the cause of death among individuals is mostly due to issues not directly related to multiple sclerosis, such as cardiovascular disease and cancer. (Cutter, 2015) The mortality rate of multiple sclerosis patients is similar to the rising mortality rate of old age. (Cutter, 2015)

As for the ongoing COVID-19 pandemic, it has been shown that multiple sclerosis is a risk factor for the virus. (Zawada, 2019) Having other health complications while also dealing with multiple sclerosis puts a significant strain on the immune system and can cause rapid mortality. (Zawada, 2019) COVID-19 has the potential to exacerbate the symptoms of multiple sclerosis as well, potentially causing long term negative effects. (Zawada, 2019)

Multiple sclerosis is an autoimmune disease that affects the nervous system by degrading the myelin sheath around nervous tissue. It is fairly prevalent in North America, and people who are afflicted with it are classified as being especially at risk for suffering death from COVID-19. (Zawada, 2019) If you refer to my clay sculptures you will see the difference between a healthy neuron and one that has a degraded myelin sheath due to multiple sclerosis.

## References

Multiple sclerosis. By: Zawada, W. Michael, PhD, Campanella, James J., PhD, Magill's Medical Guide (Online Edition), 2019

De-la-Peña, C., Parra-Bolaños, N., Bernabéu-Brotóns, E., & Fernández-Medina, J. (2020). Neuropsychological differences between types of multiple sclerosis: relapsing remitting versus primary progressive. *Revista Mexicana de Neurociencia*, 21(5), 192–198.

<https://doi.org/10.24875/RMN.20000039>

Cutter, G. R., Zimmerman, J., Salter, A. R., Knappertz, V., Suarez, G., Waterbor, J., Howard, V. J., & Ann Marrie, R. (2015). Causes of death among persons with multiple sclerosis. *Multiple Sclerosis & Related Disorders*, 4(5), 484–490.

Zawada, W. M., PhD, & Campanella, J. J., PhD. (2019). Multiple sclerosis. Magill's Medical Guide (Online Edition).