



Multiple Sclerosis

Why in News?

Recently, Scientists have **fabricated monolayers of pure Myelin Basic Protein (MBP)**.

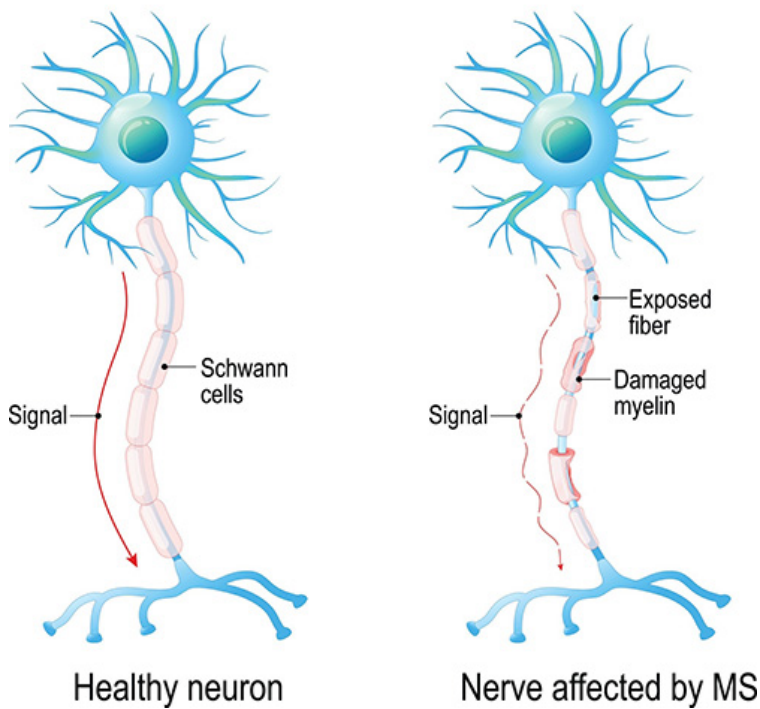
- **MBP is a major protein component of the myelin sheath**, a protective membrane that wraps around the axon of **nerve cells** and acts as a **model protein in studying diseases like [multiple sclerosis \(MS\)](#)**.

What is Multiple Sclerosis?

- **About:**
 - Multiple Sclerosis (MS) is a **chronic autoimmune disease** that affects the **central nervous system (CNS)**.
 - In MS, the immune system attacks and damages the **myelin sheath**, a protective covering that surrounds the **nerve fibers in the brain and spinal cord, causing a range of symptoms**.
- **Symptoms:**
 - **Muscle weakness** and Numbness
 - **Bladder Problems:** A person may have difficulty emptying their bladder or need to urinate frequently or suddenly
 - **Bowel problems, Fatigue, Dizziness, and damaged nerve fibers** in the spinal cord.
 - Since symptoms are common, people don't often recognise the disease early and often takes many years for someone to be diagnosed, as it is impossible to determine a specific cause or trigger.
- **Causes:**
 - The exact cause of the disease is unknown, but it could be a combination of:
 - **Genetic factors:** Susceptibility may pass down in the genes
 - **Smoking and Stress**
 - **Vitamin D and B12 deficiency**

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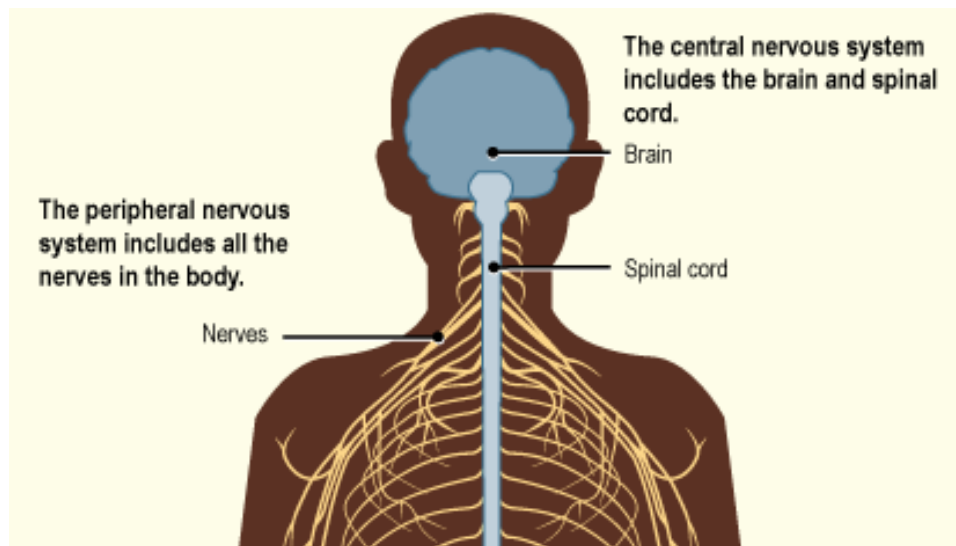


What are the Key Highlights from the Research?

- **Understanding the Behaviour of Protein under Variable pH Conditions:**
 - The researchers studied how the protein behaved in different levels of acidity, by looking at different parts of the layer formed on top of the water.
 - They found that the **stiffness of the layer was related to the specific patterns formed and the space they occupied on the water surface.**
- **Fabricated MBP Layer:**
 - The researchers have created a tightly packed layer of MBP using Langmuir-**Blodgett (LB) technique.**
 - **The Langmuir-Blodgett (LB) technique is a process used to create monolayers of molecules, including proteins, at air-water and air-solid interfaces.**
 - This layer can be used to study the **different properties of MBP in 2D and how it interacts with other proteins.**
 - The researchers also found that the **layer can act as a template for other proteins to crystallize on**, which can help in **studying their structures.**
 - Overall, this research helps us better understand the role of MBP in our bodies and how it interacts with other molecules.

What is the Central Nervous System?

- Central nervous system (CNS) is composed of the **brain and spinal cord:**
 - The brain is responsible for **processing information and controlling body functions.**
 - The **spinal cord acts as a relay between the brain and the rest of the body.**
- The CNS is protected by the **skull and spinal column.**
 - Neurons are the basic building blocks of the CNS.
 - The CNS uses neurotransmitters to communicate between neurons.
- Disorders of the CNS can result in a wide range of neurological conditions such as [Alzheimer's](#), [Parkinson's](#), and **Multiple sclerosis.**



[Source: PIB](#)

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