

Ageing myelin, the cause of MS?

11th December, 2016



You are not as old as you think you are! We often think that our bodies are static, that it is the same body we have always had, maybe a little softer in parts, possibly a little less flexible and blessed with a few more character marks, but roughly its the same one.

However, the reality is vastly different, our bodies are very dynamic. The cells and proteins that make up body are constantly and rapidly being renewed and refreshed, with a lot of the cells in your body being created long after you were born.

However, not all cells and not all proteins are in this state of constant flux. We have known for a long time that different types of cells have different life span, for

example cells lining the acid filled stomach are thought to last only about 5 days, whereas some of our brain cells are thought to last a lifetime. The proteins in our body also show a wide range of lifespans, ranging mainly from less than an hour to 22 hours. However, in some cases they have lifetimes of months or years, with some showing no turnover at all. Professor Roger Truscott at the University of Wollongong, has been investigating the myelin basic protein and what happens to it as it ages.

The myelin basic protein is one of the important components that make up myelin, which forms the insulating sheath that protects nerves cells. In MS the immune system appears to wrongly attack this myelin sheath damaging it and damaging the nerve cells it is meant to be protecting. What causes the immune system to attack the myelin sheath is unknown. Professor Truscott thinks he might have an answer and it may have something to do with the myelin aging poorly.

Professor Truscott and his team recently published their findings in the journal [*Acta Neuropathologica Communications*] <https://actaneurocomms.biomedcentral.com/articles/10.1186/s40478-016-0348-x>. They suggest that the myelin basic protein is a long lived protein, and using a scientific technique called mass spectrometry to investigate the basic chemical elements of this protein. They found that as an individual ages their myelin basic protein suffers a lot of wear and tear leading to minute chemical changes in their myelin. While these changes might be minute, they potentially have a drastic impact. Professor Truscott's research suggests that these chemical changes may cause changes in the shape of the myelin protein, which might fool the immune system into thinking it is a foreign protein and mount an attack.

Using tissue from brains of people with and without MS, the researchers isolated myelin basic protein from people of various ages. They found that the myelin basic protein changes with age in both people with MS and those without. They also detected some changes specific to the people with MS, as well as some premature age damage in people with MS and hypothesis that this might be a characteristic difference that triggers the immune system to attack the myelin basic protein in MS.

This is a very interesting observation, however the number of people included in the study were quite small, so further larger studies are needed. More work also needs to be done to determine whether this is an early event leading to MS or whether it is a by-product of the immune system attacking the myelin. However, this is an exciting step and we look forward to future studies investigating this phenomenon.