Neurodegeneration is an all-too-common set of symptoms seen in people as they reach life’s later stages. Most famously, neurodegeneration can lead to memory loss, robbing people of their quality of life and their essential personality.

Much fundamental research has led to a greater understanding of the pathophysiological processes involved in neurodegeneration and has revealed that accumulation of misfolded, toxic proteins is frequently a cause of neurodegeneration. This understanding is being refined toward the view that a common underlying principle of neurodegenerative misfolded proteins involves pathological phase transitions.

Many different disorders can cause neurodegeneration, but by far the most prevalent is Alzheimer’s disease. Much is already known about the genetic underpinnings of susceptibility to Alzheimer’s disease, but there is still a lot to learn about how to translate this knowledge into therapies.

Disrupted sleep often occurs before or in the early stages of neurogenerative disease. An important function of sleep is to allow waste products—including misfolded proteins associated with neurodegeneration—to be cleared from the brain via the glymphatic system.

Microglia, the major tissue-resident immune cells of the brain, directly modulate neuronal function in development and in neurodegenerative diseases such as Alzheimer’s and Parkinson’s diseases.

Elucidating the biological foundations of neurodegenerative disease will be key to the development of targeted therapies to slow or prevent the onset of dementia. In such late-onset diseases, delaying symptoms by even a few years can make an enormous difference to the quality of life of patients, as well as their families and caregivers.

By Stella Hurtley and Gemma Alderton
Neurodegeneration can stop people from being able to perform the most basic tasks in life. However, possibly the most difficult thing is the gradual loss of their most precious memories of loved ones.
Neurodegeneration
Stella Hurtley and Gemma Alderton

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