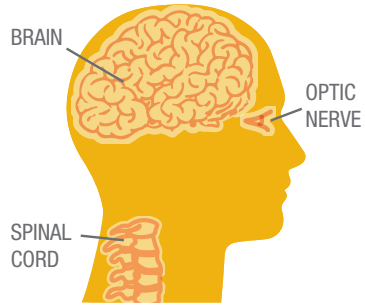


# Multiple Sclerosis & the Brain



Multiple sclerosis (MS) is a chronic autoimmune disease that attacks the central nervous system (CNS) – the **brain, spinal cord and optic nerve**<sup>1</sup>.

MS affects the ability of nerve cells in the brain and spinal cord to **communicate** with each other effectively<sup>2</sup>.

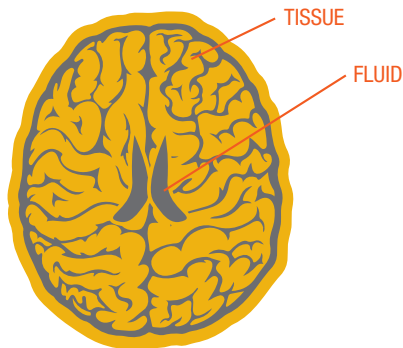
## What is brain volume loss in MS?

Brain atrophy, a permanent loss of brain tissue, is assessed in patients as brain volume change over time.

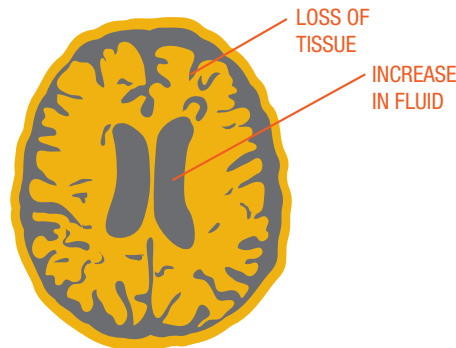
Although brain atrophy occurs in people without MS, it occurs **3–5 times faster in people with MS**<sup>3</sup>. The atrophy occurs early in the disease and continues throughout the course of disease and in all forms of the disease<sup>3–5</sup>.



## What does brain volume loss look like in someone with MS?



HEALTHY BRAIN



BRAIN OF SOMEONE WHO HAS HAD RELAPSING REMITTING MULTIPLE SCLEROSIS (THE MOST COMMON FORM OF MS) FOR APPROXIMATELY 10 YEARS

Adapted from Bermel *et al.*, 2006<sup>6</sup>

## How is brain volume loss measured?

Currently, assessing brain volume loss is not routinely measured as part of a patient's clinical evaluation.

There is increasing recognition that the assessment of brain volume loss is becoming an important consideration in monitoring MS treatment effects, in addition to being a standard secondary outcome in clinical trials<sup>7,8</sup>.

MRI uses a magnetic field and pulses of radio wave energy to produce images of the brain<sup>9</sup>.

Brain volume loss is a key MRI-predictor of long-term disability<sup>5,9–10</sup>, can be reliably measured and can help determine the disease course.



## What is the impact of brain volume loss in MS?

Brain volume loss in MS has been linked to **symptoms that can significantly affect the life of people with MS**<sup>9–12</sup>.



**REDUCED STRENGTH**



**FATIGUE**



**DIFFICULTY WALKING**



**COGNITIVE IMPAIRMENT**

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