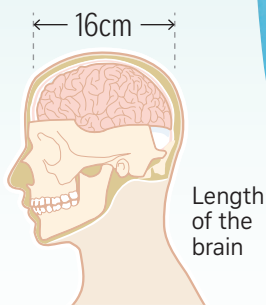


The body's powerhouse

Weighing just 1.2kg, the brain controls thought processes and the rest of the body. And when parts of the brain are damaged, the consequences can be devastating. With neurodegenerative conditions on the rise in Singapore, **Clara Chong** delves into some common disorders and how they can be prevented.

BRAINY FACTS:

Weight of an average human brain **1.2kg**



A young adult and an elderly person should **not have any differences in brain weight**, if both are healthy.

Basic brain structure is determined by genetic programming, but functions and learnt skills controlled by the brain develop after birth and are influenced by the environment.

There is no correlation between brain density or size and intellect.

DONATING YOUR BRAIN

Why is the brain bank important?

Singapore needs its own brain bank so researchers can discover specific changes in Asian brains which could lead to better treatments and diagnostics for our local population.

The brain is not just floating in the skull. It is **connected to other tissues**, known as connective tissues, such as blood vessels, that hold it in place suspended in fluid. **So to obtain the brain, these tissues need to be carefully cut.**

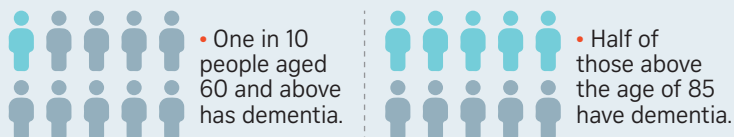
The retrieval of the whole brain and the cerebral spinal fluid takes about **an hour**.

COMMON NEURODEGENERATIVE CONDITIONS

DEMENTIA

- Dementia is the deterioration in memory, thinking, behaviour and the ability to perform everyday activities. Alzheimer's disease is the most common cause.
- These patients have smaller and lighter brains. Healthy brains have wrinkles on the brain surface, as wrinkles increase the surface area to pack brain cells. Dementia causes loss of some of these cells, shrinking the brain.

IN SINGAPORE:



Around 82,000 people have dementia, and the number is expected to cross 100,000 by 2030.

- A study of patients in the National Neuroscience Institute found that for those **over 65**, the median annual cost of treatment was around **\$11,400**.
- For younger patients**, it was nearly double that, at **\$21,400**.

40% Percentage of younger patients who reported losing their jobs due to dementia.

WORLDWIDE: Every 3 seconds, 1 person is diagnosed with dementia.

MOTOR NEURON DISEASE (MND)

Motor neuron disease causes the nerves in the spine and brain to lose function over time.

300 to 400 people live with MND in Singapore

PARKINSON'S DISEASE (PD)

Parkinson's disease is a brain disorder that affects movement, leading to shaking, stiffness, and difficulty with walking, balance, and coordination.

IN SINGAPORE:

Up to **8,000** people have PD
3 in 1,000 aged over 50 have PD

WORLDWIDE: The number of people with PD will double from **6.9 million** (in 2015) to **14.2 million** (in 2040)



The right hemisphere of the brain of a woman in her 70s, the first donated to the Brain Bank Singapore.

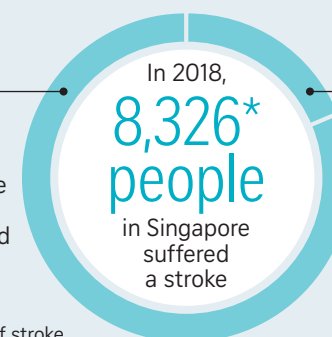
OTHER NEUROLOGICAL CONDITIONS INCLUDE:

STROKE

Stroke is a leading cause of adult disability and is the fourth leading cause of death in Singapore.



6,764 cases of ischaemic stroke (caused by blockage of a blood vessel in the brain)



1,552 cases of haemorrhagic stroke (caused by a burst blood vessel in the brain)

The number of Singaporeans aged 65 and above will almost double by 2030, making up a quarter of the population.

Just over one in three patients develop cognitive impairment caused by their stroke.

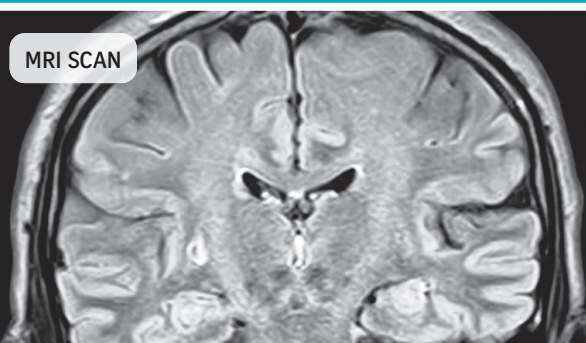
The incidence of stroke is expected to increase in tandem.

This can happen **within six months** after the stroke and affect their memory, concentration and ability to find their way and learn new things.

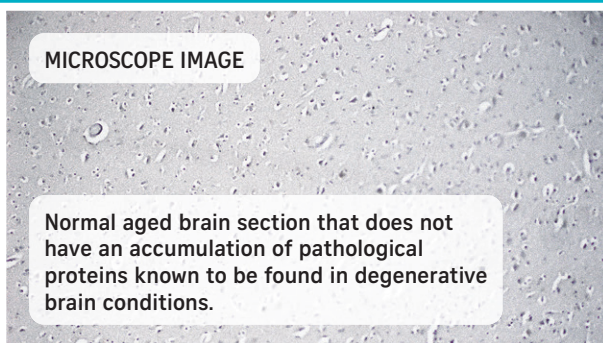
Individuals with diabetes and high blood pressure are more prone to "silent" strokes, caused by interrupted blood flow in the brain's small blood vessels. The damage can build up, leading to dementia.

Stroke and multiple sclerosis can affect the integrity of the blood brain barrier which protects the brain, allowing harmful cells and molecules to enter.

HEALTHY BRAIN



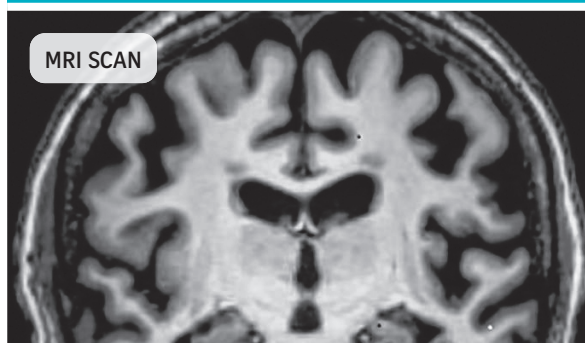
MRI SCAN



MICROSCOPE IMAGE

Normal aged brain section that does not have an accumulation of pathological proteins known to be found in degenerative brain conditions.

ALZHEIMER'S BRAIN



MRI SCAN



MICROSCOPE IMAGE

Presence of dying neurons containing tangles of a toxic protein, phospho-Tau, in brown, among healthy-looking purple neurons.

PROTECTING THE BRAIN

Ageing is a major risk factor for developing neurodegenerative conditions such as dementia, but there are ways to reduce the risk:



Get checked and treated for **high blood pressure, high cholesterol and diabetes**



Quit smoking



Exercise regularly and maintain a healthy diet



Get adequate rest and sleep to reduce the risk of cognitive decline



Maintain an active social life



Work, play games or learn new skills