



DISEASE FACT SHEET

Parkinson's Disease

Parkinson's disease

Named after English physician Dr James Parkinson, who first described the disease as the "shaking palsy" in 1817, Parkinson's disease is a degenerative condition of the central nervous system, characterised by tremor, rigidity and impaired movement. Although there is currently no cure for Parkinson's disease, it can be managed and the symptoms alleviated.

There are currently about 100 000 Australians living with Parkinson's disease. It is usually diagnosed around the age of 65, but of those who contract the disease, one in ten will be diagnosed before they are 45. Men are slightly more at risk of developing Parkinson's than women.

What causes Parkinson's disease?

Although there are many theories about the cause of Parkinson's disease, none has ever been proved. A few cases have been shown to be inherited and have been traced to mutations in four different genes, including the alpha-synuclein gene that Garvan is investigating.

The symptoms of Parkinson's disease result from the progressive degeneration of neurons, or brain cells, in the midbrain. Neurons in the part of the brain that control co-ordinated movement release a neurotransmitter called dopamine. Dopamine stimulates motor neurons, those nerve cells that control the muscles. When dopamine production is depleted, the motor system nerves are unable to control movement and coordination. Parkinson's disease patients lose 80% or more of their dopamine-producing cells by the time their symptoms appear.

What are the symptoms of Parkinson's?

Initially, symptoms are mild and often located on one side of the body. Although the rate of progression varies between individuals, the symptoms become more pronounced and spread to other parts of the body.

- Tremor (shaking) - This often occurs in the hands, fingers, forearms, foot, mouth and chin. Tremors typically take place when limbs are at rest
- Rigidity (muscle stiffness) - This often produces muscle pain that is increased during movement
- Bradykinesia - Slowness in voluntary movement such as standing up, walking and sitting down
- Difficulty with balance - This occurs due to the loss of reflexes that help posture. Falling is common
- "Parkinson's gait" - This common walk of a Parkinson's patient includes a shuffling gait, drooped shoulders, lack of arm swing, head faced down and leaning backwards or forwards unnaturally. It is difficult to initiate walking and pausing mid-stride is common
- Micrographia (small handwriting)
- Lethargy and depression



"About 100 000 Australians are living with Parkinson's disease"

"The average age of diagnosis is 65 years, but one in ten are under 45 years of age"

"Parkinson's disease patients have lost at least 80% of their dopamine-producing cells by the time symptoms appear"



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How is Parkinson's diagnosed & managed?

There are currently no laboratory tests to diagnose Parkinson's disease definitively. A thorough neurological examination, including testing of reflexes, muscle strength and coordination is given, along with other tests, such as magnetic resonance imaging (MRI) and blood tests, to rule out the possibility of other diseases. As there is currently no cure for Parkinson's, the symptoms are managed with a variety of treatments including drug and physical therapy.

Drug therapy aims to overcome the problem of depleted dopamine stores in the brain. Different drugs have different actions: some mimic the action of dopamine, some prevent further depletion and some enhance the action of the remaining dopamine stores. A neurologist will prescribe the treatment and dosage appropriate to the patient as severity and type of symptoms vary greatly between individuals.

In severe cases, neurosurgery may be necessary to relieve symptoms. Lesions are made on certain parts of the brain to interrupt involuntary movement. Deep brain stimulation, where an electrode is implanted in the affected area of the brain, may also help alleviate symptoms.

What research is Garvan doing in this area?

The Garvan Institute is investigating Parkinson's disease from a range of approaches. We have some scientists researching the mechanisms behind cell degeneration. We know that certain pesticides, toxins and genes (such as the alpha-synuclein gene) cause Parkinson's disease, but why they cause the disease is not yet fully understood.

Another aspect of Garvan's research is investigating the mechanisms behind the release and control of dopamine in the brain. Once the various mechanisms are known, we can develop a therapeutic approach to treat the disease and restore movement control.

One of our most exciting research projects involves seeing how we can harness the brain's own adult stem cells, which normally function to repair injury to the brain and make new nerve cell connections, to help treat Parkinson's disease, as well as other neurodegenerative conditions.

Further sources of information

Parkinson's Australia	www.parkinsons.org.au
National Parkinson's Foundation (USA)	www.parkinson.org
Parkinson's Disease Society (UK)	www.parkinsons.org.uk

Garvan Institute of Medical Research – how you can get involved

The Garvan Institute of Medical Research was founded in 1963. Initially a research department of St Vincent's Hospital in Sydney, it is now one of Australia's largest medical research institutions with approximately 500 scientists, students and support staff. Garvan's main research areas are: Cancer, Diabetes & Obesity, Immunology, Osteoporosis & Bone Biology and Neuroscience.

Your support makes it possible for the Garvan scientists to continue their great work. You can help by making a donation or a bequest, holding a community fundraiser or volunteering your time for Garvan. For details on how to get involved, please visit www.giving.garvan.org.au or contact the Garvan Research Foundation on (02) 9295 8110.

Education is one of Garvan's top priorities. Our Public Engagement Coordinator can visit your community group or school to give a talk on a number of science and health related topics. Garvan also offers regular tours of our facilities. For further details, visit our website or call on (02) 9295 8108.

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