

## Parkinson's disease Essay

### **Title: Parkinson's disease – current knowledge and future research challenges**

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Parkinson's disease (PD) is a progressive neurological condition characterised by both motor (movement) and non-motor symptoms. The four main symptoms are:

- Tremor
- Bradykinesia (stiffness of movement)
- Muscle rigidity
- Postural instability

These symptoms are due to a deficit of the neurotransmitter dopamine as the dopamine producing neurons have died within the brain region called the substantia nigra. We still do not know why and how these cells, however the most commonly explored theories are:

- Environmental toxins

Exposure to a range of metals and chemicals including manganese, copper, mercury, carbon monoxide and cyanide. Industrial pollutants, herbicides and pesticides have also been considered as possible causative factors [1].

- Oxidative stress and neuroinflammation

Free radicals are produced by the aging process [2].

- Genetic factors

10% of all PD cases have a genetic link [3].

- Multi-factorial

Like many neurological disorders, PD is considered a complex disorder caused by a combination of genetic and environmental factors [4].

Currently, only post mortem studies can make a definitive diagnosis by confirming a loss of dopamine producing neurons and the presence of Lewy bodies (abnormal protein deposits) in surviving cells. However, although not widely available, recent techniques using positron emission tomography (PET) scanning can estimate dopamine levels.

PD is the second most common neurological disorder worldwide, affecting approximately 6.3 million people. In Victoria, 20,000 people are living with the disease with 1000 new cases per annum [5]. Age is an increasing risk for PD with an incidence of 1:1000 for people over 65 and 1:100 over 75 years. Average age of onset is 55-65 years of age. Young-onset (40-50 years of age) and juvenile forms of the disease have also been diagnosed. However, Parkinson's disease is incurable, with current drug therapies only alleviating symptoms. The main form of treatment is medication to restore the dopamine levels; either drugs that can cross the blood-brain barrier and be converted into dopamine by the brain (such as levodopa) or those that can stimulate the dopamine receptors of the brain (dopamine agonists). Long-term use of anti-Parkinsonian medication is associated with serious side effects and medication has a maximum benefit of 5 - 10 years. Deep Brain Stimulation (DBS) of

the subthalamic nucleus region of the brain has now been successfully performed to support and reduce drug medication treatment for PD.

## References

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5. <http://www.parkinsonsvic.org.au/>