

Free essay on parkinson's disease

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Parkinson's disease was first described by James Parkinson in 1817 as the "shaking palsy". A person with Parkinson's disease suffers from continuous shaking tremors while they are at rest, a phenomenon known as "pill rolling" (Jankovic, 2008). There are several public figures that live with Parkinson's disease including the actor Michael J. Fox, the boxer Muhammad Ali, and former Attorney General Janet Reno. While tremendous research efforts have uncovered many important aspects of this disease, it is still unclear what determines the onset of this disease. The majority of Parkinson disease cases are idiopathic, meaning that there is no known origin. However there are a small percentage of cases that are thought to be related to a genetic factor (Jankovic, 2008).

Parkinson's disease affects a person's ability to control their motor movements. Parkinson's disease primarily affects the substantia nigra, a large midbrain nuclei that is part of the basal ganglia system that coordinates motor control in humans. The substantia nigra is home to the brain's largest population of dopaminergic neurons, neurons that produce the neurotransmitter dopamine (Nicholls et al., 2012). These dopaminergic neurons project axons to the striatum, another portion of the basal ganglia system. These axons release dopamine providing an overall excitatory effect in the striatum. This excitatory tone from the substantia nigra ensures that the inhibitory GABAergic neurons in the striatum fire upon the globus pallidum, another nuclei in the basal ganglia system. The neurons of the globus pallidum are also inhibitory GABAergic neurons that, in turn, project to neurons in the thalamus. The thalamus provides excitatory projections to the motor cortex. This complicated circuitry is affected by Parkinson's

Disease. A person with Parkinson's disease experiences abnormal degeneration of the dopaminergic neurons in the substantia nigra. As a result, the striatum is underexcited and provides less inhibition to the globus pallidum. Less inhibition of globus pallidum neurons means more inhibitory tone projected to the thalamus and a lower level of excitatory input to the motor cortex. Because of this, Parkinson's patients suffer from hypokinesia, or less bodily movement (Nicholls et al., 2012).

Several different methods have been used to study Parkinson's disease. Studies to determine the effects of Parkinson's disease on brain activity have used electroencephalograms (EEGs), a test that records and quantifies the brain electrical activity (Dietz et al., 2013). Magnetic resonance imaging (MRI) and computed tomography (CT) scans have been used to acquire detailed images of the brain in order to study which areas and to what extent these areas are affected by Parkinson's disease (Brooks, 2010). Functional magnetic resonance imaging (fMRI) is another method used to study how Parkinson's disease affects the metabolic activity of the brain (Hall et al., 2012). Medical doctors use these technologies to help diagnose people with Parkinson's disease. Even with the use of all this technology, a definitive Parkinson's Disease diagnosis is not always clear since many of the classic Parkinson symptoms may be caused by a number of other conditions. MRI and CT scans will usually appear normal in Parkinson patients but they can help rule out other possible causes of symptoms (Jankovic, 2008).. Functional imaging technology may be more helpful in obtaining a diagnosis because they can be used to study dopamine levels and activity in the brain.

Parkinson's Disease is a progressive disease that decreases the life span of

an individual and increases the chance of age related dementia. The primary treatment for Parkinson's disease is the administration of L-DOPA, a dopamine precursor that can cross the blood brain barrier. The administration of dopamine is not a viable option because it cannot pass the blood brain barrier. L-Dopa is taken up by neurons in the substantia nigra and used to synthesize dopamine (Nicholls et al., 2012). Experimental treatments include the grafting of stem cells in the substantia nigra to replace lost dopaminergic neurons (Ali et al., 2013). L-Dopa treatment becomes less effective as the disease progresses and a person with Parkinson's disease will usually die from a secondary illness directly related to their disease. As advanced technology and steadfast effort has allowed researchers to uncover the underlying mechanisms of Parkinson's disease, the quest for more effective treatments and a definitive cure optimistically continues.

References

- Ali, F., Stott, S. R., & Barker, R. A. (2013). Stem cells and the treatment of Parkinson's disease. *Exp Neurol*. doi: 10. 1016/j. expneurol. 2012. 12. 017
- Brooks, D. J. (2010). Imaging approaches to Parkinson disease. [Review]. *J Nucl Med*, 51(4), 596-609. doi: 10. 2967/jnumed. 108. 059998
- Dietz, J., Bradley, M. M., Jones, J., Okun, M. S., Perlstein, W. M., & Bowers, D. (2013). The late positive potential, emotion and apathy in Parkinson's disease. *Neuropsychologia*. doi: 10. 1016/j. neuropsychologia. 2013. 01. 001
- Hall, H., Cuellar-Baena, S., Dahlberg, C., In't Zandt, R., Denisov, V., & Kirik, D. (2012). Magnetic resonance spectroscopic methods for the assessment of metabolic functions in the diseased brain. *Curr Top Behav Neurosci*, 11, 169-
<https://assignbuster.com/free-essay-on-parkinsons-disease/>

198. doi: 10. 1007/7854_2011_166

Jankovic, J. (2008). Parkinson's disease: clinical features and diagnosis.

[Research Support, Non-U. S. Gov't Review]. *J Neurol Neurosurg Psychiatry*,

79(4), 368-376. doi: 10. 1136/jnnp. 2007. 131045

Nicholls, J. G., Martin, A. R., Fuchs, P. A., Brown, D. A., Diamond, M. E.,

Weisblat, D. A. (2012). *From Neuron to Brain* (5th ed.). Sunderland, MA; Sinar

Associates, Inc. Publishers.