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Parkinson's Disease Genetic Influence

Recent developments in research gene research has found that genetic influence plays a large role in Parkinson's disease. Five main genes that are believed to contribute to the disease have been identified and located. These include alpha-synuclein, Parkin, Ubiquitin carboxyl-terminal hydrolase, DJ-1 and SCA2. It has been found that mutations of these genes are some of the underlying causes. In some cases there can be multiple mutations in one gene. The effects of some of these mutations are now understood.

- Alpha-synuclein – Has been found to be associated with dementia in Parkinson's Disease patients. The mutations have also been associated with the young onset form of Sporadic Parkinson's Disease.
- Ubiquitin carboxyl-terminal hydrolase – Has also been associated with Sporadic Parkinson's Disease. Mutations in this gene have also been found to cause abnormal protein processing, where proteins should be degraded. Covering a protein in ubiquitin would normally be the cell's way of labeling the protein for discarding. But when the gene is mutated, these instructions are not presented adequately. This abnormal processing results in adverse cell reactions, which eventually lead to cell death.
- Parkin – the parkin gene helps to ubiquitinate a protein called Cyclin E. Cyclin E can then be degraded. When the parkin gene is mutated, Cyclin E accumulates in neurons which then begin to die. Researchers have found excess Cyclin E in the dopamine releasing neurons of some Sporadic Parkinson's Disease patients.

Researchers suspect that genes associated with the late onset of Parkinson's Disease are susceptibility genes rather than causal genes. It is thought that environmental factors act on these genes, consequently leading to Parkinson's disease. But the mechanism in which they do so is not yet known. Researchers believe that if they can work out this mechanism, they can disrupt it in some way, and therefore halt the onset of the disease.

The general consensus among researchers is that both genetic influence and environmental factors lead to the onset of Parkinson's Disease. The mechanisms of the genetic influence of Parkinson's Disease are still to be understood and much more research is required.