PARKINSON'S DISEASE
Patient Information Fact Sheet

What is Parkinson's disease?
Parkinson's disease is a progressive disease of the nervous system. In the United States, 50,000 to 60,000 new cases of Parkinson's disease are diagnosed each year, adding to the 1 million people who currently have Parkinson's disease. In fact, it is estimated that 4 to 6 million people around the world suffer from the condition. Parkinson's disease becomes more common with increasing age, though there are those diagnosed with early- or young-onset Parkinson's disease, perhaps actor Michael J. Fox being the most famous. He was diagnosed at age 30 and has raised awareness and research for this disease via his foundation.

Symptoms of the disease usually first appear in people over the age of 50, although as noted above, younger people can also develop the disease. There is no evidence that Parkinson's disease is hereditary, although in around 5% of cases there is another family member affected. It is believed that genetics may make some people more prone to developing Parkinson's disease, but only if combined with exposure to external factors. To date, scientists have identified nine genes linked to Parkinson's disease.

What are the symptoms of Parkinson's disease?
The main symptoms of Parkinson's disease are tremor, stiff muscles and joints, and slowness or difficulty in walking. In most people the presenting symptom of the disease is tremor, which usually begins on one side of the body (unilaterally) in the hand or arm. The tremor usually occurs at rest and decreases when the affected part is being used. It usually increases during times of stress or heightened emotion and decreases during sleep. Stiffness or rigidity of the muscles can also occur; this can be quite painful and can cause difficulty in performing many everyday motions. Walking may be slowed and it can be difficult to start to walk. A lack of coordination may also cause problems. Other symptoms include difficulties with balance, speech and writing, and sometimes a lack of facial expression, altered posture and fatigue.

What causes Parkinson's disease?
The reasons people develop Parkinson's disease are not yet fully known. However, it is known that it is caused by a decrease in the nerve cells in a particular area of the brain called the substantia nigra. These cells produce and store dopamine, a chemical messenger involved in the coordination of movements in the body. The amount of dopamine being produced is therefore reduced while the level of acetylcholine, another chemical messenger, remains normal, causing an imbalance between the two. Symptoms of Parkinson's disease usually appear when around 80% of the dopamine-producing cells have been lost.

How is Parkinson's disease treated?

Currently, there is no cure for Parkinson's. But there are drugs available that are used to restore the balance between dopamine and acetylcholine and that can help to control some of the symptoms.

Levodopa is a natural amino acid that has been used to treat Parkinson's disease since the 1960s. Levodopa is converted into dopamine by an enzyme in the brain. In order to prevent the levodopa being metabolized by this enzyme before it reaches the brain, it is given in combination with an enzyme inhibitor (eg, **carbidopa**) that blocks the enzyme in the gastrointestinal tract. The inhibitors are not able to pass into the brain and therefore, do not inhibit the conversion of levodopa into dopamine in the brain. Levodopa considerably improves symptoms such as stiffness and slowness of movement. The most commonly prescribed combination is Sinemet (levodopa and carbidopa).

Of those people who respond to treatment with levodopa, around two-thirds will experience some loss of benefit after two to five years as their body becomes tolerant to the drug. Some people will then experience a progressive recurrence of their parkinsonian disability. Other people, especially younger sufferers, will develop fluctuations in their mobility throughout the day. This is known as end-of-dose deterioration or the "wearing-off" effect. Sometimes this effect can be managed by decreasing the time between doses of levodopa. In some people this may not be effective and the change between mobility and immobility may become more abrupt; this is known as the "on/off" effect.

Dopamine agonists stimulate the parts of the brain where dopamine acts. They can be taken alone or sometimes in combination with Sinemet. They produce fewer long-term side effects such as the on/off effect and are therefore often used in younger patients. Commonly prescribed examples are **bromocriptine** (Parlodel) and **ropinirole** (Requip). **Apomorphine** (Apokyn) is an injectable dopamine agonist that acts very quickly and can be used for people who experience extreme variations in mobility and need to be active at specific times. Cabergoline may be used in combination with levodopa, and **pramipexole** (Mirapex) may be used alone or in combination with levodopa. **Amantadine** (Symmetrel) promotes the release of dopamine and can help to reduce involuntary movements, but as it has only a mild effect is suitable for a smaller number of people.

Anticholinergics are used to correct the balance between acetylcholine and dopamine by blocking the action of acetylcholine. They are often used in younger people with milder symptoms. These include **benzatropine** (Cogentin), **orphenadrine** (Norflex), and **trihexyphenidyl**. **COMT inhibitors** are a newer class of drugs that block COMT, an enzyme that breaks down levodopa. This class includes **entacapone** (Comtan) and **tolcapone** (Tasmar). A combined product containing entacapone plus levodopa and

carbidopa is also available (Stalevo). **Selegiline** (Eldepryl, Zelapar) slows the breakdown of dopamine and can increase the effectiveness of Sinemet. **Rasagiline** (Azilect) is another drug that works in a similar way.

The use of surgery to treat Parkinson's disease has been largely abandoned since the introduction of levodopa and other drugs. However, recently there has been renewed interest and new surgical techniques are currently being researched.

How does Parkinson's disease affect a person's life?

Most people with Parkinson's disease can lead a long and busy life. Life expectancy is the same as for people who do not have the disease. Despite problems with everyday life such as with writing, driving a car, mobility and communication difficulties, much help and support are available. Physical therapy, speech and language therapy and occupational therapy are all beneficial.

Self-help measures

- Keeping active can help to loosen stiff muscles and improve speech or posture.
- If you shuffle when walking, wear leather soled shoes to help you keep your balance.
- Try to keep your weight at a normal level as being overweight puts additional strain on your joints and may affect your mobility.
- Try to relieve symptoms of anxiety as this can make any tremor more severe and can also affect your sleep.

Further information

National Parkinson Foundation: http://www.parkinson.org

American Parkinson Disease Association: http://www.apdaparkinson.org

Michael J. Fox Foundation for Parkinson's Research: http://www.michaeljfox.org

Date last reviewed: July 2011