IMPORTANT
This book is intended not as a substitute for personal medical advice but as a supplement to that advice for the patient who wishes to understand more about his or her condition.

Before taking any form of treatment YOU SHOULD ALWAYS CONSULT YOUR MEDICAL PRACTITIONER.

In particular (without limit) you should note that advances in medical science occur rapidly and some information about drugs and treatment contained in this booklet may very soon be out of date.

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Acknowledgements
I am indebted to the many Parkinson’s disease patients whom I have seen over the years. Their comments and reflections upon their disease have guided the design of this book. The role of the Parkinson’s Disease Society in acting as sponsor, informant and advocate for their members is both recognised and acknowledged. I am indebted to Dr Diane Playford for writing the chapter ‘Living with Parkinson’s disease’. Her expertise in this area has been invaluable and her chapter will no doubt be of great value to readers. Finally, I thank our Parkinson’s disease nurse specialist, Ms Cathy McGee, for reviewing and commenting on the book and for reviewing the role of the nurse specialist.

Dedication
To my wife Laura and my daughter Sarah for their constant understanding and inspiration.

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What is Parkinson’s disease?
This book aims to give you an understanding of Parkinson’s disease presented in a straightforward and accessible way. If you, or a close friend or relative, has the disease, it will help you deal positively with treatment and daily living. Or you may read it out of general interest or to bring yourself up to date.

Parkinson’s disease is one of the most common disorders of the nervous system. It affects muscle movement and many of its symptoms are caused by loss of nerve cells in a very small part of the brain. The main features are tremor, muscle stiffness and slower movements, and these eventually cause the person with the disease to have a characteristic appearance and way of walking.

If you are to have a clear picture of the disease you will need to understand the structure and functions of the brain, and these are explained in the first chapter. The next three chapters give an account of the features of the disease, how it is recognised and what is known about the causes. It was first described
in 1817 by Dr James Parkinson, a GP in London. The disease has probably been around for hundreds of years but seems more common now. This would be expected because Parkinson’s disease occurs mostly in those over the age of 60 or 70, and nowadays many more people are living beyond that age. Doctors are also now more aware of Parkinson’s disease and are able to diagnose it more frequently. Some have suggested that other possible factors, including environmental pollution, might contribute to an increase of the disease (see pages 28–9).

Medical research has identified some of the biochemical causes of the disease and how these affect brain function, causing the typical symptoms. Most importantly, research has led the way to treatment of these symptoms. The treatment of the disease with drugs is described in detail in the chapter starting on page 50.

New drugs introduced in the past 10 years have led to dramatic changes in the control of symptoms and in the outlook for people newly diagnosed with Parkinson’s disease. Today, much research is focused on developing treatments that slow or prevent the progression of the disease – and it is likely that such drugs will become available over the next 10 years. As advances are made, some parts of this book will become outdated. We will continually review this and update the book as necessary.

The later chapters in the book discuss the practical aspects of living with Parkinson’s disease – which will be helped greatly if you make full use of the support that is available from health professionals such as physiotherapists and specialist nurses. I am particularly indebted to Dr Diane Playford for writing the chapter on ‘Living with Parkinson’s disease’ (page 92).

I dedicate this book to patients with Parkinson’s disease, their partners and other family members – they provide an inspiration to others who are faced with less important challenges in life. I also dedicate it to the doctors and scientists who are working towards developing a cure for the disease.

**KEY POINTS**

- Parkinson’s disease is one of the most common disorders of the nervous system
- Parkinson’s disease occurs mostly in those over the age of 60 or 70
How the brain works

Different parts of the brain have different functions

As the symptoms of Parkinson’s disease result from changes in the brain, it helps to understand a little about how your brain works.

Your brain lies inside your skull, and nerves run from it to your eyes and nose, and through the base of your skull into your vertebral column (your spinal cord). Together this makes your central nervous system. Your brain contains millions of nerve cells and also other types of cells that help nerves to function. You have special types of nerve cells in various parts of your brain and they are used for different functions.

The cortex of your brain is the outer layer and forms the indented surface that makes your brain look rather like a walnut! The cortex is divided into several areas and contains a high proportion of nerve cells. Your motor cortex (so called because it controls movement or motion) is towards the front of your brain and is important in voluntary actions – when you want to move your hand or walk it sends signals down bundles of nerve fibres called the pyramidal tract to the appropriate part of your body.

Your sensory cortex lies a little behind your motor cortex and receives messages about sensations such as touch, heat or vibration.

The central nervous system

The brain and spinal cord form the central nervous system. The brain performs many complex functions, for instance it is the source of our consciousness, intelligence and creativity. It also monitors and controls, through the peripheral nervous system, most body processes – ranging from the automatic, such as breathing, to complex voluntary activities, such as riding a bicycle.
it enables you to coordinate movements and perform
delicate and complex tasks such as playing the piano.

Generally speaking, one side of your brain tends to
control movement and sensation over the other side
of your body. Some specific functions are located on
only one side of your brain – for instance, speech is
controlled predominantly by the left side.

Your occipital cortex lies at the back of your brain
and is involved in sight. It receives signals from your
eyes. These signals are ‘unscrambled’ to form pictures
that give us sight.

The cerebellum is separate from the two cerebral
hemispheres that form the greater part of your brain.
The cerebellum is involved in maintaining balance and

Functions of the brain cortex

Different areas of the brain cortex have specific functions.

- **Premotor cortex** coordinates complex movements such
  as playing a musical instrument.
- **Primary motor cortex** sends signals to muscles to
  cause voluntary movements.
- **Sensory association cortex** analyses data about
  sensations.
- **Visual association cortex** forms images once
  visual data have been analysed.
- **Primary visual cortex** receives nerve impulses
  from the eye.
- **Wernicke’s area** interprets written and spoken language.
- **Broca’s area** is involved in the formation of
  speech.
- **Primary auditory cortex** distinguishes the particular
  qualities of sound.
- **Auditory association cortex** analyses and interprets sound data.
- **Prefrontal cortex** deals with behaviour and personality.
- **Motor cortex** sends signals to muscles to cause voluntary
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An area of the brain that is of great importance to Parkinson’s disease is the extrapyramidal system (or basal ganglia), which adds unconscious tuning to the impulses sent down the pyramidal tract. This extrapyramidal tuning is the function of different areas of the brain that appear to work together in organising movement. The names of the parts of the extrapyramidal system are based on their appearance when the brain is examined after death. They include the substantia nigra, the caudate and putamen (which together form...
the striatum), the thalamus, globus pallidus and subthalamnic nucleus.

These areas lie deep within the base of the brain and are connected to the motor cortex. It is in the substantia nigra that there is most loss of nerve cells in Parkinson’s disease.

The areas of your brain do not work in isolation – it is the connections between the different nerve cells and areas of the brain that allow it to function in the highly efficient and intricate way that it does.

**Nerve cell communications**

Nerve cells communicate with each other by two forms of message: one electrical, the other chemical. Nerve cells meet at junctions called synapses. An electrical message passes along a nerve until it reaches the synapse. Here the electrical message is converted into a chemical message by releasing a neurotransmitter from the end of the nerve at the synapse. This neurotransmitter then interacts with receptors on the other side of the synapse. The interaction of the chemical with the receptor is converted into an electrical message that passes along the second nerve. This process is continued so that the message is passed from one nerve to another.

There are different forms of chemical messenger or neurotransmitter in the brain. The cells in the substantia nigra use dopamine as a neurotransmitter. As the number of cells in the substantia nigra falls in Parkinson’s disease, so the level of dopamine falls. This affects signals from the substantia nigra to other parts of the brain and interferes with the working of the extrapyramidal system. This results in the symptoms of Parkinson’s disease.
How frequent is Parkinson’s disease?

Parkinson’s disease is a common neurological disorder – exactly how common is difficult to be sure. Some estimates suggest that about one person in 300 is affected. There are about 200,000 people with Parkinson’s disease in the UK. The chance of a person developing Parkinson’s disease during their lifetime is estimated at around one in 40 to one in 50. Although the disorder may start at any age from teenage years onwards, it is much more common from 50 years on. In elderly people, the symptoms of Parkinson’s disease are often passed off as ‘old age’, which means that the true frequency of Parkinson’s disease is probably higher than estimated.

There is no clear evidence that Parkinson’s disease is becoming more frequent. More people are now diagnosed with the disorder, but this is partly caused by increasing awareness of the disease and better diagnosis. Another factor is the increasing proportion

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At the beginning of Parkinson’s disease, it is usual for only one side of the brain to be affected or for one side to be affected more than the other. Why one side should be affected before the other remains unexplained.

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**KEY POINTS**

- An area that appears to be of great importance to Parkinson’s disease is the extrapyramidal system located in the ‘deep’ brain.
- The main symptoms of Parkinson’s disease are caused by loss of nerve cells in the substantia nigra.

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**The features of Parkinson’s disease**

**How frequent is Parkinson's disease?**

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Is gender a factor? Parkinson’s disease affects men slightly more frequently than it does women. Female hormones may play some protective role against Parkinson’s disease. The contribution of genetic factors is currently the subject of much research – see page 23. Genetic factors are important in explaining the rarer types of the disease that have their onset before the age of 50 (see page 26).

The symptoms of Parkinson’s disease
Most frequently, the symptoms of Parkinson’s disease develop very gradually over a period of years rather than months. The person affected may be unaware of elderly people in the population, because Parkinson’s disease is more frequent in elderly people. Estimates of the frequency of Parkinson’s disease around the world vary – we don’t know if these represent true geographical differences in the disease.

Does pollution cause Parkinson’s disease?
Environmental pollution from industrialisation has often been thought to contribute to the onset of Parkinson’s disease. If this were so, we would expect the disease to be more common in industrialised nations – and some estimates do suggest this. However, this may simply reflect the greater ease with which advanced health-care systems allow a more accurate estimation of the frequency of Parkinson’s disease.