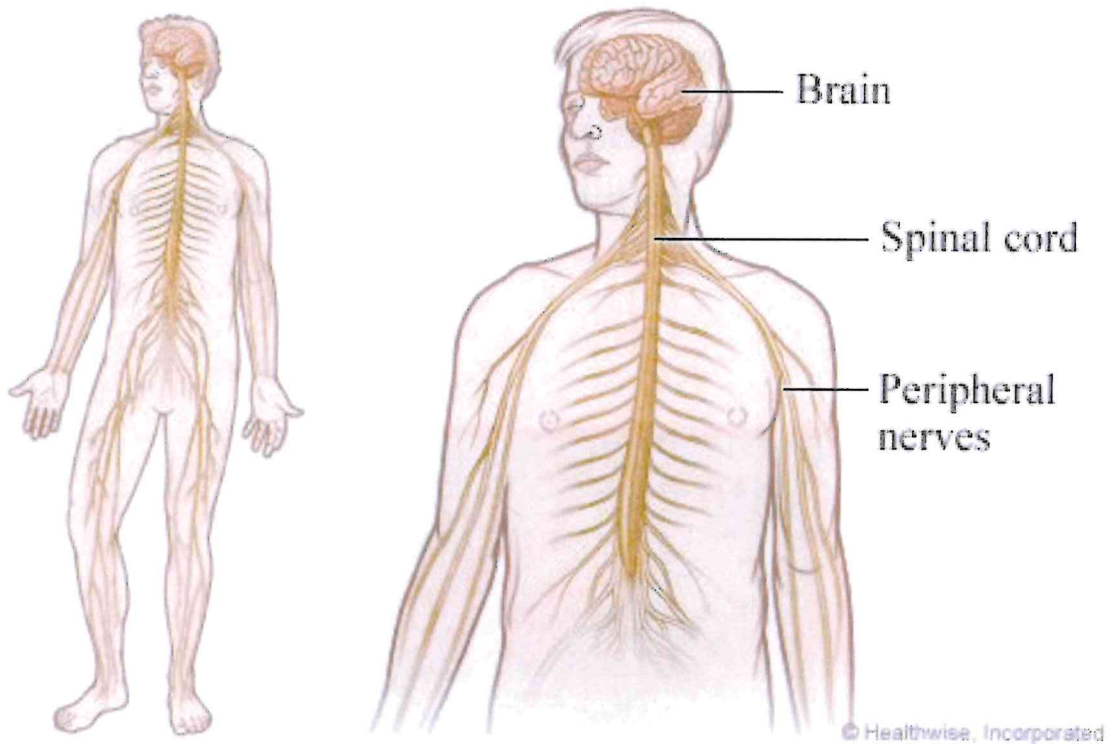


BTEC National Extended Certificate in Health & Social Care

Unit 14: Physiological Disorders and their Care

LA A1



THE NERVOUS SYSTEM

- Parkinson's disease
- Alzheimer's disease

INSTRUCTIONS

- Read the information in the booklet.
- Highlight important or interesting information.
- Add extra notes about the physiological disorders that you find whilst doing additional research.
- Answer the questions at the end. Remember to incorporate as much detail as possible.
- When we discuss and go over the answers in class, add any missed detail to your work using a red pen.



Physiological disorders of the nervous system and their effects

The nervous system is essentially a communication and control system, responsible for receiving and transmitting information between the external environment and the internal.

It consists of:

- the brain and spinal cord, known as the **central nervous system (CNS)**
- nerves that run from the spinal cord to other parts of the body, known as the **peripheral nervous system**
- nerves that control the automatic functioning of the body, below conscious control, such as homeostasis, digestion, heartbeat and breathing rate, known as the **autonomic nervous system**

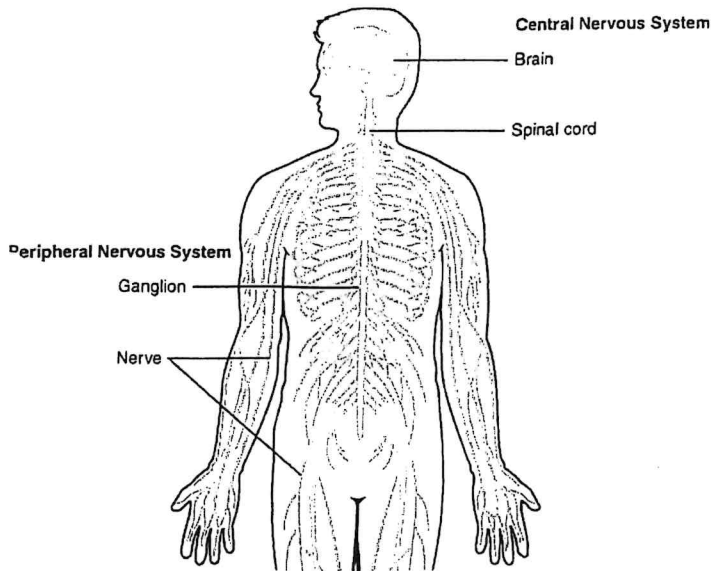
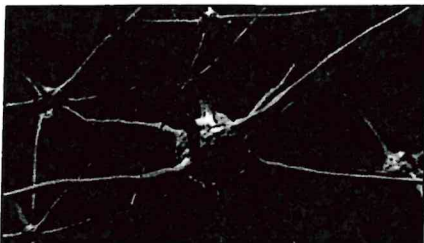


Diagram showing an overview of the nervous system


Parkinson's disease

Approximately 145,000 people in the UK are diagnosed with Parkinson's, or one person in every 350. Older adults are more at risk, with one to two people out of every 100 over the age of 65 and about 1 person in 10 over 80; more men than women develop the condition.



Parkinson's is a disorder that affects mainly **motor function**, although it also affects emotional and mental health. Inside the brain, at the **synapse**, **neurotransmitters** enable messages to leap from one **neurone** to another. The image on the left shows neurones connecting with each other within the brain.

There are many different neurotransmitters but the one involved in Parkinson's is **dopamine**. In an area of the brain known as the **midbrain** are collections of cells, the **substantia nigra**, that produce dopamine. Under certain conditions the cells die, the levels of dopamine fall and Parkinson's disease develops. Because dopamine is mainly concerned with motor function, movement and coordination are affected.



Central nervous system: the brain and spinal cord

Peripheral nervous system: nerves that run from the spinal cord throughout the body

Autonomic nervous system: nerves that control 'automatic' functions of the body, such as digestion

Synapse: the junction between one nerve cell and another

Neurotransmitters: chemical compounds that enable a message to cross the synapse

Neurone: another word for nerve cell

Motor function: movement

Dopamine: a neurotransmitter

Midbrain: a region of the brain

Substantia nigra: a collection of cells in the midbrain that produces dopamine

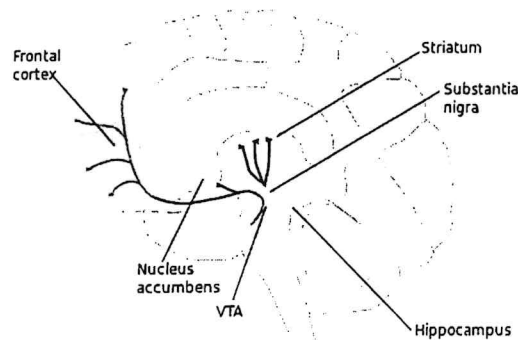


Diagram showing where dopamine is produced and its pathways through the brain

Effects on the body

One of the most well-known effects of Parkinson's disease is the **tremor**, usually of the hands and wrists and more noticeable when the person is resting.

Another well-known symptom is **bradykinesia**, which leads to the typical slow, shuffling walk.

Rigid muscles are also a common effect, where the muscles become stiff and tense. This makes it hard to show facial expression and also causes painful cramps.

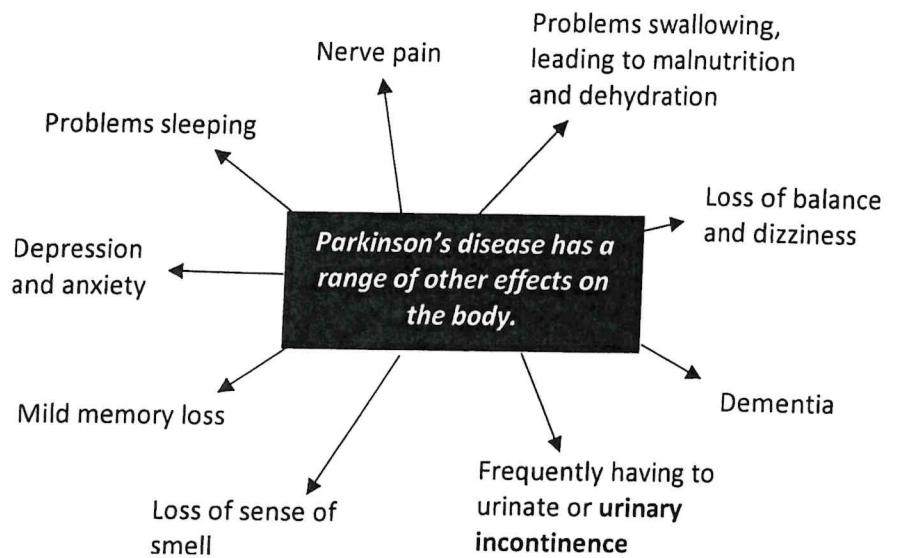
Tremor: shaking of hands and wrists

Bradykinesia: slowness of movement

Urinary incontinence: inability to control the bladder



These old drawings show the shuffling walk and body posture associated with Parkinson's disease.



Did you know...
Parkinson's disease used to be known as the 'shaking palsy'.

Why does Parkinson's cause somebody to lose their sense of smell?

Hallucinations: seeing, hearing or smelling something that isn't there

Lewy bodies: collections of a specific protein that form in the brain and cause dementia

Dementia

There are two main types of dementia linked to Parkinson's disease, although not all people with Parkinson's will also develop dementia. These are Parkinson's dementia and dementia with **Lewy bodies**.

People with Parkinson's disease are more likely to develop two main types of dementia.

Parkinson's dementia

Where a person has had physical symptoms of Parkinson's for at least a year and then develops dementia.

Dementia with Lewy bodies

When someone develops both their movement symptoms and dementia at the same time. They are especially likely to experience vivid visual **hallucinations**. They may also have difficulties judging distances and movement, leading them to fall over for no apparent reason.

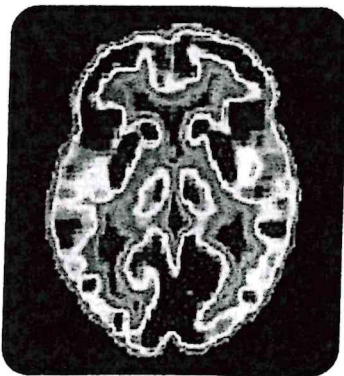
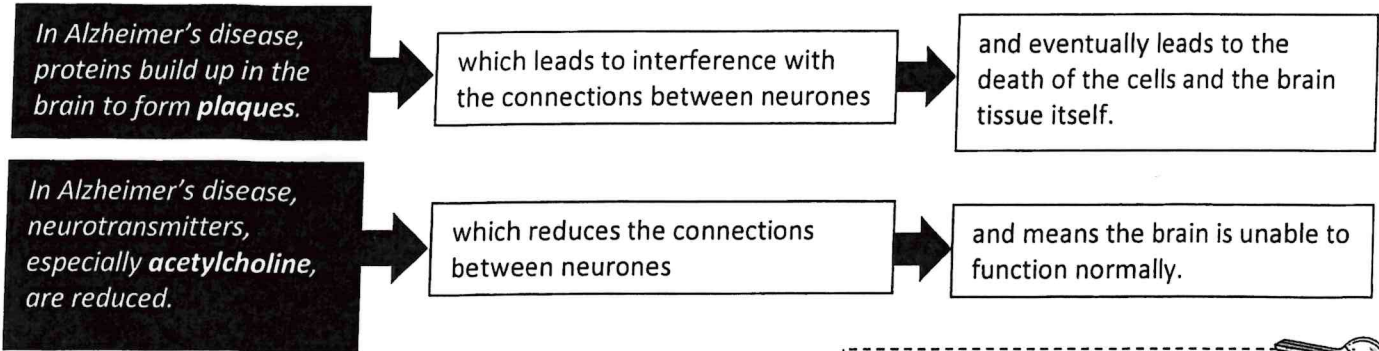
Imagine you are a volunteer working for a local branch of a charity that supports people with Parkinson's disease. Individually or in pairs, **create a leaflet** that gives information about the disorder and its effects on the body for service users and their carers.

Alzheimer's Disease

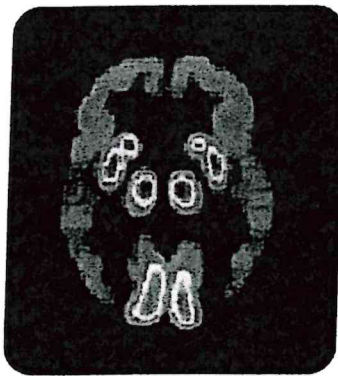
Dementia is the name given to a group of disorders that affect cognitive function, including memory, ability to cope with everyday tasks and organisation. **Spatial awareness** is also affected, so that people with dementia find it hard to judge distances; for example, on stairs.

How many neurotransmitters does the brain produce and how are they made?
What are the roles of the main ones?

There are several different forms of dementia that share similar signs and symptoms. Alzheimer's disease is the most common, making up 60% to 70% of cases. Currently, there are estimated to be approximately 850,000 cases in the UK, most of which are among people over 65 years.



PET Scan of Normal Brain



PET Scan of Alzheimer's Disease Brain

Photographs showing how Alzheimer's disease affects the brain tissue

Plaques: collections of a specific protein that form in the brain and cause Alzheimer's disease
Spatial awareness: being aware of distances and being able to negotiate obstacles without tripping or falling
Acetylcholine: a neurotransmitter

Imagine you're a volunteer with an over-60s club at your local community centre. Research risk factors for Alzheimer's disease and use your information to create a PowerPoint presentation for club members, along with tips on how people can reduce their risk.

Effects on the body – stages of Alzheimer's disease

Early stage	The signs and symptoms are very mild and can be put down to other causes, such as bereavement, stress or part of natural ageing. The person may show memory loss, a very common early sign that is often only recognised as early dementia later on, looking back.
Middle stage	Changes in memory and ability to cope with everyday life are much more noticeable. Individuals are likely to need support with daily activities, such as washing, dressing, eating and so on.
Late stage	The person will be increasingly dependent on others. Their memory will be severely affected, although there may be times when the person suddenly has a 'flash' of recognition or remembers something. Because the brain tissue is dying off, other body systems will be affected and the person will become weak, have difficulty walking and may be incontinent (unable to control their bladder or bowel).

Physiological disorders of the nervous system and their effects – Topic questions



1. Which organs make up the central nervous system?
2. What is a neurotransmitter?
3. Identify three effects of Parkinson's disease.
4. What two types of dementia are linked to Parkinson's disease?
5. What are 'plaques' in Alzheimer's disease?
6. Outline the three stages of Alzheimer's disease.
7. To answer these questions, you may have to do further research.

Harry is 81 years old and has always been fit and healthy. He lives with his wife Dorothy, aged 80. Dorothy has type 2 diabetes and osteoarthritis of her right knee and hip. Her hip is much worse than her knee and she is on the waiting list for a hip replacement. Usually, she walks with a walking stick and relies on Harry to drive her everywhere, including to the GP surgery. They live in a small village that's a half-hour drive from the nearest small town. The couple have two grown-up children. Their son Eddie lives in Australia and their other son, Patrick, lives 250 miles away in a large city.

Over the last 12 months, Dorothy has become increasingly concerned about Harry's forgetfulness and the number of falls that he's having, resulting in black eyes and cuts to his face and hands. For example, he often forgets that Dorothy has an appointment at the surgery, although she has reminded him several times that day. On one occasion, he said he was going out to collect Eddie from school and, on another occasion, forgot the new road layout and drove the wrong way around a roundabout.

- i) Who can Dorothy talk to about her concerns for Harry?
- ii) What tests might be organised in order to diagnose Alzheimer's disease for Harry?
- iii) What other disorders could his symptoms be caused by?