académie Nantes
RÉGION ACADÉMIQUE PAYS DE LA LOIRE
MINISTÈRE DE L'ÉDUCATION NATIONALE, DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE

BACCALAUREAT GENERAL ET TECHNOLOGIQUE

EPREUVE SPECIFIQUE MENTION

« SECTION EUROPEENNE OU DE LANGUE ORIENTALE »

Académie de Nantes, binôme : Anglais/SVT

Thème 3 - Corps humain et santé

3-B Neurone et fibre musculaire : la communication nerveuse

Parkinson's disease (PD): The nervous system & dopamine

Use the documents to show:
1. How the synapse transmits the nervous system message
2. Dopamine has a central role in Parkinson's disease

What is Parkinson's disease?

Parkinson's Disease (PD) is a chronic, degenerative progressive disorder that affects nerve cells deep in the brain responsible for planning and controlling body movement. Dopamine is a chemical used in body movement. When the dopamine-producing nerve cells die, symptoms begin to occur. The cause of Parkinson's is largely unknown, and the disease cannot be cured at this time. Treatments focus on reducing symptoms to enable a more active lifestyle.

To understand Parkinson's, it is helpful to understand how the nervous system works (figure 1.) and how PD affects normal functions.

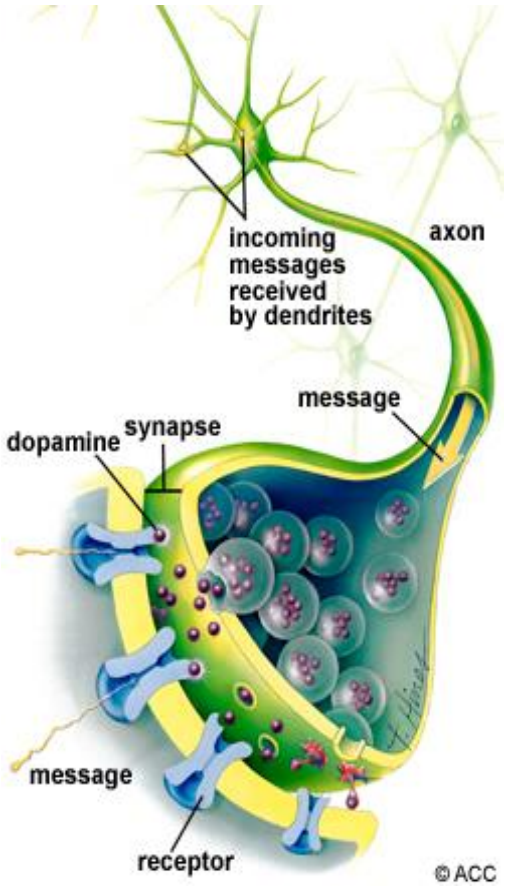

Figure 1. Neurons communicate with each other across a tiny gap called a synapse. Incoming messages from the dendrites are passed to the axon where the nerve cell is stimulated to release neurotransmitters into the synapse. The neighboring nerve cell receptors pick up these chemical messengers and effectively transmit the message onto the next nerve cell.

Nerve cells produce the neurotransmitter dopamine and are responsible for relaying messages that plan and control body movement. For reasons not yet understood, the dopamine-producing nerve cells of the substantia nigra begin to die off in some individuals. When 80 percent of dopamine is lost, PD symptoms such as tremor, slowness of movement, stiffness, and balance problems occur.

These impulses are passed from neuron to neuron, moving quickly from the brain to the spinal cord and, finally, to the muscles.

The action of dopamine is opposed by another neurotransmitter called acetylcholine. In PD the nerve cells that produce dopamine are dying. The PD symptoms of tremor and stiffness occur when the nerve cells fire and there isn't enough dopamine to transmit messages. High levels of glutamate, another neurotransmitter, also appear in PD as the body tries to compensate for the lack of dopamine.

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