SAMPLE

COMPLETE GUIDE TO

Biopsychology

A-level Psychology | AQA | Paper 2

BIOPSYCHOLOGY

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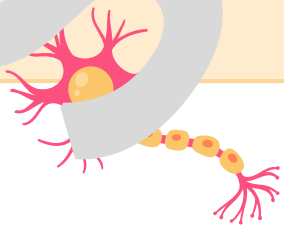
What you need to know for the AQA A-level Exam Specification



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Structure & Function of Neurons

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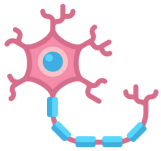
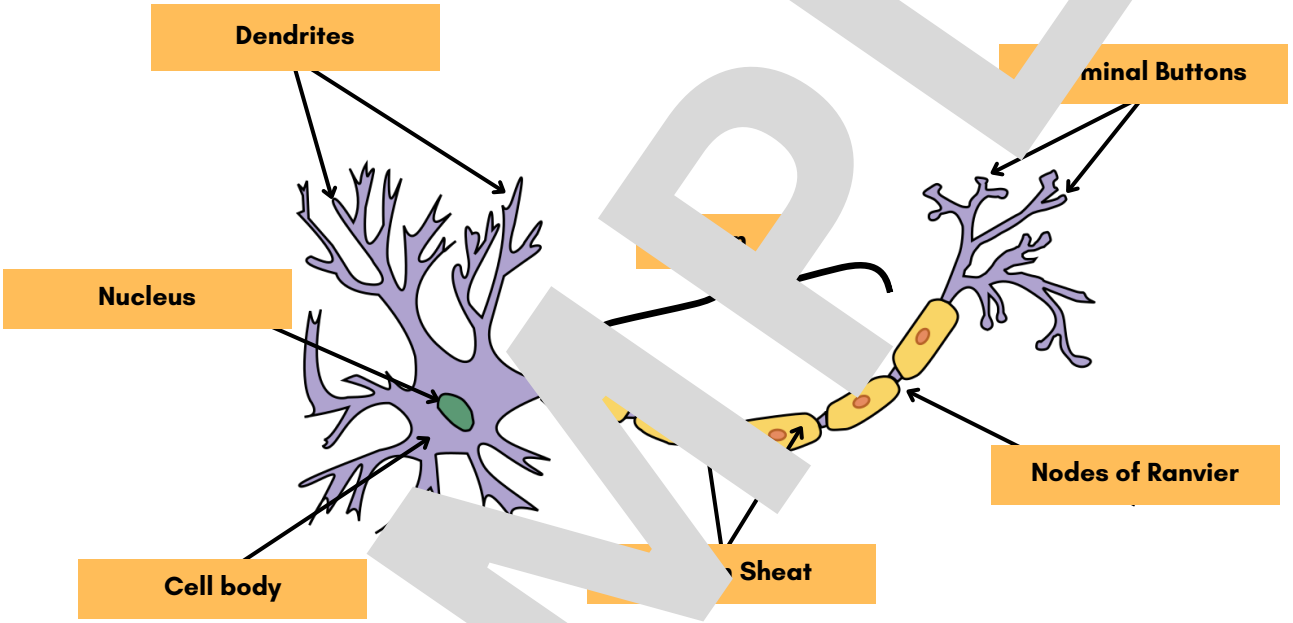


In this section we are going ask how the nervous system transmits signals round the body; how it communicates with itself. This is where neurons come in. Firstly, we are going to explore the Structure and Function of Neurons, including Sensory neu s, Relay neurons and Motor neurons. Then secondly, we are going to explore Synaptic Tra ssion.

Neurons
(Structure & Function)

Your nervous system is thought to contain somewhere around 100 billion neurons, brain co g approximately 80% of them! Neurons enable communication within the nervous syste hese rons transmit signals electrically and chemically.

WITHIN a neuron, signals are transmitted ELECTRICALLY where the electrical signal start the dendrites and travels along an axon to t inal buttons.

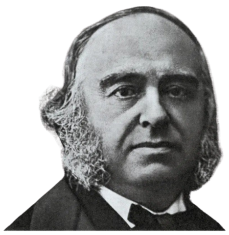


Cell Body	This includes cleus which contains the genetic material.
Dendrites	hese ar ctures that come out of the nerve cell to connect with other neuron e information from other neurons and send nerve impulses towards the cell body.
	Car ve impulses away from the cell body. The length of axons varies from a few millimetres to over a metre in the spinal cord.
lin She	nsula s and protects the axon and helps to speed up the electrical transmission along the axon. (Schwann cells make the myelin)
Nodes of Ranvier	e are the gaps in the myelin sheath that force the impulse to 'jump' across the gaps along the axon. This helps increase the speed of the electrical impulse.
Terminal Button	At the end of the axon are terminal buttons that send impulses to the next neuron across the synapse. The synapse is the gap between one neuron and the next neuron. The terminal buttons contain tiny sacs containing chemicals called neurotransmitters.

Evaluation of Localisation of Function

Paul Broca

Paul Broca was a French physician and surgeon in the 19th century who specialised in the study of language. In April 1861 Paul Broca first met a man by the name of Louis Victor Leborgne.



When Broca studied Leborgne he found that "regardless of the question asked him, he always responded: tan, tan. This is why, throughout the hospital, he is known o[illegible] the name Tan." Later that same month Leborgne, Patient Tan, died. Broca himself c[illegible]ted the post-mortem exam on his brain which revealed a large lesion in the left frontal [illegible]. This dis[illegible]very provides support for the idea of localisation of function in the brain as it [illegible]gests tha[illegible] area of the brain, referred to as Broca's area, is responsible for speech pr[illegible].

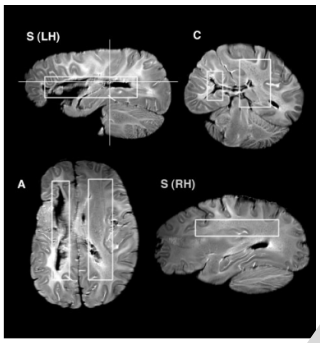
Karl Wernicke

About 10 years later, Carl Wernicke identified patients who ha[illegible]s producing speech, but were unable to comprehend language; the[illegible]r understand it.

When he examined the brains of these patients he fo[illegible]ons at [illegible]ction of the left temporal, close to the junction with the pari[illegible]d occipit[illegible]. Th[illegible]ea of the brain has become known as Wernicke's area. It i[illegible] with the [illegible]ding of spoken and written language - further demonstrati[illegible]ow the [illegible] may be locali[illegible]d for function.

Dronkers et al. (2007)

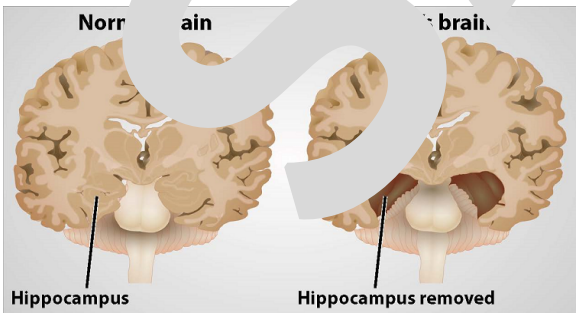
Ho[illegible]r, research b[illegible]s et al. (2007) has raised questions a[illegible]'s area.



This is because they co[illegible]te[illegible] scan on Patient Tan's brain. Now you may be thinking how in the world a[illegible]ey st[illegible]nt Tan's brain in 2007 when he died in 1861? Well, Broca made the decisi[illegible]en we[illegible]ed out the post-mortem not to dissect the brain of pa[illegible]but to pre[illegible] it in alcohol where it was placed in a Paris museum for future[illegible] As a[illegible]sult of advances in technology Patient Tans' brain was with an [illegible]hine. [illegible] resolution images showed that other areas of the brain were also a[illegible]d and therefore may have been involved in his failure to produce speech beyond simp[illegible]'s area. Therefore, these findings raise questions about l[illegible]calisation of function o[illegible]ain particularly for language and suggest that a more [illegible]rstanding is neede[illegible] where other areas of the brain are involved.

Patient HM

Othe[illegible]porting research comes from one of the most famous and studied ind[illegible]uals in the history of psychology: a man known as patient HM. His real [illegible] was Henry Molaison.



During his childhood HM had been involved in a bicycle accident, which resulted in HM developing epilepsy. Many of the seizures he experienced worsened to the point where medication was having little impact and left him with the option of surgery. However, when HM had specific parts of his brain removed, including the hippocampus, whilst it helped reduce his seizures, it left him with problems with his memory.

HM was unable to form any new LTM memories. He could remember things before the surgery but couldn't form memories after the surgery. His STM was fine, but he couldn't transfer any of this information to LTM.

Evaluating fMRIs

Temporal Resolution	This refers to how quickly the brain scan can detect changes in brain activity.

Spatial Resolution	This is about how accurately it can show exactly wh rea of the brain is active. It's about how specific the measurement location of activity in the brain is.

Spatial Resolution

One of the main strengths of fMRIs relates to spatial resolution

This is because fMRI machines have HIGH spatial resolution of ately 1-2 mm wh s significantly greater than the other techniques such as EEGs and ERPS. Therefo ggests th Rs can provide more insight into the brain's activity because it offers a more an accurate v dyin brain.

Temporal Resolution

Another limita of fMR ates to temporal resolution.

This is because fMRI scans have LOW temporal resolution l-4 seconds which is not as good as other techniques (e.g. EEG/ERP which have a tem ral resolution milliseconds). Therefore, this undermines the extent to which fMRIs can tell us abo tivity in the b use this delay makes it harder for psychologists to know accurately when the b started.

Cost/Sampling

A limitation of is th are more expensive than EEG AND ERPs .

For example, the cost of an EEG e is b 0 and $25,000 whereas an fMRI machine costs anywhere between $500,000 and $3 llars. This eans that EEGs and ERPs are more accessible for a wider range of people and further mea larger sample sizes from studies can be used to draw conclusions about the brain's activity. In contra xpense of conducting fMRI scans reduces the number of people involved in st mits the extent to w ch generalisations can be made from the results.

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Biological Rhythms - Circadian

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Biological rhythms are repeated patterns of changes in the body that are regulated by an internal clock. In other words, there are processes in your body that happen again and again that are controlled by a clock inside you. In this section you need to know about **the Circadian rhythm, and the effect of Endogenous Pacemakers and Exogenous Zeitgebers on the Sleep/Wake Cycle.**

Circadian Rhythms

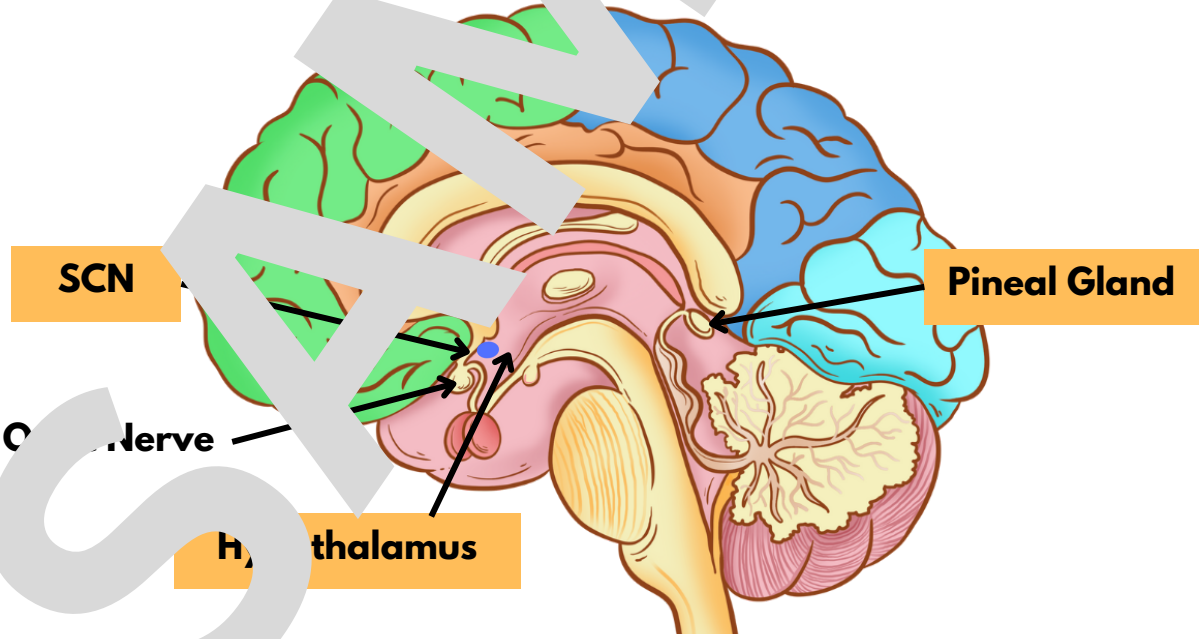
Circadian rhythms last for around 24 hours.

The word circa is latin for "about". Diem is latin for "day".

A circadian rhythm means about a day. An example of a circadian rhythm is the sleep wake cycle. Our body has a rhythm where once a day we sleep for an extended period of time, and then wake for an extended period of time.

Endogenous Pacemaker	Exogenous Zeitgeber
Endo = Greek for inside Genous = Greek for producing	Exo = Greek for outside Zeitgeber = German for time giver
An internal body clock that regulates our biological rhythms.	External influences that influence and reset our internal biological clocks.

The SCN is thought to be the Endogenous Pacemaker for our sleep/wake cycle.



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