

The Brain, Biology and Cognition

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Overview of Module and Assessments on Moodle





Question:

- How can an approx. 1.4 kg organ create thoughts, emotions, memories, relationships, creativity, and consciousness?
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Question:

- Why study the brain?
 - Does it make us who we are?
 - Our thoughts
 - Our memories
 - Our personalities
 - Our biology
 - Our experience
-

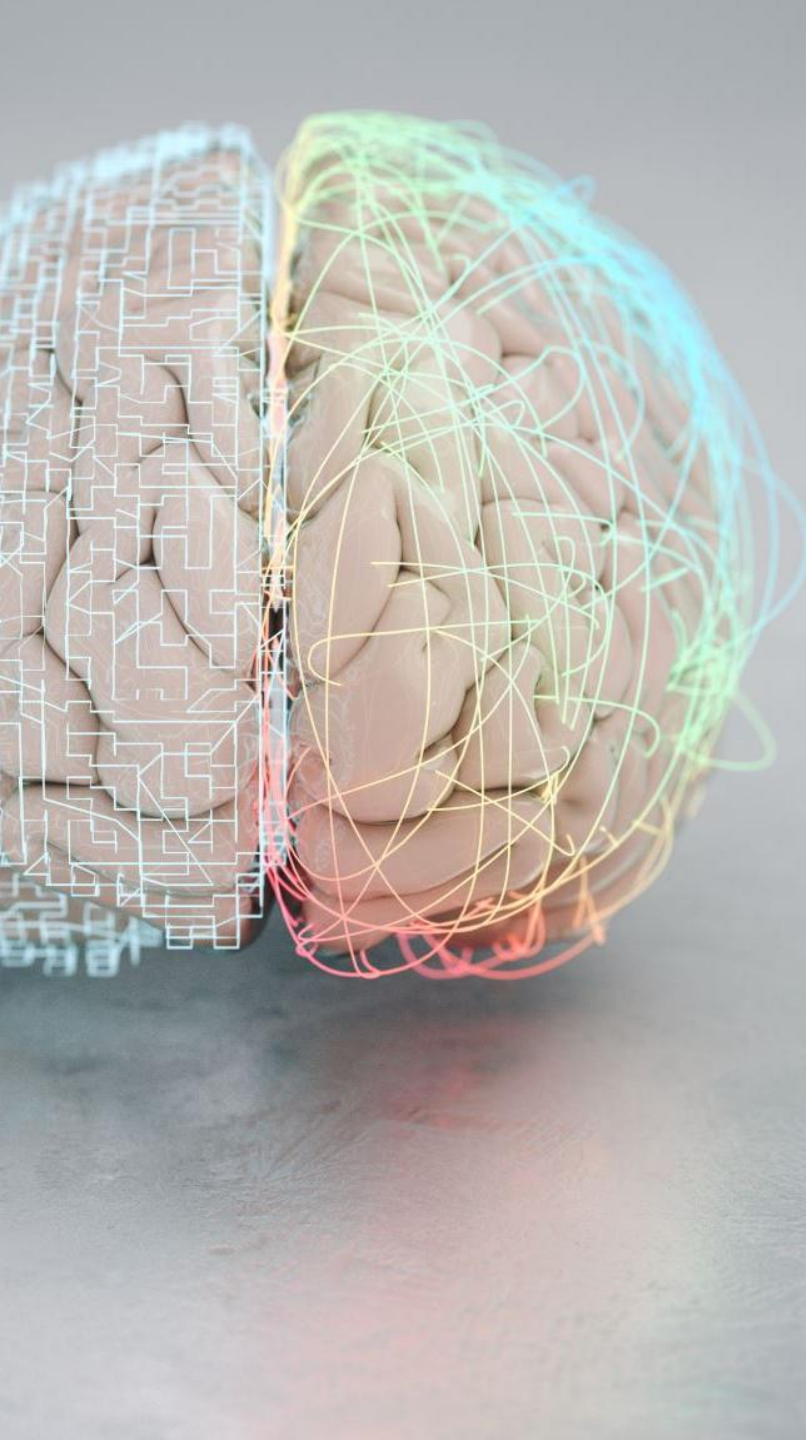


Question:

- Why study Biopsychology?
 - Biopsychology is the scientific study of the biological basis of behaviour, cognition, emotion, and mental processes.

It asks questions such as:

- How do memories form?
 - Why do emotions occur?
 - What happens when the brain is damaged?
-



Core Principle

- Behaviour arises from interactions between:
 - Brain
 - Body
 - Environment



Interactive Activity: Think-Pair-Share

- Question:
 - What behaviours or mental processes can you think of that are influenced by biology

Why Biopsychology Matters



Understanding the brain helps us understand:

Mental Health

- Anxiety
- Depression
- Schizophrenia

Neurological Disorders

- Alzheimer's disease
- Parkinson's disease
- Epilepsy

Everyday Behaviour

- Learning
- Memory
- Decision-making
- Emotions



The Biological Foundations of Behaviour

Imagine you are about to sit an exam.
What happens?

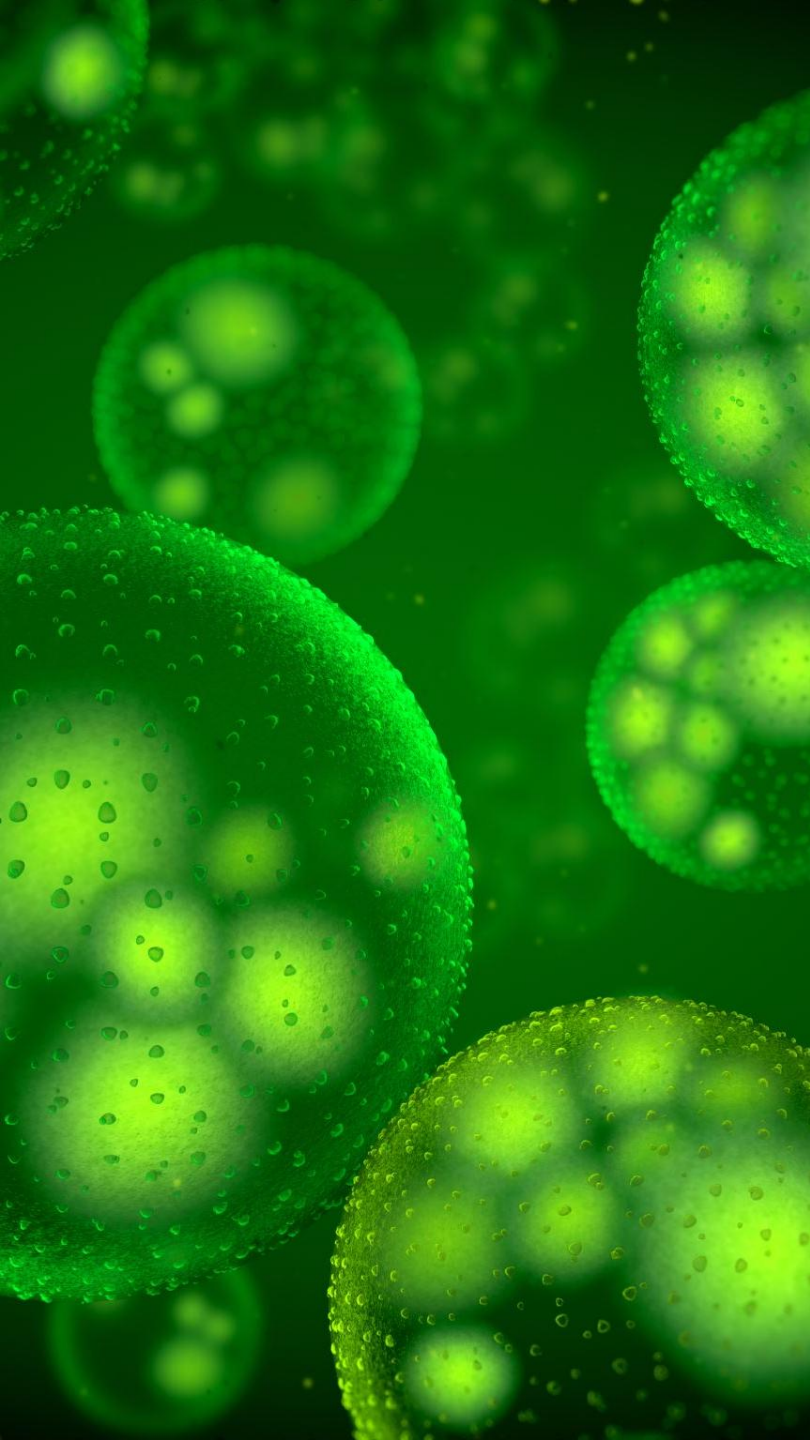
Biological Changes

- Increased heart rate
- Release of adrenaline
- Increased alertness
- Heightened attention

Psychological Experience

- Nervousness
- Motivation
- Anxiety

Mind and body are interconnected.

An abstract background on the left side of the slide featuring several overlapping spheres in various shades of green and yellow. The spheres have a textured, almost crystalline appearance with small dots and lines on their surfaces. They are set against a dark green background with a subtle pattern of small, glowing yellow dots.

Major Themes of Biopsychology

1. Behaviour Has Biological Causes

Behaviour is linked to:

- Brain activity
- Hormones
- Neurotransmitters
- Genetics

2. Biology is Not Destiny

Behaviour is also shaped by:

- Experience
- Culture
- Learning
- Environment

Nature and Nurture work together

Levels of Explanation

To understand behaviour, we need multiple levels.

Biological

Neurons, neurotransmitters

Cognitive

Thinking and memory

Behavioural

Observable actions

Social

Relationships and culture



Example: Memory

Biological Level

Hippocampus activity

Cognitive Level

Encoding and retrieval

Behavioural Level

Remembering lecture content

Social Level

Learning with peers

No single explanation is sufficient.

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Branches of Neuroscience

Neuroanatomy

Structure of the nervous system

Neurochemistry

Chemical communication

Neurophysiology

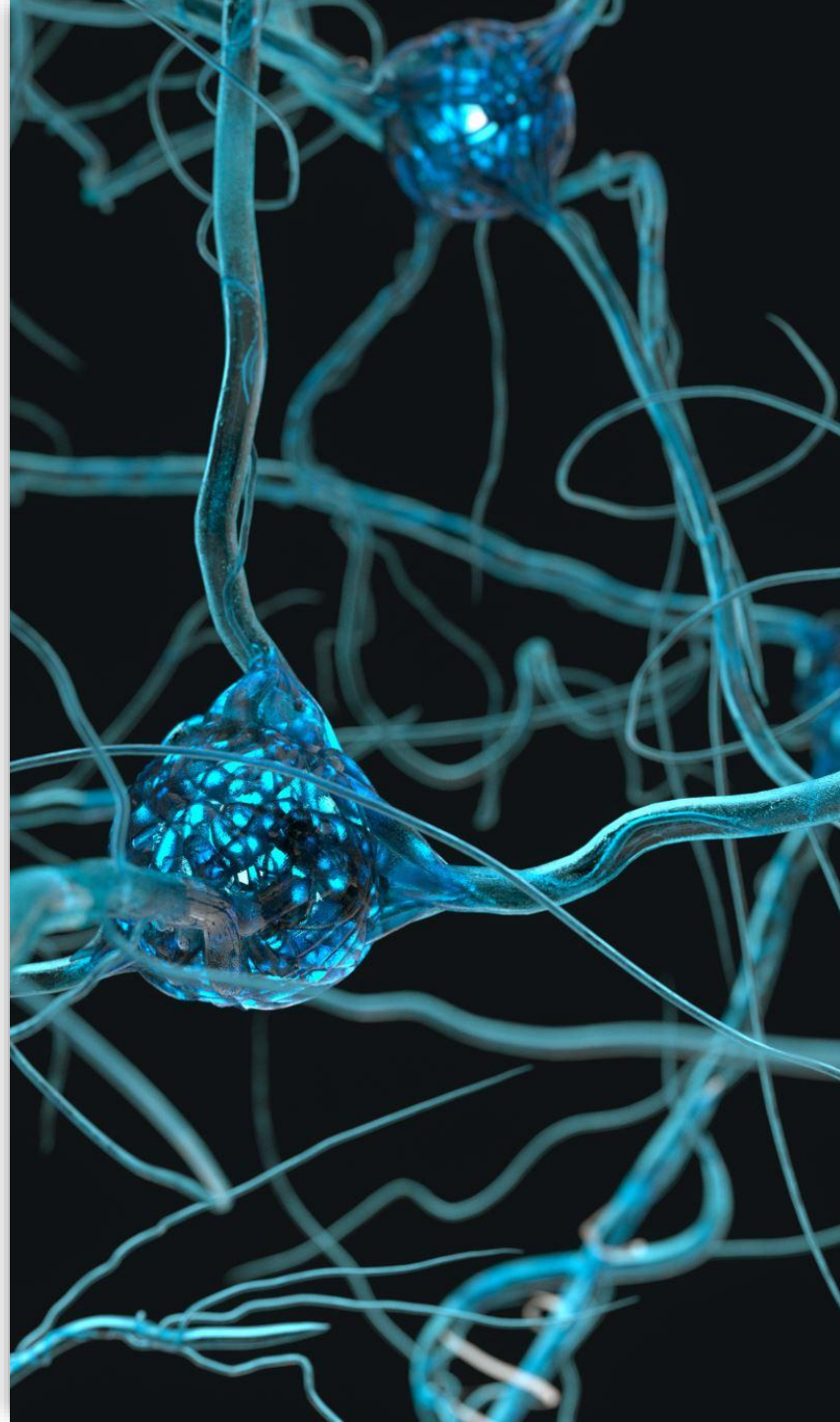
Neural activity

Neuroendocrinology

Hormones and behaviour

Cognitive Neuroscience

Brain mechanisms underlying cognition



Humans as Biological Systems

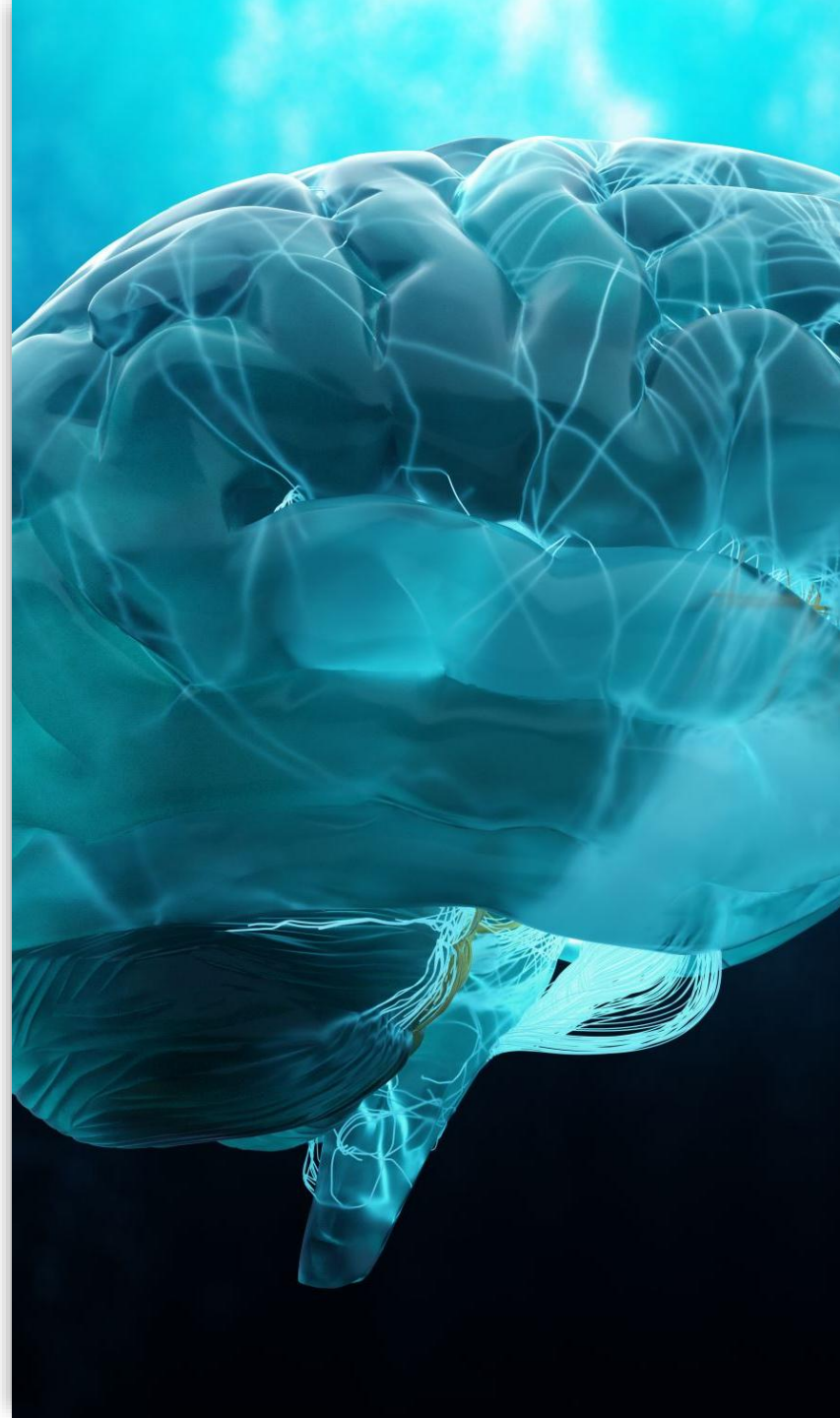
The brain does not work alone.

Connected Systems

- Nervous system
- Endocrine system
- Immune system

These systems constantly interact.

Example: Stress affects hormones, immunity, thinking, and behaviour.



Studying brain injury

- MRI/ fMRI

Electrical activity

Understanding fundamental mechanisms

Controlled investigation

Converging Evidence

- No Single Method is Perfect

Researchers combine:

- Animal studies
- Brain imaging
- Clinical observations
- Experimental findings

When different methods reach similar conclusions, confidence increases.



Brain Plasticity

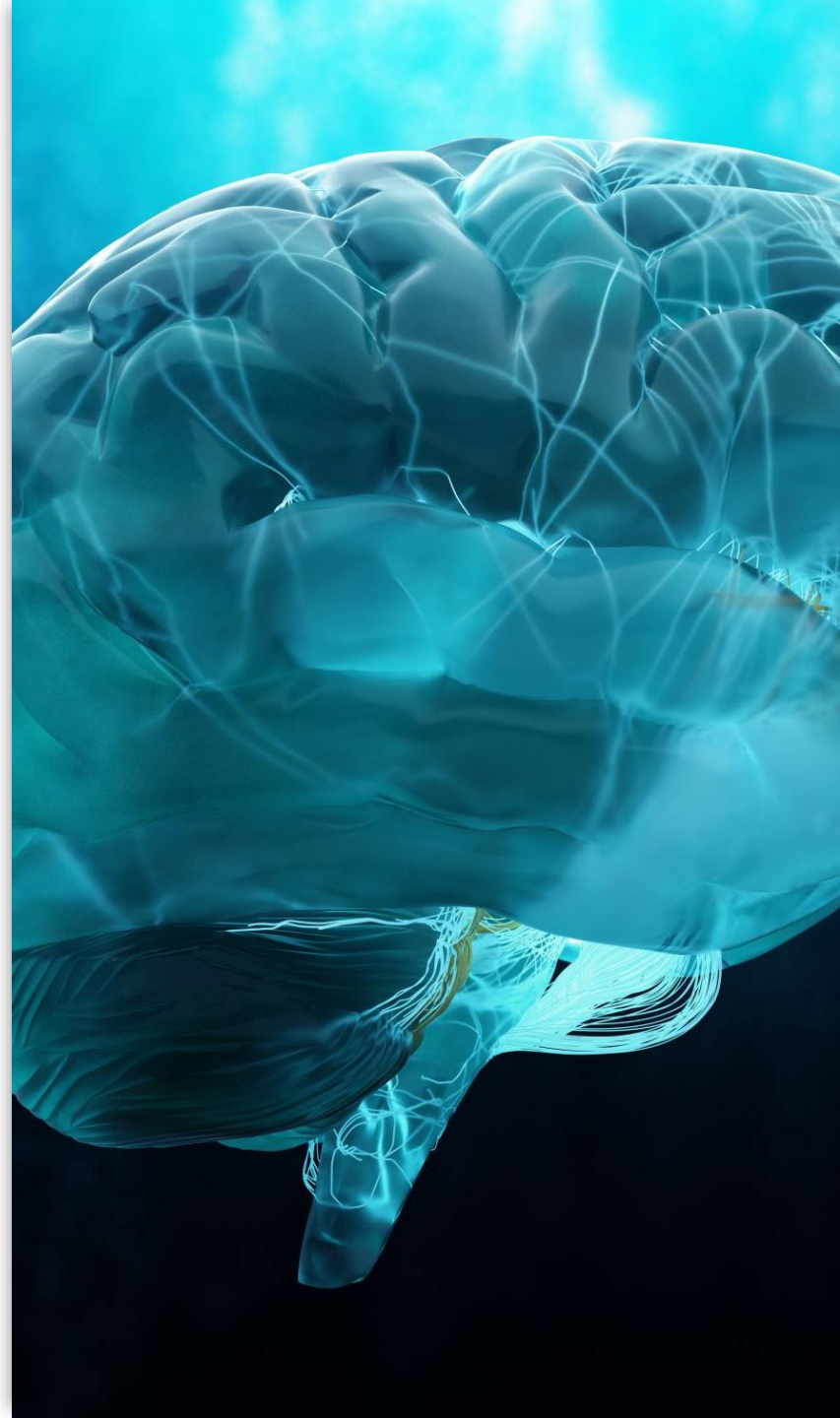
Neuroplasticity

The brain can change throughout life.

Changes occur through:

- Learning
- Experience
- Practice
- Recovery after injury

Your brain is continually changing even while studying this module!



Throughout this module you will explore:

Brain Structure

How the nervous system is organised

Neural Communication

How neurons communicate

Sensation and Perception

How we experience the world

Learning and Memory

How knowledge is acquired

Psychiatric disorders and brain damage

What can happen to our brain

Effects of Drugs

How this changes the brain

Cognition

How we think and make decisions

Research Methods

How to study the brain

Language

How we communicate

Animal Research

Does this tell us anything more