

LF267-15 Neurobiology of Disease

22/23

Department

Life Sciences

Level

Undergraduate Level 2

Module leader

Johannes Boltze

Credit value

15

Module duration

5 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module will cover the neuropathology, anatomy and pathophysiology of diseases involving the nervous system. It will provide insight into both the structure and function of the brain, upper motor neurones, lower motor neurones, the neuromuscular junction and the peripheral sensory nervous system. The aim of the module is to introduce the students to how physiological processes can be disrupted and the clinical consequences these disruptions cause. The module will provide pre-requisite knowledge that will aid student learning in Y3 modules on the Neuroscience degree programme, for example BS374 (Modern approaches to human disease) and BS362 (Integrative Neuroscience).

Module aims

LO1 Demonstrate understanding of anatomy of the nervous system; LO2 Demonstrate understanding of the physiology and pathophysiology of the brain, including motor neurons; LO3 Demonstrate understanding of the physiology and pathophysiology of the neurovascular unit; LO4 Demonstrate understanding of the physiology and pathophysiology of the white matter; LO5 Demonstrate understanding of the physiology and pathophysiology of communicable CNS diseases; LO6 Demonstrate understanding of the physiology and pathophysiology of the sensory nervous system; LO7 Demonstrate understanding of the physiology and pathophysiology of neurodevelopmental disorders

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

1. Anatomy of the nervous system (i)
Basic review of the anatomy of the brain.
2. Anatomy of the nervous system (ii)
Basic review of the anatomy of the spinal cord and the neuromuscular junction
3. Pathophysiology of the brain (i)
Focus on blood supply and metabolic restrictions: Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of cerebral vascular dysfunctions
4. Pathophysiology of the brain (ii)
Focus on neurodegeneration: Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of proteinopathies
5. Pathophysiology of the brain (iii)
Focus on cellular degeneration: discussion of cell death mechanisms e.g. necrosis, apoptosis, parthanathos or autophagy and their role in nervous system disorders
6. Pathophysiology of the brain (iv)
Focus on neuronal communication: Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of epilepsy and seizures
7. Pathophysiology of the spinal cord
Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of traumatic spinal cord injury
8. Pathophysiology of motor neurones (i)
Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of e.g. spinal muscular atrophy (SMA), spinal bulbar muscular atrophy (SBMA) and myasthenia gravis (MG)
9. Pathophysiology of motor neurones (ii)
Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of e.g. amyotrophic lateral sclerosis (ALS)
10. Pathophysiology of the white matter
Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of e.g. multiple sclerosis (MS)
11. Communicable nervous system diseases (i)
Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of e.g. rabies
12. Communicable nervous system diseases (ii)

Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of prion diseases

13. Pathophysiology of the sensory systems (i)

Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of pain sensation

14. Pathophysiology of the sensory systems (ii)

Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of dyslexia and dyscalculia

15. Pathophysiology of neurodevelopmental conditions

Disease framework (cause, signs and symptoms, diagnosis, prognosis and potential treatment) of e.g. Down syndrome and autism spectrum conditions

Learning outcomes

By the end of the module, students should be able to:

- Level 5 understanding of the anatomy of the nervous system
- Level 5 understanding of the physiology and pathophysiology of the brain, including motor neurones
- Level 5 understanding of the physiology and pathophysiology of the vascular unit
- Level 5 understanding of the physiology and pathophysiology of the white matter
- Level 5 understanding of the physiology and pathophysiology of communicable CNS diseases
- Level 5 understanding of the physiology and pathophysiology of neurodevelopmental disorders
- Level 5 understanding of the physiology and pathophysiology of the sensory nervous system

Indicative reading list

Purves et al, Neuroscience 6th Edn. (Sinauer/Oxford UP, 2019)

Subject specific skills

LO1 Demonstrate understanding of anatomy of the nervous system

LO2 Demonstrate understanding of the physiology and pathophysiology of the brain

LO3 Demonstrate understanding of the physiology and pathophysiology of upper motor neurones

LO4 Demonstrate understanding of the physiology and pathophysiology of lower motor neurones

LO5 Demonstrate understanding of the physiology and pathophysiology of the neuromuscular junction

LO6 Demonstrate understanding of the physiology and pathophysiology of skeletal muscle

LO7 Demonstrate understanding of the physiology and pathophysiology of the sensory nervous system

Transferable skills

Adult learning
Self directed learning
Quantitative skills and data handling skills

Study

Study time

Type	Required
Lectures	15 sessions of 1 hour (10%)
Practical classes	3 sessions of 6 hours (12%)
Private study	117 hours (78%)
Total	150 hours

Private study description

Self directed learning and revision

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group D1

	Weighting	Study time	Eligible for self-certification
In-module laboratory 6hr laboratory sessions	30%	30 hours	Yes (extension)
Online Examination 45 min SAQ paper / 45 min essay paper	70%	45 hours	No

- Online examination: No Answerbook required

Assessment group R1

	Weighting	Study time	Eligible for self-certification
In-person Examination - Resit 45 min SAQ paper / 45 min essay paper	100%		No

- Answerbook Green (8 page)

Feedback on assessment

Individual written feedback

[Past exam papers for LF267](#)

Availability

Courses

This module is Core for:

- Year 2 of ULFA-B140 Undergraduate Neuroscience (BSc)
- Year 2 of ULFA-B142 Undergraduate Neuroscience (MBio)
- Year 2 of ULFA-B143 Undergraduate Neuroscience (with Industrial Placement) (MBio)
- Year 2 of ULFA-B141 Undergraduate Neuroscience (with Placement Year) (BSc)