



THE UNIVERSITY OF
BUCKINGHAM

MEDICAL SCHOOL

MB ChB

Unit Summary: Nervous System

1 *Educational Aims of the Unit*

The unit aims to enable students to make progress towards meeting some of the learning outcomes described in Tomorrow's Doctors (2009) relevant to 'The Doctor as a Scholar and Scientist' and 'The Doctor as a Professional'. The specific aims of this sixth term unit are that through a study of the function of the major elements of the nervous system and the anatomy of their connections, students should appreciate nervous system function and dysfunction. In addition students should gain an insight into its testing and imaging as applied to patients' problems, an understanding of the diagnostic importance of concepts such as upper and lower motor neurones and peripheral and central divisions, and finally, an understanding of the global function of the cerebral cortex in terms of brain neurochemistry.

2 *Learning Outcomes From Tomorrow's Doctors (2009)*

Outcomes 1: The Doctor as a Scholar and Scientist.

8. The graduate will be able to apply to medical practice biomedical scientific principles.
 - a) Explain normal human structure and functions.
 - b) Explain the scientific bases for common disease presentations.
 - c) Justify the selection of appropriate investigations for common clinical cases.
 - d) Explain the fundamental principles underlying such investigative techniques.
 - g) Make accurate observations of clinical phenomena and appropriate critical analysis of clinical data.
12. Apply scientific method and approaches to medical research.
 - a) Critically appraise the results of relevant diagnostic, prognostic and treatment trials and other qualitative and quantitative studies as reported in the medical and scientific literature.
 - b) Formulate simple relevant research questions in biomedical science, psychosocial science or population science, and design appropriate studies or experiments to address the questions.
 - c) Apply findings from the literature to answer questions raised by specific clinical problems.

Outcomes 3: The Doctor as a Professional

20. The graduate will be able to behave according to ethical and legal principles. The graduate will be able to:
 - e) Recognise the rights and the equal value of all people and how opportunities for some people may be restricted by others' perceptions.
21. Reflect, learn and teach others.
 - b) Establish the foundations for lifelong learning and continuing professional development, including a professional development portfolio containing reflections, achievements and learning needs.
 - c) Continually and systematically reflect on practice and, whenever necessary, translate that reflection into action, using improvement techniques and audit appropriately for example, by critically appraising the prescribing of others.
 - d) Manage time and prioritise tasks, and work autonomously when necessary and appropriate.

e) Recognise own personal and professional limits and seek help from colleagues and supervisors when necessary.

3 Teaching and Learning Strategies

Principles will be introduced in formal lectures, and learning will be reinforced in practical classes and facilitator led small-group work immediately afterwards. Student will work in the same teams throughout Phase I to encourage team-working.

Some concepts will be discussed in more detail in tutorials, and Moodle- based tests and coursework will allow for formative assessment. Students will be provided with workbooks describing structured tasks to direct independent learning throughout the unit, and ongoing use of an e-portfolio will nurture and encourage reflective practice.

4 Unit Outline/Syllabus

Session 1: The structure, function & development of the nervous system

Lecture: Introduction to a) Structure of the Module & b) Self Study in Neuroanatomy and The organisation of the nervous system

Lecture: Understanding CNS from its embryology

Group Work: Gross anatomy of the Nervous System

Self-directed Study: The internal structures of the brain & spinal cord

Session 2: The environment of the brain

Lecture: Cellular physiology of the brain

Group Work: Environment of the brain

Session 3: Somatic Sensation & the Sensory Pathway

Lecture: Somatic sensation Reflexes

Lecture: Ascending tracts

Group Work: Patterns of sensory deficits

Session 4: The Motor System

Lecture: Lower motoneurons & the muscle stretch reflex

Lecture: Upper motoneurons & Descending (Motor) Tracts

Demonstration: Demonstrations on Motor Deficits

Self-directed Study: The Skull & Cranial Nerves

Session 5: Motor Disorders & Review of Patterns of Sensory Deficits

Lecture: Disorders of the Motor System & Parkinson's Disease

Group Work: Motor deficits

Session 6: Pain

Lecture: The neural basis of pain

Lecture: Pain Mechanisms

Group Work: Case Studies on Disturbances of autonomic function

Session 7: Special Sense of Sight

Lecture: Embryology of the Eye & the Ear

Lecture: The Eye & Central Visual Pathways Clinical Disturbances of Vision & Their Implications

Group Work: Vision

Session 8: Special Sense of Hearing

Lecture: Mechanisms of Hearing

Lecture: Case studies on Disturbances of Autonomic Function

Group Work: Case studies

Session 9: Strokes, CNS Imaging and Head Trauma

Lecture: Blood Supply to the Brain & its Disruptions (Strokes)

Lecture: Head Trauma & Acute Intracranial Events

Group Work: Case studies in Neuro-Imaging / Head Trauma

Self-directed Study: The special senses

Session 10: Consciousness & Its Disturbances

Lecture: The Brainstem, Arousal, Sleep & Origins of Consciousness

Group Work: Case studies on Consciousness

Lecture: Clinical Assessments of Consciousness

Session 11: Higher functions of the brain & Neuro-Degeneration

Lecture: The cortical association areas

Lecture: Disturbances of Cortical Function & Dementias

Group Work: Case studies

Session 12: The Nervous System In Primary Care & Neuropathology

Lecture: The Nervous System in Primary Care

Lecture: The Importance of History Taking in the Diagnoses of Nervous System Disorders

Lecture: Pathology of the brain

5 *Secondary Learning Outcomes*

In addition to meeting the outcomes described in Tomorrow's Doctors, at the completion of the unit students will be able to:

- Explain how the proper function of the nervous system depends upon its anatomical and biochemical integrity.
- Outline and distinguish between the peripheral and central divisions of the somatic nervous system and between the functions of the somatic and autonomic nervous systems.
- Outline the gross anatomy of the nervous system and the function of specific nuclei and tracts.
- Describe how the nervous system can be examined and imaged.
- Describe the disturbances induced by congenital defects, trauma, disease or ageing.
- Describe the properties of cutaneous and special sense organs and their central representation.

- Outline the role of the cortex, the basal ganglia and the cerebellum in the integration of movement.
- Describe the blood supply of the brain and the mechanisms and consequences of its failure.
- Appreciate the role of the meninges and cerebro-spinal fluid in trauma and disease.
- Outline the role of the cortical association areas, the limbic system and the reticular activating centres in the regulation of the „higher functions“ of the brain, including a consideration of sleep and consciousness.
- Describe the neuroanatomy of pain and its clinical management.
- Relate the anatomy of the cranial nerves to their function and clinical examination.

6 Key Texts and/or Other Learning Materials

- Siegel & Sapru, *Essential Neuroscience*, 3rd Ed, Lippincott, Williams & Wilkins
- Crossman & Neary, *Neuroanatomy*, 5th Ed, Churchill Livingstone
- Young & Young & Tolbert, *Basic Clinical Neuroscience*, 2nd Ed. Lippincott, Williams & Wilkins
- Renton, *Medical Imaging*, Churchill Livingstone
- Ross, *Nervous System Crash Course*, 4th Ed, Elsevier
- Vander, Sherman & Luciano, *Human Physiology*, 7th Edition, McGraw Hill
- Berne & Levy, *Principles of Physiology*, Mosby
- Moore, Agur & Dalley, *Essential Clinical Anatomy*, 5th Edition, Williams & Wilkins
- Ellis, *Clinical Anatomy*, Blackwell
- Snell, *Clinical Anatomy By Regions*, 9th Ed, L, Williams & Wilkins
- Kumar & Clarke, *Clinical Medicine*, Bailliere Tindall
- Axford, *Medicine*, Blackwell
- Douglas, Nicol & Robertson, *Macleod's Clinical Examination*, Elsevier, Churchill
- Goldberg, *Clinical Neuroanatomy Made Ridiculously Easy*, MedMaster, US
- Pritchard & Alloway, *Medical Neuroscience*, Fence Creek
- Bear, Connors & Paradiso, *Neuroscience*, Williams & Wilkins
- Diamond, Schiebel, Elson, *The Human Brain Colouring Book*, Harper Collins
- Chumbley & Hutchins, *A Colour Atlas of Human Dissection*, Wolfe
- Jacobs, *Anatomy: A Dissection Manual & Atlas*, Churchill Livingstone
- England & Wakely, *A Colour Atlas of the Brain & Spinal Cord*, 2nd Ed., Mosby
- Also available in the Moodle Learning Environment is a series of self-marking multiple-choice formative assessments to allow you to assess your learning in the Unit.

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