Module Specification

Clinical Biochemistry

Version: 2025-26, v4.0, Approved

Contents

Part 1: Information

Module title: Clinical Biochemistry

Module code: USSKBL-30-3

Level: Level 6

For implementation from: 2025-26

UWE credit rating: 30

ECTS credit rating: 15

College: College of Health, Science & Society

School: CHSS School of Applied Sciences

Partner institutions: None

Field: Applied Sciences

Module type: Module

Pre-requisites: Studies in the Biology of Disease 2025-26

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Students will develop an understanding of a range of infectious diseases, their pathogenesis, diagnosis, treatment, epidemiology. The module is UK focused but shows the interconnectivity of what happens in other countries to what we see in the UK.

Clinical biochemistry is concerned with the study of biochemical parameters measured in blood samples and other body fluids (e.g. urine), which reflect changes

in cellular processes resulting from a pathological condition. Many different biochemical parameters may be investigated, and a particular disease may only change one of these or perhaps many. An understanding of events which bring about these biochemical changes can aid the clinician in correctly diagnosing the patient. Clinical biochemistry also plays an important role in screening for and monitoring treatment of disease.

Pre-requisites: Students must have passed USSKAT-30-2 Studies in the Biology of Disease before starting this module.

Features: Not applicable

Educational aims: This module aims to develop the students understanding of the clinical biochemistry interpretation of major pathological diseases.

Outline syllabus: Proteins, enzymes and clinical utility: Examples of specific clinically relevant biomarkers. Tissue damage and relationship to diagnostic use of proteins, enzymes and isoenzymes. Clinical utility is an area which underpins all of current diagnostic clinical biochemistry, discussing the value of biochemical and molecular biological tests in the investigation of disease. Covering concepts such as sensitivity, specificity, and accuracy.

Liver disease: Review of fundamental liver biochemistry. Causes of acute and chronic liver disease. Liver function tests. Differential diagnosis of jaundice and other hepatic disorders.

Renal disease: Review of normal kidney functions. Tests of the glomerular function – renal clearance, eGFR (estimated glomerular filtration rate), serum creatinine and urea determinations. Outline of tests of tubular function. Renal calculi and their investigations. Urinary protein markers will also be discussed. Fluid and electrolyte balance is central to the management of any patient who is seriously ill. In this lecture series, water and sodium balance together with hypo/hypernatraemia, hypo/hyperkalaemia will be discussed.

Acid-base disorders: Review of fundamental acid-base concepts. Metabolic and respiratory causes and clinical effects of acidosis and alkalosis. Disturbances to

oxygen transport. Assessment of acid-base status; diagnosis and management of acid-base disorders.

Endocrinology disorders: This will discuss the disorders of the hypothalamic-pituitary organ axis, with particular reference to thyroid, adrenal and gonad diseases. Other disorders of endocrine control will be studied which involve other systems of the body.

Cancer, Tumour markers, and drug therapy: Pathophysiology of tumours. Tumour biomarkers as they relate to clinical biochemistry. Specific examples of proteins as tumour markers – either direct or indirect. Treatment of cancer using cytotoxic drugs.

Plasma lipids and lipid disorders: An understanding of the pathophysiology of plasma lipid metabolism is usually based on the concept of lipoproteins, the form that circulates in plasma. This will be studied in the context of hyperlipidaemias, diabetes and acquired metabolic disorders.

Chronic inflammatory disorders: An understanding of the pathophysiology and monitoring of chronic inflammatory conditions; including musculoskeletal disorders (types of arthritis) and cardiovascular disease. Biochemical and inflammatory serum markers, serology and synovial fluid analysis will be discussed.

Part 3: Teaching and learning methods

Teaching and learning methods: This module is delivered as underpinning lectures followed by a series of tutorials where extensive use of case studies will be made.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Critically appraise clinical biochemistry results, including in the context of wider biomedical data, in the investigation and diagnosis of disease.

MO2 Interpret biochemical test results, and explain how any abnormal result(s) could be caused by a named underlying disease.

MO3 Orally articulate and critically analyse recent scientific literature and integrate into disease discussion.

MO4 Orally articulate complex scientific information in relation to a specific disease or group of diseases, as it relates to the clinical biochemistry specialism.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/usskbl-30-3.html

Part 4: Assessment

Assessment strategy: Assessment 1: Presentation (50%)
This assessment is designed to develop students' understanding of how pathophysiology is related to clinical results. In this assessment, students are required to summarise pathophysiological and research information on an assigned disease in a six minute media clip, and to explain why an individual presents clinically. This encourages students to engage with published research in the field and to gain an appreciation of recent advances in this area. A media clip has been selected as this develops and assesses the students' ability to articulate scientific concepts in the context of clinical biochemistry.

Students are supported to succeed by the provision of previous good examples. There is also a specific part of the introductory session dedicated to talking through this assessment.

Assessment 2: Examination (50%)
Three hour on-campus invigilated examination to align with the Institute of Biomedical Science requirements. Questions will be set to cover the breadth of the module. This assessment is designed to demonstrate the students' ability to describe pathogenic pathways and interpret biomedical data in an integrated manner (albeit focussing on clinical biochemistry).

Students are supported in this assessment by bespoke tutorials where they practice exam style questions, based on case studies, in small groups, and receive formative feedback. At the end of the year there is also a more structured practice exam, upon which feedback is provided to the class as a feed-forward exercise. Closer to the exam, students are also allowed to send lecturers practice answers from questions in the tutorial.

Students are further supported to succeed by being permitted to bring a single A4 box file of information with them in to the assessment for use as a reference point. The content of the box is controlled to prevent students bringing pre-written essays in to copy.

Assessment tasks:

Presentation (First Sit)
Description: Media Clip presenting pathology related case studies
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO3, MO4

Examination (First Sit)
Description: Three Hour Examination
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

Presentation (Resit)
Description: Media Clip presenting pathology related case studies
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO3, MO4

Examination (Resit)
Description: Three Hour Examination
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Biomedical Science {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2021-22

Biomedical Science [Frenchay] BSc (Hons) 2023-24

Biomedical Science [Frenchay] MSci 2023-24

Biomedical Science [Sep][PT][Frenchay][6yrs] BSc (Hons) 2020-21

Biomedical Science [Sep][PT][Frenchay][6yrs] BSc (Hons) 2021-22

Biomedical Science {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2021-22

Biomedical Science [Sep][PT][Frenchay][8yrs] MSci 2020-21

Biomedical Science [Sep][PT][Frenchay][8yrs] MSci 2021-22

Biomedical Science [Frenchay] BSc (Hons) 2022-23

Biomedical Science {Foundation} [Frenchay] BSc (Hons) 2022-23

Biomedical Science [Frenchay] MSci 2022-23