



Module Specification

Clinical Biochemistry

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Part 1: Information

Module title: Clinical Biochemistry

Module code: USSKBL-30-3

Level: Level 6

For implementation from: 2022-23

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Health & Applied Sciences

Department: HAS Dept of Applied Sciences

Partner institutions: None

Delivery locations: Frenchay Campus

Field: Applied Sciences

Module type: Standard

Pre-requisites: Studies in the Biology of Disease 2022-23

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Blood/urine samples have been used for many years to aid the diagnosis of disease. Clinical biochemistry is concerned with the study of biochemical parameters measured in blood samples and other body fluids such as 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. Modern clinical biochemistry involves the use of molecular biological techniques to aid diagnosis or to screen for diseases like cancer or inherited defects of metabolism.

Features: Not applicable

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

Outline syllabus: Enzymes and clinical utility:

Examples of specific clinically relevant enzymes. Tissue damage and relationship to diagnostic use of 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. Introducing concepts such as sensitivity, specificity, predictive values and population selection.

Liver function/disease:

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

Disorders of detoxification and excretory mechanisms - renal:

Review of normal kidney functions. Tests of the glomerular function – renal clearance, GFR (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:

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-target organ axis, with particular reference to the thyroid and adrenal glands. Other disorders of endocrine control will be studied which involve other systems of the body, for example: abnormalities in calcium metabolism; abnormalities in control of electrolyte and fluid balance. Furthermore, case studies will be used to discuss disorders of gonad function.

Cancer, Tumour markers, Toxicology and drug therapy:

Pathophysiology of tumors. Tumor biomarkers. Paraproteins as an example of the use of proteins as tumour markers. Treatment of cancer using cytotoxic drugs.

Plasma lipids and lipid disorders:

An understanding of the pathophysiology of plasma lipid metabolism is usefully based on the concept of lipoproteins, the form that circulates in plasma. This will be studied in the context of hyperlipidaemias, diabetes and lifestyle disorders. Plasma protein and markers of cardiovascular disease will be discussed.

Molecular genetics in disease:

This topic introduces the role of molecular genetics in the investigation and understanding of disease processes such as in-born-errors of metabolism and cancer.

Biomarkers of bone disease and electrolyte imbalance will be covered in coursework assessments.

Part 3: Teaching and learning methods

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

Case studies will be provided prior to the tutorial sessions. Tutorials will use indicative lists of questions to guide student learning. It is expected that the case study will be completed before the tutorial. Therefore, the tutorial will engage active discussion on individual and group findings. Case studies will be part of the final year assessment and therefore attendance at tutorials is strongly encouraged.

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

MO1 Interpret biomedical data in the investigation and diagnosis of disease and critically discuss the origin and effects of an abnormal biochemical profile

MO2 Critically appraise the nature and diagnosis of disease in terms of abnormalities in the biochemical and molecular biological aspects of cellular process

MO3 Critically discuss the relevance of biochemical, molecular biological diagnostic tests in the investigation of disease

MO4 Critically and analytically appraise relevant scientific literature

MO5 Verbally articulate complex scientific information as a media clip

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

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

Part 4: Assessment

Assessment strategy: Component A is a three hour examination, which comprises questions that cover all areas of the module. This assessment is designed to assess the students' ability to describe pathogenic pathways and interpret biomedical data in an integrated manner. Students are supported in this assessment by a bespoke tutorial and also by weekly sessions in which they practice exam questions and receive feedback.

Component B is designed to develop students' understanding of how pathophysiology is related to clinical outcome. In this assessment, students are required to summarise pathophysiological and research information on an assigned disease in a media clip, and to explain why an individual presents clinically. This encourages students to engage with 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. This assessment scaffolds from a assessment at level 2 and is supported by a bespoke session with our Science Communication Unit.

Assessment components:

Examination - Component A (First Sit)

Description: Three Hour Examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Presentation - Component B (First Sit)

Description: Media Clip presenting pathology related case studies

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Examination - Component A (Resit)

Description: Three Hour Examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Presentation - Component B (Resit)

Description: Media Clip presenting pathology related case studies

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Biomedical Science [Sep][SW][Frenchay][5yrs] MSci 2019-20

Biomedical Science {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2019-20

Biomedical Science {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2018-19

Applied Biomedical Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2020-21

Biomedical Science [Sep][FT][Frenchay][4yrs] MSci 2020-21

Biomedical Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2020-21

Biomedical Science [Sep][SW][Frenchay][4yrs] BSc (Hons) 2019-20

Biomedical Science {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2019-20

Biomedical Science {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2018-19