

Liverpool John Moores University

Title: BLOOD CELL SCIENCE
Status: Definitive
Code: **5106BMBMOL** (122384)
Version Start Date: 01-08-2021

Owning School/Faculty: Pharmacy & Biomolecular Sciences
Teaching School/Faculty: Pharmacy & Biomolecular Sciences

Team	Leader
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Academic Level: FHEQ5 **Credit Value:** 20 **Total Delivered Hours:** 53
Total Learning Hours: 200 **Private Study:** 147

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	41
Practical	5
Workshop	5

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	examination	50	2
Practice	AS2	practical report based on a case study	50	

Aims

This module aims to provide the students with an opportunity to increase and

develop their understanding of the principles and practice of Haematology and Transfusion Science, to extend the students' knowledge and understanding of haematological disorders and malignancies, together with the undesirable effects of blood transfusion and to develop students' practical skills in Haematology and Transfusion Science.

Learning Outcomes

After completing the module the student should be able to:

- 1 Explain the factors affecting the production and development of red and white blood cells.
- 2 Demonstrate an understanding of the processes involved in disease of both red and white blood cells.
- 3 Distinguish the features of a variety of pathological conditions encountered in haematology
- 4 Present the factors involved in the maintenance of haemostasis.
- 5 Explain the principles of blood component replacement therapy and the associated risks.
- 6 Assess the characteristic changes of blood parameters in selected disease states.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

exam	1	3	2	4	5
case study	3	2	6		

Outline Syllabus

This module will provide a background information on the physiology and function of red blood cells, white cells and platelets. This will also address essential metabolic pathways underpinning key functions of these cells. This will include the synthesis and function of haemoglobin, NADPH oxidase function for neutrophils and generation of thromboxane A₂ in platelets. Understanding of molecular biology will be developed through relevant examples..

Blood cell formation and identification: Development of blood cells from stem cells to maturity. The influence of cytokines, architecture of the bone marrow and growth factors. Methods of investigation of bone marrow structure and function. An introduction to the identification of blood cells in peripheral blood smears along with key cell surface markers.

The classification of the anaemias will be presented. This will include abnormalities in red cell morphology in anaemia. Haemoglobinopathies such as the Thalassaemias and their identification. Clinical features, presenting symptoms and laboratory investigations of microcytic, macrocytic and haemolytic anaemias. A molecular consideration will also be given for sickle cell anaemia, thalassaemias and glucose-6-phosphate dehydrogenase deficiency.

The haematological malignancies; Terminology, aetiology, epidemiology and classification of the proliferative disorders. Laboratory investigations for the differential diagnosis of leukaemia, and monoclonal-gammopathies. This will adopt advances techniques such as Bcl-ABL in situ hybridisation and the JAK 2 cell signalling.

An introduction to the inter-relationship between the haemostatic and fibrinolytic mechanisms will be given. Coagulation defects, performance and interpretation of coagulation tests. Anticoagulant therapy (warfarin, heparin and factor Xa inhibitors) and its monitoring. Disorders of haemostasis both the hereditary and acquired disorders including thrombocytopaenias and thrombocytopathies.

The biochemistry of the major blood group systems (ABO , Rh Lewis) , their inheritance and laboratory identification will be presented . The concept of compatibility testing and electronic issue will also be given.

Blood banking: Storage of blood and the factors affecting survival times, changes during storage. Use of anticoagulants. Sterility testing and screening of blood for transmissible disease. Production and storage of blood components. Quality control. The optimum use of blood and blood products.

Transplantation: Theories and application of tissue typing techniques in transplantation. Graft versus host disease and its prevention.

Undesirable effects of blood transfusion: Transfusion reactions and their laboratory investigation. Hypomagnesaemia, hyperkalaemia, haemostatic defects, cardiac arrest, circulatory overload and pharmaceutical incompatibilities. Delayed transfusion reactions. Transmission of disease via blood transfusion. Haemolytic disease of the newborn (HDN)

Learning Activities

Most of the material will be delivered through lectures and workshops. The practical element should help enforce some principles and allow the student to develop basic haematological techniques in cell counting and assessing coagulation pathways. MCQ will be posted on blackboard to supplement further understanding from the lectures. Workshops will extend knowledge derived from the lectures to prepare the student for their level 6 studies.

Notes

The lecture content will establish the background information to haematology. The theme of the lectures will be information and application of the knowledge of a professional situation. The module will be assessed by the students approaching haematological problems through case studies. The students will collate their data at practical sessions and present their finding in the form of a poster. The examination will be a series of short answer questions and one essay from 3.

No specific benchmarks are available for this module, but the learning outcomes at least meet, if not exceed, those stipulated in the relevant qualification descriptors for

a higher education qualification at level 5 as defined by QAA, Sept 2015. The module has also been informed by the benchmark statement for Biomedical Science June 2015.

Intake is every September.

The criteria for admission to the module require that candidates meet the criteria for admission to the BSc Biomedical Science programme (32805).

The final award is Certificate of Professional Development in Blood Cell Science, 20 credits at Level 5.

The students have access to a module Blackboard site and the University's other range of electronic support such as access to the electronic library facilities. The module content is regularly updated on the Blackboard site including contemporary reading lists and links to journal articles. Students have access to the community site for Biomedical Science. All students have access to the module leader through phone contact and email. Module and CPD guides are also provided, which provide a range of information.

The programme is assessed and run in line with the Academic Framework

<http://www.ljmu.ac.uk/eaqs/121984.htm>

The module is accredited by The Institute for Biomedical Science (Sept 2016- Aug 2021). The module forms part of the BSc Biomedical Science programme (32805) which was reviewed in April 2016.

The methods for improving the quality and standards of learning are as follows:

- Annual monitoring Review;
- Liaison and feedback from the students;
- Reports from External Examiner;
- Programme team ensuring the module reflects the values of the current teaching and learning strategy;
- Module leader updating knowledge and skills to ensure these remain current and relevant.

The module is included in the programme specification for the BSc Biomedical Science programme (32805). The module is aligned with the same BSc Biomedical Science module for annual monitoring and external examining purposes.