Genetics

Module Information

2022.01, Approved

Summary Information

Module Code	7503CEBMOL
Formal Module Title	Genetics
Owning School	Pharmacy & Biomolecular Sciences
Career	Postgraduate Taught
Credits	20
Academic level	FHEQ Level 7
Grading Schema	50

Teaching Responsibility

LJMU Schools involved in Delivery
Pharmacy & Biomolecular Sciences

Learning Methods

Learning Method Type	Hours
Lecture	20
Practical	10
Tutorial	6
Workshop	4

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

Aims and Outcomes

Aims	This module will first introduce a description of the human genome and its evolution, with an emphasis on the features that can explain the prevalence of certain diseases and traits in modern day humans. The classical processes of mutation identification in single gene disorders and the impact of modern technologies will be critically appraised using primary research literature. We will look into the current methodologies used to identify risk alleles in complex diseases and how these large studies have contributed to the diagnosis of common diseases. We will encourage student understanding and appreciation of how molecular technologies (such as the human genome project, embryonic stem cells, cloning nuclear transfer and reprogramming) might relate to the future treatment of infertility and the ethical/legal issues involved. We will finally explore the role of human genetics in non-clinical scenarios, such as intelligence or athletic performance, and the variety of ethical issues that may arise as a result of genetic testing.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Critically review the molecular genetic and epigenetic mechanisms regulating gene expression and development.
MLO2	2	Critically discuss how current molecular technologies might relate to the future treatment of infertility.
MLO3	3	Display an advanced understanding of selected techniques used in diagnosis and treatment of human disease.
MLO4	4	Consider the potential impact of genomics on the diagnosis and treatment of disease.

Module Content

Outline Syllabus	• Essential cellular and molecular biology (including embryonic stem cells, cloning, nuclear transfer and reprogramming) • Cytogenetics • Next generation sequencing (NGS) • Genetics to genomics • Epigenetics to epigenomics • Pre-implantation genetic testing (previously known as pre-implantation genetic diagnosis (PGD) or screening (PGS)) • Law and ethical concerns and controversies • Genetic counselling • Interpretation of PGT results and mosaicism • Clinical and laboratory methods that allow diagnosis of foetal genomic abnormalities, current treatment options and future developments: • Non-invasive screening of embryos • Prenatal testing (NIPT) • Carrier screening • Polygenic score prediction • CRISPR and other gene editing technologies
Module Overview	
Additional Information	This module will provide students with an understanding of some of the cutting-edge techniques and their applications currently used in the fields of genetics and cellular biology. This module will link to topics covered in other modules on the programme and will focus on four broad themes, molecular techniques, diagnostic techniques, genomics and inheritance. All lectures will be covered by experts in their respective fields who will introduce the basic principles of the techniques and how these techniques are employed throughout molecular genetics and cellular biology, both in the clinical and academic setting. Students will be expected to advance their knowledge of the topics covered in lectures throughout the programme by independent research.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Laboratory report	50	0	MLO3, MLO4
Exam	Essay based exam	50	3	MLO1, MLO2, MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Giles Watts	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings