Genomics, Health and Society (IEHC0036)

Description

‘Genomics, Health and Society’ is a module which aims to introduce the basic concepts of genetics and genomics, their application in health care for treatment and prevention of diseases, and the implications of genetic technologies and information on society. The topics you will cover as part of this module include basic genetics, genetic science, as well as concepts in epidemiology and statistics as they apply to genetics; human genetics and susceptibility to disease; epigenetics; genomics and population health; counselling and risk communication; molecular epidemiology; big data, as well as ethical, legal, social implications of genomics in health and society.

By the end of the module you should be able to:

- Describe the relevant terminology in genetics (e.g. DNA, gene, allele, locus, haplotype, penetrance, dominant / recessive inheritance, heritability, pedigree)
- Describe techniques in epidemiology and statistics that apply to genetic epidemiology (e.g. Hardy Weinberg Equilibrium, linkage disequilibrium, GWAS, Mendelian randomisation)
- Describe genomic variation and its role in health and disease
- Explain the pattern of inheritance of rare and common diseases
- Explain the role of epigenetics in cancer development and control
- Assess the utility of predictive genetic testing in risk stratification for cancer prevention and screening
- Explain the application of pathogen genomics in preventing, predicting and treating infectious diseases
- Explain what is ‘big data’ and how it could be used to improve health

Key information

- Year: 2020/21
- Credit value: 15 (150 study hours)
- Delivery: UG L6, Campus-based
- Reading List: View on UCL website
- Tutor: Prof Nora Pashayan
- Term: Term 2
- Timetable: View on UCL website

Assessment

For more information about the department, programmes, relevant open days and to browse other modules, visit ucl.ac.uk
Discuss different approaches for counselling and genetic risk communication

Discuss the ethical, social, and legal considerations in using genomic information in healthcare

This is an optional advanced module open to Year 3 students on the BSc Population Health module. Those wishing to select this module must have successfully completed IEHC0028 Research Methods in Population Health or any similar introductory or intermediate research methods module. There is availability for UCL elective students from other departments. However, spaces are limited to 25 and are allocated on a ‘first come, first served’ basis on Portico, with preference given to BSc Population Health students.

You will attend weekly two-hour group tutorials in Term 2 each followed by one-hour lectures.

You will be assessed based on a data interpretation exercise (2,000 words) which counts for 100% of your final mark for this module.

Selected Reading List

Molecular Biology of the Cell. Bruce Alberts, Alexander Johnson, Julian Lewis and Martin Raff. Garland Science, 2008 (Chapter 4. DNA and Chromosomes; Chapter 5. DNA Replication, Repair, and Recombination; Chapter 6. How Cells Read the Genome: From DNA to Protein; Chapter 7. Control of Gene Expression)

Health Education England’s basic course in genomics
https://www.genomicseducation.hee.nhs.uk/

Useful primers for students without a grounding in biology and genetics.

Stratified screening for cancer – Recommendations and analysis from the COGS project. PHG Foundation. 2014
http://www.phgfoundation.org/file/15380/
