QUEEN'S UNIVERSITY BELFAST

FROM DISCOVERY TO RECOVERY

BSc

HUMAN BIOLOGY

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Welcome to our BSc Human Biology handbook and thank you for showing an interest in this exciting subject area.

Human Biology explores the scientific principles regarding the function of the human body, it's anatomy, physiology and the study of health and disease.

The Human Biology degree at Queen's is underpinned by the core disciplines of Anatomy, Microanatomy and Physiology (the study of the function of the human body). In addition, it provides a solid foundation in Mammalian Biochemistry, Genetics, Molecular Biology, and Microbiology.

This is a practical, hands-on degree in Anatomy that allows you to combine a programme that includes cadaveric dissection with modules from medical and biological sciences.

We aim to make sure you are applying what you are learning in the classroom, to the lab bench and to scientific research. That emphasis is demonstrated by the opportunity for all students to obtain first-hand experience through an innovative range of learning experiences, such as the use of ultrasound imaging in cardiovascular physiology and exposure to cadaveric dissection.

Myself and the team in the School of Medicine, Dentistry and Biomedical Science at Queen's hope that you can join us to help solve worldwide health issues and we look forward to welcoming you to Belfast soon.

RANKED IN THE TOP 1% OF UNIVERSITIES INT THE WORLD
(QS WORLD UNIVERSITY RANKINGS 2018/ WEBOMETRICS.INFO)

BELFAST IS THE SAFEST REGION IN THE UK
(BRITISH CRIME SURVEYS, 2015/16)

94% OF STUDENTS IN BELFAST SAID THEY WERE **'VERY HAPPY'** TO BE STUDYING HERE
(STUDENT LIVING BY SODEXO 2016)

BELFAST VOTED **NUMBER 1 REGION** IN THE WORLD TO VISIT IN 2018
(LONELY PLANET, 2017)

LOWEST COST OF LIVING IN THE UK
(MERCER, 2016)

ALL MAJOR UK CITIES WITHIN AN HOUR'S FLYING TIME
(COMPLETE UNIVERSITY GUIDE 2016)

WHAT IS HUMAN BIOLOGY?

Human Biology is the integrated study of human anatomy and physiology, including the study of the body in health and disease. It covers a wide range of topics, ranging from genetics, microbiology and immunology to the core disciplines of anatomy, microanatomy and physiology.

What will I learn?

Specialist subject areas which can be studied in detail include Pharmacology, Topographical Anatomy, Exercise and Applied Physiology, Developmental Studies, Embryology, Neuroscience and Science Communication.

Within these subject areas we provide a wide and innovative range of learning experiences, such as the use of ultrasound imaging in cardiovascular physiology and exposure to cadaveric dissection.

Where will my degree take me?

This degree programme is aimed at students seeking a broad-based knowledge of Human Biology with career opportunities in the medical and pharmaceutical industries, teaching, scientific publishing or the scientific civil service. Many students go into further study after their degree, completing Master's and PhDs and a significant proportion of graduates gain entry to a Medical degree both here and abroad.

We have established links with two Universities in the US, The University of Nevada in Reno and the University of Vermont. Students are given the opportunity to apply on a competitive basis to work in Research Laboratories in these institutions for a year between second and final year, and some students have been offered a PhD place in the US on completion of their degree.

"I couldn't recommend the Human Biology course more strongly. With a comprehensive support network in place, students have the opportunity to reach their full potential and are equipped for challenges in their academic career and beyond."

Helen Monaghan, BSc Human Biology Student, 2018

MODULE INFORMATION

Stage 1

The World of Microorganisms

A practical and theoretical introduction to the biology of bacteria, viruses, fungi, algae, protozoa and parasites. On completion of this module, you will be able to describe the basic structure of economically and medically important examples of bacteria, viruses, fungi, together with protozoan and metazoan parasites; outline the various interactions that such organisms may have with animals and plants; describe how microorganisms relate to production and use of food; describe how such organisms may contribute to the manifestation of disease; discuss the biotechnological potential of such organisms for the benefit of humankind.

Human Structure and Function

This module gives you an introduction to the structure and function of cells, tissues and systems of the human body. It covers basic anatomical and physiological terminology, the microanatomy of the cell and the structure, function and classification of the basic tissues of the body including epithelium, connective, muscle and nerve; the structure and function of skin, blood, eye and ear; the structure and function of the organs and components of the major body systems including the cardiovascular, respiratory, urinary, endocrine, immune, alimentary and reproductive systems. The study of anatomy is enhanced by a range of practical classes where there are opportunities to examine prosected human cadaveric specimens, preserved potted human specimens and microscopic anatomy via virtual slides.

Molecular Basis of Life

This module will give you a knowledge and understanding of: the structure and roles of nucleic acids, amino acids and proteins, including specific named examples; some of the techniques used to study them including pH, pKa, absorbance calculations and PCR; the genetic code, its translation into proteins, its effect on the phenotype by biochemical activity; basic control of differentiation in embryogenesis, the structure and transmission of chromosomes (nuclear and organelle); independent segregation, linkage and recombination; evolution by selection; the methods of study of allele frequencies at population level, including the Hardy-Weinberg equilibrium prediction, its calculation, interpretation and use; the use of web-based bioinformatics tools to identify a protein-encoding gene, predict protein structure and function and the applications of genetics in biotechnology. You will develop laboratory skills related to molecular biology, biochemistry and genetics as well as computational analyses of genome/transcriptome data.

MODULE INFORMATION

Stage 2

Molecular Cell Biology
This module aims to provide you with a substantial understanding of the molecular basis of cell structure and function, including practical experience of handling and observing living mammalian cells. Cell signalling mechanisms and the processes of information flow between the plasma membrane and the nucleus are covered in some detail providing the knowledge base to understand intracellular control mechanisms and the bulk of the literature published in current medical research. You will be taught practical laboratory skills in animal cell handling and culture, phase-contrast biomicroscopy, immunofluorescent staining and confocal scanning laser microscopy

Human Physiological Measurement
This course covers the principles of bioinstrumentation and electrophysiological measurement. Specific study topics include revision of normal physiology and common pathologies of major body systems such as cardiovascular, respiratory, neural, muscular and metabolic systems. The module will examine the methods currently used in clinical and research settings to measure physiological changes to these major body systems and you will gain practical skills of collecting physiological measurements from human subjects.

Scientific Methods/Statistics
The course has two main strands: the application of statistics to medical research and the methodology of how to undertake scientific research. The statistics component provides an introduction to basic statistical principles/methods and experience in presenting, analysing and interpreting data. The scientific methods component gives a working knowledge of the scientific method. Practical use of the scientific method will be developed in sessions focussed on experimental design, reading the scientific literature, peer-review and scientific writing. There will also be an introduction to the types of experimental models currently used in the Biomedical Sciences.

Anatomical Sciences
This module covers the theory and practice underlying the processing of specimens for examination by different types of microscopy including light, electron, immunofluorescence and confocal microscopy. It also includes an Introduction to the study of gross anatomy starting with the basic terminology relating to anatomical planes, anatomical positions and anatomical directions. Study of the gross anatomy of the head, neck, thorax, abdomen and limbs, including an overview of the respiratory, cardiovascular, gastrointestinal, renal and musculoskeletal systems, through the use of osteological and prosected human specimens and by dissection (specimens permitting). The module will also incorporate medical imaging and will involve the integration of a range of imaging modalities into practical classes using advanced interactive technologies.

MODULE INFORMATION

Stage 2

Physiological Sciences

The module will provide knowledge and understanding in the following areas: Introductory and basic systems pharmacology; physiology of movement and sensation; physiology of pain, analgesia and use of local anaesthetics; the neural control of exercising muscle; physiological regulation of the vasculature and circulation; blood supply to special regions; cardiac output; mechanical and electrical events of the cardiac cycle; the cardiovascular system during exercise; static and dynamic lung mechanics; spirometry; gas transport and transfer; lung function and exercise; renal clearance; acid base regulation and disorders; the kidney's role in exercise and drug excretion; applied physiology including exercise testing and training.

Human Evolution

This module will provide you with knowledge and understanding of the comparative anatomy between modern humans and our closest living relatives (the great apes), and how our current anatomy evolved since the split with the last human / chimpanzee common ancestor by considering the fossil evidence for extinct hominid species from the genera Ardipithecus, Australopithecus, Paranthropus and Homo. Particular emphasis will be given to the evolution of the limbs, pelvis, thoracic cage, cranium, brain and dentition. The genetic evidence for human evolution will also be explored. Where possible the medical significance of human evolution will be explored. Scientific writing and critical review of the scientific literature represents a major element of the module and you will apply the principles learned to reviews of current developments in our understanding of how modern humans evolved.

Stage 3

Principles of Pharmacology & Therapeutics

This module explores the fundamental principles of pharmacodynamics, pharmacokinetics and toxicology. Emphasis is placed on the application of such principles to the steps involved in the development of new drugs, with particular reference to novel therapies for the treatment of selected diseases of the gastrointestinal system, and to evaluation of the efficacy and safety of prescription medicines and herbal remedies. The module addresses drug handling by the human body and the various molecular targets at which chemical mediators and drugs act, examining the principles governing drug disposition and action. Guidelines for prescribing in selected patient subpopulations are discussed including children, elderly, pregnancy, hepatic and renal disease, and the influence of pharmacogenomic variation. The classification of adverse drug reactions and drug interactions is explained, and the management of drug poisoning discussed.

MODULE INFORMATION

Stage 3

Research Project

You will undertake a substantial piece of project work that will provide an introduction to scientific research, further developing your capacity for independent, analytical and critical thought and improve their application of technical/transferable skills. In the first semester you will interpret and analyse the scientific literature around a specific question of relevance to biomedical or human biology research and produce an illustrated science magazine article that provides a distillation of the science for the consumption of the educated lay person. In the second semester you will carry out a short, closely defined laboratory based project or analysis of data linked to the scientific question posed in semester one resulting in a final report in the form of a scientific journal paper and a 10 min oral presentation to a panel of subject experts.

Sports and Exercise Physiology

The module emphasises the development of skills in the higher cognitive domains as applied to human physical activity. The process involves making measurements and observations, interpreting data and putting those data into the context of the scientific literature. The topics include cardiac, vascular, respiratory, metabolic and muscular responses to exercise, kinetics, genetic factors, fitness training and the health benefits of exercise. There is detailed content on understanding the physiological and pathophysiological responses to exercise and the health significance of physical activity for individuals and society. The professional approach to evaluating evidence from data and the literature upon which valid conclusions can be reached and communicating these to colleagues is the central learning experience.

Advanced Neurosciences

This module is divided into several main themes: a study of the detailed human neuroanatomy of the brain and associated nerves particularly in relation to disease; magnetic resonance imaging of the brain in health and disease; connections between parts of the brain - brain circuits; neurodegenerative and neuroimmunological disorders; regeneration of the nervous system after injury; the neuroscience of vision; the neuroscience of pain.

MODULE INFORMATION

Stage 3 (continued)

Cardiovascular Pathobiology & Treatment

This course addresses cardiovascular biology and pathology and the evaluation of established and emerging therapies. The biology of important mediators and modulators of cardiovascular function will first be explored. The pathobiology and treatment of many conditions such as hypertension, peripheral vascular disease, thromboembolism, systolic heart failure and atrial fibrillation will be discussed in addition to the clinical pharmacology of drugs

Embryology & Developmental Biology

This course exploits the knowledge-base of embryology and developmental biology to provide students with concepts and mechanistic understanding of how the human body develops. This module covers the clinically relevant embryology and development of selected organs and organ systems including stem cell biology, the role of genetic hierarchies; basic processes of fertilization, gastrulation and neurulation;Key stages in embryonic and foetal development;Tissue cross-talk in the development of complex organs;Development of the cardiovascular, nervous, gastrointestinal, respiratory, urogenital and musculoskeletal systems

WHAT'S NEXT?

Visit our dedicated website

Our website for new students will provide you with more information on the application process, fees & funding, life in Belfast and much more.
www.qub.ac.uk/MHLS/NewStudents

Get in touch

Contact a member of our team directly with any questions or queries you may have.
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