

UNIVERSITY OF
EXETER | MEDICAL
SCHOOL

MEDICAL SCIENCES
SPORTS AND EXERCISE
MEDICAL SCIENCES

UNDERGRADUATE SUBJECT BROCHURE 2018





THE UNIVERSITY OF EXETER MEDICAL SCHOOL

The University of Exeter Medical School delivers four highly-regarded and innovative undergraduate degrees: the BSc in Medical Sciences, the BSc in Sports and Exercise Medical Sciences, the BSc in Medical Imaging (Diagnostic Radiography), and the Bachelor of Medicine, Bachelor of Surgery (BMBS). Our research extends from cutting-edge fundamental life science to studies of disease mechanisms; from innovative health services research to world-renowned patient-centred interventions. As a student here you'll benefit from the unparalleled insights that can be gained by spending time in such an exceptional research environment.

The combination of our scientific research and evidence-based approaches to learning and teaching will prepare you to become the scientists and doctors that will overcome current and future challenges in health and social care.

As a student of the Medical School, you'll also benefit from our partnership with the NHS, the cutting-edge research of the

Institute of Biomedical and Clinical Sciences in life and medical sciences and various translational health technologies (eg, cardiovascular, diabetes, neuroscience and ageing) and the research of other colleges across the University.



The Athena SWAN Charter recognises and celebrates good employment practice for women working in STEMM in higher education and research.

The University of Exeter Medical School have been awarded an Athena SWAN Silver department award. Find out more about Athena SWAN in the University of Exeter Medical School at www.exeter.ac.uk/medicine/about/equalitydiversity/athenaswan



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Glucose is a sugar found in many foodstuffs which is required to fuel the energy demands of our body. For this reason, the body goes to great lengths to control blood glucose levels and a key player in this is the hormone insulin. Insulin is produced by specialised “beta” cells present in tiny mini-organs, known as islets of Langerhans, which are located in the pancreas. Unfortunately, in some people, the beta cells are destroyed by the body’s own immune system, leading to type I diabetes. Patients with type I diabetes must inject themselves with insulin daily and, at present, we do not understand what triggers the immune attack on their beta cells.

Our research has shown that, in some individuals with type I diabetes, the beta cells can become infected with a particular type of virus which might then initiate the disease. We have also discovered that this infection is unusual and that the virus has developed unexpected ways to evade the normal anti-viral pathways found in beta cells. Our on-going work aims to discover how this happens and how viral infection triggers the immune attack seen in type I diabetes. This will then enable the design of new strategies (vaccination, for example) to prevent people developing type I diabetes.

Professor Noel Morgan, Director of Institute of Biomedical and Clinical Science

KEY INFORMATION AND ENTRY REQUIREMENTS

DEGREE PROGRAMME	UCAS CODE	TYPICAL OFFER	REQUIRED SUBJECTS
BSc Single Honours Medical Sciences	B100 3 yrs (B101 4 yrs)	AAB-ABB; IB: 34-32	At least one grade A and one grade B in GCE AL science subjects, one of which must be Biology; at least one HL6 and one HL5 in IB science subjects, one of which must be Biology
Medical Sciences (Human Genomics)	B109 3 yrs (B119 4 yrs)	AAB-ABB; IB: 34-32	
Medical Sciences (Neuroscience)	B106 3 yrs (B116 4 yrs)	AAB-ABB; IB: 34-32	
Medical Sciences (Pharmacology and Therapeutics)	B105 3 yrs (B115 4 yrs)	AAB-ABB; IB: 34-32	
Sport and Exercise Medical Sciences	BC03 3 yrs	AAA-AAB; IB: 36-34	GCE AL Biology grade B and another science at grade B; IB Biology HL5; and second science HL5
Sport and Exercise Medical Sciences with Professional Training Year	BC04 4 yrs	AAA-AAB; IB: 36-34	

GCE AL/AS science includes: Biology/Human Biology⁺; Chemistry; Computing; Design and Technology; Electronics; Environmental Studies; Geography; Geology; Maths/Pure Maths/ Further Maths⁺; Physical Education; Physics; Psychology; Science (applied); Statistics.

Students joining the three-year programme will have the option to transfer to the four-year programme, and vice versa.

International students

You can find details of English language requirements and Foundation programmes at www.exeter.ac.uk/ug/international

For full and up-to-date information on applying to Exeter and entry requirements, including requirements for other types of qualification, please see www.exeter.ac.uk/ug/applications

Biosciences

The Medical Sciences programmes are delivered in conjunction with Biosciences. You may also be interested in programmes within the Biosciences portfolio including BSc Exercise and Sports Sciences, BSc Biochemistry and BSc Biological and Medicinal Chemistry; Study Abroad and professional placement variants of each of these programmes are offered. Full details of the programmes are available in the Biosciences subject brochure and online at www.exeter.ac.uk/ug/biosciences

Sport and Health Sciences

The Sport and Exercise Medical Sciences programmes are delivered in conjunction with Sport and Health Sciences. You may also be interested in programmes within the Sport and Health Sciences department including BSc Exercise and Sports Science, BSc Psychology with Sport and Exercise Science; Study Abroad and professional placement variants of each of these programmes are offered. Full details of the programmes are available in the Sport and Health Sciences subject brochure and online at www.exeter.ac.uk/ug/sport

BSc (HONS) MEDICAL SCIENCES

Top ten in the UK for Biosciences in *The Guardian University Guide 2017*¹

90% of Medical Sciences students progressing into employment or further study within six months of graduation²

83% of research classified as world-leading or internationally excellent³

Study pathways in Health Research, Human Genomics, Neuroscience or Pharmacology and Therapeutics

Innovative approaches to individual and group learning

Programme information

Email: medicine@exeter.ac.uk

Phone: +44 (0)1392 725500

www.exeter.ac.uk/ug/medical-sciences

At present, many scientific discoveries often do not leave the laboratories in which they are made. At the same time, the needs of front-line clinicians – and their patients – often go unheard by those doing research. This career-focused degree trains you to fill these gaps, and thereby enhance the lives of patients.

Our Medical Sciences degrees offer an innovative approach to learning, which includes lectures from world-leading experts; student-focused small-group learning; internationally renowned e-learning resources; hands-on sessions in research laboratories and clinical settings; inspirational clinician-scientist-patient sessions; and worldwide professional training placements. The curriculum combines contemporary medical sciences with the training required to undertake cutting-edge research.

Career preparations and employability training run throughout the programme: after your second year, you could choose to

take a Professional Training Year (PTY) and spend a year undertaking research at one of the world's leading universities, find out what it's really like to work in industry or work in the NHS research environment. This optional year will increase your employability skills and reinforce your CV.

Medical Sciences has been developed in consultation with industry employers, the NHS and academia and provides a firm foundation in the core biomedical and biomolecular sciences, alongside an insight into medical practice and the biotechnologies used to prevent, test and diagnose disorders and treat patients. You'll develop an integrated, scientific knowledge that you can put into practice in a clinical setting and robust research skills, plus creative and inquisitive communication, leadership, critical appraisal and problem-solving skills. These key skills will prepare you for a career helping to progress scientific discovery into clinical and medical practice, ultimately to improve human health.

¹ Medical Sciences is included with other related subjects in this category

² respondents to the Destination of Leavers from Higher Education (DLHE) Survey of 2014/15 graduates

³ Research Excellence Framework 2014 based on the percentage of research categorised as 4* and 3*. Medical Sciences is returned to the Clinical Medicine Unit of Assessment

DEGREE PROGRAMME

BSc (Hons) Medical Sciences

LOCATION: EXETER (ST LUKE'S AND STREATHAM CAMPUSES)

Our Medical Sciences degrees prioritise the science that underpins medicine and clinical practice, preparing you to translate scientific discoveries and technological advances into improved healthcare. To achieve this, the first part of the programme gives you a comprehensive insight into how the human body normally works. We study this through small group sessions (in the *Integrated Clinical Science* and *Fundamental Skills for Medical Scientists* modules), interactive workshops, lectures and hands-on laboratory practicals.

We then build upon this foundation to see how things can go wrong in the body due to disease and how normal function might be restored. We are keen that you develop a holistic understanding of human health. For example, whilst pharmaceutical intervention may be appropriate in some conditions, other conditions might be helped more by exercise or using technology or engineering. You will be able to see this for yourself, thanks to the wide-range of placements that we run throughout the programme.

The longest of these placements is the Professional Training Year in the third year, when many students take the option to spend a whole year working in industry, a university or NHS laboratory. Whether you chose to do the three or four-year programme, your final year will be spent specialising in the area, which interests you most, tailoring your degree to match your specific career ambitions. You'll also undertake a two-term long independent research project under the supervision of an academic.

Pathways within Medical Sciences

All students complete the same first year regardless of whether you choose Medical Sciences or one of our four Medical Sciences pathways. Our programme is designed to be flexible so that you can change between pathways, or onto a pathway at the end of Year 1. In Year 2, modules are introduced which are designated to the pathways, and in the final year you will study advanced pathway-specific modules and complete a research project within your chosen area.

These pathways have been developed through discussions with the scientific community to ensure graduates have the skills and knowledge needed to work in the ever evolving workplace. These areas link with the research strengths of the Medical School; this means that you will learn about the most relevant and up-to-date thinking in these fields.

Please note that the modules listed relate to the core BSc (Hons) Medical Sciences programme. If you study one of our pathways core and optional modules will differ slightly in Year 2 and the final year. Refer to our website for the most up-to-date module information.

Human Genomics

LOCATION: EXETER (ST LUKE'S AND STREATHAM CAMPUSES)

Genomics is the study of the structure and function of our genome. Genes are regulated to produce the RNAs and proteins needed for life, and these factors may be influenced by internal factors (such as genetic variation or disease states) or external factors (such as our environment). Powerful technologies in genomics allow us to sequence a person's entire genetic code, giving insight into the mechanisms of normal and pathological states, as well as the identification, diagnosis and treatment of genetic disorders.

Topics/modules will include:

- Medical Genetics;
- Medical Genomics;
- Pharmacogenomics;
- Genomics and Introductory Bioinformatics;
- Molecular Biology of the Gene;
- Final Year Project in Human Genomics.

Neuroscience

LOCATION: EXETER (ST LUKE'S AND STREATHAM CAMPUSES)

How do the 100 billion nerve cells in the human brain get connected? How do nerve cells communicate with each other – and why does this change in diseases such as Alzheimer's and epilepsy? How do nerve cells give rise to thoughts, emotions and actions?

Neuroscience seeks to answer questions such as these. Some modules focus on normal function, others on disease processes and opportunities for treatment. All of the modules draw on the research undertaken by our staff, a feature which ensures students can engage with the very latest work in the field.

Topics/modules will include:

- Foundations in Neuroscience;
- Frontiers in Neuroscience;
- Neuropharmacology;
- Final Year Project in Neuroscience.

Pharmacology and Therapeutics

LOCATION: EXETER (ST LUKE'S AND STREATHAM CAMPUSES)

Study how drugs are designed and how they work in the body. Become familiar with research and development in the new generation of 'smart' drugs and how they are being targeted for specific subset of disorders.

Topics/modules will include:

- Induction to Pharmacology;
- Rational Drug Design;
- Pharmacogenomics;
- Neuropharmacology;
- Pharmacology and Medicinal Chemistry;
- Final Year Project in Pharmacology.

MODULES

KEY C = Core
● = Optional

Please note that the modules listed relate to the core BSc (Hons) Medical Sciences programme. If you study one of our pathways, core and optional modules will differ slightly in Year 2 and the final year. Refer to our website for the most up-to-date module information.

Year 1 Modules

Module Name	
Fundamental Skills for Medical Scientists	C
Biochemistry and Genetics	C
Integrated Clinical Science	C
Microbiology and Cell I	C

Year 2 Modules

Module Name	
Medical Research Evaluation	●
Disease, Diagnostics and Therapeutics (DDT)	C
Principles of Medical Research	C
Academic and Professional Support	C*
Advanced Cell Biology	●
Molecular Biology of the Gene	●
Medical and General Microbiology	●
Anatomical Sciences	●
Immunopathology	●
Molecular Microbiology	●
Genomics and Introductory Bioinformatics	●
Analytical Techniques in Biochemistry	●
Medical Genetics	C
Introduction to Pharmacology	C
Foundations in Neuroscience	C

Professional Training Year (PTY) optional competitive entry

Module Name	
Professional Training Year	C
Academic and Professional Support	C*

Final Year Modules

Module Name	
Research Project	C
Translational Medical Science	C
Cellular Basis of Immunity	●
Frontiers in Molecular Cell Biology	●
Managing Clinical Trials: Putting Science into Practice	●
Medical Imaging: Principles and Applications	●
Molecular Basis of Infection	●
Pharmacology and Medicinal Chemistry	●
Bioinformatics	●
Horizons of Biochemical Research	●
Energy Metabolism	●
Leadership and Teams	●
Psychology Applied to Health	●
Health Economics	●
Cell Biology of Disease	●
Academic and Professional Support	C*

In Medical Sciences you have a great relationship with your tutors and you have the backing of expertise to get a really good quality of teaching. The structured small group learning sessions have been great for developing my communication and team-working skills. You're not just sat in a lecture theatre being talked at, you're actively participating in the learning and I find this a more engaging way to learn.

Tim Hong-Ho, final year Medical Sciences

MODULES CONTINUED

Year I

In your first year you will explore the science that underpins the advancement of modern medical practice. The emphasis is on understanding the normal functioning of the human body, from enzymes through to whole biological systems. This is supplemented by the study of environmental micro-organisms and human microbiom and how they may benefit or alter our health. Without this core knowledge of how the body works, it would be impossible for us, as scientists, to devise the new preventative or diagnostic tests, drugs or treatments that will best benefit patients.

Alongside lectures, tutorials and laboratory practicals, you will engage in student-centred small group work where you are given the freedom to explore a scientific topic under the expert guidance of one of our tutors (in the *Integrated Clinical Science* and *Fundamental Skills for Medical Scientists*). Further tutor-guided learning occurs within our Life Sciences Resource Centre, supported by state-of-the-art technology-enhanced learning resources (the *Integrated Clinical Science* and DDT modules). Your core laboratory skills will be developed through laboratory-based practicals that run alongside and support your other sessions. Some inspirational sessions also involve a doctor, scientist and patient to explore key clinical cases from three different perspectives.

You will begin to compile your Personal Development and Professionalism Portfolio, in which you chart your progress from a new student to a professional individual ready for the world of employment. You'll do this by analysing your academic performance and the frequent feedback offered by the school to identify opportunities for personal and professional development to help you achieve your educational and career goals. Support for your academic progress, employability and career planning is provided by your allocated Academic Tutor and through various workshops and training sessions which are embedded in core modules called Academic and Professional Support.

Core modules:

Biochemistry and Genetics

Biochemistry is an introductory module providing the essential biochemical knowledge for understanding all living processes. You will study protein structure, enzyme kinetics and basic metabolism; understanding how each of these processes function and shape the living cell. Practical sessions offer you vital hands-on experience, learning key biochemical techniques and how to apply them.

This module will provide you with the opportunity to develop the important academic and professional skills of reflective practice and writing, the critical analysis of published data and scientific writing in the form of a literature review. This module will also show you how basic science can improve healthcare by introducing you to expert researchers and gaining an insight into what they do. The day-to-day life of a researcher will be demonstrated in scheduled visits to laboratories in both university and healthcare environments, and in seminars detailing the biomedical science and clinical concepts of specific diseases from the viewpoint of doctor, patient and researcher.

Fundamental Skills for Medical Scientists

Introduces the underlying concepts required for scientific investigation, including modern laboratory techniques, experimental design and presenting scientific data. Particular emphasis is given to learning the quantitative skills required to analyse experimental results. Team development training and small group tutorial work are features of this module.

Integrated Clinical Science

This module links the key scientific concepts you explore in other modules to clinical practice. You will study the core principles of biomedical disciplines relating to human function (including biochemistry, physiology, pharmacology, neuroscience and immunology) and observe how these subjects interact and interrelate within normal human function. You'll also have an opportunity to gain an understanding of some key medical technologies used to assess human health and function.

Microbiology and Cell

This module provides an introduction to the microbial world. Essentially divided into two parts, concepts and skills, this module will introduce these through lectures and practical sessions. The core concepts are focused around five key themes which are: evolution, information flow, metabolic pathways, structure and function, and the impact of micro-organisms. Micro-organisms, including bacteria, protists and fungi, will be used to highlight these concepts. You will thus be introduced to a variety of biological concepts, ranging from an evolutionary perspective through to modern day Medical Microbiology.

Year 2

The second year focuses on the scientific basis of important diseases, beginning with some fundamental insights into the ways in which human biology goes awry in disease. This knowledge is then used to explore how cutting-edge scientific technologies can be exploited to advance disease diagnosis and treatment.

Within a variety of learning environments, including lectures, tutorials, workshops, laboratory practicals and small group learning, you will have opportunities to investigate and debate how disease develops and how healthcare can be improved. Key aspects of applied research are explored including clinical research methods and its design and setting within healthcare environments. Your understanding of these areas develops through a variety of hands-on learning opportunities which enhance your practical research skills and knowledge of contemporary medical research issues.

You'll continue to develop your academic professionalism and if you plan to undertake the Professional Training Year placement, you'll be supported in making your application. These activities are embedded in the core module called Academic and Professional Support.

Core modules:

Disease, Diagnostics and Therapy

Building on the first year module, you'll utilise group learning to investigate the biology of some key human diseases. You will develop your understanding of core human diseases and cutting-edge medical technologies applied to their detection, diagnosis and treatment. You will also gain an understanding of how the successful translation of science may further advance medical practice in the future.

Principles of Medical Research

The best research blends knowledge, skill and inspiration; this module combines all three and will unlock your research potential. Working wherever possible in small groups and hands-on, we begin with an historical and philosophical perspective. We then consider experimental design, explore how critical thinking supports discovery and see why ethics matter. You'll then have a chance to put all this into practice by designing, conducting and analysing your own research project. Throughout, we help you develop the skills of presentation and writing, which will ensure you can share your ideas in whatever career you pursue.

Optional modules. You can select two from the following:

Medical Genetics

This module aims to give you an insight into how and why genetics is important in the diagnosis and treatment of disease and also to understand the role of genetics in elucidating biological processes. You will focus on how genetic material is replicated and curated, how sequence changes can lead to genetic disease, or susceptibility to complex diseases, and explore the molecular mechanisms by which genes are regulated and influenced by the environment. You will gain an understanding of inheritance patterns, genetic risk and non-inherited genetic disease. In addition, the module will explore some of the important ethical issues that surround modern medicine in the genomic era.

Medical Research Evaluation

Working both individually and as part of a research team, this module develops your critical research enquiry and analytical skills. It consolidates your growing skills in collection, interpretation and presentation of research evidence in a variety of cutting-edge scientific areas. With the assistance of your personal tutor you will also develop your academic skills and professional aptitudes in leadership, teamwork and communication.

Foundations in Neuroscience

The human brain is the most complex object in the known universe. Through its function, and that of the wider nervous system, we are able to respond to environmental stimuli and, through learning, to construct hypotheses about the world around us. These hypotheses, and many other aspects of our conscious experience, may then be shared through external communication. To begin your detailed exploration of these processes, this module introduces functional neuroanatomy, considers some key features of molecular cell biology, and describes synaptic transmission. The basic biological concepts will be illustrated using practical elements and clinical examples from neurological disorders.

Genomics and Introductory Bioinformatics

This module considers concepts, techniques and applications of genomics and the bioinformatics methods that support them. The module will focus on state-of-the-art technology for analysis of genomes and gene expression and critically discuss their use in biological research. Practical classes will consolidate use of internet-based bioinformatics tools and databases through individual and group project work, and presentations will provide a platform to critically discuss case studies.

MODULES CONTINUED

Advanced Cell Biology

This module builds on the first year module, *Cell and Developmental Biology*, focusing on processes such as maintenance of cell shape, cell division, cell motility and autophagy, and the regulation of these processes, to provide you with an understanding of the complex spatio-temporal organisation required for cell function.

Molecular Biology of the Gene

This module covers a range of topics including cellular structure, genome organisation and replication, and genome expression, including protein modification and targeting.

Medical and General Microbiology

This module explores the relationship of the microbial world with our environment and ourselves. Microbial infective potential and the human response to infection form a large portion of this module. Specific examples of disease-causing organisms and disease processes are explored. This module is supported by guest lectures from active researchers and lecturers within medicine and from a veterinary school. The practical classes will train you in the aseptic techniques which are essential skills for safe working practice within microbiology.

Anatomical Sciences

This module will allow you to implement your anatomy knowledge and relate it to physiology and pathologies through the discovery of current or past anatomy breakthroughs according to your interest. Using this knowledge you will explore the key concepts and principles that underpin human diseases, learn about research methods and explain the basis of diseases and scientific discoveries of your choice. Additionally, we aim to develop new teaching tools for the life science resource centre using current anatomy models. The main focus is to develop these learning tools as a student-centred teaching tool that incorporates your research on specific areas of anatomy, physiology, pathology and scientific discoveries. This module not only deepens your factual knowledge of anatomy and understanding of diseases, but also aims to engage presentation and feedback skills through student-led seminars and the development of new anatomy teaching resources.

Immunopathology

In this module you will explore how your immune system is vital for protection from disease. Immunology is also fundamental for preventing the spread of disease, through vaccination, as well as treating infectious conditions, autoimmune diseases and even cancer. You will learn to identify the major components of the immune system and how they relate to diseases which have major global impact, such as malaria. You will also recognise how immunology has been exploited for the development of therapeutics (such as monoclonal antibodies) and for diagnostic assays.

Analytical Techniques in Biochemistry

The module will introduce you to the main experimental techniques used in the purification and characterisation of biological macromolecules, with the main emphasis on protein methodologies. It will provide you with laboratory training in selected techniques as part of experimental investigations. Develop your skills of experimental data analysis and scientific report writing. It will involve research-enriched learning in the area of protein structural and biochemical analysis, and it will provide important skills required for any future laboratory based employment opportunities.

Molecular Microbiology

This module aims to develop knowledge of microbiology at a molecular level. You will gain an understanding of the molecular mechanisms that underlie the growth and survival of microbial species in diverse environments, their ability to cause disease in relevant hosts, and their ability to resist antimicrobial agents. In addition, this module will consider molecular methods that can be applied to the study of microbes, and how those methods impact on our understanding of human-microbial interactions during health and disease. Additionally, this module will provide practical training in molecular microbiology methods.

Introduction to Pharmacology

Students on this module will develop an understanding of the fundamental concepts behind pharmacology and pharmacotherapy as the basis for disease treatment. The basic principles of pharmacokinetics, pharmacodynamics and drug metabolism will also be discussed. Throughout, the module will provide examples of licenced drugs used in treatment of disease in order to underpin and provide context to the major concepts and principles of pharmacology.

Professional Training Year (PTY)

Our students have been awarded a prestigious placement in major pharmaceutical companies, such as AstraZeneca, BTG International and Pfizer. Placements with these companies are open to all UK undergraduates, and our students are closely supported by us throughout their application. Some of the research organisations our students have previously undertaken placements in include:

- Research laboratories within the NHS;
- Harvard Medical School (USA);
- Johns Hopkins University (USA);
- University of California (USA);
- Public Health England;
- Universities of London (King's College, Imperial), Exeter, Oxford and Southampton.

Students who are not successful in securing a PTY placement or who would like to only study for three years, will continue directly from the second year into the final year of the programme.

Core modules:

Professional Training Year

Here you will gain valuable experience of working within a professional clinical and medical research environment. You'll also further develop evidence-based analysis of your academic and professional experience throughout your placement. During your placement you are closely supported by both your workplace supervisor and by a visiting PTY tutor normally acting as your personal tutor. You will gain valuable experience of working within a professional clinical and medical research environment. You'll also further develop evidence-based analysis of your academic and professional experience throughout your placement culminating in a scientific report and its presentation. This module will further help you to focus and reflect on your PTY to ensure that you gain the maximum benefit from the year. During your placement you are closely supported by both your workplace supervisor and your visiting PTY tutor.

 Advantage and opportunity are the two main factors that make this Medical Sciences degree a worthy consideration. The first two years provide you with the confidence and teamwork skills necessary to not only do well during the Professional Training Year, but to enjoy it. These skills mean you make the contacts required to take the next step in your career. On top of this, you have an edge over other graduates in the job market. Thanks to the Professional Training Year programme I returned to the US to continue the research I began during the year, with leaders in the field of vascular biology and ophthalmology. 

Mark Graham, Medical Sciences graduate



MODULES CONTINUED

Final Year

In your final year you have opportunities to study and undertake research to help improve current medical knowledge and practice. In addition to the core modules, you can select from a range of optional specialist advanced modules, enabling you to tailor your degree to match your own specific interests and career ambitions.

You'll look at authentic and complex clinical case scenarios and, working as a team, you'll apply evidence-based scientific theory and explore emerging new health technologies to help improve patient health and advance fundamental understanding of pathologies. During this year, you will undertake closely supervised by an expert research professional.

You'll also complete your Personal Development and Professionalism Portfolio. Support will be provided to help you consider your career options and help consolidate your CV and interview technique within the *Academic and Professional Support* module.

Core modules:

Final Year Research Project

In this module you'll have an opportunity to undertake your own independent and original piece of clinical research under expert staff supervision. Research projects deal with questions and issues at the cutting-edge of medical, clinical, health or environmental sciences developments. You'll design the research project, collect and analyse data and then write up the results. In addition, the module will also enhance your future employability by consolidating your personal and professional skills.

Translational Medical Science

Continuing on from the first and second year modules, you'll apply critical appraisal of technological advances, scientific discoveries and published research to contemporary healthcare problems, thereby illustrating how science translation advances current clinical practice. Major areas of translational science such as genetics, diabetes, immunology and neuroscience will be explored within extensive medical and clinical contexts.

Optional modules. You can select three from the following:

Cellular Basis of Immunity

This module introduces you to the science of immunology. Key components of the immune system are explored and current research topics are used to illustrate how antibodies are engineered and used in the diagnosis and prevention of diseases in contemporary medicine and agriculture.

Frontiers in Molecular Cell Biology

Selected topics at the forefront of cell biology are explored in this module and you will be introduced to the range of experimental techniques that are used to investigate how cells function. In addition, you'll gain understanding of the medical relevance of some cellular processes such as mitosis, motors in membrane trafficking, function and morphogenesis of cilia and bacterial environmental sensing and chemotaxis.

Managing Clinical Trials: Putting Science into Practice

This module explores the key scientific principles underpinning the successful design, implementation and monitoring strategies associated with a new clinical technology trial. You will gain a thorough understanding of the key principles that influence new clinical trial design; including but not limited to the role of diagnostic biomarkers, the development of complex interventions and the role of health prevention.

Medical Imaging: Principles and Applications

This module provides an understanding of the key scientific principles and clinical research applications of current and emerging innovations in medical imaging. Medical imaging uses ionising and non-ionising radiation in order to visualise anatomical structures and physiological processes, diagnose and treat pathologies, monitor disease progression and the effects of therapeutic interventions.

Molecular Basis of Infection

Both bacterial and fungal pathogens pose a significant threat to our health and that of the agricultural crops upon which we depend. In this module we will explore the strategies adopted by pathogens that allow them to gain entry into a host and survive within the host environment. You will gain insight into how disease might be controlled in the future through evaluating the molecular basis of pathogenicity.

Pharmacology and Medicinal Chemistry

This module offers you an insight into the design of drug molecules, the biological macromolecules they are designed to target and their mode of action. It covers a broad area of the subject from the chemical design to allow molecules to get to their target in the human or bacterial cell, the biological targets and mode of action and their medical application. Lectures will include external speakers who are working at the forefront of this area in industry and in the medical profession. It will be of invaluable experience for those wanting to pursue a career in medicine or medically-related research, the pharmaceutical or biotechnology industries.

Horizons of Biochemical Research

Biochemistry, the study of chemical processes in biological systems, is a broad discipline, encompassing biological aspects of chemistry, study of biological macromolecules, and the many ways in which chemicals are synthesised and degraded in organisms. This module seeks to engage you with recent research in diverse areas of biochemistry, giving an insight into the progress that has been made, the range of areas being explored, and the challenges for the next generation of scientists. You will actively engage with the literature across a series of six distinct areas of biochemistry, gaining a broad understanding of the current state of the art.

Cell Biology of Disease

This module aims to elucidate the underlying molecular and cellular alterations in various forms of disease with particular emphasis on cellular dynamics, the cytoskeleton and organelle function. The emphasis is on the underlying cell biology and molecular defects of various disorders which are linked to alterations of the cytoskeleton and intracellular motility, neurodegeneration such as in Alzheimer's or Huntington's disease, pathogen/ parasite invasion, protein sorting, organelle biogenesis and metabolism, and deregulation of mitosis in cancer.

Bioinformatics

Research in the biological sciences is increasingly dependent on large datasets such as those generated by DNA sequencing and microarrays. This is also true for diagnostics and medicine. Analysis of these datasets requires a range of skills and knowledge drawn from computer science, physical sciences, and mathematics and statistics as well as biological sciences. Bioinformatics is the discipline that integrates algorithms and methods from these disciplines to model biological systems and infer patterns hidden in complex data.

Energy Metabolism

The *Energy Metabolism* module aims to advance your knowledge of metabolic biochemistry by studying in detail the reactions in anaerobic energy metabolism, oxidative phosphorylation and photosynthesis, and appreciate how these reactions can lead to the generation of oxidative stress. How these reactive oxygen species (ROS) are controlled and managed is key to the survival and function of the cell. During this module you will engage critically with current scientific literature and methodology in order to gain a rounded understanding of the limits of current research in bioenergetics and oxidative stress in a number of diverse model systems.

Health Economics

The module will introduce the basic principles of economics analysis in health care and the tools used in health economics. It will provide information on the underlying concepts of scarcity and choice, opportunity cost, demand and supply for health care, supplier-induced demand, efficiency and equity; will consider the processes of healthcare financing and health insurance. It will emphasise the use of different approaches to economic evaluation and valuation of health benefits for assessing healthcare interventions as a way of making informed decisions in terms of costs and benefits. Finally, it will describe priority setting and equity on health.

Psychology Applied to Health

Health and illness are not only influenced by biological factors (viruses, bacteria, etc), but also by psychological and social factors, including emotions, personality, and our relationships with other people. Understanding the interplay between these different influences is critical to medical research and clinical practice. Students on this module are introduced to contemporary research in key areas of psychology applied to health (including stress, social support, medication adherence), and will study how research findings are translated into practice in healthcare settings.



BSc Sport and Exercise Medical Sciences

(also available with Professional Training Year)

LOCATION: EXETER (ST LUKE'S CAMPUS)

Taught jointly by the University of Exeter Medical School and Sport and Health Sciences, this programme blends an understanding of the pathology, prevention and treatment of acute or chronic disease/injury, alongside an insight into the science underpinning the optimal preparation, performance and rehabilitation of the athlete or healing patient. The combination of medical sciences and sport and health sciences enables you to develop a holistic understanding of the human body and exercise and physical activity. The four-year version, with Professional Training Year, offers you the opportunity to undertake a relevant work placement with an employer within the health sector or another appropriate sector.

Programme details

The programme responds to a growing public health agenda which seeks to prevent disease and treat targeted disorders through appropriate physical activity, lifestyle-related health behaviours and nutrition. It provides a broad range of career opportunities particularly within medical sciences, rehabilitation, sport science, health and wellbeing sectors. On graduation, you will be well positioned to support the preparation and rehabilitation of athletes, with patients recovering from injury or illness, and to undertake roles aimed at improving lifestyle through increasing levels of sport and exercise in the population at large. You will also be well placed to pursue further postgraduate study in, for example, Sport and Exercise Medicine, Medicine, Physiotherapy, Occupational Therapy, Sports Nutrition, Nursing.

The first part of the programme gives you a wide-ranging insight into how the human body normally works. We study this through small group sessions (in the *Integrated Clinical Science* and *Fundamental Skills for Medical Scientists* modules), lectures and hands-on laboratory practicals.

We then build upon this foundation to see how things can go wrong in the body due to disease or sport/exercise injury and how normal function might be restored. We are keen that you develop a holistic understanding of human health. For example, whilst pharmaceutical intervention may be appropriate in some conditions, other conditions might be helped more by using technology or engineering. You will be able to see this for yourself, thanks to the wide-range of placements that run throughout the programme.

The longest of these placements is the Professional Training Year in the third year, when many students take the option to spend a whole year working in industry, the sports and exercise environment or a university or NHS laboratory. Whether you chose to do the three or four-year programme, your final year will be spent specialising in the area that interests you most. You'll also undertake a two-term long independent research project under the supervision of an academic.



I came to an Offer-Holder Visit Day for the Medical Sciences programme, where I had a look around the campus, took part in a teaching taster session and thought 'wow, this is the course for me'. I've really enjoyed it. The campus is beautiful and Exeter as a university is really good; it is in the top 10 and the Russell Group. I have enjoyed the Professional Training Year the most; it was a chance to go out and work

in a research environment. This was a really great experience. I also liked the style of learning which is based around group work where we would examine a particular topic each week.

At the start of the week we'd get a trigger. We would then, as a group, set our own questions and through self-directed learning aim to solve these. At the end of the week we would come back together and present to the group. The sessions at the start and the end of the week are facilitated by an expert in the area who would make sure we stayed on topic or help if we had any questions. I've found this style really helped me to remember the content much better than other styles I've experienced.

Sam Wallis, Medical Sciences graduate

MODULES

KEY C = Core
● = Optional

Please note that the modules listed relate to the core BSc (Hons) Sport and Exercise Medical Sciences programme. Refer to our website for the most up-to-date module information.

Year 1 Modules

Module Name	
Foundations of Biomechanics	C
Sports Training Physiology	C
Foundations of Sports Nutrition and Metabolism	C
Foundations of Exercise and Sport Psychology	C
Integrated Clinical Science	C
Fundamental Skills for Medical Scientists	C

Year 2 Modules

Module Name	
Exercise Physiology	C
Biomechanics and Kinesiology	C
Sport Psychology	C
Disease, Diagnostics and Therapeutics	C
Principles of Medical Research	C
Strength and Conditioning Physiology	●
Sports Nutrition and Metabolism	●
Skill Acquisition	●
Learning and Teaching in Physical Education	●
Medical Research Evaluation	●
Foundation in Neuroscience	●
Introduction to Pharmacology	●
Medical Genetics	●
Immunopathology	●
Anatomical Sciences	●

Professional Training Year (PTY) optional competitive entry

Module Name	
Professional Training Year	C
Academic and Professional Support	C*

Final Year Modules

Module Name	
Dissertation or Research Project and Personal Development Planning	C
Medical Imaging – Principles and Applications	C
Rehabilitation Medicine	C
Biomechanical Analysis of Human Movement	●
Clinical Exercise Prescription	●
Employability and Career Development	●
Physiological Determinants of Exercise Performance	●
Integrated Physiology and Adaption to Physical (in)Activity	●
Paediatric Exercise Physiology	●
Sport, Physical Activity and Health	●
Sport Psychology	●
Medical Genomics	●
Pharmacogenomics	●
Rational Drug Design	●
Neuropharmacology	●
Psychology Applied to Health	●
Academic and Professional Support	C*
Health Economics	●

LEARNING AND TEACHING

Throughout the programme, you benefit from a careful blend of innovative and traditional teaching methods employed by the Medical School, Biosciences, and Sport and Health Sciences departments. A variety of stimulating, cutting-edge resources are also available to support your learning.

Structured small group learning sessions

In tutor-led groups of about 12-14 students, you'll investigate key scientific concepts and systems presented in the form of triggers. The style of trigger varies week by week but will include patient-based clinical case studies, current media-worthy medical science breakthroughs and extracts from research papers. Within your group, you will discuss the trigger and report back your individual research findings, coming to a shared understanding of the medically relevant scientific knowledge important to fully understand the trigger. Throughout your degree you'll have the opportunity to apply your increasing knowledge to new triggers and build on the depth of your understanding. These small group sessions will also develop your critical thinking, problem design and solving, teamwork, presentation and lifelong learning skills which are essential for your career development.

Life Sciences Resource Centre activities

You'll be supported in your exploration of the human biomedical science that is presented in your small group sessions by the rich variety of state-of-the-art resources available in the Life Sciences Resource Centre. These resources include anatomical models, multimedia and IT resources, and a well-

stocked library. Tutor-led activities will drive your engagement with selected resources in order to increase your understanding of the small group triggers.

Lectures and seminars

Large group lectures and cutting-edge research and Translational Science seminars delivered by academics as well as external speakers will complement your studies. Lectures may contain students from a variety of different programmes for which the lecture content is relevant.

Practical laboratory sessions

You'll develop your laboratory skills in brand new Medical Sciences and Sport and Health Sciences teaching laboratories on the St Luke's Campus, which are equipped with the best available instruments for observational, experimental and numerical aspects of biosciences including a range of biochemical, molecular, physiological and electronic apparatus. Computer-based practical sessions are held in the IT suite on the St Luke's Campus. Helpful and friendly technicians and demonstrators are always available during practical sessions to ensure that you get the most out of your training sessions.

Online learning

Your learning will be supported by the University's virtual learning environment. You will have individual access to electronic journals, content-rich study guides, and interactive online learning materials covering various science disciplines, formative online assessments and group discussion forums.

Assessment

Regular assessment is used to help provide you with frequent feedback, enabling you to identify your strengths, as well as areas for improvement. Feedback is provided in a number of different ways including online written feedback and self, peer, tutor or small group feedback.

Assessment in the early stages of the degree tends to be more knowledge-based to ensure a strong and broad grounding in the subject area, with some opportunities for essay writing and critical analysis. Assessment in the later degree stages tends to assess your critical appraisal skills, depth of understanding and your ability to think independently. Some assessments take place in groups, focusing on the team product or how well you lead your team to complete a task. A variety of assessment methods are employed across the programme, each aligned to the intended learning outcomes of the modules. Assessment formats include multiple-choice tests, essays, structured practical exams, reflective essays, oral and poster presentations, scientific report writing, short-answer question tests and independent project work.

SUPPORT FOR YOUR LEARNING

Academic support

All students are assigned an academic tutor by the Medical School for the three or four years of their programme. Your academic tutor is responsible for monitoring and supporting your academic progress and offers support and guidance in remediation, module choice advice and career development via the Personal Development Planning programme. Your academic tutor will also support you through career and employability workshops and training events.

In addition, you'll be assigned a programme adviser from Biosciences or Sport and Health Sciences who will provide you with extra academic support for Biosciences or Sport and Health Sciences modules.

You will benefit from student representation in the Student-Staff Liaison Committee.

This organisation enables student opinions and interests to be recognised, and provide an effective channel for formal communications between students and academic, clinical and administrative staff.

Wellbeing

We offer a friendly and supportive environment from your first day with us. Our Senior Tutor team can provide assistance with non-academic issues.

The University also provides extensive wellbeing support through a range of services including counselling services, advice units, chaplaincy, childcare facilities and student health centres. Further information can be found at www.exeter.ac.uk/undergraduate/life/wellbeing

CAREERS AND EMPLOYABILITY

These programmes are designed to prepare you for employment in a wide variety of professional careers and helps to develop the key transferable skills valued by employers. These skills range from identifying and solving problems, to efficient communication, leadership and management. Key vocational skills, such as advanced laboratory training within molecular biology, also enhance your employability. Additionally, those students undertaking a Professional Training Year have an additional and invaluable insight into the professional workplace, having also potentially gained an employer reference for their CV.

Science graduates compete well in the wider graduate employment market, as they offer strong analytical and problem-solving skills valued highly across all sectors.

Future career pathways include:

- postgraduate study, either at a university or with the NHS;
- employment in knowledge industries, such as pharmaceuticals or medical technology. Roles might include research and development, clinical trials, or sales and marketing;
- training and employment to become a Scientific Officer in the Civil Service;
- NHS management;
- postgraduate training for the NHS Scientist Training Programme (STP);
- graduate entry to professional degrees such as radiotherapy;
- graduate entry to medicine, dentistry or other accredited healthcare programmes.

* up to eight final year students will have the opportunity to be interviewed for entry to BMBS without the need to sit the GAMSAT examination. Selection for this will be by a competitive process. For further details contact medicine@exeter.ac.uk



ABOUT THE UNIVERSITY OF EXETER

Top 1% of universities worldwide (*Times Higher Education*)

9th in *The Times* and *The Sunday Times Good University Guide 2017*

Six months after graduation, 94% of our first degree graduates were in employment or further study (*HESA 2014/15*)

Our teaching is inspired by our research, 98% of which is of international quality (*2014 Research Excellence Framework*)

We have 21,000 students from 181 countries, and they are the most satisfied in the Russell Group (*NSS*)

VISIT US TO FIND OUT MORE

Open Days

You can register your interest now for our Open Days and receive priority access to book your place*; visit www.exeter.ac.uk/opendays

* Pre-registration only guarantees priority access to the booking system and is not an absolute guarantee of a place at any of our Open Days. Booking is essential and is on a first-come, first-served basis.

Exeter campuses:

Friday 2 June 2017

Saturday 3 June 2017

Saturday 2 September 2017

Campus Tours

We run campus tours at the Streatham Campus each weekday, and at St Luke's Campus on Tuesdays and Fridays during term time. You'll be shown round by a current student, who'll give you a first-hand account of what it's like to live and study at the University.

Phone: +44 (0)1392 724043

Email: visitus@exeter.ac.uk

www.exeter.ac.uk/ug/medical-sciences



This document forms part of the University's Undergraduate Prospectus. Every effort has been made to ensure that the information contained in the Prospectus is correct at the time of going to print. The University will endeavour to deliver programmes and other services in accordance with the descriptions provided on the website and in this prospectus. The University reserves the right to make variations to programme content, entry requirements and methods of delivery and to discontinue, merge or combine programmes, both before and after a student's admission to the University. Full terms and conditions can be found at www.exeter.ac.uk/undergraduate/applications/disclaimer

