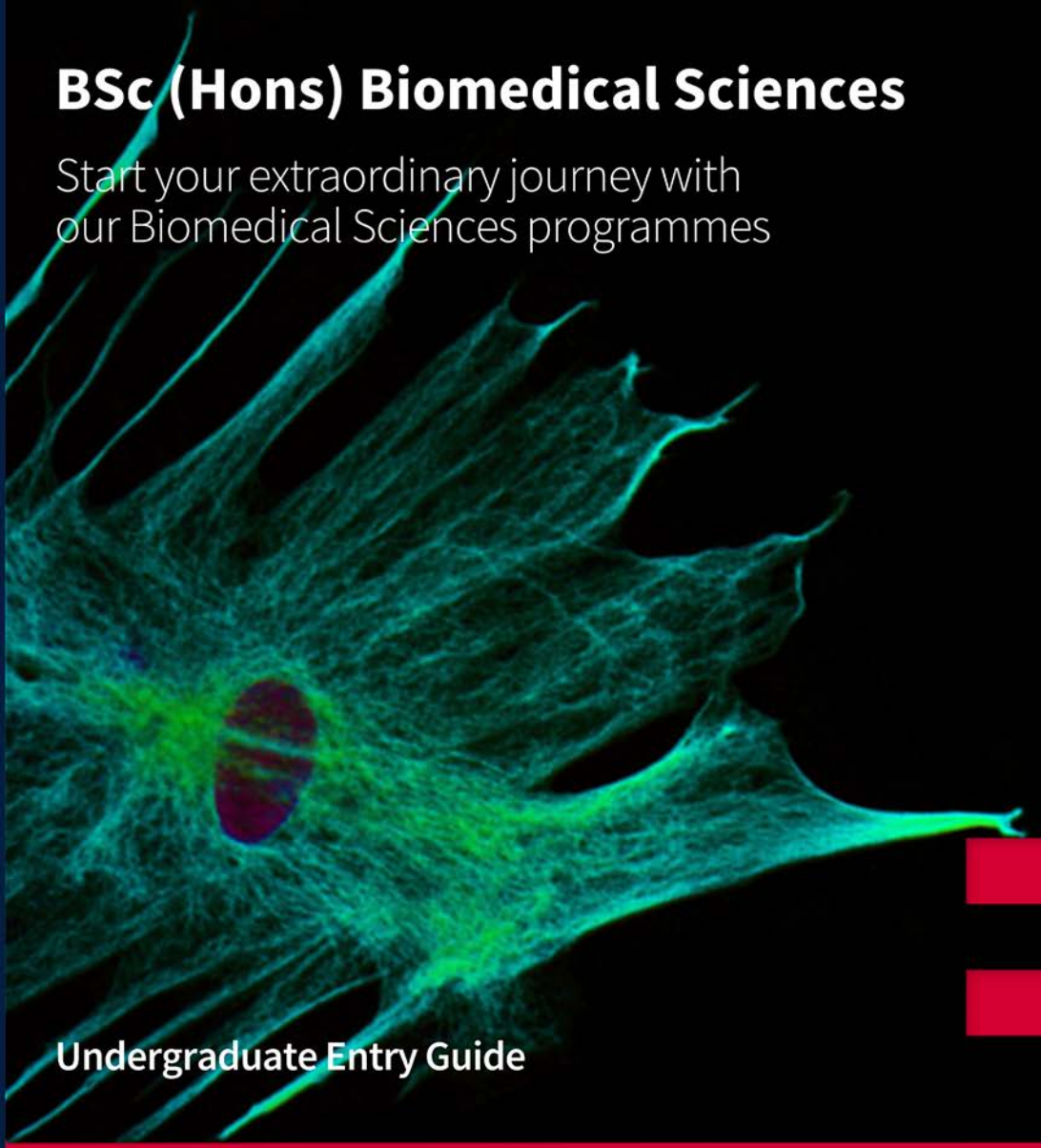
THE UNIVERSITY of EDINBURGH
Edinburgh Medical School

Biomedical Sciences

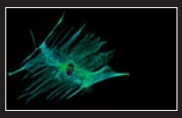
BSc (Hons) Biomedical Sciences

Start your extraordinary journey with our Biomedical Sciences programmes



Undergraduate Entry Guide

EDINBURGH
xtraordinary futures await



Astrocytes

These star-shaped cells, or “astrocytes”, were once thought to be simple support cells for neurons. Now we know that they are much more important than this. They help to maintain the blood-brain barrier and also create and maintain an environment in the brain that is optimised for electrical and chemical communication.

This picture shows an astrocyte that has been generated from a human stem cell. We now have the ability to study these human astrocytes in typical and diseased states since scientists have been able to generate them from human stem cells.

Image courtesy of Siddharthan Chandran and Nina Rzechorzek at the Centre for Clinical Brain Sciences, the Centre for Regenerative Medicine and the Euan MacDonald Centre.

The Patrick Wild Centre
for Research Into Autism, Fragile X Syndrome & Intellectual Disabilities

Welcome

Welcome to our booklet designed to give you an introduction to Biomedical Sciences programmes at the University of Edinburgh. This is a short guide to what our programmes offer and the standard entry requirements you will need in order to be eligible to apply. We hope you will find this useful in determining whether one of our programmes is right for you.

Dr Dawn Livingstone
Director of Teaching: Undergraduate Biomedical Sciences
Edinburgh Medical School

"I found the Biomedical Sciences degree offered me lots of things, not just learning the theoretical aspects, but also gave students opportunities to go abroad and apply for internships. I got a summer internship in my third year funded by the school, where I learnt lots of new skills like laboratory skills and research skills. I managed to take the research project to my final year dissertation, for which I was very grateful for the opportunity."

Nadiah Ikhlas
BSc (Hons) Biomedical Sciences

Academic Families

Our Academic Families continue to thrive, bringing together students from across the Biomedical Sciences programmes, providing a framework for peer-assisted support and guidance.

The Academic Family team received Student Award for the best Peer Support group

The aims of the Academic Family system are to:

- encourage the forming of relationships
- foster a sense of belonging to the University
- ensure that new students quickly feel part of the Biomedical Sciences community.

Academic Families allow space for incoming students to ask about course choices, common pitfalls or even the best places to go out.

They also give the higher year students the opportunity to nurture newer students and facilitate their learning. Academic families offer a safe and welcoming environment where new students can feel comfortable seeking guidance and advice.

Contents

Biomedical Sciences students in the East/West Lab, Teviot, Edinburgh

Introducing Biomedical Sciences at the University of Edinburgh

Biomedical Sciences involves the study of the processes underlying human health and disease and some of the UK's most outstanding biomedical research is carried out in Edinburgh. This world-leading research, as well as driving and guiding developments in medical practice, fosters a dynamic learning and teaching environment in which our students acquire knowledge and develop skills through access to this top-rated teaching and research expertise.

Our strengths in teaching and research are reflected in the themes that direct each year of our biomedical programmes. In years 1 and 2 our biomedical programmes provide a firm grounding in the knowledge, understanding and skills required in the disciplines of infectious diseases, neuroscience, pharmacology, and reproductive biology. In years 3 and 4 individual programmes focus on exploring the discipline in depth through a development of the research skills needed to investigate, interpret and analyse new findings that will advance knowledge and understanding. Year 4 provides the opportunity to actively engage in research by undertaking project work with one of our research groups.

What can I study?

We offer the following Honours programmes:
BSc (Hons) Anatomy and Development (C183)
BSc (Hons) Infectious Diseases (C590)
BSc (Hons) Neuroscience (B140)
BSc (Hons) Pharmacology (B210)
BSc (Hons) Reproductive Biology (C142)
BSc (Hons) Biomedical Sciences (C190)

You only need to apply to one programme and we recommend applying to BSc (Hons) Biomedical Sciences.

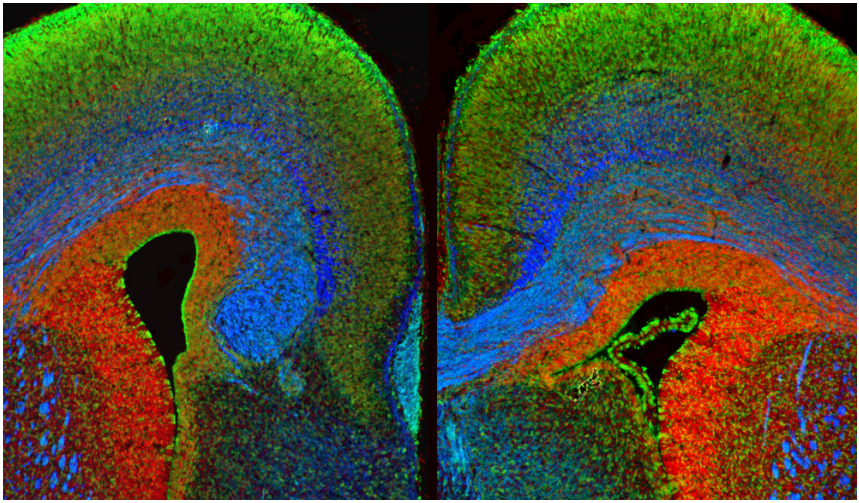
In the first and second years all of our biomedical programmes share a common structure and the same compulsory courses. The third and fourth years of the programmes focus in depth on the specific disciplines.

In each subject area the syllabus is constructed from a combination of compulsory, discipline-specific courses and student-selected (elective) courses aimed at broadening understanding of the discipline. Applicants are advised to apply to only one of the programmes listed.

Choosing/Changing your Honours (Year 3 and 4) specialisation

Your choice of Honours specialisation is confirmed at the end of year 2. You are not obliged to continue in the discipline that you entered at the beginning of year 1. The year 1 and year 2 programme provides a breadth of knowledge across all the Honours disciplines that allows you to change your specialisation choice at the end of year 2 if you have decided that one of the other biomedical disciplines is now of more relevance to you.

There is also sufficient flexibility within the biomedical programmes that, with appropriate choice of third year elective courses, a change in Honours specialisation may also be possible at the end of year 3.



Breakdown in communication. Image courtesy of James Clegg and Tom Pratt.

Study year by year (All programmes)

Pre-Honours - Year 1

Year 1 highlights “Inspirational Science” through a theme of examining the importance of Biomedical Sciences to medicine and health. Using representative narratives of discovery and breakthroughs in understanding we aim to capture the excitement and enthusiasm of our new students and facilitate their transformation into active learners.

Compulsory courses develop themes relating to major current issues in the Biomedical Sciences delivered by people at the forefront of these research activities. Discussion group sessions create time and space for students to discuss these issues and become aware of how research contributes to the shifting frontiers of our understanding. They also provide foundational knowledge and understanding in molecular and cellular biology and biological chemistry. Opportunities are also available to choose other courses from a range of biomedical and non-biomedical options.

Pre-Honours - Year 2

Year 2 develops the building blocks of discipline-specific knowledge and understanding through compulsory courses that simultaneously develop key graduate skills and attributes. The main cellular, molecular and genetic principles relating to the function of the whole body are developed alongside the functioning of, and interplay between, the major body systems. This learning is delivered in the context of the research activities that continue to challenge and advance these foundational principles. These courses showcase each of our Honours disciplines by addressing some of the key research questions being pursued by our academic staff and the wider biomedical sciences research community.

Embedded within this discipline-based learning is the introduction and continued development of core researcher skills - introducing the scientific literature and developing skills in literature searching, analysis of published scientific papers, development of problem-solving skills alongside expanding competency in all types of communication.

As in the previous year, opportunities are also available to choose other courses from a range of biomedical and non-biomedical options.

Junior Honours - Year 3

For all specialisations, Year 3 looks at the key processes of learning from, or developing knowledge from, experiment. Students learn about the scientific method, structured reasoning, inferences from data, design of experiments and about the range of experimental techniques currently available in the Biomedical Sciences. Compulsory and elective courses bring this alive through examples from the core Honours disciplines that look at, how key discoveries arise through experiment, how our understanding is labile and changes as new findings arise and how new technologies enable new findings to emerge. In Years 3 and 4 individual programmes focus on exploring these themes in relation to the specific discipline through development of in-depth knowledge and research skills needed to investigate, interpret and analyse new findings that will advance knowledge and understanding.

Senior Honours - Year 4

In Year 4, each programme of study is structured around compulsory and elective courses that are linked directly to discipline-specific, cutting edge, research issues led by staff actively engaged in that, or a closely related, research area. A research project is a key element of the final year pairing students with research active staff to pursue a novel research question in a research group environment. Each student will have individual supervisor support while engaging with their research project which can involve original laboratory-based research or data / literature analysis-based research.

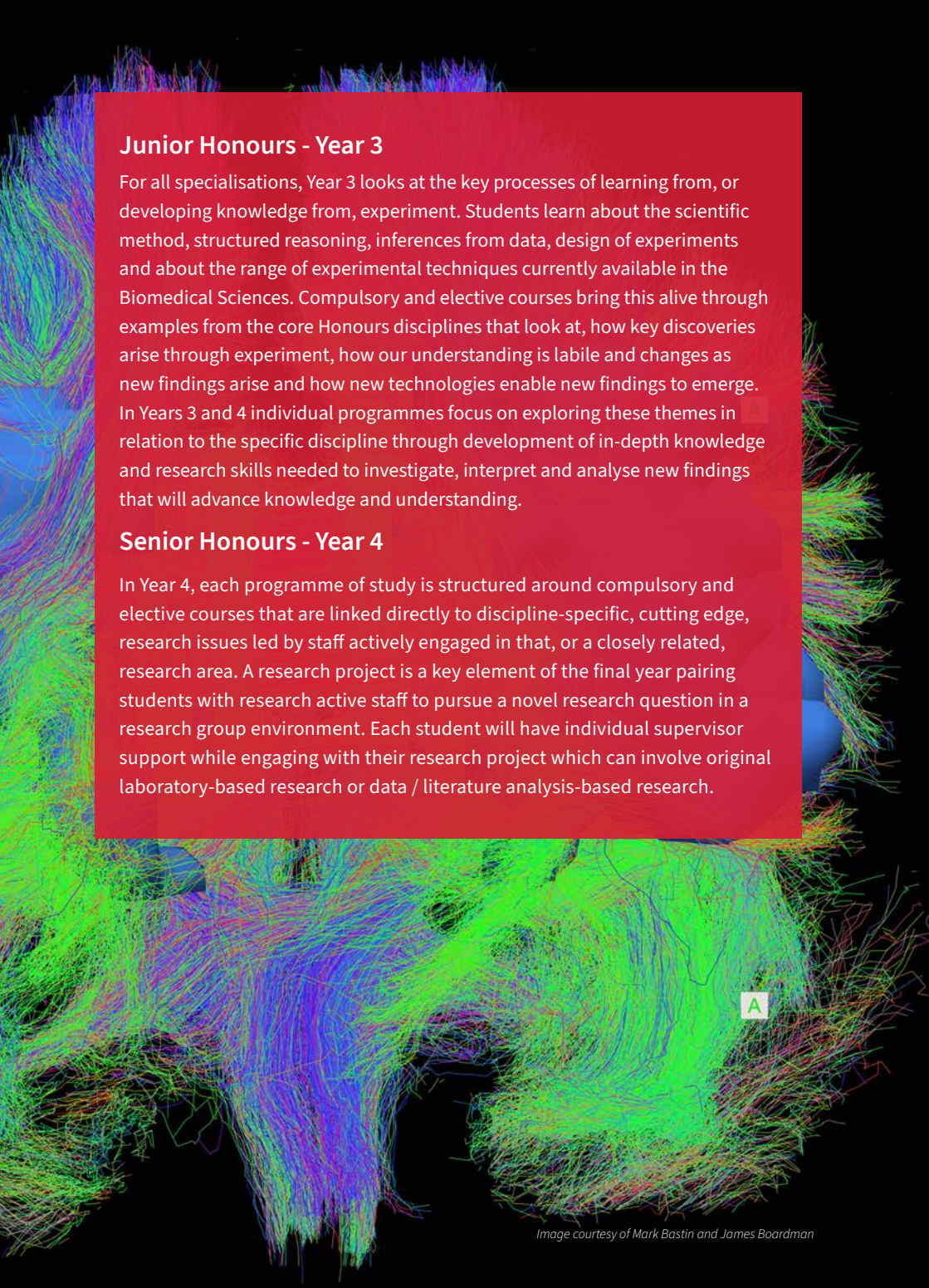


Image courtesy of Mark Bastin and James Boardman

BSc (Hons) Anatomy and Development

The fields of anatomy and developmental biology are closely interlinked. Knowledge of anatomy is important in many areas of biology and medicine, including developmental biology.

Similarly, developmental biology tells us much about how normal anatomy is formed and maintained and how developmental disorders can arise when developmental processes are dysregulated. Understanding the anatomy and development of tissues and organs is essential to the emerging area of tissue repair.

Year 3

You study two compulsory courses: Biomedical Sciences 3, the cornerstone to the theme of developing knowledge from experiment, and Anatomy and Development 3. A third course, Mechanisms of Brain Development 3, is also strongly recommended to students on this programme. In addition, you will study further, individually selected, biomedical courses.

Year 4

The final year theme is research in practice. You will study the compulsory course, Anatomy and Development, together with two option courses covering cutting-edge topics in more depth, such as Applied Human Osteology, or Development and Disease.

Alongside the taught programme components you will also undertake your capstone honours project in an area of research related to the themes of your chosen programme.

Students looking at anatomy diagram of human brain

BSc (Hons) Infectious Diseases

Infectious diseases present a significant global healthcare problem: every year they cause 25% of all deaths worldwide and 43% of deaths in the developing world. We are now faced with the rapidly growing problem of antibiotic resistance and the threat of pandemics of untreatable emerging and re-emerging infections.

The pathology of infectious diseases is a result of a complex interplay between pathogens (bacteria, viruses, protozoa, fungi, nematodes and other agents) and their hosts. Gaining an understanding of the interactions between pathogen and host allows us to unravel pathogen-induced disease mechanisms. Applying this knowledge to diagnostics and therapeutics permits more effective detection, control and cure of infectious diseases.

Year 3

You study three compulsory courses: Biomedical Sciences 3, the cornerstone to the theme of developing knowledge from experiment; Medical Microbiology 3 and either Immunology 3 or Clinical Immunology and Haematology 3A. In addition, you will study further, individually selected, biomedical courses.

Year 4

You study the compulsory course Host-Pathogen Interactions in Infectious Diseases, together with two option courses covering cutting-edge topics in more depth, such as Global Health and Infectious Diseases or Diagnostics and Therapeutics for Infectious Disease.

Alongside the taught programme components you will also undertake your capstone honours project in an area of research related to the themes of your chosen programme.

A student working in the lab

BSc (Hons) Neuroscience

Neuroscience is the study of the nervous system, the workings of the brain and the interaction of cells in the control of behaviour. It is an interdisciplinary field involving biology, chemistry, physics, anatomy, and behavioural studies.

Areas of interest to neuroscientists range from the molecular and physiological study of single neurons to the basis of complex cognitive phenomena such as consciousness and memory. The applications of such research are numerous and include the use of diagnostic imaging techniques such as PET scans and MRI and the development of drugs for treating neurodegenerative conditions, such as Alzheimer's and Parkinson's diseases, and psychiatric illnesses.

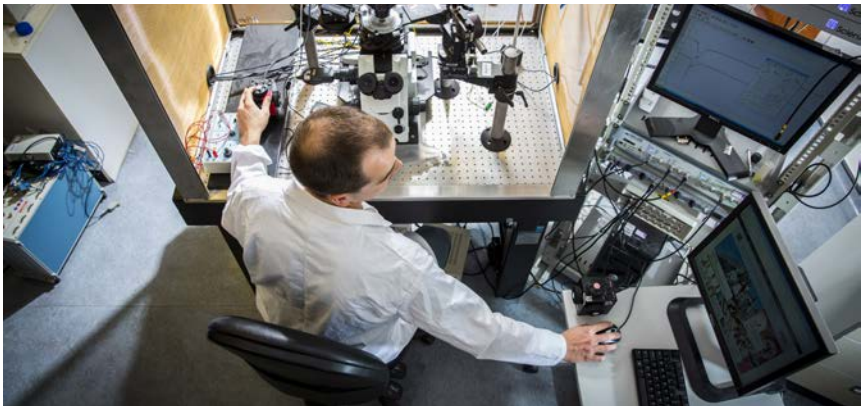
Year 3

You study two compulsory courses: Biomedical Sciences 3, the cornerstone to the theme of developing knowledge from experiment; and Neuroscience 3. In addition, you will study further, individually selected, biomedical courses such as Mechanisms of Brain Development 3.

Year 4

You study the compulsory course General Neuroscience, together with two option courses covering cutting-edge topics in more depth, such as Developmental and Clinical Neuroscience or Advances in Dementia Research.

Alongside the taught programme components you will also undertake your capstone honours project in an area of research related to the themes of your chosen programme.



A student working in the lab

BSc (Hons) Pharmacology

In essence pharmacology is the study of how both natural and synthetic chemical agents affect biological systems. Pharmacologists study the derivation, chemical properties, modes of action, physiological and behavioural effects and therapeutic uses of these agents.

It can be studied at all levels from the cell to the whole organism. Pharmacology is a multidisciplinary field with researchers employing many approaches from genomic and proteomic studies to the use of computational models of drug actions and interactions.

Year 3

You study two compulsory courses: Biomedical Sciences 3, the cornerstone to the theme of developing knowledge from experiment; and Pharmacology 3. In addition, you will study further, individually selected, biomedical courses such as Applied Pharmacology 3.

Year 4

You study the compulsory course Drugs, Receptors and Therapeutics, together with two option courses covering cutting-edge topics in more depth, such as Cardiovascular Pharmacology and Therapeutics or Endocrine Physiology and Pharmacology.

Alongside the taught programme components you will also undertake your capstone honours project in an area of research related to the themes of your chosen programme.

A student working in the lab

BSc (Hons) Reproductive Biology

The study of reproductive biology has provided the scientific background for in vitro fertilisation and other assisted conception techniques that have revolutionised medical and veterinary practice in the last twenty years.

It has also helped shape powerful research tools such as the production of transgenic animals and cloning. The reproductive system is recognised as a unique model for many other physiological processes in health and disease. It involves cyclical episodes of inflammation, blood vessel growth and tissue remodelling, normally only associated with the development of pathology. This programme looks at the requirements for reproduction, including the production of sufficient numbers of viable gametes, fertilisation, implantation in a receptive uterus, formation of the placenta and delivery at full term.

Year 3

You study two compulsory courses: Biomedical Sciences 3, the cornerstone to the theme of developing knowledge from experiment; and Reproductive Biology 3. In addition, you will study further, individually selected, biomedical courses such as Developmental Biology 3 or Neuroscience 3.

Year 4

You study the compulsory course Research Skills in Reproductive Biology, together with two option courses covering cutting-edge topics in more depth, such as Reproductive Cancers and Conception to Parturition.

Alongside the taught programme components you will also undertake your capstone honours project in an area of research related to the themes of your chosen programme.

A student working in the lab

BSc (Hons) Biomedical Sciences

The ultimate aim of biomedical sciences is to understand the functioning of the human body at the molecular, cellular, organ and system levels, in health and disease.

Biomedical scientists integrate knowledge gained by research across a range of related disciplines and apply this to the analysis of disease mechanisms. The basic research carried out by biomedical scientists is fundamental to development and innovation in disease diagnosis, treatment and prevention. This programme develops scientific, experimental and critical analysis skills, preparing students for careers where the application of these research skills can facilitate the improvement of health and prolongation of life.

Year 3

You study the compulsory course Biomedical Sciences 3, the cornerstone to the theme of developing knowledge from experiment. You must study at least one of the following: Anatomy and Development 3, Clinical Biochemistry and Endocrinology 3, Clinical Immunology and Haematology 3A, Medical Microbiology 3, Mechanisms of Brain Development 3, Neuroscience 3, Physiology 3, Pharmacology 3 and Reproductive Biology 3. In addition, you will study further, individually selected, biomedical courses that may also come from the preceding list.

Year 4

You study the compulsory course Biomedical Sciences Core, together with two option courses covering cutting-edge topics in more depth, such as Cancer Biology and Medicine, and Development and Disease.

Alongside the taught programme components you will also undertake your capstone honours project in an area of research related to the themes of your chosen programme.

A student working in the lab

Academic Requirements

To be considered for a place, all applicants must meet our standard academic requirements. Below we cover our standard entry requirements from the UK along with a link to our website for qualifications we accept from elsewhere in the world. All applicants must also meet our general university entry requirements including SQA, GCSE or equivalent English language requirements. You can find the University's approved subject listing online at:

SQA Higher subjects accepted for general University entry purposes

A level subjects accepted for general university entry purposes

Demand for places on our Biomedical programmes is much higher than places available so applicants who meet the standard academic requirements are not guaranteed an offer of studies. The majority of offers will be made to students who achieve grades above the standard academic requirement.

SQA Highers

AABB (achievement by end of S5 preferred). BBB must be achieved in one year of S4-S6. Higher Mathematics and/or Physics, and Advanced Higher Biology and Chemistry are recommended for ease of transition to degree study but are not required for entry. National 5: Mathematics at grade B and English at grade C.

To be considered for second year entry: Advanced Higher AB to include Biology and Chemistry.

GCE A levels

AAB (preferably in one set of exams), to include Biology/Human Biology and Chemistry. Mathematics and/or Physics are recommended for ease of transition to degree study but are not required for entry. GCSEs: Mathematics at Grade B or 6 and English at Grade C or 4.

To be considered for second year entry: AAB, in one set of exams, to include Biology and Chemistry.

International Baccalaureate

Overall score of: 34 points with 655 at HL; to include Biology and Chemistry, one at Grade 5 and one at Grade 6. Mathematics and/or Physics are recommended at HL for ease of transition to degree study, but are not required at this level of entry. SL: English at Grade 5 and Mathematics at Grade 5. Both the Mathematics Analysis & Approaches and Applications & Interpretation pathways will be accepted. We also accept IB MY English and Maths to meet our lower-level requirements.

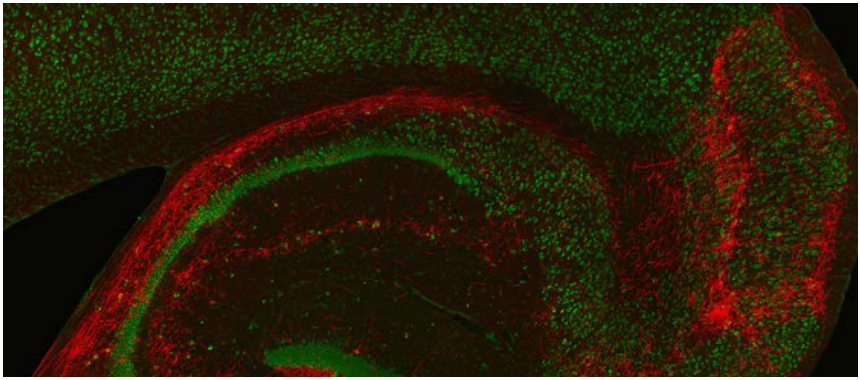
To be considered for second year entry: Overall score of 36 points, with 666 at HL to include Biology and Chemistry

HNC/HND

We welcome applications from individuals holding HNC and HND qualifications for entry into the Biomedical Sciences programmes. Given the wide range of HNC/HND qualifications available and the different grading of assessments it is difficult to provide specific standard academic requirements. Nevertheless, we would expect the HNC/HND to have substantial credit weighting in the Biological/Biomedical subject area and in Chemistry. Where grades are awarded alphabetically we would require a minimum of a B grade overall and where a Pass/Merit/Distinction classification is used we would require a minimum of a Merit overall.

For further information about accepted HNC/HND, Access courses, Foundation programmes, and other UK qualifications, please contact the UG Admissions and Recruitment Team at: medug@ed.ac.uk.

For countries outside the UK from which we commonly accept applications please visit: **www.ed.ac.uk/studying/international/country**



The seahorse. Image courtesy of Alfredo Gonzalez-Sulser and Matt Nolan.

Non-Academic Evidence

In terms of your personal statement we are looking for the following: mention of why you want to study Biomedical Sciences specifically (e.g. reasons; interests in the subject); what preparation you have undertaken within your studies that align with this programme choice, and how this will help you.

In terms of other preparation/insight: explain awareness of the subject and how this links into society/healthcare; awareness of the importance of research; mention career plans; work experience (lab-based); explanation of relevance of work experience to the chosen programme of study; other interests showing responsibility/ representation.

Frequently asked questions

How will I be taught?

Through a combination of lectures, tutorials, practical work, problem-based learning and computer-assisted learning. In third and fourth year there is a greater emphasis on self-directed study and discussion sessions with academic staff.

How will I be assessed?

In-course assessment and exams are used in all years of the programmes. Your degree classification will be based on your performance in years 3 and 4 with a 1:2 weighting.

Where will I be taught?

Teaching takes place principally at both the University's Central Area and King's Buildings Campus though some teaching may also take place at the new Medical School buildings at BioQuarter. You will have access to the University's libraries and computer labs. Study materials are available online.

Do you consider transfers?

If you are interested in transferring degree programme from within the University you should contact the school running this programme. We would also expect you to discuss this with your Student Advisor beforehand.

Student Support

Edinburgh Medical School Student Administration Services

The team is responsible for all aspects of management, administration and delivery of undergraduate and postgraduate teaching within Edinburgh Medical School. We guide you through your academic journey from pre-arrival and Welcome Week, the critical first steps in your studies which include important meetings and induction events, to graduation and your transition into a new career or postgraduate study. We will respond with help and advice to your questions about any subject at any stage of your studies.

Support from your School

You will be supported by a combination of academic and dedicated student experience and administrative staff. They will be able to provide you with, or direct you to, appropriate support for challenges which may occur during your studies. These could be directly related to your learning and teaching skills or rising from life situations. The student support system in Edinburgh Medical School will:

- Support you to become a confident learner in your discipline
- Encourage you to play an active part in your academic community
- Support you to develop and reflect on the range of graduate attributes required for success at university and beyond
- Support you to meet the challenges and opportunities of University life
- Encourage you to reflect on your academic progress
- Support the development of your academic skills
- Encourage your effective use of feedback

In addition to this support, you will also have access to a variety of peer-to-peer learning networks as well as student societies.

How do I find out more?

Further information about Biomedical Sciences degree programmes can be obtained from:

EMS Student Administration Services
The University of Edinburgh
Old Medical School
Teviot Place
Edinburgh
EH8 9AG
Tel: 0131 650 3160
Email: BMTO@ed.ac.uk

Further information and advice on applying to any of our programmes can be obtained from:

Undergraduate Admissions
K: CMVM College Office, second floor
Usher Building
The University of Edinburgh
5-7 Little France Road
Edinburgh BioQuarter- Gate 3
Edinburgh EH16 4UX
Tel: 0131 651 7999
Email: medug@ed.ac.uk

For more detailed information on degree structure and content, please also see: www.ed.ac.uk/studying/undergraduate/degrees

Career opportunities

Our programmes will appeal to those planning a career in biomedical research or related areas as well as graduate-level entry careers in industry, management and the public sector. The broad analytical, scientific and personal skills you gain will equip you for a variety of careers.

A biomedical sciences degree gives you more than specialist knowledge. Our programmes are designed to develop analytical, problem-solving and communication skills that will benefit you in a range of sectors.

Graduate options may include:

- postgraduate study, such as a Masters or PhD
- graduate professional accredited programmes in medicine, veterinary medicine or teaching
- scientific or laboratory-based roles, such as a biomedical research scientist
- graduate training in healthcare professions such as clinical physiologist
- employment in the health service, universities or the biotech industry

- non-laboratory scientific roles such as scientific writing, science communication, healthcare management, scientific policy development, scientific advisor to medical associated charities
- postgraduate teacher training for secondary science education or primary education
- graduate entry careers in management or the public sector
- non-scientific roles such as marketing, accountancy and finance or policy research

What do our students say?

Every year, the top Biomedical Sciences undergraduate students in their course class is awarded the Biomedical Sciences Most Distinguished Scholar Prize. Read testimonials from our student community as they offer their thoughts about the courses they have taken.

https://biomedical-sciences.ed.ac.uk/bmto/about-us/teaching-excellence/testimonials

"Studying Biomedical Sciences at the University of Edinburgh Medical School has been an incredibly rewarding experience. I have particularly valued the opportunity to explore such a broad range of topics, whilst also developing my practical and analytical scientific skills."

Tatiana Sandmann, BSc (Hons) Biomedical Sciences

"I enjoy being able to have massive debates about infectious diseases. The people here genuinely are so passionate about their subject, and it is so refreshing to go into class every day and learn something new and be able to talk to your lecturers about it afterwards."

Rebecca Dorman, BSc (Hons) Infectious Diseases

"I was really interested in how drugs affect the body, and this programme captured everything I was looking for. It was good to share the classrooms with students from all over the world, individuals who are like-minded. This degree has opened many doors for me in terms of different jobs I could pursue after graduation."

Destiny Docherty, BSc (Hons) Pharmacology


Doorway No 1
Centre for Population
Health Sciences

For further information, please contact: BMTO@ed.ac.uk

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Navigating axons: a circuitous route. Image courtesy of James Clegg and David Price.