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Biochemistry Undergraduate Degrees in Swansea

The academic staff in the Biochemistry Group are members of the College of Medicine and have offices and laboratories, primarily in the new Institute of Life Sciences building. The Group represents a diverse team of research active academics with interests as far ranging as novel antibiotic development, cellular control of protein degradation, cancer biomarker discovery, soil hydrophobicity and chemical ecology.

Swansea offers single honours degree courses in 'Biochemistry' and 'Medical Biochemistry', and a joint honours degree course in 'Genetics and Biochemistry'.

Biochemistry staff and research interests

Staff within the College of Medicine carry out research and teaching in a wide range of areas relating to biochemistry and molecular biology. Human research is important but there are also important areas of research on other mammals, invertebrates, and microbes such as yeast and Streptomyces. The Genetics and Biochemistry Group is responsible for the teaching of the biochemistry degree courses from within the College of Medicine and the staff and their research interests are listed below:

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| Dr Ricardo Del Sol Abascal | - Streptomyces genetics and nanotechnology |
| Dr Ed Dudley | - Biomolecular mass spectrometry, proteomics and metabolomics |
| Professor Paul Dyson | - Microbial genetics |
| Dr George Johnson | - DNA damage, genetic toxicology and cancer |
| Dr Hugh Jones | - Protein engineering |
| Dr Geertje van Keulen | - Microbial physiology, regulation of antibiotic production, environmental stress, anaerobic metabolism and fermentation |
| Dr Colin Restall | - Biochemistry of membrane systems, membrane dynamics |
| Dr Paula Row | - Membrane trafficking, cell signalling, ubiquitination, molecular basis of disease |
| Professor David Skibinski | - Evolutionary genetics, biostatistics and proteomics |
| Dr Masood Yousef | - Chemistry of pharmaceuticals, mass spectrometry |

The following staff members, with research areas indicated, are also involved in teaching elements of the biochemistry and genetics degree programmes. Many are also active in clinical work in local hospitals.

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| Prof Stephen Bain | - diabetes |
| Prof Gareth Brenton | - mass spectrometry |
| Dr Steven Conlan | - eukaryotic gene regulation and Centre for NanoHealth |
| Dr Jeff Davies | - inherited human neurological and cardiac disorders |
| Dr Shareen Doak | - nanomedicine, nanotoxicology and cancer research |
| Dr Rossen Donev | - molecular psychiatry and psychopharmacology |
| Dr Deya Gonzalez | - reproductive biology and the genetics of fertility |
| Prof Julian Hopkin | - genetics of asthma and allergy |
| Dr Gareth Jenkins | - DNA damage and cancer |
| Dr Diane Kelly | - pharmacogenetics |
| Dr Paul Lewis | - drug discovery and bioinformatics |
| Prof Gareth Morgan | - developmental medicine (paediatrics and immunity) |
| Prof Mark Rees | - inherited human neurological and cardiac disorders |
| Prof Martin Sheldon | - reproductive immuno-biology |
| Dr Jeffrey Stephens | - diabetes and cardiovascular genetics |
| Dr Cathy Thornton | - newborn immunity and allergy |
| Prof Johannes Thome | - molecular psychiatry and psychopharmacology |
| Dr Tom Wilkinson | - microbiology and infection research group |

Further information is available via the Biochemistry Group web page.
<http://www.swan.ac.uk/medicine/BScProgrammes/>

Entry Requirements

You normally need three A-levels or equivalent, one of which must normally be Chemistry and another preferably Biology.
Typical offers: for three A-levels 300-320 tariff points.

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| BSc Biochemistry | Course code C700 |
| BSc Medical Biochemistry | Course code C741 |
| BSc Genetics and Biochemistry | Course code CC47 |

The UCAS institution code is **SWAN S93**

Enquiries

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Opportunities in Biochemistry

Biochemistry represents the understanding of cellular processes at the chemical level, allowing for an understanding of the biochemical processes and interactions that are present in healthy and diseased states. Biochemistry includes the study and treatment of a huge variety of human diseases, the development of pharmaceuticals, the understanding of cellular control mechanisms and the complex interactions between microbes, our environment and us. Furthermore, Biochemistry has been at the forefront of biomedical developments advancing our understanding of diseases at the molecular level and the development of novel treatments.

The degree schemes utilise College of Medicine research facilities, which include the Biomolecular Analysis Mass Spectrometry (BAMS) laboratories which allow post-genomic studies such as functional proteomics and metabolomics.

- The Biochemistry degree in Swansea has been formulated to benefit from research strengths in molecular cell biology, microbiology, biomolecular mass spectrometry and environmental science.
- The Biochemistry degree also provides a detailed knowledge at the chemical and molecular level, of the structure and function of living organisms, from bacteria to plants and animals.
- Medical Biochemistry involves further teaching input from the medical professionals within the College of Medicine, many of whom work as doctors and consultants in local hospitals.

Students graduating in Biochemistry find a variety of positions open to them following graduation, including positions in pharmaceutical companies, hospital laboratories and academia; some undertake careers in fields as diverse as teaching, scientific publication management, forensic science and scientific sales. We offer expert careers advice throughout the course itself and also to our graduates. Although most of our graduates find careers that are closely allied to their degree subjects, they also learn a vast array of transferable skills that are applicable to most career options; this provides them with access to a diverse range of potential career choices after their degree. The Medical Biochemistry course provides appropriate training for students wishing to train as medical doctors. Although we cannot guarantee placement on graduate entry medical programmes following graduation with a genetics or biochemistry degree, we can provide appropriate help and guidance.

“The biochemistry research project was a great opportunity to further myself, allowing me to not only learn about the intricacies of biochemistry but also preparing me for a future career in science and research. The academic staff are always approachable and helpful.”

Alun Newsome
Third year Medical Biochemistry undergraduate

General Information on Biochemistry Degree Courses

The home department of the students pursuing biochemistry degrees is the College of Medicine. At all levels (years), teaching is carried out under the modular system. Each module is concerned with a specific topic and usually carries 10 credits. Students follow modules giving a total of 120 credits at each level. Most modules consist of about 15 lectures and associated practical classes given over a period of 5 weeks. Students will normally complete one or more marked assignments such as practical write-ups for each module and undertake a written exam. There is some flexibility for students to change degree scheme during Levels 1 or 2.

At each level students have both personal and academic tutors who monitor their progress and are available to discuss both academic and any other problems that they may have.

An important module at each level is the Biochemistry tutorial module which is undertaken in small groups, allowing for significant contact time between students and academics. In this module, the student develops a vast array of transferable skills. They are introduced to the scientific literature and receive guidance in essay writing, analysis of scientific problems, preparing presentations, giving feedback to peers and participating in scientific discussion and debate in small groups under the supervision of members of staff.

Research Project

A key component at Level 3 is the research project (30 credits) in which students carry out research in a laboratory in the College of Medicine on a novel problem at the frontiers of scientific research. Project students have the opportunity to work in research laboratories equipped to the highest standards. Facilities include a range of;

- Bioanalytical equipment such as HPLC, GC and Mass spectrometry
- DNA and protein analytical equipment,
- Computer based image analyzers for molecular or cellular studies, and
- A powerful supercomputer facility.

Project topics are offered from the contributing staff as listed on the back page of this pamphlet. There is the opportunity for hands on experience of techniques such as

- ELISA protein visualisation and quantitation analysis,
- Proteomics,
- Bioanalytical chemistry and separation sciences,
- fluorescence microscopy, and
- analysis of antibiotic production by bacteria and other organisms

For Medical Biochemistry students, project topics include a wide range of medical areas, including cancer research and the identification of the genes involved in diseases such as diabetes and asthma.

Students benefit from the opportunity to attend research talks which are held at least weekly. These are given by Swansea staff or by speakers from other universities or research institutes. There are some opportunities for taking time out for spending periods of research in industrial or medical laboratories either in the UK or abroad.

Our Teaching Scheme

Teaching in Level 1 (Year 1)

In the first year students pursue a broad range of modules across the whole range of biology and chemistry, including biochemistry. Further study of biochemistry and medical biochemistry topics takes place in the tutorial module.

Teaching in Level 2 (Year 2)

In the second year, students take specialised modules in biochemistry given by the College of Medicine which are wide-ranging but focus on biochemical techniques that can be used in scientific investigation, metabolic pathways involved in the biochemical conversions of sugars and fatty acids, biomolecular mass spectrometry (including protein analysis), enzymology and its role in metabolic regulation and clinical biochemistry.

Teaching in Level 3 (Year 3)

In the final year, the modules allow students to pursue specialised topics in greater depth. Many of the topics are related to the research strengths of the academic staff.

Students studying for a **Biochemistry degree (C700)** would normally follow modules covering the areas of recombinant DNA technology, biotechnology and protein engineering, membranes and energy transduction pathways and nucleic acid metabolism / chemical modification. Students also undertake a 30-credit project module in an appropriate area of biochemistry.

Students studying for a **Medical Biochemistry degree (C741)** would normally follow modules including aspects of sensory and metabolic biochemistry, the biochemistry of natural products, mutations and human health, medical genetics, membrane trafficking of proteins and carry out a 30-credit project in an area of medical biochemistry.

Students in both Biochemistry and Medical Biochemistry would have the possibility of pursuing some optional modules according to interest, for example in molecular evolution, cell physiology / immunobiology and genetics of cancer.

