Biochemistry

Roles of the Department and Colleges

Oxford is a collegiate university where many of the students are supported by the college system. The biochemistry course is organized and largely taught within the Department, but lectures, classes, practicals, research projects and exams are all provided centrally. The undergraduate admissions process is also centrally coordinated by the Department. This means that your choice of getting an offer of place and the education that you receive after you have arrived do not depend on the college to which you apply (and many students apply to several colleges different to the one they eventually applied to).

What qualifications will I need?

A-levels: A*AA including Chemistry and Biology, or AA*A including Chemistry and Physics, or A*A*A in three very closely related subjects. GCSE in English and Mathematics are also required. No additional requirement is needed for admission.

What can I gain from the course?

1. Knowledge and understanding of biochemistry and the specific areas you study.
2. Transferable skills in the use of rigorous scientific method. These skills are of great value in a variety of future careers.
3. Experience of research work and the design of experiments.
4. Development of team work and communication skills.
5. Flexibility in the choice of career.
6. A wide range of social and cultural activities.
7. A broad Intellectual training.
8. The ability to work and communicate with people from a variety of cultural backgrounds.

Alternative career paths

- Some students enter the health service, or the scientific civil service. However, the course does not provide specific preparation for these careers.
- Alternatives can be to enter industry, the health service, or the scientific civil service. However, the course does not provide specific preparation for these careers.
- Some students choose to continue their studies in science or a related subject.
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Department of Biochemistry

The Department was established over 100 years ago. Centred on a modern, award-winning building, it houses over 45 independent research groups; these cover a wide range of disciplines which include genetics, computational biology, atomic resolution structure determination and glycochemistry. The collective research aims are to arrive at a full understanding of the chemistry and assembly of molecules in living cells and how this relates to the physiology and development of multicellular organisms. These research goals are facilitated by close links with other Departments in Oxford, including Chemistry, Biology, Physiology, Pathology, Pharmacology, Physics and Molecular Medicine. According to the 2021 Research Excellence Framework assessment, over 90% of Oxford’s Biological Sciences research, of which we are part, was rated as internationally excellent or world leading in terms of significance, rigour and originality. Three Nobel Prize winners (Hans Krebs, Rodney Porter and Paul Nurse) have been members of the Department.

What is Biochemistry?

Biochemistry, the study of the life at the molecular level, continues to undergo rapid expansion and development. Powerful new techniques, for example in molecular biology and structural biology, enable us to explore biological phenomena in more and more precise molecular terms. Biochemistry gives us even increasing insight into topics as various as the origin of life, the nature of disease and the development of organisms from a single cell to assemblies of specialised cells. As well as answering fundamental questions, it has also led to commercially valuable developments in drug discovery, food science, environmental sensing and many other areas. The powerful tools developed for biochemical studies have been adopted by many other disciplines including medicine and evolutionary biology.

Why study Biochemistry at Oxford?

Our 4-year integrated Masters course, taught both in the Department and College, gives a comprehensive introduction to the subject. The course is well established and has been fine-tuned over many years. It is consistent with biological sciences (Oxford University) compliant level 7 qualifications. There is a coherence and sense of community in the Department; as well as high quality interdisciplinary research question, that helps us provide a flexible, efficient and cutting-edge course.

“The Biochemistry course was equal measures fascinating and rigorous. It was the best thing I could have done to prepare me for steps after university; I have transitioned into teaching Biology and use my degree every day. I am confident that wherever life takes me, the transferable skills I learnt at Oxford will stay with me.”

Rosie became a science teacher after graduation

The Department has a strong tradition of training the next generation of biochemists. This is evident from the number of Nobel Prize winners who have been members of the Department. The Department has also contributed to the development of many textbooks on the subject. The Department has a strong tradition of training the next generation of biochemists. This is evident from the number of Nobel Prize winners who have been members of the Department. The Department has also contributed to the development of many textbooks on the subject.

“Where I have been able to work at the Department of Biochemistry, I have been able to work on research projects that have allowed me to develop my skills in molecular biology and biochemical techniques. These skills have been essential for my future career in biochemistry.”

James, a graduate of the course who now works in science communication

“Teaching at Oxford University is an opportunity to reflect on your aptitude and enthusiasm for a research career.”

Teaching at Oxford University

Lectures

There are usually about 10 lectures a week held in and around the Department. The lecture material defines the course, and forms the basis of your examinations. The course is kept under constant review by a Steering Committee which contains representatives of the student body as well as members of the academic staff. In this way new developments in the subject, and requests from students for teaching in particular areas, can be incorporated into the course.

Practical Classes

These run throughout the course in parallel with lectures. Some lab based (wet) practicals, which introduce you to the basic techniques used in research laboratories, are computer based, whereas the more advanced practicals (dry, wet or molecular structural) or the assessment and interpretation of experimental data. First year practicals tend to last for one day, but in later years longer practicals allow you to devise and complete more challenging experiments, and serve as an introduction to the more independent research you will carry out in your fourth year.

The Research project

Carried out in the fourth year and under the supervision of the group leader, you will be able to design your own experiments, and will hopefully see the fruits of your lab work. You will have the support of other workers in the field and, in your specific area, a specialist publication for guidance. The experience may lead you to consider further postgraduate study, but during the fourth year are much valued by employers, and you will also have the opportunity to reflect on your aptitude and enthusiasm for a research career.
What is Biochemistry?

Biochemistry, the study of life at the molecular level, continues to undergo rapid expansion and development. Powerful new techniques, for example in more general and shorter determination, enable us to study biological phenomena in more and more precise molecular terms. Biochemistry gives us ever increasing insight into topics as various as the origin of life, the nature of disease and the development of organisms from a single cell to assemblies of specialised cells. As well as answering fundamental questions it has also played a critical role in many areas, including health, the environment and many other areas. The powerful tools developed for biochemical studies have been adopted by many other disciplines including medicine and evolutionary biology.

How is the course structured?

The course takes four years and has an intake of about 100 students per year. It is divided into three sections:

1. **First Year**
   - Principles of biochemistry
   - Introduction to cell biology
2. **Second & Third Year**
   - Advanced biochemistry
   - Research project
3. **Fourth Year**
   - Advanced research project

**COURSEWORK**

A wide range of coursework is available to all students. This includes a number of mandatory and optional modules.

**RESEARCH PROJECT**

Students conduct a research project in their fourth year, which is supervised by a member of the academic staff.

**PAST & PRESENT**

The Biochemistry course is equal measures fascinating and rigorous. It was the best thing I could have done to prepare me for steps after university. I have transitioned into teaching Biology and use my degree every day. I am confident that wherever life takes me, the transferable skills I learnt at Oxford will stay with me.

“The Biochemistry course was about more than just learning; it was about being part of a research community. My PhD research was done in a lab with about 10-12 other students, and we all worked together towards the same goal. This experience was invaluable in preparing me for my future career.”

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The Research project

Carried out in the fourth year and under the supervision of the research group leader, you will be able to design your own experiments, and will develop your skills and understanding of biochemistry. You will also have the opportunity to reflect on your aptitude and enthusiasm for a research career.

Why study Biochemistry at Oxford?

Our 4-year integrated Masters course, taught both in the Department and College, gives a comprehensive introduction to the subject. The course is well established and has been fine-tuned over many years. It is considered biochemistry at level 7 qualifications. There is a coherence and sense of community in the Department, as well as high quality interdisciplinary research. That helps us provide a flexible, efficient and cutting-edge course.

Training in Biochemistry is valuable because it plays an important role in many areas, including health, the environment and agriculture. The level of employment for Biochemistry graduates is high — our graduates find places in a wide range of industries, in medical research, in agriculture, in education, and in patent law to name but a few.

“The Oxford biochemistry course gave me not only a thorough grounding in a range of specific biochemistry topics, but also a deep understanding about the practical processes of scientific research in general. My work in science communication and engagement has all stemmed from the experiences and opportunities gained through this course.”

Jasmine, a graduate of the course who now works as a science communicator.
Introduction

The Biochemistry course takes four years and has an intake of about 100 students per year.

The course is divided into three sections:

- Cellular Biochemistry
- Molecular Biochemistry
- Mechanistic Biochemistry

There is a wide choice of research projects available within Biochemistry or other University departments.

One of the most distinctive features of the course is the research project. Here, you spend 23 weeks full time on a research project, working in a laboratory setting under the supervision of a faculty member.

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Biochemistry gives us even more insight into topics as various as the origin of life, the nature of disease and the development of organisms from a single cell to a collection of specialised cells. As well as answering fundamental questions, it has also led to commercially valuable developments in drug design, forensic science, agriculture, in education, and in patent law.

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Our 4-year integrated Masters course, taught both in the Department and College, gives a comprehensive introduction to the subject. The course is well established and has been fine-tuned over many years. It is taught both in the Department and College, including health, the environment and agriculture.

The course is based on tutorial teaching, where certain nuclei form clusters rather than being correctly spaced. It is facilitated by close links with other Departments in Oxford, including Chemistry, Biology, Pathology, Pharmacology, Physics and Molecular Medicine.

“Biochemistry is a science where we can prepare the food for today and make the food for tomorrow.”
- John Finlay

The 2021 Research Excellence Framework assessment showed excellent research outputs across the University, with 50% of the Department’s outputs being rated as world leading, and 38% of the outputs being rated as internationally excellent.

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Jasmin, a graduate of the course who now works in science education.

Teaching at Oxford University

Lectures

There are usually about 10 lectures a week held in and around the Department. The lecture material defines the course, and forms the basis of your examinations. The course is kept under constant review by a Steering Committee which contains representatives of the student body as well as members of the academic staff.

Practical Classes

These are run throughout the course in parallel with lectures. Some labs based on practicals, which introduce you to the basic techniques used in research laboratories, are computer-based. Others run terminal-based practicals, in which you pack a computer system with specialised software and perform experiments.

The Research project

Carried out in the fourth year and under the supervision of the group leader, you will be able to design your own experiments, and will typically gain a first-hand understanding of the research process.

Tutorials

Tutorials allow you to study individual topics in more depth and also to clarify lecture topics in small group discussions. Your college tutor will arrange an initial tutorial to discuss your programme of study, and any questions you may have.

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Jasmin, a graduate of the course who now works in science education.
Biochemistry is an expanding area and graduates have no difficulty in finding employment at the end of their course. You may embark on a research career by studying for a higher degree and about half our students do so. Alternatively you can enter industry, the health service, or the scientific civil service. However, the course is also provided with some familiarity with mathematical methods and quantitative reasoning and a proper understanding of rigorous scientific method. These skills are of great value in jobs that are not necessarily directly related to biochemistry. Our students find posts in accountancy, computing, management, advertising, the health and civil services, teaching and many other areas. The Careers Service offers helpful guidance.

What qualifications will I need?

Typical offer for successful candidates: A-levels of A*AA including Chemistry and another science or Maths, with the A* in Maths. Physics, Chemistry, or Biology (or a very closely related subject) is also required.

Advanced Highers: AA/AAB

IB: 39 including core points

IB Higher: AA/AB

IB Standard level in the IB can be helpful to students in completing the course, although it is not required for admission.

If you have Maths to A-level or the equivalent, it is strongly recommended, although not required for admission, may make an application more competitive. Building beyond GCSE or the equivalent (e.g. to A-level, Scottish High, Standard level in the IB) can be helpful to students in completing the course, although it is not required for admission.

What can I do after I finish my degree?

Biochemistry is a fundamental science and the knowledge acquired forms a basic element of many biological systems. Many students who undertake an undergraduate course in biological chemistry are likely to find careers in research areas, or in the chemical, pharmaceutical and biotechnology industries. Students with a strong interest in biological system and medical science may choose postgraduate studies, either for a research or for teaching career.

Research in the Department

The following list of some research staff of the department, and publications gives only an idea of the breadth and scope of interests and activities of the department. Inevitably, it is selected to illustrate some of the more widely known research with which the department is involved. It is not possible to give a comprehensive list for all our research. For more information, please visit the department's website at www.bioch.ox.ac.uk/research.

Get in touch...

The department's website provides more information on the course, advice on applying, suggested reading as well as information about the department itself and its excellent and award-winning research.

If you have any further questions regarding studying biochemistry at Oxford, please do email: admissions@bioch.ox.ac.uk

Department of Biochemistry

Dorothy Hodgkin Building
South Parks Road
Oxford
OX1 3QD

Telephone +44 (0)1865 613277

www.bioch.ox.ac.uk

Biochemistry (C700)

This course is about biological molecules and how they assemble to make living cells and organisms. It illustrates how modern techniques, and the information acquired, are fundamental for studying most branches of life sciences.
Biochemistry is an expanding area and graduates have no difficulty in finding employment at the end of their course. You may embark on a research career by studying for a higher degree and about half our students who do choose this route end up at a college different to the one they originally applied to.

What qualifications will I need?

Typical offer for successful candidates:

- A levels: Physics, Chemistry, Mathematics (including an offer in Chemistry or Mathematics, or Biology with A* in Chemistry), or Biology (or a closely related subject). Advanced Higher A/AA
- B 11 including core points
- Or any other equivalent.

Full details on the Departmental website:

Admissions

For more information on applying to Oxford, please visit www.admissions.ox.ac.uk.

Open Days

There is no better way to find out what Oxford is really like than to visit us. Many colleges and departments welcome arranged visits throughout the year but our University open days remain the most popular time to visit. Explore colleges and departments and talk directly to tutors and students to help you make your decisions.

For details, please see www.admissions.ox.ac.uk/opendays.

Research in the Department

This is an area of the senior research staff of the Department, and our webpages are for those Colleges admitting biochemists. The following is a list of the senior research staff of the Department, and the Biochemistry tutors for those Colleges admitting biochemists.

Get in touch...

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MBiochem BIOCHEMISTRY

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Biochemistry (C700)

Biochemistry is one of the three main disciplines in the Life Sciences, along with Molecular Genetics and Cell Biology. The Biochemistry course is designed to provide foundational knowledge in chemical and biochemical processes that are essential for understanding how living organisms function.