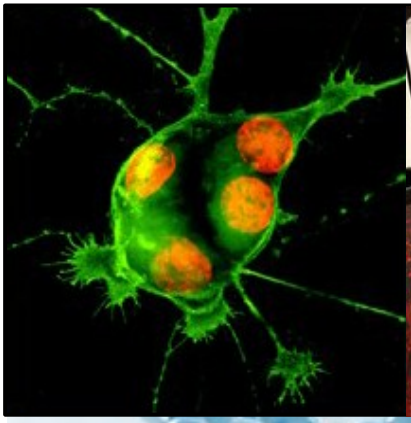
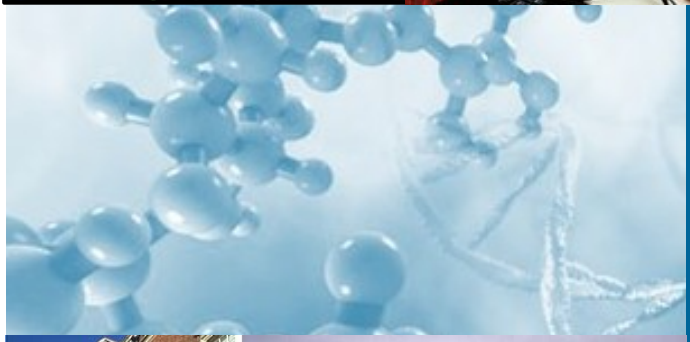
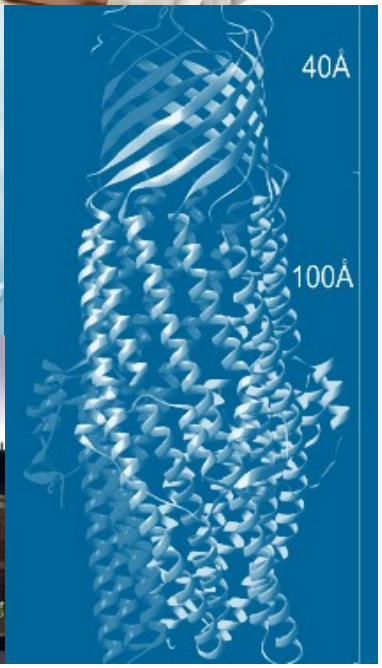
UNIVERSITY OF CAMBRIDGE

Department of Biochemistry

Natural Sciences Tripos
Biochemistry Part II and Part III
2018-2020







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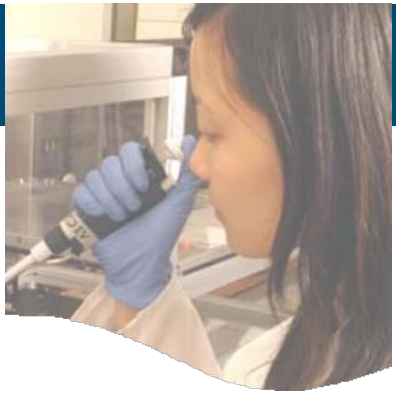

Biochemistry is the study of living organisms at the chemical, molecular and cellular levels. Its underpinning concepts and experimental approaches are fundamental to the whole range of present day biological sciences. Participation in the Biochemistry courses is diverse, including both Natural Science and Medical & Veterinary Science students. Part II and Part III Biochemistry are thorough preparations for a future science-based career, not just in Biochemistry itself but also in the broader areas of molecular and medical biosciences as well as territories that might be traditionally filed under Plant Sciences, Genetics, Developmental Biology, Microbiology, Parasitology, Pathology, Pharmacology, Virology and Zoology. As the core discipline for molecular and medical biosciences, a foundation in Biochemistry offers you the maximum choice and flexibility to specialise in any of these areas as your scientific training progresses**.**

Even so, many of our students do not plan to become academic or industrial researchers. They study Biochemistry because they find the molecular approach to the study of life intellectually stimulating and illuminating, and because they know that the rigorous training they receive makes them very attractive to a range of occupations. Our recent graduates include investment analysts, science writers, industrial managers, intellectual property and patent lawyers, school teachers, civil servants, diplomats and members of regulatory bodies and non-governmental organizations (NGOs).

The purpose of this brochure is to provide you with information about the Part II and Part III Biochemistry courses. In addition to the information in this brochure, members of staff of the Biochemistry Department are happy to answer queries from prospective Part II and Part III Biochemists at any time. Perhaps the most convenient way is to speak to the academic staff in charge of an NST Part IB practical class but anyone should feel free to contact Christine Thulborn our Teaching and Examinations Administrator by e-mail (examtchg@bioc.cam.ac.uk).

In addition, there will be a FACULTY BOARD OF BIOLOGY Part II Subjects Fair held on **Friday, 16th March 2018,** from 12 noon to 4pm, in the Cormack Room at the University Centre, at which Biochemistry Department staff members and current Part II and III students will be happy to answer your questions.

"Biochemistry Part II/III are definitely the most sociable and fun Natural Science options. I've enjoyed so many fun times with these people and the tea and scones are awesome!"

Past Biochemistry Student

Biochemistry offers Part II and Part III courses in the Natural Sciences Tripos. Students currently in their second year who want to specialise in Biochemistry have a choice between a one-year Part II, leading to a BA, or two years of study in which the Part II is followed by Part III and leads to both BA and MSci degrees. Medical and Veterinary students who are considering a career in medical research after qualifying will find the Part II course an excellent foundation and they may also continue to the Part III course if they wish to, by slightly delaying entry to clinical school.

The objective of Part II is to provide advanced training in biochemistry, cell biology and molecular biology through lectures, classes, discussion groups and research projects that will enable those wishing to pursue research. Part II Biochemistry is also superb training for those interested in other careers that require advanced analytical skills, creativity and versatility, whether they be in industry, journalism, finance, law, teaching or government.

The Part II core lecture course is supplemented by Methods and Skills classes encompassing key methodologies such as bioinformatics and molecular imaging, together with real research experience through an eight-week research project. The type of practical work involved in such projects is diverse, ranging from bench work to computer-based projects and bioinformatics. Teaching of transferable laboratory and communication skills (such as record keeping, statistical data analysis, database searching, graphic illustration, seminar presentation and report writing) is embedded in the course. Note also that we place an emphasis, through our prepared essay, on communication between Scientists and Society.

IA Chemistry or equivalent is an adequate chemical background for Part II Biochemistry. Special arrangements are in place to ensure that medics and vets who choose Part II Biochemistry begin on an equal footing with natural scientists (see later section on "Medical and Veterinary Students").

The Part III Biochemistry programme expands on the Part II course and is primarily geared to students who plan to pursue a research career. It includes a two-term research project together with continuing advanced teaching in lectures, seminars and discussion groups.

In addition to Part III Biochemistry, we also offer a Part III course in Systems Biology (http://www.cam.ac.uk/about/natscitripos/ps/p3/sb.html).

Part IB students often ask about the requirement to do Part III Biochemistry if they are planning to do research in the Department. Completion of Part III is not an obligate requirement for entry to the PhD programme in the Department. Official Departmental policy allows entry to a PhD directly from Part II. However, it is fair to assume that students undertaking the extra year are likely to be better prepared. Other Universities are also aware of the extra scientific training and skills that a fourth year provides and indeed for most competitive PhD programs a Masters degree is highly desirable.

There is no interview and no specific entry form for NST Part II Biochemistry. In the Easter Term, in consultation with your DoS, you should apply online through CamSIS. Information on how to register for Part III will be made available to all in the Part II class.

There is a limit of 40 places on the Part II course, of whom a maximum of 30 can continue on to the Part III course. There is no minimum qualifying standard for entry into Part II, other than obtaining Honours in NST Part IB or MVST Part IB. However, continuing to Part III requires a II.i or better in NST II Biochemistry. Students who do not fulfill these criteria may exceptionally be considered as a special case by the Faculty Board and should contact the Teaching and Examinations Administrator (examtchg@bioc.cam.ac.uk) in the first instance. Full details can be found at: http://www.natsci.tripos.cam.ac.uk/students/fourth.

"Part III Biochem definitely gives you an experience of what life as a researcher/ Ph.D. student will be like while still enjoying benefits of being an undergrad! "

Past Biochemistry Student

For Natural Scientists, we take your 3 subject scores in NST IB, add in your Biochemistry IB mark again (i.e. give double weighting to your performance in Biochemistry) and prepare a ranked order of merit based on the 3 subjects plus Biochemistry mark. For students taking CDB but not Biochemistry in NST IB, we treat your CDB mark in the same way as the Biochemistry mark.

For Medical and Veterinary students, we take your IB performance (total) and adjust it to give a total out of 300 (i.e. bring it in line with the NST total), then your performance in MVST IA MIMS is added in and the revised total (out of 400) is produced.

The Department offers a major subject called "Biochemistry" in NST Part II Biological and Biomedical Sciences (NST Part II BBS). This subject requires students to attend all the lectures (approximately 60, plus methods and skills classes) in the Biochemistry Michaelmas Term course for NST Part II students and in the Lent Term (approximately 36). There is no formal didactic teaching in the Easter term. The course is also supported by weekly group supervisions (see below). For these supervisions students join with NST Part II and Part III students. Entry to the course is limited to seven students. The Biochemistry major subject part of the BBS course is examined in four written papers covering the modules of the Michaelmas and Lent terms, and one 'data handling' paper dealing with the analysis and assessment of biochemical data and hypotheses.

As well as the Biochemistry MAJOR subject, students also take a 1-paper MINOR subject in NST Part II BBS, provided by another Department. (For allowable minor subjects see http://www.biology.cam.ac.uk/undergrads/nst/bbs/subject-combinations.)

Both subjects offer dissertation topics. According to the Regulations for NST Part II BBS, students must write a dissertation that "must not exceed 6,000 words, excluding appendices, tables, figures, footnotes and bibliography." The dissertation is not a report of laboratory work and the Biochemistry Major subject has no experimental work included. Course organisers will tell you when and where the dissertation titles will be released; this should be no later than the first day of the full Michaelmas term. Your dissertation should be prepared in accordance with the Guidelines for the dissertation issued by the Faculty Board, which can be found at http://www.biology.cam.ac.uk/undergrads/nst/bbs/dissertations.

Module A: Structural & Chemical Biology (24 Lectures)

This module outlines how modern techniques of structural and chemical biology are being used to solve biological problems. Topics draw on multiple aspects of macromolecular biochemistry including nucleic acid structures and interactions, signalling proteins and membrane proteins. Finally, new approaches to studying enzyme kinetics are discussed together with how the knowledge so gained can be used in drug discovery and protein design.

Module B: From Genome to Proteome (24 Lectures)

This module, which is shared with Zoology as their module M7, examines all the steps involved in regulating eukaryotic gene expression, from chromatin accessibility through to translation and mRNA turnover.

Module C: Stem – The Dynamic Cell (12 lectures)

The first half of this module is a common cell biology "stem" focused on the dynamics of proteins and membrane-bound organelles in eukaryotic cells. This is followed in the Lent Term by a choice of two branches, one concerned with exploitation of plants and microorganisms for renewable materials and energy provision and the other covering molecular microbiology and infectious disease.

Essential Methods and Skills Classes

These feature key methods such as bioinformatics and molecular imaging. Also included are data handling sessions using past examination papers as core material to study approaches to data analysis and interpretation. Teaching of transferable laboratory and communication skills (such as graphic illustration, record keeping, data analysis, database searching and essay and report writing) are embedded in the course.

Weekly Biochemical Supervision Sessions

These comprise weekly meetings of groups of ~8-10 students and 3-5 members of staff. The discussion groups provide a forum for both Part II and Part III NST students and for Part II BBS students to present and discuss topics of interest from the course and the literature and to monitor research project progress. Advice and training in examination skills, data analysis and oral presentation will be given. The discussion groups also provide an opportunity for interactions between third and fourth year students.

Journal Clubs

These comprise advanced sessions embedded in the weekly supervision groups where Part II and Part III students analyse a published paper in depth with the guidance of members of the department.

Prepared Essays

An extended critical essay (no more than 3,000 words) on a "Science that affects Society" topic chosen from a list provided by the Department in the Michaelmas Term. Examples from recent years are:

1. Discuss current scientific theories of the origin of life.
2. Is the mouse a good model for studying human disease?
3. There was a major outbreak of Zika virus infections in 2016. How might a biological understanding of the virus and its transmission help in preventing or containing future outbreaks?

Module C: Branch 1: Bioenergy – the exploitation of plants and microorganisms (12 lectures)

This course elaborates how photosynthesis in plants and algae may be harnessed for renewable material and energy production, either directly, using photovoltaic systems, or indirectly through production of oils or other forms of biomass such as cell walls. The module also looks at conversion of biomass to other fuels, high value products and at novel biofuel sources, such as algae.

OR…

Module C: Branch 2: Molecular Microbiology of Infectious Disease (12 lectures)

This course focuses on prokaryotes as agents of animal and plant pathogenesis and as sources of antibiotics. Examples of antibiotic biosynthesis and resistance mechanisms, and the mechanisms and impacts of drug resistance gene dissemination are discussed; molecular aspects of protozoan infectious disease are also covered.

Module D: Cell Cycle, Signalling and Cancer (24 lectures)

This module is shared with Zoology as their L7. It addresses how the processes of cell proliferation, survival, repair, differentiation, metabolism, movement and migration are regulated in normal cells and tissues and how such regulation is corrupted in cancers.

Research Project

Students undertake a research project lasting eight weeks offered by members of the Department (see examples below). Projects may also be undertaken at other Cambridge locations such as the Gurdon Institute for Cancer and Developmental Biology, the Systems Biology Institute, the Cambridge Institute for Medical Research, the Department of Clinical Biochemistry (Institute of Metabolic Science), the Department of Veterinary Medicine, the MRC Dunn Human Nutrition Unit, the MRC Laboratory of Molecular Biology, the Hutchison/MRC Research Centre, the Unilever Cambridge Centre for Molecular Informatics and the Department of Chemical Engineering and Biotechnology.

Students may suggest their own projects at such a location but must submit it for approval by the Course and Project Organisers. The project may be based on bench experiments or be computer based, such as bioinformatics, protein structure prediction or an in-depth analysis of current literature on a current topic (e.g. the safety of genetically engineered food). Our goal is for each member of the Part II class to work on the type of project he/ she wishes.

Weekly Biochemical Supervision Sessions

These comprise eight weekly meetings continuing on from the Michaelmas Term.

Essential Methods and Skills Classes

A continuation from the Michaelmas Term.

Weekly Biochemical Supervision Sessions

This comprises one meeting continuing on from the Lent Term.

Revision and Examinations

The Part II examination consists of five written papers, each of 3 hours. Papers 1- 4 examine modules A, B, C and D, each requiring three essays. Paper 5 examines data handling and analysis of biochemical data.

Early in the Lent Term, students are also required to hand in a prepared essay on a "Science that affects Society" topic of not more than 3,000 words in length selected from titles proposed by the examiners (see above). In the Easter Term students are required to submit a dissertation of not more than 5,000 words in length describing their work on their research project. **(**http://www.bioc.cam.ac.uk/teaching/partii/prospectivept2students.html**)**

Successful students graduate with a BA (3 year students) or continue to Part III (4 year students)

The research project entails each Part II student working closely with one of the research groups in the Department, usually under the supervision of a member of staff and a senior graduate student or postdoctoral worker. Projects may also be undertaken at other institutes in Cambridge (see above).

Research projects are one of the most popular features of the course and, despite the limited time available, discoveries are often made that lead to publications. Importantly, research projects give students a very good sense for whether they feel the life of a graduate student would be rewarding; some find that, while they are happy with theoretical biology, reading reviews and papers and the writing essays, when it comes to lab work they are all thumbs. Conversely, some students who had no previous intention of pursuing a career in scientific research get hooked on research as a result of their research project experience. Projects are allocated towards the end of Michaelmas Term. Students are able to select preferred research areas in which they would like to do their project and every effort is made to assign students to one of their chosen themes.

- Functional studies of the Mayaro virus protease.
- Mutagenesis studies of human 5-hydroxytryptamine 3 receptor.
- Is LGR5 expression essential for colorectal cancer cells?
- Differential transcription regulation by Sall4 isoforms in mouse embryonic stem cells.
- Human neuronal responses to familial Alzheimer's disease secretomes.
- Recombination-based engineering of the polyene filipin.
- The evolving role of And1 at the replication fork: from yeast to humans.
- Kinetic analysis of novel lipolytic enzymes from a metagenomics library.
- The functional effects of mutations in the myddosome in oesophageal adenocarcinomas.
- The structure and binding of H1.11L C-terminal tail.
- Transcriptional refinement of Wnt pathway activity by Tcf4 regulation.
- Investigating the binding of coagulation factors and related molecules to collagen.
- Structural and functional characterization of affinity matured DARPins.

Research Project

Research Projects, which run through two terms and are supervised by a member of staff, are chosen from an extensive list. See section on Research Projects below.

Advanced Lecture Module

Students choose a 12-lecture module on either:

Molecular Recognition and Interaction

Lectures present case studies within broad themes of protein-protein recognition (e.g. in molecular signalling), protein-nucleic acid recognition (e.g. in the RNA degradosome and DNA repair) and protein-small molecule recognition (e.g. in molecular assembly lines and drug screening).

OR…

Cell Fate

Lectures describe how cell fate is determined from cradle to grave, including pluripotency, differentiation, ageing, neurodegeneration and cell death, with emphasis on stem cells and the brain and how we can change cell fate.

Part III Biochemistry Seminar Series on Scientific Method and Experimental Design

Topics cover the choice and use of model organisms, genome projects, microarrays, proteomics, RNAi, interactomics and measurement of interactions, recombinant protein expression and imaging. Methodology seminars alternate with seminars on landmark papers in biochemistry. This series showcases examples of creative and brilliant science, provides a sense of why current knowledge has accumulated as it has, and of what limitations are imposed by available technology. Each session, led by a member of faculty or an invited expert, addresses a landmark paper (or small group of papers) that represents a significant conceptual or practical leap forward. Papers may be historic (such as the hypothesis and subsequent experimental verification of the lac operon) or more contemporary (such as the discovery of genetic interference by double-stranded RNAs). Groups of students research and make presentations to the class as a whole on various aspects of the paper being considered, including the state of knowledge before publication of the landmark paper and its subsequent impact on the scientific landscape.

Weekly General Supervisions

These are on similar lines to those described earlier for the Part II year.

Research Project
Continuation from Michaelmas Term.

Advanced Lecture Module:
Choose a 12-lecture module on either:

Contemporary Cancer Studies
This module uses a combination of lectures and workshop-style discussions to focus on recent advances in our understanding of cancer as a microevolutionary process driven by accumulation of mutations in regulatory processes that govern cell proliferation, survival, differentiation, invasion and metabolism, and as a pathology of dysfunctional tissues as well as aberrant cells.

OR…

The Biochemistry and Biophysics of Neuronal and Metabolic Disorders
The module addresses how molecular and systems approaches can further our understanding of diseases that perturb metabolic integration, cardiovascular function and neurotransmitter and hormonal signalling. Contexts will include neurological disorders, diabetes, obesity, cardiac rhythm disturbance, and thrombotic disease.

Seminar Series on Scientific Method and Experimental Design
Continuation from Michaelmas Term.

Weekly General Supervisions
Continuation from Michaelmas Term.

Research Project

Submit Dissertation.

Weekly General Supervisions

This comprises one meeting continuing on from the Lent Term.

Revision and Examinations

The Part III Examination comprises two written papers and a research project report of not more than 8,000 words. All students have a *viva voce* on their project report with one of the examiners and another member of staff.

Paper 1 (3 hours) examines the advanced lecture modules, requiring two essays covering the chosen Michaelmas Term module and two essays covering the chosen Lent Term module.

Paper 2 ($3^{1}/_{4}$ hours) is divided into Sections I and II that carry equal marks drawing on the overall scope of the Journal Clubs embedded in the group supervisions and the Seminar Series on Scientific Method and Experimental Design. Section I will require the critical evaluation of a short biochemical research article in response to a series of compulsory questions embedded in the text. Section II will contain three essay questions of an integrative nature.

Successful students graduate with both BA and MSci degrees.

The research project, which counts for 50% of the final mark, entails each Part III student working closely with one of the research teams in the Department, usually under the supervision of a member of faculty or senior postdoctoral worker. A project lasting 17 weeks is chosen from a list offered by members of the Department (see examples below). Projects may also be undertaken at other locations in Cambridge such as the Gurdon Research Institute, the Systems Biology Centre, Cambridge Institute for Medical Research, Department of Clinical Biochemistry (Institute of Metabolic Science), Department of Veterinary Medicine, MRC Dunn Human Nutrition Unit, MRC Molecular Biology Laboratory, Hutchison/MRC Research Centre, Unilever Cambridge Centre for Molecular Informatics or the Department of Chemical Engineering and Biotechnology. Students may suggest their own project at such a location and submit it for approval by the Course and Projects Organisers.

For many of the Part III class the project is the highlight of their course as well as providing a real insight into the world of research. At the Part III Research Symposium, at the beginning of Lent Term, each student presents a 20 minute interim report and answers questions on her/his project. Design and execution of these high quality presentations is an excellent training for postgraduate and business careers. The Part III students give a final presentation on their projects to their supervision groups at the start of Easter Term.

- The role of the CAF1-NOT deadenylase complex in codon-mediated mRNA decay.
- The biology of Myc heterogeneity in mammary tumours.
- Characterisation of RAP-family RNA-binding proteins in Toxoplasma gondii.
- Regulation of cell cycle timing by the S-phase checkpoint.
- Deciphering the contribution of actin regulators to filopodial growth.
- Cyanophycin production in photosynthetic organisms.
- The role of ZMIZ1 in oestrogen receptor positive breast cancer.
- An alternative pathway of interstrand cross-link repair.
- Finding inhibitors of glycoprotein VI.
- Quantifying the fole of the P2Y6 receptor in mouse models of inflammatory neurodegeneration.
- Investigating the interaction between Calmodulin and Ra1A.
- Structure and mechanism of MacAB-To1C.

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Pance, A., Morrissey-Wettey, F.R., **Craig, H.,** Downing, A., Talbot, R. & Jackson, A.P. (2014) SDF-1 chemokine signalling modulates the apoptotic responses to iron deprivation of clathrin-depleted DT40 cells. *PLoS One* ***9***. e106278.

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Cao, L., Tang ,Y., Quan, Z., **Zhang, Z.,** Oliver, S.G. & Zhang, N. (2015) Chronological lifespan in yeast is dependent on the accumulation of storage carbohydrates mediated by Yak1, Mck1 and Rim15 kinases. PLoS Genet. **12**: e1006458..

Hamaia, S.W., **Luff, D.,** Hunter, E.J., Malcor, J.D., Bihan, D., Gullberg, D., Farndale, R.W. (2017) Unique charge-dependent constraint on collagen recognition by integrin $\alpha 10\beta 1$. *Matrix Biol.* Aug 25. **59** 80-94...

Llorian, M., Gooding, C., Bellora, N., Hallegger, M., Buckroyd, A., Wang, X., Rajgor, D., Kayikci, M., **Feltham, J.,** Ule, J., Eyras, E. & Smith, C.W.J. (2016) The alternative splicing program of differentiated smooth muscle cells involves concerted non-productive splicing of post-transcriptional regulators. *Nucleic Acids Research* **44**, 8933-8950.

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Mülleder, M., Calvani, E., Alam, M.T., **Wang, R.K.,** Eckerstorfer, F., Zelezniak, A. & Ralser, M. (2016) Functional Metabolomics Describes the Yeast Biosynthetic Regulome. Cell **167**, 553-565..

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The Biochemistry Department strongly encourages prospective Part II students to seek laboratory-based work experience in the summer vacation at the end of their second year. In addition to providing additional practical experience, such experience offers students the opportunity, at a relatively early stage in their training, of sampling biochemical research in an environment outside the teaching laboratory. In this way, students experience research in a meaningful setting, while (hopefully) making a useful contribution to the research enterprise of the host laboratory. The Department has noted that students who have taken such summer laboratory jobs are typically better motivated and significantly more skilled than their peers. Laboratory experience de-mystifies research and allows students to assess their own passion and aptitude for research, and to make valuable contacts.

To assist students in finding suitable laboratories they are encouraged to contact the Part II Course Organiser (e-mail: examtchg@bioc.cam.ac.uk) who acts as placements adviser. For students seeking summer work experience in the UK there are several funding schemes and details of these have already been made available to you through Moodle.

Natural scientists who specialise in Biochemistry come from varied backgrounds and many have combined mainly physical or mainly biological sciences in Part IA and Part IB of the Tripos. Intending Biochemists will have done the IB subject Biochemistry & Molecular Biology (BMB), and/or Cell and Developmental Biology (CDB). Applicants for Part II who have studied neither CDB nor BMB may ask to be considered as a special case.

If you opt to study Part II Biochemistry alone, in the three-year course, there will be no minimum qualifying standard, other than obtaining Honours in Part IB of the Natural Sciences Tripos.

For many reasons, the Part II Biochemistry course is an attractive third year option for medics and vets.

The Part II course includes several specialised biomedical modules such as "Molecular Microbiology of Infectious Disease" and "Cell Cycle, Signalling and Cancer". From the listing of staff research interests in the list below you will see there are very strong medical research themes in the Department. In addition, the availability of Part II research projects at selected sites outside the Biochemistry Department allows MVST students to source their projects for themselves in the Clinical Medicine or Veterinary Schools (such projects are subject to approval by the Course and Projects Organisers.) The Department is aware that the Molecules in Medical Science course in MVST IA and Biochemistry & Molecular Biology in NST IB differ somewhat in content and emphasis. You should remember, however, that other MVST IB subjects have a molecular bioscience component that will be useful background for NST Part IIs, including Biochemistry. To ensure that medics and vets are at no disadvantage in Part II Biochemistry the Department of Biochemistry has made the following provisions:

1) All medical and veterinary students taking Part II are supplied with a complete set of IB lecture notes via Moodle.
2) All medical and veterinary students taking Part II are offered 'updating' supervisions with Biochemistry IB lecturers, if they wish.

The Department of Biochemistry in Cambridge is a large one, its researchers investigating a wide range of topics that fall under the nine main headings shown below. The Department is also the home for the Cambridge Centre for Proteomics, DNA Sequencing (housing the latest 454 sequencing technology), Biophysics, CryoEM, X-ray crystallographic and NMR Facilities. Fuller details of the research programmes of individual faculty members and groups may be obtained from the web site http://www.bioc.cam.ac.uk/people/uto which can be found on the main Department web-site at http://www.bioc.cam.ac.uk.

Prof Tom Blundell	Structural biology, bioinformatics and drug discovery
Dr Bill Broadhurst	Structural dynamics of modular polyketide synthases
Prof Florian Hollfelder	Mechanism in chemistry and biology
Dr Marko Hyvönen	Specificity, regulation and inhibition of protein-protein interactions in cellular signaling
Prof Peter Leadlay	Molecular assembly lines and combinatorial biosynthesis
Dr Helen Mott	Structural biology of small G proteins and their downstream effectors
Dr Darerca Owen	Peptide-based inhibitors of small G proteins regulated signalling pathways
Prof Luca Pellegrini	Molecular mechanisms of genome duplication and stability

Prof Kevin Brindle	Molecular imaging in cancer
Prof Guy Brown	Neuroinflammation, mitochondria and cell death
Dr Marc de la Roche	Oncogenic Wnt signalling in cancer
Prof Gerard Evan	Determining the molecular basis of cancer
Prof Richard Farndale	Collagen receptors and collagen binding proteins
Dr Monique Gangloff	Structural Biology of Mosquito immunity

Dr Andrew Grace	Molecular pathophysiology of cardiac arrhythmias
Dr Svetlana Khoronenkova	DNA repair and neurodegenerative diseases
Dr Trevor Littlewood	Oncogenic signalling in cancer
Dr Rick Livesey	Mammalian neural stem cell biology, fundamental and applied
Prof Sarah Lummis	Molecular characterisation of neurotransmitter-gated ion channels
Prof Luca Pellegrini	Molecular mechanisms of genome duplication and stability
Prof Jussi Taipale	Transcriptional control of growth
Dr Simone Weyand	Membrane protein structure, function and cellular activities

Prof Tom Blundell	Structural biology, bioinformatics and drug discovery
Dr Brian Hendrich	Transcriptional control of stem cell fate
Prof Steve Jackson	Maintenance of genome stability
Dr Svetlana Khoronenkova	DNA repair and neurodegenerative diseases
Prof Ernest Laue	Structural studies of chromatin assembly/disassembly
Prof Luca Pellegrini	Molecular mechanisms of genome duplication and stability
Prof Jussi Taipale	Transcriptional control of growth
Dr Ross Waller	Cell evolution – novel chromatin biology, remodelling of the cytoskeleton for parasitism, and organellogenesis in diverse eukaryotes
Dr Philip Zegerman	Regulated replication initiation in genome stability and development

Prof Mark Carrington	Molecular cell biology of trypanosomes
Prof Chris Howe	Biochemistry of photosynthesis; molecular evolution of photosynthetic microorganisms and Plasmodium

Dr James Locke	Quantitative understanding of how cells respond to environmental signals
Dr Ellen Nisbet	Molecular evolution - from algae to malaria
Prof George Salmond	Molecular microbiology: bacterial quorum sensing, virulence, protein secretion, antibiotic regulation, gas vesicles and flotation, toxin-antitoxin systems and bacteriophage abortive infection
Dr Ross Waller	Cell evolution – novel chromatin biology, remodelling of the cytoskeleton for parasitism, and organellogenesis in diverse eukaryotes
Dr Martin Welch	Regulation of virulence and biofilm formation by pathogenic bacteria

Prof Paul Dupree	The extracellular matrix in plants – understanding cell wall biosynthesis
Prof Chris Howe	Biochemistry of photosynthesis; molecular evolution of photosynthetic microorganisms and Plasmodium
Dr Ellen Nisbet	Molecular evolution - from algae to malaria

Prof Ben Luisi	Crystallographic and functional studies of regulatory assemblies
Dr Juan Mata	Posttranscriptional regulatory networks
Prof Chris Smith	Regulation of alternative pre-mRNA splicing
Dr Nancy Standart	Post-transcriptional regulation of gene expression

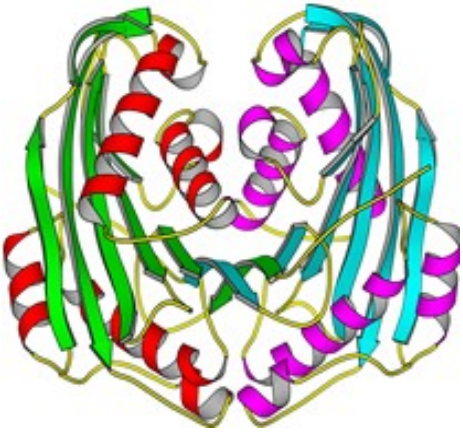
Prof Tom Blundell	Structural biology, bioinformatics and drug discovery
Prof Guy Brown	Neuroinflammation, mitochondria and cell death
Dr Jenny Gallop	Membrane-triggered actin polymerization: molecular mechanisms and morphogenesis
Dr Monique Gangloff	Structural Biology of Mosquito immunity
Prof Nick Gay	Structural biology of cellular signalling by Toll/Interleukin 1 transmembrane receptors
Dr Marko Hyvönen	Specificity, regulation and inhibition of protein-protein interactions in cellular signalling
Dr Tony Jackson	Ion channels and plasma membrane proteins
Prof Sarah Lummis	Molecular characterization of neurotransmitter-gated ion channels
Dr Helen Mott	Structural biology of small G proteins and their downstream effectors
Dr Daniel Nietlispach	Integral membrane proteins: structure, dynamics and function
Dr Darerca Owen	G proteins and their effectors as therapeutic targets in invasion and metastasis
Dr Simone Weyand	Membrane protein structure, function and cellular activities

Dr Brian Hendrich	Transcriptional control of stem cell fate
Dr Rick Livesey	Mammalian neural stem cell biology, fundamental and applied
Dr José Silva	Biology of induced pluripotency
Prof Austin Smith	Embryo stem cell biology

Dr Jasmin Fisher	Executable Biology
Prof Jules Griffin	Lipid profiling and signalling
Prof Kathryn Lilley	Cambridge Centre for Proteomics
Dr James Locke	Quantitative understanding of how cells respond to environmental signals
Prof Steve Oliver	Functional genomics and systems biology
Dr Markus Ralser	The regulatory function of the metabolic network
Dr Nianshu Zhang	Cellular ageing studies in yeast

The Biochemistry Departmental Library is well stocked with journals and books, including textbooks acquired specifically for the Part II/III course. The Library also acts as a depository for Part II/III dissertations. The Department is also equipped with numerous designated Part II/III networked computers, linked to printers. These are located in the library and widely distributed throughout the research areas.

Members of staff of the Biochemistry Department are happy to answer any queries from prospective Part II and Part III Biochemists at any time. Perhaps the most convenient way is to speak to the academic staff in charge of a NST IB practical class but anyone may contact Christine Thulborn our Teaching & Examinations Administrator by email (examtchg@bioc.cam.ac.uk).



Part II and III Brochure 2018-2020

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