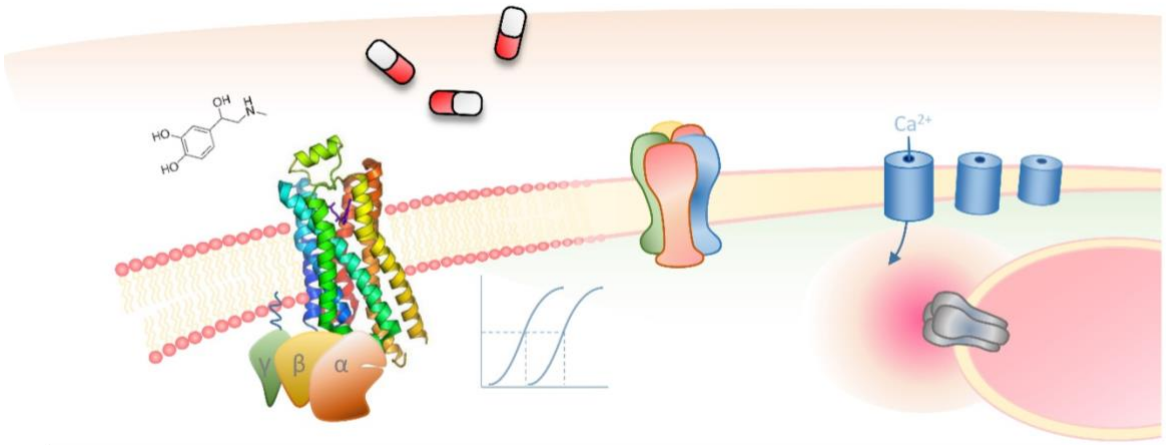
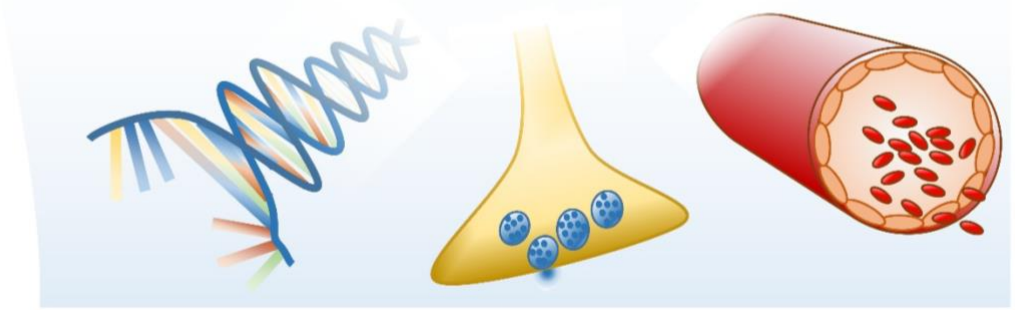
UNIVERSITY OF CAMBRIDGE



PHARMACOLOGY PART II



Course Handbook
2021 – 2022

Welcome to Pharmacology!

Pharmacology is the study of the mechanism of action of drugs on biological systems, whether the drug is synthetic, natural or endogenous. Pharmacology is a multi-disciplinary field, encompassing every level of biological organisation, from atomic structures, signalling pathways, cells, tissues and organisms, to entire populations. Pharmacology lies at the heart of drug discovery, has enormous impact on the practice of medicine and veterinary medicine, and is a vital approach to understanding health and disease. You can expect to encounter the most recent research and the controversies surrounding it.

Part II is very different from Parts IA and IB. With fewer than 100 hours of lectures during the academic year, you will have much greater responsibility for organising your work. This handbook provides the essential information you need to get started, and a summary of what lies ahead. You will probably find it helpful to refer to these notes throughout the year, and many of the queries that arise are likely to be answered within the handbook. You should use the handbook alongside Moodle, where amendments to dates, etc. will be posted. Teaching staff and examiners will also update you by email.

The COVID-19 pandemic has brought changes to almost every aspect of our lives and Part II Pharmacology is no exception. This year's lectures will be delivered in person where possible or pre-recorded and delivered online. Supervisions and discussion groups may also be online where needed. We are making every effort to keep running lab projects in Lent Term, though we will also have to be flexible to cope with the changing situation.

Most of your work will now be based in the Department of Pharmacology, and we hope that you will feel at home and safe in Pharmacology. Whether you are reading Pharmacology or BBS, you have a busy and enjoyable year ahead of you!

David Bulmer
Course Organiser

CONTENTS

THE COURSE

Course Aims

- To provide a wide-ranging, balanced and critical treatment of pharmacology as it relates to understanding mechanisms of drug action
- To equip you with a range of skills for your future career, whether it is in life sciences research, medicine, veterinary medicine, drug discovery, or other careers not directly related to pharmacology

Learning Objectives

By the end of the course, you should be able to:

- Think critically and with an appropriate level of knowledge across a wide range of pharmacological topics.
- Find, critically assess and integrate information from the scientific literature.
- Critically assess different methods to solve pharmacological problems.
- Communicate effectively with a scientific audience in oral presentations, written reports or dissertations, and essays.
- *(Part II Pharmacology only)* Analyse and assess research methods and results during a supervised research project

Course structure

The course is taught through lectures, tech talks, discussion groups, supervisions, and study skills workshops. **All of these are shared between Part II Pharmacology and Part II BBS**. The teaching is delivered by staff from the Department of Pharmacology who are all actively engaged in research and committed to teaching excellence, complemented by visitors from other departments and pharmaceutical companies.

Michaelmas Term

Lectures	In person or online via Moodle.
Workshops	Essay-writing – Library skills – Practical statistics – Drug Review – Data Interpretation
Tech Talks	In person or online via Moodle
Discussion Groups	4 meetings, focussing on presentation and critical evaluation of published papers.
Supervisions	Arranged individually. All University-based lecturers are available to provide supervisions.
Drug Review	*Pharmacology Part II only*. You will have the entire term to complete your Review, to be handed in after Christmas.
Feedback	Feedback meeting: **10am Friday November 26th** *Towards the end of term you will choose your project or dissertation topic.*

Lent Term

Lectures	In person or online
Discussion Groups	4 meetings. These are likely to combine presentations with reviews of progress in projects or dissertations.
Research Project	*Pharmacology Part II only*. About 24 days spent completing and writing a practical research project. You will meet regularly with your research project supervisor throughout the term.
Dissertation	*BBS only.* You will have the entire term to complete your dissertation, supplemented by about 4 formal meetings with your dissertation supervisor. You will present your dissertation as a 3-minute thesis (date to be confirmed later).
Supervisions	Arranged individually. All University-based lecturers are available to provide supervisions.
Feedback	Feedback meeting: **10am Friday, March 11th**

Easter Term

There is no formal teaching in the Easter Term, leaving you free to read and revise.	
Research Projects	*Pharmacology Part II only*. You will present your research project as a talk to the Part II examiners. The presentation is assessed.
Examinations	

Lectures cover the full breadth of modern pharmacology, from atomic structures to populations and everything in between. Some lectures will focus on basic sciences, others on clinical application; some will focus on drug action at the molecular and cellular level, while others on better understanding disease to find new drug targets. What unites them is the application of pharmacology to solve biological and clinical problems.

Lectures are an introduction to the topic and an overview of the major areas of interest. You should not see them as exhaustive coverage of a topic or as a series of 'facts' to be learnt and reproduced in an exam. Instead, they should show encourage you to research the topic in depth and think about the major unresolved questions.

Note that in previous years the lectures were divided into Systems Pharmacology, and Molecular and Cellular Pharmacology. This arbitrary division has been removed, although you will see it in the past exam papers. ***You are expected to watch all lectures.*** Although the examinations allow a choice of questions, your choice may be severely compromised if you chose to be too selective in your engagement with lectures. You cannot assume that every topic covered in lectures will be included in the exam papers.

Lectures will be delivered in person and made available online, or pre-recorded as circumstances dictate. You can access them on Moodle. Lecture recordings will be released approximately weekly, which is the equivalent of no more than 2 hours/day spent in lectures, so there is plenty of time to explore specific topics in depth.

Getting the most out of Part II lectures

1. ***Prepare***
   Read about the subject before the lecture course starts. Review your notes from previous lectures before the next one in each course. This means that you will be ready to identify the key themes and ideas. The learning objectives for the course will also highlight the key themes.

2. ***Actively take notes***
   You should not expect the lengthy handouts provided in Part I courses, so you will need to take notes. Good notes are not just for later memory but are also an important part of the learning process. Actively taking notes helps you to understand the lectures. Active note taking summarises the main points and themes of the lectures, rather than attempting to create a verbatim account of the lectures. You should aim to construct a framework of understanding that you can use to organise the information from the lectures and your reading. Many students find that summary diagrams or mind maps are effective ways of doing this, which is supported by educational research. Active note taking requires active listening, without other distractions. This is particularly important as you watch online lectures in your college room.

3. ***Read beyond the lectures***
   Lecturers will provide reference lists. Many lecturers will suggest which papers are the best place to start. This is a key difference from Part I: lectures now provide the essential introduction, but it

is for you to pursue topics in more detail by selective reading of both the primary and review literature, initially guided by the reference lists. The relatively light schedule of formal lectures is designed to ensure that you have abundant opportunity to read and think in depth.

4. Think about what you have heard and read and consolidate your thinking

Reflect on the lectures and the papers you have read. Think about the main themes in the lecture topic. What conclusions are supported by the evidence? Is there another way of interpreting the data? What further experiments are needed? Look for connections to other lecture courses.

Mind maps or essays plans can help consolidate your notes. It is better to start this soon after the lectures rather than waiting until Easter Term.

You should also treat the material in the lecture courses as examples to answer broader questions:

- How can we develop new drugs for unmet clinical needs? What it the role of pharmacology in developing new drugs? What is the role of academic research in drug development? Should we just leave it to Big Pharma?
- To what extent does understanding disease help find new therapeutic targets? To what extent does a clear understanding of the cellular and molecular nature of drug targets help our development of new drugs?
- Why do patients respond differently to drugs?

All lecturers based at the University can provide **supervisions** on their lectures. The aims of these supervisions are to answer your questions, give feedback on essays, and discuss the topic in greater detail. The more that you prepare for supervisions, the more you will get from them, so come armed with questions. Lecturers like to run their supervisions in different ways. Some lecturers will expect that you should submit an essay to the lecturer in good time before the supervision. This essay will form the starting point for discussing the topic further. Writing an essay on the topic also helps you to develop your understanding of a topic and highlight questions that you want to discuss. Other lecturers may run question and answer sessions to help you understand their course. In 2021-22, supervisions may be in person or online.

It is your responsibility to arrange the supervisions you want. (You should discuss supervisions with your college Director of Studies, and note the Supervisions Norms on Moodle). Supervisions are arranged through an online supervision sign-up system on Moodle. Lecturers will create supervision slots with a maximum group size. The slots will be after the lecture course, to give you time to read, think, and write. You can sign up for free slots on Moodle. The slot description will also indicate whether an essay is required, giving some suggested essays titles and a deadline for submission, or whether this will be a Q&A session.

Some lecturers will be happy to comment on **essays** without a supervision. You should contact the lecturer directly to arrange this. Lecturers may be unavailable during vacations or during the interview period in December. You should not expect lecturers to mark essays in the 2-3 weeks before exams.

Tech talks provide overviews of a variety of advanced techniques used in pharmacology research. They give essential insight into the methods you will encounter in lectures and reading, and so better prepare you for critical evaluation of published evidence. Tech talks are usually given by senior researchers with first-hand expertise in the techniques. There are no supervisions associated with Tech Talks and nor should you expect to have essays marked on these topics. The subject matter is, however, of immediate relevance to examinations – particularly Paper 4 – and dissertations and projects. In 2021-22, all Tech Talks will be either pre-recorded or delivered in person and made available online via Moodle. ***You are expected to engage with all Tech Talks.***

Study skills workshops, some with introductory lectures, are taught in small groups, typically lasting 2-3 hours, for which sign-up arrangements will be circulated. Although none of the materials covered is directly examined, each workshop seeks to develop skills that you will find useful across the entire course. *Essay-writing* reviews the skills needed to write concisely and with the breadth and depth expected at Part II; it is complemented by *Library skills* which provides guidance on accessing the literature and dealing with references. *Practical statistics* is designed to provide basic statistical methods, power analyses and curve-fitting. It is directly relevant to research projects. ***You are expected to attend each workshop***, although practical statistics is optional for BBS students. In addition to these skills workshops, there will be workshops to support the *Data interpretation* paper and the *Drug Review* (the latter is Part II research project students only). Details of these workshops will also be circulated close to the time.

You have been allocated to a **Discussion Group** of about 5-7 students. The list is circulated separately. Early in each term, you will agree a timetable for your meetings (four in each of the Michaelmas and Lent Terms). The exact format of the meetings varies between groups, but each seeks to develop presentation skills and the ability critically to evaluate the scientific literature. Staff will provide your college with a report summarising your participation and performance in the Discussion Group at the end of each term. ***You are expected to attend all meetings of your Discussion Group.***

Arrangements for the **minor subjects** (*BBS only*) differ between subjects. You can obtain further details from the web site. The timetables do not include the minor subject details.

Feedback and student representation

The present course has been shaped in part by the comments of your predecessors. There are three levels at which we encourage current Part II students to provide constructive comments on the course:

1. You can write or speak directly to the Course Organiser (dcb53). Anonymous comments will not be accepted. If you have comments that you feel must be submitted anonymously, you should do so *via* your course representative or college tutor. Note that questions about the examinations should be directly to the Senior Examiner.

2. We have a feedback meeting immediately after a lecture in the last week of term, which ***all students are expected to attend***. These meetings collate comments on each lecture course from the preceding term. These are returned to lecturers. The dates of the feedback meetings are

provided in the lecture timetable. There will also be a broader feedback survey towards the end of the course.

3. You elect two representatives from the current class, one to represent Part II Pharmacology and the other to represent BBS. Both attend meetings of the Teaching Committee, which meets 3 times during the academic year (on the last Friday of each term). The representatives provide input into the more detailed discussions of course reviews, etc. that are considered by Teaching Committee. It is for you to decide on your representatives and to provide the course organiser with the names before the end of October.

Please make use of these opportunities to provide your feedback but remember that constructive criticism is most likely to be effective!

We will always try to resolve any problems that you may have. However, if you consider that a complaint has not been resolved, or appropriate action has not been taken, you can initiate a formal complaints process. The University's Student Complaints Procedure can be found at: http://www.studentcomplaints.admin.cam.ac.uk/student-complaints.

Examples of recent changes introduced in response to student feedback

- More diverse exam structure, testing a broader range of skills
- Smaller discussion groups
- Online supervision sign-up system introduced to simplify and standardize the process
- Some lecture courses reduced in length, others increased in length, to improve the balance
- Lecture courses reordered to make links between courses more apparent
- Tech talks re-focused on interpreting papers

Drug Review *(Part II Pharmacology only)*

1. Choosing the topic for your Drug Review

The list of drugs that you can choose to cover for your review will be issued at the beginning of Michaelmas Term. You must choose a drug from this list. You can choose the same drug as another student, although you should be aware that the examiners will consider unacknowledged collaboration to be plagiarism.

2. Researching your Drug Review

Your review provides an opportunity to explore a topic in depth. You should aim to provide a wide-ranging, detailed and balanced description of the drug's use(s), its mechanism(s) of action and its development, supported by the available scientific evidence. You should give your own critical appraisal of the evidence. Do not be afraid to suggest you own interpretations.

One of the aims of the Drug Review is to promote your independent research skills. There will be no specialist supervisions on your review. A workshop in Michaelmas Term will help you explore what makes a good review.

3. Preparing your Drug Review

- **Maximum length**: 2,500 words, excluding title, lay summary, tables (and table legends), figures (and figure legends), footnotes, bibliography and acknowledgements. You should avoid putting a lot of text in figures, tables or footnotes in an attempt to stretch the word limit. Note that any in-text citations (see 'References', below) are counted as part of the 2,500 words. A contents page is not required. You should not include any appendices.

- **Format**: Drug Reviews must be typed and submitted as a single PDF. Your Drug Review should be written in a scientific style and with the evidence supported by references that you have read and critically interpreted. You can include as many figures as you need, although you are strongly encouraged to develop the figures yourself.

- **References**: A variety of software is available to allow you to manage references. Examples of free software that students have previously found useful are Zotero, Mendeley or Endnote Web. See http://www.lib.cam.ac.uk/toolbox/rmt.html for more details.

  Unlike your Research Project Report, you can reference in any commonly used style, so long as you are consistent throughout the Review. Note that, if you use the Author-date style, which has, for example (Vane, 1971) in the main text, these in-text citations will count towards your word limit.

Inadequately acknowledging the work of others is plagiarism. **Both examiners and the general scientific community regard plagiarism as a serious offence.** Where you refer to the work of others (in text or figures), make sure that the original source is fully acknowledged. The electronic version of your dissertation will be run through plagiarism-detection software. Further guidance on plagiarism is provided below and in the Faculty Board's statement on plagiarism (https://www.biology.cam.ac.uk/exams/AllExams/plagiarism).

- **Lay summary**: Your Review should begin with a short summary of the major points written in a style suitable for an intelligent lay person. History suggests that most students fail to write this paragraph in a style that would *really* be understandable by a lay reader: avoid technical language, but without being patronising. This section is more difficult than you might imagine, so work at it. Non-scientific friends are often the best judge of whether you have judged the level correctly. The limit for this section is 500 words. This really is an upper limit, not a target. A good lay summary is often much shorter than this.
- **Declaration**: In addition to your Drug Review PDF, you must submit a separate **signed** declaration on a single page that includes: the drug name, your full name and college, word count, a declaration that it is your original work and has not previously been submitted for a similar purpose, a statement that you have read and understood the Faculty of Biology statement on plagiarism (found here: https://www.biology.cam.ac.uk/exams/AllExams/plagiarism), a statement that the Drug Review is submitted in partial fulfillment of the regulations for NST Part II Pharmacology, and the date. Any help you have received must be acknowledged.

4. Submitting your Drug Review

The deadline for submitting your Drug Review will be confirmed by the Senior Examiner closer to the time. (It is *likely* to be noon on the first Friday of Lent Term.) You must submit your Drug Review via Moodle as a single PDF and your declaration as a separate document. Your Drug Review may be subject to scrutiny for plagiarism.

5. Presenting your Drug Review

You will present your Drug Review to your Discussion Group. Talks may last not more than 5 minutes.

Research Projects (*Part II Pharmacology only*)

1. Choosing your Research Project

The list of projects is issued in late October. Supervisors will be happy to discuss potential projects. You are not allowed to complete your project in a lab where you have worked previously (e.g., as a summer student). The number of projects available exactly matches the number of students: you **must** choose from the circulated list. You are not allowed to make independent arrangements with supervisors. Most projects are within the research labs of staff of the department, but on occasion a few projects are based elsewhere (e.g., Clinical Pharmacology, CIMR). The details for making your choice will also be circulated in late October. Once you have all indicated your preferences, we will allocate projects.

The availability of lab-based projects depends on the University being open. If the ongoing COVID-19 pandemic requires the closure of our labs, or other control measures that make lab-based project unfeasible, we will make alternative arrangements.

2. Before you begin

Before beginning any laboratory work, you are required to attend a safety course. This is mandatory: **you will not be allowed to begin your project unless you attend**. Further details of safety issues are provided in later sections.

Once you have been allocated your project, you should discuss the project with your supervisor before the end of Michaelmas Term. Your supervisor is likely to recommend some reading to help you prepare for the project. Make full use of this to ensure that you arrive for your project well prepared – you will then get more out of your project.

3. During your Research Project

You will spend about 3 days/week working on your project (24 days in total). The Lent Term is busy with both lectures (although fewer than in Michaelmas Term) and your research project. You can easily slip into spending too much time on your project to the neglect of reading around lecture materials. Occasionally, supervisors may have unrealistic expectations of the time you are expected to devote to your project. Try to keep to a balanced timetable. If that proves difficult, discuss it with your supervisor in the first instance. The Course Organiser or Head of Department are also available to help. Do seek help if you or your supervisor are finding it difficult to balance the demands of your project with the other components of the course.

These are *research* projects, and research does not always run to plan or to a 24-day timetable! Don't panic if your experiments are not working as expected. Discuss your results with your supervisor and ask others for their thoughts. Even if the final outcome is not the research paper you'd hoped for, remember to write up the work systematically. Some of the best reports and talks have come from projects that were bedevilled with problems.

It is an essential, and statutory, requirement that your research project be conducted with appropriate attention to health and safety issues. In addition to attending the mandatory safety course (see above), you must also be familiar with the risk assessments relating to your specific project work. Your project

write-up must include discussion of the risk assessments. Further details of health and safety matters are provided later in this handbook.

4. Preparing your Research Project Report

At the end of your Research Project you must submit a written report to the examiners in the style of a published paper. You will also present your project as a talk.
The report should be written entirely by the student. Supervisors are permitted to give only general comments and advice on reports. Some reports from previous years are available via Moodle and are useful sources of guidance. The following requirements were recently revised to encourage concise reports (by imposing a word limit) and to include a lay summary. Some reports from previous years may have been submitted under the older rules.

Research Project Report requirements

- **Maximum length**: 6,000 words, excluding title page, acknowledgements, bibliography, and any appendices, tables, figures and footnotes, but including all other text (lay summary, abstract, main text, figure legends, etc.). Note that in-text citations (see 'References', below) are counted as part of the 6,000 words.
- **Format**: Reports must be typed, **double-spaced** on A4 paper. Leave sufficient left margin to allow binding. Your Report must be permanently bound.
- **Acknowledgements**: Immediately after you title page you must acknowledge all sources of help or collaboration. This statement should appear on a page of its own.

  Where projects have been carried out in pairs, each student must write an **independent** report and acknowledge which work was a joint effort. The statement must clearly delineate the contributions of each student. This is extremely important. Examiners must be able to resolve unambiguously the contributions of each student. Where students have worked in pairs but provide separate data to a joint figure, each student must also clearly delineate the contributions of each partner in the figure legend. For example, a figure legend might state: '*The results were collected entirely by AB (panel a), entirely by CD (panel b), with AB and CD working together (panel c) and with two replicates provided by AB and 3 replicates provided by CD (panel d). The analysis shown in panel e was from data collected by AB and analysed by CD'*. It is essential that you provide this information for shared projects (or where others have contributed to your results).
- **Abstract**: Your Abstract should succinctly summarise your key findings and why the work is important. It should be divided into subheadings: 'Background and Purpose', 'Experimental Approach', 'Key Results', and 'Conclusions and Implications'. The Abstract should not be more than 250 words (including subheadings), and is included in the 6,000 word limit.
- **Lay summary**: Your report should begin with a single short paragraph summarising the background, results and conclusions written in a style suitable for an intelligent lay person. History suggests that most students fail to write this paragraph in a style that would *really* be understandable by a lay reader: avoid technical language, but without being patronising.

This section is more difficult than you might imagine, so work at it. Non-scientific friends are often the best judge of whether you have judged the level correctly.

- **Main text**: Your report should be written concisely and in a style similar to that of a paper in the *British Journal of Pharmacology*. The **Introduction** sets the scene by defining your project in the context of the literature; it should be brief. The **Methods** should be written in detail sufficient to allow your experiments to be repeated, and they must include reports of the precautions taken to ensure safe execution of the work. The latter is a recent requirement, so you will not find it in all past reports. The **Results** section reports your findings, while the **Discussion** interprets them. Consider carefully whether any abbreviations help. Lists of cryptic abbreviations can be a barrier to understanding for readers from outside your immediate field.

- **References**: A variety of software is available to allow you to manage references. Examples of free software that students have previously found useful are Zotero, Mendeley or Endnote Web. See http://www.lib.cam.ac.uk/toolbox/rmt.html for more details.

  References should be formatted in the 'APA' style. In the main text, references are given as '(Vane, 1971)', or 'Vane (1971) showed that…'. These in-text citations count in the word limit. In the bibliography, references are arranged in alphabetical order of surname of the first author, in the form:

  > Vane, JR. (1971). Inhibition of prostaglandin synthesis as a mechanism of action for aspirin-like drugs. Nature New Biology, 231 (25), 232-235.

  If there are more than 7 authors, list the first 6 authors followed by an ellipsis (…) then the name of the last author.

  This is described in detail in the Author Guidelines for the *British Journal of Pharmacology*, available online here: https://bpspubs.onlinelibrary.wiley.com/pb%2Dassets/assets/14765381/Author%20Guidelines/Author%20Guidelines%20BJP%2010.08.2020.pdf

  The bibliography is not included in the word limit.

Plagiarism is the inadequately acknowledged citation of the work of others. **Both the examiners and the wider scientific community regard plagiarism as a serious offence.** Where you refer to the work of others (in text or figures), make sure that the original source is fully acknowledged. If you shared a project with another student, you must explicitly acknowledge the relative contributions of each student to all data presented.

5. Submitting your Research Project Report

The deadline for submitting your Research Project Report will be confirmed by the Senior Examiner closer to the time. (It is *likely* to be noon on the first Friday of Easter Term.) You must submit your Research Project Report via the Part II Pharmacology Moodle as a single PDF. This copy may be subject to scrutiny for plagiarism. Your supervisor would probably also appreciate an electronic copy.

6. Project presentations

You will present your Research Project to the Part II examiners. Talks must be presented as PowerPoint presentations. Students who have worked in pairs must present independent talks. In previous years, the maximum time limit for presentations has been 10 minutes. The Senior Examiner will confirm the details for this year during Lent Term.

Everyone has their own approach to presenting. However, the following general advice usually works well: Keep your slides simple and uncluttered. Provide a brief background, dwell on the details of methods only if they are novel or the focus of your work, show your key results and interpret them in the context of the literature, and try to finish with a single sentence summary of the take-home message. Try to present without using any written notes. Reading from a prepared script is strongly discouraged.

Dissertations (*BBS only*)

1. Choosing your dissertation title

You will select a dissertation title from lists provided by Pharmacology and your Minor Subject. Most students choose a title from the pharmacology list. Details will be circulated in the Michaelmas Term. Prospective supervisors will be available to discuss titles before you make the final decision. As most staff supervise only 1 or 2 dissertation students, you are not guaranteed to get your first choice of title, but there are more titles on offer than students doing the BBS course. The BBS class are expected to meet to decide the final allocation of students to dissertation titles in a fair manner. Once the allocation is decided, you are required to have a form signed by your supervisor agreeing the title of your dissertation and to then submit this form by a published deadline (it is *likely* to be 4pm on the middle Friday of Michaelmas Term). You require formal permission if you later decide to change the title of your project, and the appropriate form must be completed before the last Friday of Lent Term.

2. Researching your Dissertation

The dissertation provides an opportunity to explore a topic in depth, which requires that you adopt a suitable focus: too broad and you are unlikely to engage effectively with the primary literature; too narrow and you are unlikely to see the bigger picture. Your supervisor will help you with this. Your first meeting should be before you go down at the end of Michaelmas Term to get some guidance on initial reading, etc. and to agree on the focus of your dissertation. You can expect to receive a maximum of **four** supervisions with your dissertation supervisor. You are expected to meet with your supervisor at least twice during the preparation of your dissertation. Your dissertation supervisor will provide your College with a report at the end of the Lent Term. The final supervision should be after the supervisor has read a draft of your dissertation to allow suggestions for improvements. The supervisor will not read the final version or more than one preliminary version of the dissertation.

You should aim, through reading and discussions with supervisor and others, to provide an extended and balanced review of your field that identifies controversies and gaps in knowledge. Do not be afraid of suggesting your own interpretations.

3. Preparing your Dissertation

The regulations governing submission of BBS dissertations are laid down by the Faculty (https://www.biology.cam.ac.uk/undergrads/nst/bbs/dissertations).

Your supervisor is allowed to read and comment on only one draft of the complete dissertation; they will not comment further on the final draft.

Dissertation requirements

- **Maximum length**: 6,000 words, excluding cover sheet, title page, summary, appendices, contents page, tables (and table legends), figures (and figure legends), footnotes, bibliography and acknowledgements. Note that in-text citations (see 'References', below) are counted as part of the 6,000 words.
- **Format**: Dissertations must be typed, **double-spaced, and single-sided** on A4 paper with 2.5cm margins. Your Dissertations must be permanently soft-bound using comb-binding or

wire binding. The font size should be no greater than 12pt and no smaller than 10pt.

- **Cover page**: The first page must be a cover page, which can be downloaded (http://www.bio.cam.ac.uk/sbs/facbiol/bbs/dissertations.html). It must include: the approved title, your full name and college, word count, a signed declaration that it is your original work and has not previously been submitted for a similar purpose, a statement that the dissertation is submitted in partial fulfillment of the regulations for NST Part II BBS, and the date. Electronic copies do not need a cover page.

  The cover page should be loosely bound to the dissertation.

- **Title page**: Immediately after the cover page you should include a title page, with the title of your dissertation, name of your supervisor, the word count and your examination number. (You should ask your college for your examination number.) **Do not include your name of the title page.**

- **Summary**: The dissertation must begin with a summary of no more than 300 words.

- **Main text**: Your dissertation should be written in a scientific style, with appropriate sub-sections and with the evidence supported by references that you have read. It is not acceptable to cite references that you have not read. Write concisely (and then shorten it!). The examiners are looking for clear, concisely written and well-argued dissertations. Do make full use of figures that you develop yourself. Consider carefully whether any abbreviations help. Lists of cryptic abbreviations can be a barrier to understanding for readers from outside your immediate field. Further advice can be found at https://www.biology.cam.ac.uk/undergrads/nst/bbs/dissertations

- **References**: A variety of software is available to allow you to manage references. Examples of free software that students have previously found useful are Zotero, Mendeley or Endnote Web. See http://www.lib.cam.ac.uk/toolbox/rmt.html for more details.

  References should be formatted in the 'Harvard' style, also known as 'Author-date'. In the main text, references are given as '(Vane, 1971)', or 'Vane (1971) showed that…'. These in-text citations count in the word limit. In the bibliography, references are arranged in alphabetical order of surname of the first author, in the form:

  > Vane JR (1971). Inhibition of prostaglandin synthesis as a mechanism of action for aspirin-like drugs. Nat New Biol 231: 232-235.

  This is described in detail in the Author Guidelines for the *British Journal of Pharmacology*, available online here: http://bpspubs.onlinelibrary.wiley.com/hub/journal/10.1111/(ISSN)1476-5381/about/author-guidelines.html. This bibliography is not included in the word limit.

Plagiarism is the inadequately acknowledged citation of the work of others. Both examiners, and the general scientific community, regard plagiarism as a serious offence. Where you refer to the work of others (in text or figures), make sure that the original source is fully acknowledged. The electronic version of your dissertation may be run through plagiarism-detection software. Further guidance on plagiarism is provided below and in the Faculty Board's statement on plagiarism (https://www.biology.cam.ac.uk/exams/AllExams/plagiarism).

4. Submitting your Dissertation

Full instructions will appear on this website during Lent Term (https://www.biology.cam.ac.uk/undergrads/nst/bbs/dissertations). You must submit 2 electronic copies – one copy via the BBS Moodle page and a separate copy via the Part II Pharmacology Moodle page. Your supervisor might also appreciate a copy. Your dissertation may be subject to scrutiny for plagiarism.

Details of these arrangements will be circulated by the Senior Examiner. The deadline for submission of your dissertation is *likely* to be noon on the first Friday of Easter Term. Neither the Senior Examiner nor the Course Organiser is authorised to extend this deadline. If you experience difficulties meeting the deadline, consult your college tutor. Otherwise, you will receive no marks for your dissertation if it is received after the deadline.

5. Presenting your dissertation

You will present your dissertation to the Department and your Part II colleagues. You will have an opportunity to explain why the dissertation is important and interesting, the most exciting new research you have discovered, and to put forward your own ideas. The format will be based on the popular '3-*minute thesis*' approach. Each student is allowed no more than **3 minutes** to present. You may use a single, static Powerpoint slide, which will be uploaded in advance. No slide transitions, animations or 'movement' of any description are permitted. Your slide must be present from the beginning of your talk. No other props are allowed. Reading from a prepared script is strongly discouraged.

EXAMINATIONS

Written exam papers (May – June)

There are 4 written papers in Pharmacology All 4 papers are taken by all candidates from BBS and Part II Pharmacology. The format of written exam papers has changed this year. Specimen papers are available via Moodle. For reference, past papers are also available via Moodle.

Papers 1, 2 and **3** last 3 hours each. You will be expected to answer 3 questions from a choice of at least 6. The examiners are not required to provide questions on every lecture course. You are, therefore, strongly advised to avoid being too selective in the choice of topics you revise for examinations.

Credit will be given for answers that go beyond straightforward recall of lectures and which successfully integrate materials from the literature and from different lecture series. The marking criteria used by examiners (see below) illustrate the importance attached to this aspect.

For Part II Pharmacology, Papers 1-3 each contribute 20% of the total mark. Paper 4 contributes 10% of the total mark, and the Drug Review contributes 10%. The research project contributes 20 % of the total mark, and comprises marks for the report and presentation.

For BBS students, the four examination papers in Pharmacology (papers 1-4) contribute 64 % of the marks, the minor subject contributes 16 % of the marks and the dissertation contributes 20 % of the marks. Note that BBS students do not submit a Drug Review.

The examiners may also invite candidates from **either** course for an additional oral examination on any part of the course, although in recent years BBS candidates have not usually been summoned for an additional viva. The Senior Examiner will inform you in the Easter Term of the dates for oral examinations, but you will get very short notice (by e-mail) of whether you are required to attend an oral examination. You should keep the dates free until advised that you are not required to attend an oral exam. ***You must ensure that you will be available should the examiners request your attendance at a viva.***

Any questions about the written exams or vivas should be addressed to the Senior Examiner, Dr Robert Henderson (rmh1003)
***not* the Course Organiser.**

Guidelines used by examiners to mark examination essays in Part II Pharmacology

It is normal practice for answers to essay questions in Part II examinations to be read by two people, who are likely to differ in the extent of their expertise in the field covered by the question. A good answer will aim to address the needs of both types of reader. Thus, as well as addressing (often necessarily selectively) details of recent relevant research, it will also set the subject matter in its broader context, giving appropriate consideration to the significance and historical development of the subject matter.

Class	Description
First	Work, which is excellent both in the range and command of the material covered and in the argument and analysis. Work that is excellent in its understanding of the subject; that has engaged closely with the question; that has shown some originality and treated the evidence critically; that brings in relevant material from an appropriate range of sources; and that is well-planned and complete. A first class mark may be awarded on more than one set of criteria: there may be a great deal of relevant information, displaying substantial knowledge and understanding; the arguments and presentation may be stylish; the approach may be original, critical or unorthodox. An upper first would be an outstanding performance, meeting all, or virtually all, of these criteria. A low first would meet at least some of these criteria.
Upper Second	Work that shows a good broad-based knowledge of the topic and the lecture material; that is presented in an organised way; and clearly argued and focused on the set question. Answers at the top end of this class would often include material from outside the taught material and where relevant, from different lecture courses and would include some attempt to treat the evidence critically and to synthesise arguments. Answers at the lower end of this class would be competent, accurate in reproducing lecture material and show evidence of reading of the principal sources of published work on the subject.
Lower Second	Work that overall shows a reasonable competence in the understanding and presentation of the relevant material. Answers at the top end of this class would show competent understanding of the basic lecture material or reasonable organisation and focus; an answer at the lower end would show gaps in understanding and coverage together with poor organisation and focus. Certain types of uneven work would fall into this class; detailed factually-correct work that did not relate a broad knowledge of the topic to the specific question asked, or work with clear organisation and some insight but with serious omissions of factual knowledge.
Third	At the upper end of the class, work that just shows competent knowledge of the basic, core material. At the lower end of the class, work that shows some knowledge of the material but with serious deficiencies in understanding, coverage and organisation. This will include work that is unduly brief or largely misses the point of the question.
Fail	Work that is irrelevant, shows a considerable degree of ignorance or is short and superficial. Where the question is barely attempted.

Plagiarism

Lecturers and examiners take plagiarism extremely seriously: **it will not be tolerated**. Future employers are likely also to regard plagiarism as evidence of untrustworthiness.

The following guidance has been issued by the Faculty Board of Biology (https://www.biology.cam.ac.uk/exams/AllExams/plagiarism):

As agreed by the General Board: **"Plagiarism is defined as submitting as one's own work, irrespective of intent to deceive, that which derives in part or in its entirety from the work of others without due acknowledgement; or, in the case of self-plagiarism, unless explicitly permitted by regulation, submitting one's own work that has already been submitted for assessment to satisfy the requirements of any other academic qualification, or submitted for publication without due acknowledgement. It is both poor scholarship and a breach of academic integrity."**

Such use of unfair means will not be tolerated by the University; if detected, the penalty may be severe and may lead to disciplinary proceedings being taken against you.

1. The scope of plagiarism

Plagiarism is defined as submitting as one's own work, irrespective of intent to deceive, that which derives in part or in its entirety from the work of others without due acknowledgement.

Examples of plagiarism include **copying** (using another person's language and/or ideas as if they are a candidate's own), by:

- **quoting verbatim** another person's work without due acknowledgement of the source;
- **paraphrasing** another person's work by changing some of the words, or the order of the words, without due acknowledgement of the source;
- **using ideas** taken from someone else without reference to the originator;
- **cutting and pasting** from the Internet to make a pastiche of online sources;
- **submitting someone else's work** as part of a candidate's own without identifying clearly who did the work. For example, buying or commissioning work via professional agencies such as 'essay banks' or 'paper mills', or not attributing research contributed by others to a joint project.

Plagiarism might also arise from **colluding** with another person, including another candidate, other than as permitted for joint project work (i.e. where collaboration is concealed or has been forbidden). A candidate should include a general acknowledgement where he or she has received substantial help, for example with the language and style of a piece of written work.

Plagiarism can occur in respect to all types of sources and media:

- text, illustrations, musical quotations, mathematical derivations, computer code, etc;
- material downloaded from websites or drawn from manuscripts or other media;
- published and unpublished material, including lecture handouts and other students' work.

Acceptable means of acknowledging the work of others (by referencing, in footnotes, or otherwise) vary according to the subject matter and mode of assessment. Faculties or Departments should issue written guidance on the relevant scholarly conventions for submitted work, and also make it clear to candidates what level of acknowledgement might be expected in written examinations. Candidates are required to familiarize themselves with this guidance, to follow it in all work submitted for assessment, and may be required to sign a declaration to that effect. If a candidate has any outstanding queries, clarification should be sought from her or his Director of Studies, Course Director or Supervisor as appropriate.

Self-plagiarism is defined as submitting one's own work, that has already been submitted for assessment, to satisfy the requirements of any other academic qualification or submitted for publication without due acknowledgement.

Examples of self-plagiarism include:

- writing an essay twice or more for a single set of exams;
- writing the same essay, or a substantial part of an essay, twice in the same exam;
- memorising substantial blocks of text and reproducing them more than once as the whole or as parts of an answer in an exam.

Failure to conform to the expected standards of scholarship (e.g. by not referencing sources) in examinations may affect the mark given to the candidate's work. In addition, suspected cases of the use of unfair means (of which plagiarism is one form) will be investigated and may be brought to one of the University's Courts. The Courts have wide powers to discipline those found guilty of using unfair means in an examination, including depriving such persons of membership of the University, and deprivation of a degree.

2. How to avoid plagiarism

The stylistic conventions for different subjects vary and you should consult your Course Organiser or project supervisor about the conventions pertaining in your particular subject area. Most courses will issue written guidance on the relevant scholarly conventions and you are expected to have read and to follow this advice. However, the main points that apply to submitted work (e.g. dissertations, project reports) are:

- when presenting the views and work of others, include in the text an indication of the source of the material, e.g. 'as Sharpe (1993) has shown,' and give the full details of the work quoted in your bibliography;
- if you quote text verbatim, place the sentence in inverted commas and give the appropriate reference, e.g. 'The elk is of necessity less graceful than the gazelle' (Thompson, 1942, p 46) and give the full details in your bibliography as above;
- if you wish to set out the work of another at length so that you can produce a counter-argument, set the quoted text apart from your own text (eg by indenting a paragraph) and identify it by using inverted commas and adding a reference as above. NB long quotations may infringe copyright, which exists for the life of the author plus 70 years.

- if you are copying text, keep a note of the author and the reference as you go along, with the copied text, so that you will not mistakenly think the material to be your own work when you come back to it in a few weeks' time;
- if you reproduce an illustration or include someone else's data in a graph include the reference to the original work in the legend, eg (figure redrawn from Webb, 1976) or (triangles = data from Webb, 1976);
- if you wish to **collaborate** with another person on your project, you should check with the Course Organiser to see whether this might be allowed and then seek their permission;
- if you have been **authorised to work together** with another candidate or other researchers, you must acknowledge their contribution fully in your introductory section. If there is likely to be any doubt as to who contributed which parts of the work, you should make this clear in the text wherever necessary, e.g. 'I am grateful to A. Smith for analysing the sodium content of these samples';
- be especially careful if **cutting and pasting** work from electronic media; do not fail to attribute the work to its source. If authorship of the electronic source is not given, ask yourself whether it is worth copying;
- don't memorise substantial blocks of text in lieu of essay answers;
- tailor your answer to the question being asked.

Please note that during written answers for unseen examination papers, you will not be penalised for failures to reference information in this manner.

3. The Golden Rule:

> **The examiners must be in no doubt as to which parts of your work are your own original work and which are the rightful property of someone else.**

*For the University-wide statement on plagiarism, and further information on the topic, please click here (*https://www.plagiarism.admin.cam.ac.uk/)

Exam Review Procedure

The University has robust policies in place to ensure that examination results are accurate. However, there may be circumstances where something unusual happens during the examination and you want it taken into account. The University has procedures in place to deal with this possibility. Please see: http://www.studentcomplaints.admin.cam.ac.uk/examination-reviews for further details. This includes what to do if something goes wrong during the examination process, or if your personal circumstances affected your exam.

Students are strongly urged to seek advice from their College Tutor (or relevant departmental staff). Students can also receive free independent advice regarding any University procedure from the Students' Unions' Advice Service at www.studentadvice.cam.ac.uk.

WORKING IN THE DEPARTMENT

Who's Who: Staff and their responsibilities

You can find out more about staff, their research interests and contact details from our web site (www.phar.cam.ac.uk). Some staff also have specific responsibilities related to the Part II course:

Dr David Bulmer (dcb53)	Course Organiser	All issues relating to Part II course (except those listed below)
Dr Robert Henderson (rmh1003)	Senior Examiner, Part II	All issues relating to Part II exams
Mr Abbi Abbioui (aa275)	Computer Officer	Computing
Mr Barney Leeke (bdjl2)	Principal Technician & Safety Officer	Health & safety. Communal equipment
Dr Taufiq Rahman (mtur2)	Graduate Admissions	Graduate studies, PhD applications
Ms Amparo Saez (pharsect@hermes.cam.ac.uk)	Secretary	Room bookings. Administrative matters
Mrs Tracey Theobald-Greaves (tlg20)	Accounts Manager	Ordering, stores, photocopying charges
Thury Agustsdottir (ta421)	Departmental Administrator	Welfare. Dignity at work.

Access and Security

Your university card provides 24-hour **access** to the Department (*via* front or back doors). If you are in the Department outside normal working hours (Monday-Friday, 8am-6pm), you must sign the book at the back door when you arrive and depart. This is to provide emergency services and security staff with the information they need in case of an emergency. You **must not** work unsupervised in labs outside working hours.

Everyone is responsible for Departmental **security**. Do not allow others into the Department outside working hours and please make sure that the door locks behind you when you arrive and leave. The latter is particularly important when it is windy (check the back door has not blown open as you leave). It is advisable to lock doors to labs/offices if you will be out of the room for more than a few minutes. Contact security (01223 767444) immediately if you suspect unauthorised staff may have entered the building.

Computing

The Department has a domain called PHAR on which all Part II Students are allocated resources and printing.

IT support is available from Monday to Friday 9 am to 4 pm. If you have any IT-related issues, please refer to the TechNet area of the pharmacology website (https://www.phar.cam.ac.uk/intranet/technet)

before you contact IT staff for assistance. If you report a problem, please state the number of the machine. If you have any problem with the machines or printers, send an email to: pharit@hermes.cam.ac.uk.

Login to PHAR domain: Enter your username, which should be in the form of your University CRSiD (e.g., aa123). You will be issued a temporary password at the start of term, which you are required to change. To change your password at first login, you will be prompted to enter a new one, retype it and click OK (password must be more than 8 characters, mixed alpha-numeric, capital and lowercase). Even if you are not planning to use the IT resources of the department you MUST change your password, otherwise your account could be used by someone else.

Data storage: The University UIS offers three third-party cloud-based data storage services that you can associate with your @cam email address: OneDrive, GoogleDrive, and DropBox. Only you can access your storage account with your Raven/UIS login, but you can share your data with others whilst keeping the remaining data private.

Please note that we do not recommend or endorse any one of these cloud storage drives. You need to read the information provided by UIS and make your own decision:

https://help.uis.cam.ac.uk/service/supporting-research/servers-data-storage-and-backup/data-storage/individual-storage/storage-for-individuals

Printing We use DS-Print and printers are automatically installed for your user accounts. Please print to Phar_FindMe. Printing Credit can be purchased in multiples of £5 or £10 from the Account Office. Also, you can install the Phar_FindMe printers on your laptop. More information can be found here: https://www.phar.cam.ac.uk/intranet/technet/dsprint

Email You should only use the preferred university webmail: https://webmail.hermes.cam.ac.uk/ or use **Exchange Outlook** Online https://help.uis.cam.ac.uk/service/email-telephony-and-collaboration/exchange-online/hermes-migration-advice. You are listed on the following Phar domain email list: phar-partii@lists.cam.ac.uk this will send a message to all pharmacology Part II students and the Part II Course Organiser. Please use this list responsibly: it is a nuisance to all users to receive unwanted circulars.

Electronic journals All computers in the library are connected to the University Library Electronic Journals database from www.lib.cam.ac.uk, which includes ScienceDirect titles. There is no need to get a new user id and password for Athens accounts, use your raven credentials.

Card access Problems with card access should be reported immediately to phar-account@lists.cam.ac.uk , especially if you lose your card. You must contact your college directly for any card renewal.

Moodle All Pharmacology resources/courses are published here: https://www.vle.cam.ac.uk/login/index.php . Moodle uses Raven to verify users. All University members should have a Raven account, if not visit this page: http://www.cam.ac.uk/cs/docs/faq/n5.html .

Photos You will be given an electronic copy of a colour photo that includes all pharmacology Part II students. The photo is also needed for safety and security reasons.

Rules governing use of computing facilities

- The following rules, designed to ensure effective operation of the department's computing facilities, apply to all users. Breaches of the rules are taken seriously and can lead ultimately to offenders being denied use of university computing facilities.
- No equipment may be connected into any network or other facility of the department without prior written agreement from the Computer Officer. This includes setting up or connecting to wireless networks, VPNs or proxies in the Department.
- Users must not watch on-demand TV, listen to Internet radio, or use YouTube, iPlayer, etc or similar applications and sites.
- Downloading and installing unlicensed or freeware software is forbidden unless authorized by the Computer Officer. Using applications to download and share copyrighted materials or play computer games are not permitted.
- Users must adhere to the terms and conditions of all licence agreements, including software, equipment, services, documentation and other goods. Users must not load any software onto the computer facilities without permission from the Computer Officer.
- Users must not deliberately introduce any virus, worm, Trojan horse or other harmful or nuisance programs or files into any computing facility. Users must not take deliberate action to circumvent precautions taken or prescribed by the department to prevent installation of such nuisance programs,
- Users must not read, copy, delete or amend the data or data structures of other users without their permission.
- Users must not use another user's ID or password, nor communicate any password to another person. Users must take reasonable precautions to avoid discovery of their password by others. Do not leave computing facilities unattended when you are logged in and so potentially useable by others.
- The creation, display, production or circulation of illegal or offensive material is forbidden.
- Smoking, eating or drinking in computing facilities is forbidden. NO MOBILE PHONES.
- Users must conduct themselves in a quiet and orderly manner when using computing facilities.
- Users' data and software are subject to published procedures for their removal or archiving after specified periods.
- Users' printouts and other outputs will be disposed of after published periods if not collected.
- Please co-operate with the Computer Officer in keeping the computing facilities tidy. Remove outputs and papers from computing facilities and dispose of unwanted items.

Details of the rules on the computing facilities can be found here:

http://www.cam.ac.uk/cs/itsyndicate/

https://www.phar.cam.ac.uk/intranet/technet/rules;

http://www.admin.cam.ac.uk/offices/personnel/policy/computer.html

Health and safety

You will be given specific instructions relating to Covid-19 at the start of the course. These instructions may change to reflect changes in Government and University guidance.

There is a lot of information in this section, and some of it may become relevant only when you begin lab work, but **read it now** (and again later!). Your safety and that of your colleagues may depend upon you knowing how to deal with emergencies. There is also a legal responsibility, imposed upon you and staff of the department, to ensure that all activities comply with Health and Safety legislation. If you have any concerns about safety matters, please bring them to the immediate attention of your supervisor or the department's safety officer, Mr Barney Leeke (Room 401, Tel 34031).

The department is currently completing a major refurbishment, so builders and plant are moving around the site. Some areas are also off limits (and clearly marked as such), so take extra care when in and around the building, obey site signage and look out for email notifications of specific disruption.

When working in laboratories, you must never work unsupervised and you must be familiar with the risk assessment describing any procedures you use. Before you start work, familiarise yourself with the locations of fire extinguishers, fire blankets, fire alarms, circuit breakers, and any additional safety items described in your risk assessments.

Some of you will complete projects in other departments. You should make sure that your supervisor provides all the local safety information relating to that department.

In the event of an accident, however minor, call for help immediately.

- Spills should be contained if possible.
- Electricity should be isolated where possible, but without endangering yourself.
- Fires should be tackled only if the risk is low. In all cases, sound the alarm immediately. Close doors and windows if possible.
- A list of emergency numbers is displayed by each phone. Call for help if needed.

It is a legal requirement to report all accidents in the workplace, however minor. You must advise your supervisor or the safety officer immediately of any accident. **Risk assessments** must be completed for all laboratory work. You must see copies of these risk assessments before starting any procedure. You should sign the assessment to show you have read it. If you are not shown risk assessments, ask for them. If any aspect of a risk assessment is unclear, ask for clarification before you start work. Risk assessments identify the main hazards of a task, how these are controlled, any residual risk and what to do if an accident occurs. You must comply with all control measures in a risk assessment (e.g. the use of personal protective equipment, shielding, fume extraction etc.).

Hazards are common to all labs and cannot be considered 'clean' areas. You must always:

- Wear a lab coat and safety glasses: your lab will provide these.
- Tie back long hair
- Do not wear open sandals
- Refrain from eating, drinking or applying cosmetics

- Never store food or discard food wrappings within a lab (or lab facilities such as cold rooms)

The **fire alarm** is a continuous buzzer. If it sounds, leave the lab and follow instructions to assemble in front of the Judge Institute. There is a test on Thursdays at 8.30am; you do not need to respond to this unless it continues for more than about 30s.

Emergency numbers are displayed by each phone. It is worth putting some of these and the University Security Section number (01223 767444) in your mobile phone for quick reference.

There are many **specific hazards** in the department, including animal allergens, centrifuges, hazardous chemicals, lasers and UV light sources. If your work exposes you to any of these hazards, you must be familiar with the risk assessment. Do not expose yourself to any of these hazards without training and familiarity with the risk assessment. To avoid the possibility of becoming trapped in a cold room, use them only during working hours and leave the door slightly ajar for short visits.

The **Personal protective equipment (PPE)** required will be described in the risk assessment. It should be provided by the lab in which you are working, but it can also be obtained from the Teaching Lab or the departmental safety officer.

- **Lab coats** and **safety glasses** must be worn at all times in laboratories. Lab coats should be removed when leaving the lab, unless they are needed to provide protection when moving materials between research areas. They must never be worn in the toilets or Tea Room. Lab coats must be laundered regularly: your host lab will advise on arrangements. In some cases (e.g. when handling liquid nitrogen or pathogens), additional protection may be required: this will be described in the risk assessment.

- **Gloves** may be worn as required and must be used when required by the risk assessment. One hand must be un-gloved when moving around the department to prevent contamination. In the unlikely event of an allergic reaction to gloves, please consult the safety officer. There are specific gloves for handling hot or cold materials.

- In addition to the safety glasses used for routine lab work, full-face shields must be worn for UV light sources (UV-blocking), liquid nitrogen and other operations where the danger is to the whole face. Good handling techniques, such as opening vials away from you, and shielding should also be used to minimise risk of eye injuries.

Waste disposal guidelines are found on posters in every lab. Many of these rules are imposed by legislation. Seek advice from your supervisor if you are unsure of the correct route for waste disposal. Additional rules (and recording procedures) apply for radioactive and bioactive waste.

This guide is not comprehensive. Your host laboratory should provide all the additional information and training you need to work safely in the laboratory. Do not be afraid to ask for advice and/or clarification. The Intranet section of our web pages provides additional information. The safety officer, Barney Leeke (Rm 401), is available to answer any queries relating to safety. He will give a presentation on laboratory safety in the preparing for projects session (see timetable). **Attendance is compulsory** for all students undertaking a laboratory-based research project.

Environmental Sustainability

The University of Cambridge has an Environmental Sustainability Vision, Policy and Strategy setting out the University's commitment to achieving outstanding environmental sustainability performance. Every member of the University, staff and student, is asked to play their role in helping to achieve this vision. The following tips give some suggestions for how you can help.

General tips

- **Waste and recycling** – most of our rubbish can be recycled. Polystyrene is the key exception but we are working on this. Look out for posters on or near to bins for guidance.
- **Travel** – walk, cycle, or take the University-subsidised Universal bus to get around the city.
- **Food and drink** – get a KeepCup and try the more sustainable options in University cafés.
- **Energy** – dress appropriately for the season and switch off lights and equipment when not in use.
- **Water** – don't leave taps running, and report any dripping taps.
- **Get more involved** – become a sustainability leader and help take things to the next level.

Energy

- *The University spends £16 million on energy each year.*
- The University has adopted a Science Based Target to reduce its energy-related (scope 1 and 2) carbon emissions to absolute zero by 2048.
- We can all contribute to meeting this target through some simple steps – such as switching off lights and equipment when they are not being used. *A single light left on overnight over a year accounts for as much greenhouse gas as a car driving from Cambridge to Paris.*
- Always dress appropriately for the season to reduce the need for additional heat or cooling.
- Where possible, use the stairs rather than the lift.

Food and drink

- You can buy a KeepCup in most of the University cafés. They reduce use of disposable cups, and give you a saving each time you buy a hot drink.
- University cafés have a range of sustainable options (why not try the vegan option? Did you know the biggest impact individuals can make around food is reducing meat and dairy intake).
- All of the University cafés' disposable packaging (Vegware), as well as any food waste, can be recycled in food waste bins.

Waste and recycling

- *The University's waste from a single year weighs as much as the London Eye.*
- The University has targets to:
  - Recycle at least 95% of its total waste by 2016.
  - Send no non-hazardous waste to landfill by 2020.
- There are separate recycling facilities for:
  - Food waste / Glass / Mixed recycling (paper, cardboard, plastic bottles, plastic containers, cartons, plastic wrapping, cans and tins) / Batteries / Printer cartridges
- Look for the posters on or near the bins which say what should be placed in each. If bins do not have posters, please let your Department's Environment and Energy Coordinator, Green Impact team or facilities staff know.
- There are recycling points located throughout the department usually at key points in the corridors. Pens etc. are recycled by the pigeon holes, batteries at Goods In near the back door
- If you are unsure of which bin to use, please ask Barney Leeke
- *Reducing* and *reusing* allows us to decrease the amount of waste that will need to be recycled.
- Reduce:
  - print double sided, and only print where needed
  - share equipment wherever possible
- Reuse:
  - avoid disposable cups by using a KeepCup, mug or refillable bottle
  - donate unwanted books and other items to charity (some Colleges participate in the British Heart Foundation 'Pack for Good' campaign, where you can donate unwanted items to BHF. Ask in your College where you can find your nearest collection point).
- Most things can be recycled but key exceptions are paper towels/tissue paper and polystyrene (they need to go in the general waste bin NOT recycling).
- Most plastics can be recycled so if in doubt, put plastics in the recycling bin.

Water

- *The University spends £0.7 million per year on water.*
- The University is committed to a 20% reduction in water use by 2020.
- Cambridge is in one of the driest areas of the country so saving water is particularly important here.
- Help save water by not leaving taps running.
- If you see a leak or a drip, report it to Paul Coulson (pdc41@cam.ac.uk)

Get more involved

- Keep up-to-date with news and opportunities by subscribing to the Greenlines newsletter.
- Visit the Environment and Energy Section's student webpage to find out more about projects including Green Impact and the Living Laboratory for Sustainability.
- Email environment@admin.cam.ac.uk with any questions or to find out more about any particular opportunity.
- Contact your Environment and Energy Coordinator Barney Leeke to find out what opportunities there are to get involved in the Department, and to pass on your ideas for how the Department could be more sustainable.
- Opportunities include paid internships, support running your own environmental project, and Institute of Environmental Management and Assessment (IEMA) accredited auditor training and experience through Green Impact.

PHARMACOLOGY AS A CAREER

Postgraduate studies

You may be considering postgraduate research (for a PhD or Masters) alone or in combination with clinical training. It is a good idea to make informal enquiries with potential supervisors (here or elsewhere) as soon as possible: some departments will have their applications procedures well underway by Christmas. Anyone interested in studying for a PhD in this Department should examine the list of research interests on the Department web site, and contact Dr Rahman (mtur2@cam.ac.uk), who organises all graduate admissions, as soon as possible. The sooner you make contact, the wider the range of possible sources of funding that are available. Details of PhD opportunities elsewhere are posted on a notice board on Level 1.

The Department is very happy to support applications to the British Pharmacological Society for their prestigious A. J. Clark studentship (https://www.bps.ac.uk/membership-awards/prizes,-awards-and-grants/our-prizes/aj-clark-studentship). You should note that the deadline for this is very early (31st October 2018) and the application fairly long, so you should contact a potential supervisor immediately if you are interested.

Members of the Department offer rotation projects as part of several 4-year PhD programmes or Doctoral Training Programmes (DTPs), including those funded by the BBSRC (https://bbsrcdtp.lifesci.cam.ac.uk/), MRC (https://mrcdtp.medschl.cam.ac.uk/) and British Heart Foundation (https://www.cardiovascular.cam.ac.uk/students/prospective/phd-bhfcardio), among others.

British Pharmacological Society

The British Pharmacological Society (BPS) is the society to which almost every British pharmacologist subscribes. Associate Undergraduate Student Membership is available to undergraduates working on a pharmacological topic and to medical students until the completion of their degree. You are all entitled to FREE membership of BPS during your Part II course in pharmacology. But you need to sign-up. It's straightforward to apply from the BPS web site (http://www.bps.ac.uk). The benefits include:

- free or discounted rates at BPS scientific meeting
- free access to the full online versions of the *British Journal of Pharmacology* and *British Journal of Clinical Pharmacology*
- bursaries and travel grants to attend meetings in the UK and overseas
- network with scientists across a range of age and experience at our Connected Community website
- free print versions of *Pharmacology Matters*, the BPS magazine
- opportunities to contribute to advancing pharmacology, across a range of activities, through the Society's committees, special interest groups and working parties
- join the Clinical Section**,** bridging the gap between the medical profession, clinical research and the pharmaceutical industry