A close-up of a logo

Description automatically generated with low confidence

*PA4005- Molecular Pharmacology*

*Course Handbook 2023-2024*



*Undergraduate Medical Sciences*

*School of Medicine, Medical Sciences & Nutrition*

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Course Summary

This course is concerned with the pharmacology of receptors and drug discovery. It deals with the criteria that should be used to characterize and classify drugs and receptors. Receptor effector systems are also examined in depth. Theory is supplemented throughout by practical exercises involving data handling and interpretation and the presentation of information by students.

Course Co-ordinator: Dr James Hislop (james.hislop@abdn.ac.uk), IMS, Foresterhill.

Course Aims & Learning Outcomes

The purpose of this course is to cover in depth areas of molecular pharmacology that are particularly relevant to the discovery and characterization of receptors and their ligands. Theory is supplemented throughout by practical exercises both to improve understanding of the material covered and to develop important transferable skills.

Content will be delivered by in person lectures. Captioned recordings will be made available after each lecture. This content will be reinforced by in person tutorials. Additionally, there are 3 data analysis tutorials, and assessments consisting of an OSPE and a data analysis problem.

The detailed course objectives are:

1. To consider strategies for discovering new drugs

2. To consider strategies for characterizing pharmacological receptors

3. To gain a detailed understanding of receptor signal transduction processes.

4. To gain expertise in the use of computer software packages for the handling of the kind of data by which drugs or receptors are classified and in the interpretation of these data.

5. To gain expertise in selective reading and in the objective and critical interpretation of data and in the oral and written presentation of a hypothesis and its underlying evidence.

Course Teaching Staff

Course Co-ordinator:

Dr James Hislop (JH), Medicine, Medical Sciences and Nutrition (Course Co-ordinator)

Other Staff:

Dr Caroline Barelle (CB), Elasmogen

Dr Antonio Gonzalez-Sanchez (AG), Medicine, Medical Sciences and Nutrition

Dr Wael Houssen (WH), Medicine, Medical Sciences and Nutrition

Dr Nimesh Mody (NM), Medicine, Medical Sciences and Nutrition

Dr Fiona Murray (FM), Medicine, Medical Sciences and Nutrition

Professor Graeme Nixon (GFN), Medicine, Medical Sciences and Nutrition

Professor Derek Scott (DS), Medicine, Medical Sciences and Nutrition

Dr Sergiy Sylantyev (SS), Medicine, Medical Sciences and Nutrition

Dr Dawn Thompson (DT), Medicine, Medical Sciences and Nutrition

Professor Steve Tucker (ST), Medicine, Medical Sciences and Nutrition

Assessments & Examinations

(a) Continuous assessment - 30% of the total assessment will be based on the OSPE (15%) and data analysis assessment (15%) during the course

(b) Examination - This will take place in the summer diet, April/May. It will take the form of an essay-based examination, which will comprise 70% of the assessment for PA4005. The format will be a two-hour paper with a choice of 2 questions from a total of 4. All components of the course including the content of tutorials and presentations are examinable. All assessments (continuous and examined) will be made using the University Common Grading Scale (copy attached).

(c) Satisfactory performance - Students are expected to attend all elements of the course and to complete all class exercises. The minimum performance acceptable for the granting of a class certificate is attendance at 75% of the course and presentation of all course work.

# Class Representatives

We value students’ opinions in regard to enhancing the quality of teaching and its delivery; therefore, in conjunction with the Students’ Association we support the Class Representative system.

In the School of Medicine, Medical Sciences & Nutrition we operate a system of course representatives, who are elected from within each course. Any student registered within a course that wishes to represent a given group of students can stand for election as a class representative. You will be informed when the elections for class representative will take place.

What will it involve?

It will involve speaking to your fellow students about the course you represent. This can include any comments that they may have. You will attend a Staff-Student Liaison Committee and you should represent the views and concerns of the students within this meeting. As a representative, you will also be able to contribute to the agenda. You will then feedback to the students after this meeting with any actions that are being taken.

Training

Training for class representatives will be run by the Students Association. Training will take place within each half-session. For more information about the Class representative system visit [www.ausa.org.uk](http://www.ausa.org.uk) or email the VP Education & Employability [vped@abdn.ac.uk](mailto:vped@abdn.ac.uk) . Class representatives are also eligible to undertake the STAR (Students Taking Active Roles) Award with further information about this co-curricular award being available at: [www.abdn.ac.uk/careers](http://www.abdn.ac.uk/careers).

Problems with Coursework

If students have difficulties with any part of the course that they cannot cope with, alone they should notify the course coordinator immediately. If the problem relates to the subject matter general, advice would be to contact the member of staff who is teaching that part of the course. Students with registered disabilities should contact the medical sciences office, ([medsci@abdn.ac.uk](mailto:medsci@abdn.ac.uk)) (based in the Polwarth Building, Foresterhill) to ensure that the appropriate facilities have been made available. Otherwise, you are strongly encouraged to contact any of the following as you see appropriate:

* Course student representatives
* Course co-ordinator
* Convenor of the Medical Sciences Staff/Student Liaison Committee (Professor Gordon McEwan)
* Personal Tutor
* Medical Sciences Disabilities Co-ordinator (Dr Derryck Shewan)

All staff are based at Foresterhill and we strongly encourage the use of email or telephone the Medical Sciences Office. You may have a wasted journey travelling to Foresterhill only to find staff unavailable.

If a course has been completed and students are no longer on campus (i.e. work from second half session during the summer vacation), coursework will be kept until the end of Fresher’s Week, during the new academic year. After that point, unclaimed student work will be securely destroyed.

Course Reading List

The basics of Molecular Pharmacology are covered in the usual Pharmacology text books available in the library.

Rang & Dales Pharmacology. Ed. H.P.Rang, J.M.Ritter, R.J.Flower, G.Henderson

Netters Illustrated Pharmacology. Ed. R.B.Raffa, S.M.Rawls, E.Portyansky Beyzarov

As this is the final year, lectures will focus on more up-to-date aspects of pharmacological research, with specific focus on the research interests of the faculty. These are often not covered by general textbooks therefore students are required to rely more on primary sources for reading (e.g. review articles and peer-reviewed papers). Recommendations for advanced reading will be indicated by individual lecturers for their teaching sessions.

Lecture Synopsis

**Lecture 1: Introduction to PA4005 & Molecular Pharmacology Basics - Dr J Hislop**

This lecture will introduce the students to the course. It will also comprise a refresher lecture to reintroduce the concepts, types of analyses and terminology used by molecular pharmacologists, with focus on receptor pharmacology.

**Lecture 2**: This lecture will introduce the important G-protein-coupled Receptor (GPCR) class of membrane receptors, and their important role in cellular and physiological function. Heterotrimeric G proteins transduce signals from G protein-coupled receptors to effector proteins to modulate cellular function.  G protein signalling constitutes a fundamental mechanism of intercellular communication used by all eukaryotes.  This lecture aims to highlight the physiological role of the Gα proteins and describe recent advances in their function, regulation and downstream signalling. This lecture will describe the basics before providing more detail on activation mechanisms

**Lecture 3: GPCRs – Dimerization and Allosteric Modulation – Dr J Hislop**

This lecture will cover the concept of receptor dimerization in relation to GPCRs and its expanding role in both receptor function and as drug targets. This lecture will also go into detail about the important concept of allosteric modulation. Many receptors and ion channels contain allosteric binding sites. These are important drug targets. This lecture will introduce the concept and mechanisms of allosteric modulation.

**Lecture 4: GPCRs Desensitisation and Ligand Bias- Dr J Hislop**

How is GPCR signalling controlled? The mechanism of GPCR desensitisation will be discussed including the role of GRK and 2nd messenger kinases. This lecture will also introduce the molecule arrestin and its central role in both receptor desensitisation and novel aspects of G-protein independent signalling will be discussed (Ligand Bias).

**Lecture 5: GPCR Trafficking - Dr J Hislop**

**What are the control mechanisms and cellular events that control and maintain receptor expression? This lecture discusses the cellular mechanisms responsible for GPCR internalisation and recycling/downregulation, focussing the functional importance of these processes.**

**Lecture 6: Gs Signalling and Compartmentalisation of cAMP - Dr F Murray**

The Gs heterotrimeric G proteins transduce signals from G protein-coupled receptors to increase intracellular levels of cAMP. This lecture will cover the molecular aspects by which the level of this critical second messenger is controlled to maintain fidelity of signalling. The lecture will also discuss the importance of signalling components that tightly control the level of cAMP and those that help to generate spatially discrete signalling complexes

**Lecture 7: The Role of cAMP Signalling in Disease - Dr F Murray**

The lecture will discuss the importance of cyclic AMP in the physiological progression of a number of disease states, including hypertension.

**Lecture 8: Pharmacogenomics – Dr F Murray**

Why do some drugs seem to work in certain individuals and not in others? One reason for interindividual variability in drug response is pharmacogenomics. The lecture will review data regarding the genetic variation of G protein-coupled receptor dependent signalling pathways and their biochemical consequences.

**Lecture 9: Molecular Biology of Psychostimulant Drugs – Dr D Thompson**

This lecture will build on the concepts of GPCR function from lectures 1-4 and giving examples of how molecular changes impact on the whole animal. Specifically, the focus will be on the dopamine receptor family and how differential trafficking dictates the physiological response to psychostimulants.

**Lecture 10 and Tutorial: Gastrointestinal Pharmacology - Prof D Scott**

This lecture will introduce the various targets for therapeutic molecules in the gastrointestinal tract. We will focus specifically on drugs used to treat peptic/duodenal ulcers and inflammatory bowel disease. The development of new drugs to treat these conditions has evolved immensely over the past 50 years, and they have generated large amounts of revenue for pharmaceutical companies. The classes of drugs summarised briefly will include antacids, H2 antagonists, proton pump inhibitors, ulcer triple therapy, laxatives, antidiarrhoeal agents, corticosteroids, immunosuppressants and aminosalicylates. Students will be issued with a case study on this topic, which they will revise in their own time and prepare for the tutorial session in week 10, where their answers will be presented.

**Lecture 11: Molecular Biology of Opioids – Dr J Hislop**

This lecture will give practical examples of some of the concepts described in Lectures 1-4. This will focus on how molecular changes in receptor interaction, trafficking and signalling may underlie the efficacy, use and abuse of opioids.

**Lecture 12-13: The Molecular Pharmacology of Voltage Gated Ion Channel Function – Dr A Gonzalez-Sanchez**

Ion channels are the molecular basis of cell excitability, facilitating numerous processes including signal transduction, muscle contraction, and synaptic transmission. This Lecture will demonstrate how the pharmacological manipulation of ion channel activity can induce functional changes in cell excitability.

**Lecture 14-15: Biologic and Antibody Therapy – Dr C Barelle, Elasmogen**

The inherent ability of monoclonal antibodies (mAbs) to specifically bind target and intervene in disease-related biological processes, whilst reducing off-site toxicity, makes them an effective, potent and now proven class of therapeutics. These clinical benefits are also reflected in their commercial value as they currently dominate the top ten revenue-generating drugs. The purpose of these two lectures is to i) illustrate the molecular mechanisms underlying the action of an approved mAb; ii) discuss the emerging world of immuno-oncology – combining the action of mAbs and our own immune systems and iii) explore the next generation of biologics – how can we improve on mAbs?

**Lecture 16 and 19: Molecular Pharmacology of Ligand Gated Ion Channels – Dr S Sylantyev**

Ligand-gated neuroreceptors are central to neuroscience. These lectures will cover their principles of functioning and role in nervous system. Detail will be given for Inhibitory and Excitatory ligand-gated receptors, their classification, ligands, action mechanisms and use as drug targets in therapy. Also covered will be the application of standard pharmacological approaches to assessment of effects and to modelling of action of the ligands of ligand-gated neuroreceptors. Limitations of such approaches due to specific action mechanism(s) and design of neuroactive drugs under these limitations.

**Lecture 17-18: Diabetes and Insulin Resistance: current therapies - Dr N Mody**

This set of lectures will cover the aetiology of diabetes mellitus (type 1 and type 2 DM), with particular emphasis on causes and consequences of T2DM, insulin action and defects in post-insulin receptor signalling pathway. The lectures will address insulin’s effects on regulation of whole body glucose homeostasis, 2 phases of insulin secretion, central and peripheral actions on carbohydrate and lipid metabolism. In depth analysis of up-to-date mouse genetic research as well as translational aspects/drug therapies will be covered. Finally changes in insulin sensitivity will be put into context in relation to aetiology of other diseases such as cardiovascular and Alzheimer’s disease.

**Lecture 19: Marine Natural Products Lecture - Dr W Houssen**

The lecture will cover the drug discovery from natural products with special emphasis on drugs derived from marine organisms. Natural products in general have a long history of being an important source of new medicines. Extreme environmental conditions such as high salinity, low light intensity and high pressure may trigger marine organisms to produce novel chemical structures to help them survive within their niches. Many of these chemicals have unique pharmacological properties. Examples of these compounds and their pharmacological properties will also be discussed.

**Lecture 20-21: SIP Receptor Signalling - Prof G Nixon**

In these lectures, novel intercellular and intracellular signalling through spliningosine-1-phosphate in health and disease will be discussed.

Practical/Lab/Tutorial Work

Tutorials

Students will be divided into two groups (numbered 1 & 2). Each student will be given material in advance of tutorials. They must study this material as instructed before attending the tutorials. The purpose of these is to improve expertise in the interpretation of scientific data relating to the discovery and characterization of pharmacological receptors and their ligands. The tutorials provide preparation for the data analysis exam paper.

Practical

The practical work for PA4005 will take the form of an Objective Structured Practical Examination (OSPE for short!), which some of you may have experienced before. However, this style of assessment at multiple stations during a strict time limit is also similar to the job interviewing methods used by many employers.

The practical runs over 2 days spread throughout the course (see timetable). An online video is available to MyAberdeen to explain the basis of the OSPE and the details of the practical skills tested.

Thursday morning of week 1 (see timetable) will be available for students to have an opportunity to practice the skills which will be assessed. Students will be assigned timeslots to attend the practice session. All students should familiarise themselves with the material on MyAberdeen before this session. During this morning, staff will be on hand to demonstrate and answer any questions. This will give the opportunity to ask questions and then students will be directed towards what they should revise for the assessment. Given that students will have little other coursework at this time, their preparation for the assessment should not be too onerous. Many of you will be already familiar with some of the practical skills assessed. Please note – IT IS ESSENTIAL THAT YOU ATTEND THIS LABORATORY PRACTICAL SESSION.

On the Thursday morning of week 3, students will be scheduled to attend the practical laboratory for a one hour long slot, during which time they will undertake their assessment. Students cannot pick and choose when they attend, appointments will be issued by staff. Allocated groups will be available on the MyAberdeen course website. Attending at the correct time is one of the professional skills that will be assessed! During your one hour slot, you will be assessed at several stations on how well you complete the practical skills. In addition, the students’ professionalism as scientists and potential employees will be graded and students will also have to submit a short written assignment.

A major benefit of this practical is that, in addition to brushing up your practical skills, it can also provide practice for future interviews for jobs or academic positions. It will also prepare you in the generic skills needed for the Honours projects you will all be undertaking in the second half-session after Christmas.

The practical coordinators for PA4005 are Dr Derek Scott (d.scott@abdn.ac.uk), and Dr James Hislop. The OSPE will contribute 15% towards your final course mark.

For these classes a laboratory coat should be worn at all times in the laboratory. The University and Department safety rules must be adhered to at all times. Students may find it useful to bring a calculator to the laboratories in order that the required calculations can be made.

Data Analysis Assessment

On Thursday of week 5 (see timetable), students will be required to undertake a data analysis based assessment. Students will be provided with information and the results of a study (relating to the lecture material). Students will be required to interpret the data in the style of the results AND discussion of a research paper. The assessment will be made available at 12:01 pm and be accessible for 24 hours. All students must complete the assessment within the 24 hour window, although it is not expected that you work throughout (it should not take 24 hours). The assessment will be submitted online. Access to notes/literature is allowed. The assessment will contribute 15% towards your final exam mark.

University Policies

Students are asked to make themselves familiar with the information on key education policies, available [here](https://www.abdn.ac.uk/staffnet/teaching/key-education-policies-for-students-11809.php). These policies are relevant to all students and will be useful to you throughout your studies.  They contain important information and address issues such as what to do if you are absent, how to raise an appeal or a complaint and how the University will calculate your degree outcome.

These University wide education policies should be read in conjunction with this programme and/or course handbook, in which School specific policies are detailed. These policies are effective immediately, for the 2023/24 academic year. Further information can be found on the [University’s Infohub webpage](https://www.abdn.ac.uk/students/) or by visiting the Infohub.

The information included in the institutional area for 2023-24 includes the following:

* Assessment
* Feedback
* Academic Integrity
* Absence
* Student Monitoring/ Class Certificates
* Late Submission of Work
* Student Discipline
* The co-curriculum
* Student Learning Service (SLS)
* Professional and Academic Development
* Graduate Attributes
* Email Use
* MyAberdeen
* Appeals and Complaints

Where to Find the Following Information:

C6/C7- University of Aberdeen Homepage > Students > Academic Life > Monitoring and Progress > Student Monitoriung (C6 & C7)

https://www.abdn.ac.uk/students/academic-life/student-monitoring.php#panel5179

Absences- To report absences you should use the absence reporting system tool on Student Hub. Once you have successfully completed and sent the absence form you will get an email that your absence request has been accepted. The link below can be used to log onto the Student Hub Website and from there you can record any absences you may have.

[Log In - Student Hub (ahttps://www.abdn.ac.uk/studenthub/loginbdn.ac.uk)](https://www.abdn.ac.uk/studenthub/login)

Submitting an Appeal- University of Aberdeen Homepage > Students > Academic Life > Appeals and Complaints

https://www.abdn.ac.uk/students/academic-life/appeals-complaints-3380.php#panel2109

Academic Language & Skills support

For students whose first language is not English, the Language Centre offers support with Academic Writing and Communication Skills.

Academic Writing

* Responding to a writing task: Focusing on the question
* Organising your writing: within & between paragraphs
* Using sources to support your writing (including writing in your own words, and

citing & referencing conventions)

* Using academic language
* Critical Thinking
* Proofreading & Editing

Academic Communication Skills

* Developing skills for effective communication in an academic context
* Promoting critical thinking and evaluation
* Giving opportunities to develop confidence in communicating in English
* Developing interactive competence: contributing and responding to seminar discussions
* Useful vocabulary and expressions for taking part in discussions

More information and how to book a place can be found here

Medical Sciences Common Grading Scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Grade | Grade Point | % Mark | Category | Honours Class | Description |
| A1 | 22 | 90-100 | Excellent | First | • Outstanding ability and critical thought • Evidence of extensive reading • Superior understanding •The best performance that can be expected from a student at this level |
|  |
| A2 | 21 | 85-89 |  |
|  |
| A3 | 20 | 80-84 |  |
|  |
| A4 | 19 | 75-79 |  |
|  |
| A5 | 18 | 70-74 |  |
|  |
| B1 | 17 | 67-69 | Very Good | Upper Second | • Able to argue logically and organise answers well  • Shows a thorough grasp of concepts  • Good use of examples to illustrate points and justify arguments  • Evidence of reading and wide appreciation of subject |  |
|  |
| B2 | 16 | 64-66 |  |
|  |
| B3 | 15 | 60-63 |  |
|  |
| C1 | 14 | 57-59 | Good | Lower Second | • Repetition of lecture notes without evidence of further appreciation of subject • Lacking illustrative examples and originality • Basic level of understanding |  |
|  |
| C2 | 13 | 54-56 |  |
|  |
| C3 | 12 | 50-53 |  |
|  |
| D1 | 11 | 47-49 | Pass | Third | • Limited ability to argue logically and organise answers • Failure to develop or illustrate points • The minimum level of performance required for a student to be awarded a pass |  |
|  |
| D2 | 10 | 44-46 |  |
|  |
| D3 | 9 | 40-43 |  |
|  |
| E1 | 8 | 37-39 | Fail | Fail | • Weak presentation • Tendency to irrelevance • Some attempt at an answer but seriously lacking in content and/or ability to organise thoughts |  |
|  |
| E2 | 7 | 34-36 |  |
|  |
| E3 | 6 | 30-33 |  |
|  |
| F1 | 5 | 26-29 | Clear Fail | Not used for Honours | • Contains major errors or misconceptions • Poor presentation |  |
|  |
| F2 | 4 | 21-25 |  |
|  |
| F3 | 3 | 16-20 |  |
|  |
| G1 | 2 | 11-15 | Clear Fail/Abysmal |  | • Token or no submission |  |
|  |
| G2 | 1 | 1-10 |  |
|  |
| G3 | 0 | 0 |  |
|  |

Course Timetable - PA4005: 2023-2024

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | Time | Place | Subject | Session | Staff |
| Week 8 | | | | | |
| Mon 18 Sep | 09:00-10:00 | 1:039/040 | Molecular Pharmacology Basics | Lecture | JH |
| 12.00-13.00 | 1:032/033 | Introduction to GPCRs | Lecture | JH |
| Tue 19 Sep |  |  |  |  |  |
| Wed 20 Sep | 12:00-13:00 | 1:039/040 | GPCR Dimerization and Allosterics | Lecture | JH |
| Thu 21 Sep | 09:00-13:00 | STH 1.007 | Introduction and Practice for OSPE | Practical | JH/FM/DS/DT |
| 14.00-15.00 | 1:032/033 | Data Analysis Tutorial: Group 1 | Tutorial | ST |
| 15.00-16.00 | 1M:003 | Data Analysis Tutorial: Group 2 | Tutorial | ST |
| Fri 22 Sep | 10:00-11:00 | 1:039/040 | GPCR Desensitisation and Bias | Lecture | JH |
| 12.00-13.00 | 1:032/033 | GPCR trafficking | Lecture | JH |
| Week 9 | | | | | |
| Mon 25 Sep | 09:00-10:00 | 1:039/040 | Gs Signalling and compartmentalisation | Lecture | FM |
| 11.00-12.00 | 1:032/033 | Role of cAMP Signalling in Disease | Lecture | FM |
| Tue 26 Sep |  |  |  |  |  |
| Wed 27 Sep | 11.00-12.00 | D2-MPB | Pharmacogenomics | Lecture | FM |
| Thu 28 Sep | 12:00-13:00 | 1:032/033 | Psychostimulants | Lecture | DT |
| 14:00-15:00 | 1:032/033 | Tutorial: Group 1 | Tutorial | JH |
| 15:00-16:00 | 1M:003 | Tutorial: Group 2 | Tutorial | JH |
| Fri 29 Sep | 10.00-11.00 | 1:039/040 | GI Pharmacology and Therapeutics | Lecture | DS |
| 12:00-13:00 | 1:032/033 | Opioids | Lecture | JH |
| Week 10 | | | | | |
| Mon 2 Oct | 09:00-10:00 | 1:039/040 | Molecular Pharmacology of Ion Channels 1 | Lecture | AG |
| 11:00-12:00 | 1:032/033 | Molecular Pharmacology of Ion Channels 2 | Lecture | AG |
| Tue 3 Oct |  |  |  |  |  |
| Wed 4 Oct | 12:00-13:00 | 1:039/040 | Antibody Therapeutics 1 | Lecture | CB |
| Thu 5 Oct | 09:00-13:00 | STH 1.001 | OSPE | Practical | JH/FM/DS/DT |
| 14:00-15:00 | 1:032/033 | GI Tutorials Group 1 | Tutorial | DS |
| 15:00-16:00 | 1M:003 | GI Tutorials Group 2 | Tutorial | DS |
| Fri 6 Oct | 11:00-12:00 | 1:032/033 | Antibody Therapeutics 2 | Lecture | CB |
| Week 11 | | | | | |
| Mon 9 Oct | 9:00-10:00 | 1:039/040 | Ligand-Gated Ion Channels 1 | Lecture | SS |
| 11:00-12:00 | 1:032/033 | Diabetes and Insulin Resistance 1 | Lecture | NM |
| Tue 10 Oct |  |  |  |  |  |
| Wed 11 Oct | 9:00-10:00 | BMPLT | Diabetes and Insulin Resistance 2 | Lecture | NM |
| Thu 12 Oct | 11:00-12:00 | 1:032/033 | Ligand-Gated Ion Channels 2 | Lecture | SS |
| 15:00-16:00 | 1:032/033 |  | Lecture |  |
| Fri 13 Oct | 09:00-10:00 | 1:039/040 | Marine Products | Lecture | WH |
| Week 12 | | | | | |
| Mon 16 Oct | 09:00-10:00 | 1:039/040 |  | Lecture |  |
| 11:00-12:00 | 1:032/033 |  | Lecture |  |
| Tue 17 Oct |  |  |  |  |  |
| Wed 18 Oct | 09:00-10:00 | BMPLT | S1P Receptor Signaling 1 | Lecture | GFN |
| Thu 19 Oct | - | - | Assessment | Assessment |  |
| Fri 20 Oct | 11:00-12:00 | 1:032/033 | S1P Receptor Signaling 2 | Lecture | GFN |

STH – Science Teaching Hub, Old Aberdeen

D2-MPB – D2, Biomedical Physics Building, Foresterhill

BMPLT – Biomedical Physics Lecture Theatre, Foresterhill

All other rooms are in the Polworth Building, Foresterhill.

Campus Maps – Foresterhill



Polwarth Floor Plans

Diagram, schematic

Description automatically generated

Diagram

Description automatically generated

Diagram

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