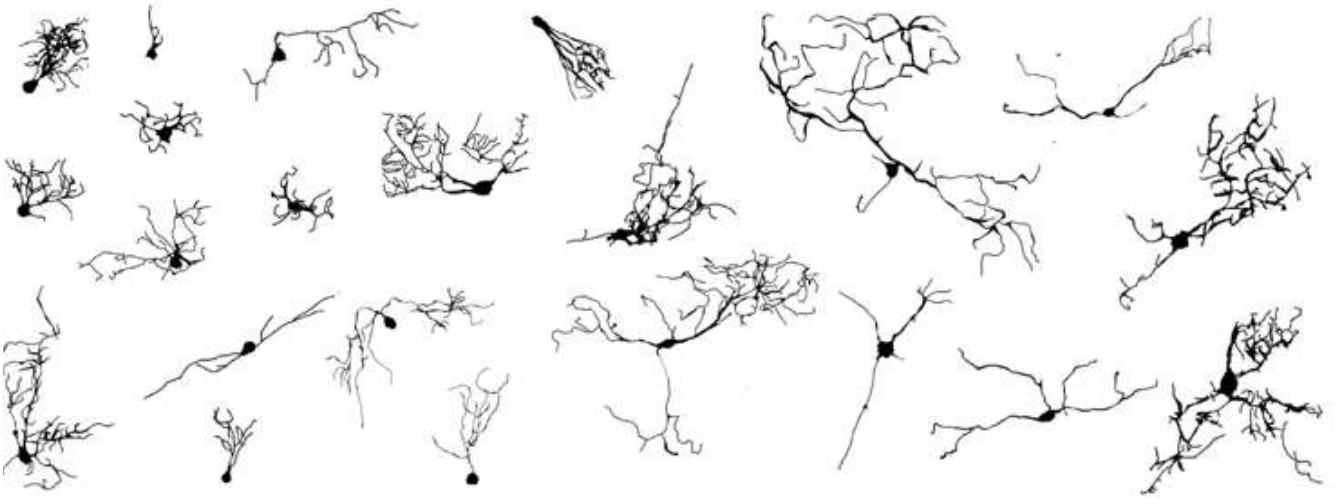
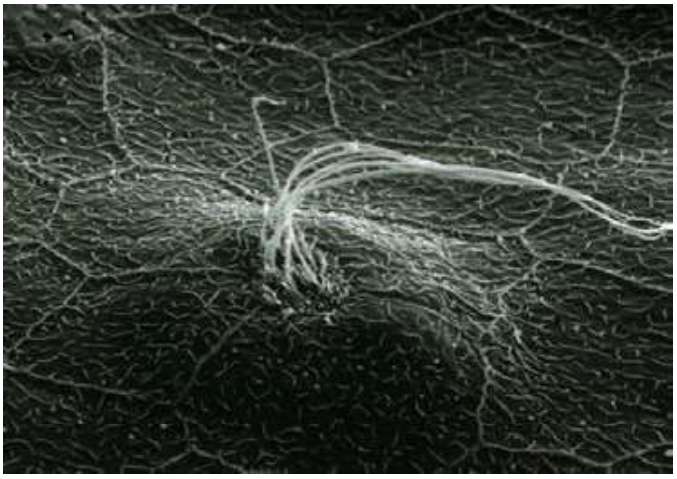
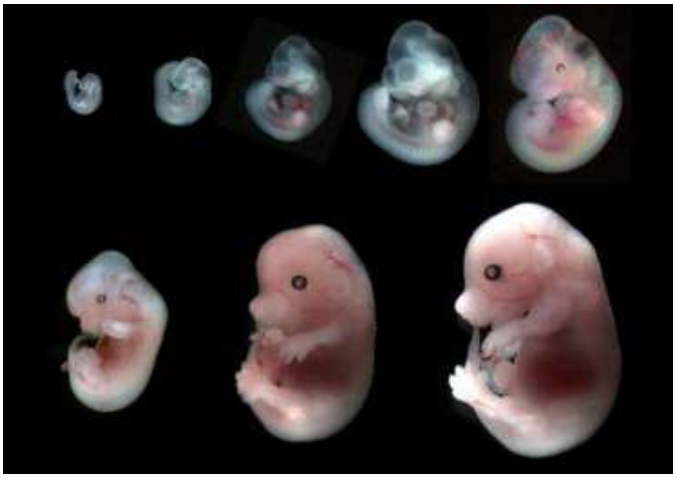
pdn part II

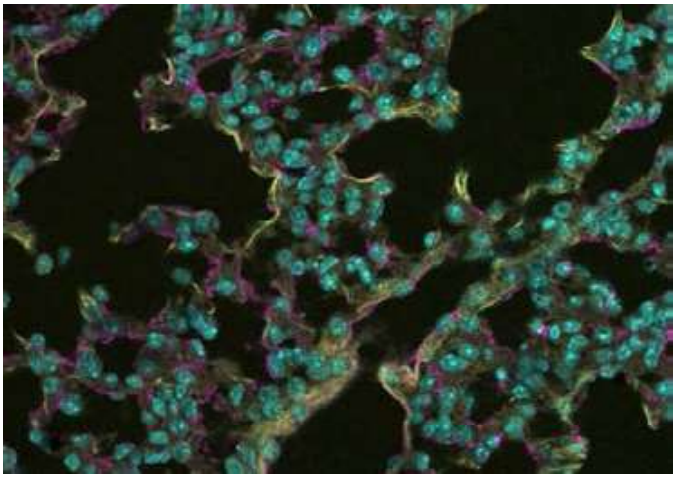
Department of Physiology,
Development and Neuroscience

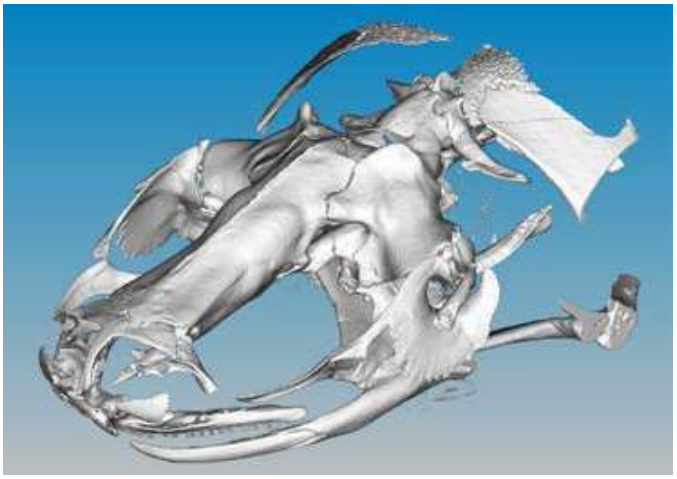
2025 - 2026











UNIVERSITY OF CAMBRIDGE

PART II PHYSIOLOGY, DEVELOPMENT AND NEUROSCIENCE 2025-2026

Course Organisers: Profs. Amanda Sferruzzi-Perri and Hannah Clarke

DEVELOPMENT AND REPRODUCTIVE BIOLOGY
Theme Organiser: Prof Nick Brown

INTEGRATIVE PHYSIOLOGY
Theme Organiser: Dr James Fraser

NEUROSCIENCE
Theme Organiser: Prof Angela Roberts

General enquiries:
Part II Administrator, Room C6, Physiology Building. email: part2@pdn.cam.ac.uk

Department of Physiology, Development and Neuroscience website:
http://www.pdn.cam.ac.uk/

Part II Physiology, Development and Neuroscience website:
http://www.pdn.cam.ac.uk/teaching/part2/index.shtml

Contents

INTRODUCTION

Part II in Physiology, Development and Neuroscience offers a broad range of teaching and project opportunities covering the full spectrum of interests within the Department. Our Part II teaching is organised into modules to offer the greatest possible flexibility allowing students to design a course to match their own interests.

The Department of Physiology, Development and Neuroscience is concerned with material central to the life sciences. It addresses questions about the way that cells, tissues and organs develop and function in people and animals. Physiology, Development and Neuroscience are broad but interlinked subjects with many different areas of specialisation. A good grounding in these subjects opens the way to a wide variety of careers: these range from those where you use your knowledge directly, to those in which the understanding you will acquire of complex organisms is put to work less directly, such as in managing equally complex human organisations.

The knowledge and skills gained on this Part II course will particularly provide a valuable basis for the practice of human and veterinary clinical medicine, where a critical understanding of scientific advances is essential in designing and evaluating new treatments. Many parts of the course concentrate on important research areas where recent discoveries have changed our perception of disease and have posed new questions to be answered. The modules are organised into three themes, allowing you to spend the whole of your third year studying in depth Development & Reproductive Biology, Integrative Physiology or Neuroscience. Alternatively, those seeking a broader overview can select to follow a more general course, combining modules across these themes.

One major benefit of studying Part II Physiology, Development and Neuroscience will be in gaining an in-depth knowledge of key core areas of the life sciences. You will also gain important knowledge and skills that graduates in any subject should these days have. These skills include:

- critically assessing information you read or hear
- keeping accurate records
- writing reports and reviews, and effectively presenting and communicating your ideas
- efficiently using libraries and information databases
- selecting appropriate statistical procedures to verify hypotheses
- using modern computer software

Teaching of the course involves most members of staff of the Department of Physiology, Development & Neuroscience and is supplemented by invited specialists from across the University and from the Babraham Institute, Cancer Research UK, Gurdon Institute, the Medical Research Council Laboratory of Molecular Biology and Addenbrookes and Papworth hospitals. We also offer a growing number of modules taught in collaboration with other Departments, allowing us to call upon the broadest range of expertise within the University.

Taking Part II in Physiology, Development & Neuroscience gives you the many advantages of a home base on the Downing Site. You will immediately feel an important contributing part of the vibrant research community. The social cohesion with your fellow Part II students will be enjoyable and valuable throughout the year and your academic and other questions can be informally dealt with when you happen to meet members of staff about the Department. You will be appointed a Departmental Advisor who will be available to discuss your progress and help support you in your studies. The friendly and supportive Part II administrator will become well known to you and will be your first port of call for queries. The Department has numerous resources available to you through the year, including a well-stocked library, where you will be able to find many of the books and journals you need in a single place. The Department also maintains computers and printers which you will be able to access.

The scope of the course

You will probably already have an overview of some or all of physiology, development and neuroscience from your Part I courses and we will therefore build upon these basics by offering an in-depth course in which we will not attempt to cover the whole of these subjects. We offer teaching on topics of current interest that we discuss to a much higher level than in Part I. This means that you can devote your time to those areas you find particularly interesting. While we expect that the majority will have done the Part IA and IB courses in physiology, neurobiology or developmental and/or reproductive biology, we will also welcome those who have done only one of these courses, as well as those who approach physiology, development and neuroscience from other directions, such as biochemistry, genetics or animal biology.

The organisation of the course

All project students study four modules. The course offers a wide choice of PDN* modules that are described in the following pages. The modules are divided into three themes: Development & Reproductive Biology, Integrative Physiology and Neuroscience. Some students will want to study one theme; however, others enjoy the opportunity to follow a more general course, combining modules across themes. You are given a free choice as to how you distribute those four modules over the two terms (for example: two in Michaelmas and two in Lent or three in Michaelmas and one in Lent etc.) but be aware that some modules have restricted numbers, and some combinations are not possible (see module descriptions from page 8).

*Students may replace up to two PDN modules with a 'shared neuroscience' module offered by Psychology or Zoology. These have very limited availability and are arranged before term begins (see page 7).

In your detailed reading you will want to concentrate on the topics that particularly interest you. In the examination there will be one paper per module. Much of your formal teaching will take place during the morning, with the exception of some shared modules. Many modules also offer one- or two -hour workshops, journal clubs or seminars in the afternoons. These give opportunities for a more interactive style of teaching that many students enjoy and find helpful in consolidating the lecture material. Most afternoons, during Michaelmas and Lent terms, are free for project work and private study. The Easter Term is kept largely free from formal commitments to allow time for reading and for discussion.

The Projects

All project students do either an experimental research project or a theory-based project, under the supervision of an appropriate member of staff. Laboratory-based research projects are limited in number and allocation cannot be guaranteed to all students who wish to do these. The findings are written-up in the form of an 8,500-word report. You may choose the topic of your project from those provided by members of staff and will have the opportunity to discuss the projects with the relevant staff members before you submit your choices. You will have the opportunity to present your progress to the Department as a poster presentation. The times that you work on your project can be negotiated with your supervisor to some extent so that you will have time available for other work and outside interests, but in general, students are expected to spend about 16 hours a week on their project. The titles of a number of recent research projects are listed towards the end of this booklet, as are some of the publications arising from projects involving previous Part II students.

PART II PDN: A strategic analysis

Our aims

- To provide a broad multidisciplinary course in Physiology, Development & Neuroscience.
- To teach you a variety of scientific skills that will equip you for future careers in a wide range of areas: health sciences (e.g., the pharmaceutical industry and environmental physiology), medicine and veterinary medicine, research in the life sciences and related disciplines, teaching, publishing and management.

How we expect to achieve them

- By offering a modular course of lectures, workshops, seminars, informal discussions and research projects, supplemented by personal contact with members of the academic staff.
- By training you in the use of practical and conceptual tools required in many sub-disciplines: from molecular biology, through membrane and cellular physiology, to the study of systems physiology and the disorders of physiology associated with disease.
- By providing constructive feedback on your progress through personal discussion and assessment of project work.

What you can expect by the end of the course

The ability to:

- Think and write critically and creatively about what you have read, learnt and discovered.
- Analyse, both qualitatively and quantitatively, data collected from research projects.
- Use available resources to conduct research into scientific problems, e.g., libraries and computer databases, together with academic and technical expertise.
- Assess and implement practical techniques necessary to solve a particular scientific problem.
- Communicate with expert and non-expert audiences through presentations, project reports and essays.

PART II PDN COMMON COURSES: Skills for all PDN students

There are some skills, which we think that everyone doing Part II PDN needs to acquire, regardless of their area of specialisation. For this reason, a number of teaching sessions open to all PDN students are offered.

Some of these sessions will be available to view as a recording prior to the start of the course and others will be held during the year.

<u>Topics to be included:</u>

- Reading and evaluating a scientific paper
- How to write a Part II essay
- Reference management
- Statistics and data analysis
- How to answer experimental design questions
- Poster and figure making
- Project write-up guidance
- Information regarding the Part II PDN examinations

WHAT TO DO IF YOU ARE INTERESTED IN APPLYING:

Two application forms must be completed:

1. **The PDN Departmental Application:** If you want to take our Part II Physiology, Development and Neuroscience or BBS-415 course it is essential that you complete our internal application form:

   https://forms.office.com/e/Lp8JniGZif

   We cannot allocate you a place if this form is not completed.

2. **The University NST Application:** Formal application to take the course **must** also be made to the NST Tripos Part II allocations team after consultation with your Director of Studies. Details of how to do this can be found on the Natural Sciences webpage: https://www.natsci.tripos.cam.ac.uk/students/third/ii-subject-allocation

   You should make all your Part II applications by Friday 23rd May 2025

A copy of this brochure and the PDN application form link are also available on our Departmental website: https://www.pdn.cam.ac.uk/undergraduate/part-ii-courses

NOTE:
This booklet describing the Part II Physiology, Development and Neuroscience course was produced in February. Some small details may change. Some lecturers may change because of timetabling or leave commitments.

PART II BBS: Options in PDN

The Part II BBS course is for students who want a course based entirely on lecture and library work, with no practical component. Students take a major subject (consisting of 4 PDN* modules) and a minor subject (1 module) and write a dissertation.

MAJOR SUBJECT 415: Physiology, Development and Neuroscience
Maximum 25 places

Course Organisers for PDN: Profs. Amanda Sferruzzi-Perri (ans48@cam.ac.uk) and Hannah Clarke (hfc23@cam.ac.uk)

BBS students must take 4 of the PDN* modules as their major subject, under the auspices of Part II PDN. Some modules have restricted numbers, and some combinations are not possible (see module descriptions from page 7 onwards).

*Students may replace up to two PDN modules with a 'shared neuroscience' module offered by Psychology or Zoology. These have very limited availability and are arranged before term begins.

MINOR SUBJECTS:

Many of the PDN modules are also offered as BBS minor subjects. Major subject 415 may be taken with any one of these minor subjects, provided that the minor is different to the four major modules, and they do not clash in the timetable.

Michaelmas Term options within PDN:

138: Module N1 Developmental Neurobiology (5 places)

152: Module N3 Neuroscience: Circuits and Systems (5 places)

153: Module P1N4 Cell Signalling (5 places)

Lent Term options within PDN:

111: Module N6 Higher Order Brain Function and Dysfunction (10 places)

142: Module P2 Development and Stem Cells (5 places)

143: Module P8 Systems and Clinical Physiology (5 places)

PDN Major subject (415) may also be taken with other minor subjects that do not clash, including:

137: Surgical and Radiological Anatomy (SaRA), run by PDN but only as a two-term BBS minor subject (see pg 16 for minor 137).

SUMMARY OF PART II PDN THEMES AND MODULES

Integrative Physiology (P)	Development and Reproductive Biology (D)	Neuroscience (N)
Michaelmas term		
P1N4 Cell Signalling P3 Fetal and Placental Physiology	N1 Developmental Neurobiology *(shared with Part II Zoology*) P3 Fetal and Placental Physiology P4 Early Development & Patterning: Genetic and Cellular Mechanisms *(shared with Part II Genetics and Zoology*) P9 Cell Assembly and Interactions *(shared with Part II Zoology)*	N1 Developmental Neurobiology (*shared with Part II Zoology*) N2 Experimental Tools for the Neuroscientist and how they are Shaping Scientific Discovery N3 Neuroscience: Circuits and Systems P1N4 Cell Signalling
Lent term		
P2 Development and Stem Cells P7 Pathophysiology of cancer P8 Systems and Clinical Physiology	P2 Development and Stem Cells P6 Development: Cell Differentiation & Organogenesis *(shared with Part II Zoology)* P7 Pathophysiology of Cancer	N6 Higher Order Brain Function and Dysfunction N9 Modulation, Plasticity and Behaviour

SHARED NEUROSCIENCE MODULES

We are able to offer some of our PDN Project and PDN-BBS (major 415) students the opportunity to select up to two of their four module choices from a selection of shared neuroscience modules offered by other departments in the School of Biological Sciences.

Spaces on these modules are very limited and we expect demand to be high. Please express your interest via our PDN application form. If you are offered a place on a module via this arrangement, it will replace one of your four PDN module choices.

Michaelmas Term:

ZM5: Evolution and Behaviour: Genes and individuals (5 places, Zoology)

PS3: Brain Mechanisms of Emotional Regulation and Motivation (15 places, Psychology)
(PS3 cannot be taken with P4)

Lent Term:

ZL3: Evolution and Behaviour: Populations and Societies (5 places, Zoology)

PS2: Memory (15 places, Psychology)
(PS2 cannot be taken with P7)

Please refer to the hosting department brochures for details of their modules.
If modules are oversubscribed, places will be allocated randomly

THE PDN COURSE MODULES

The themes to which individual modules belong are indicated as follows: (D) Development and Reproductive Biology, (P) Integrative Physiology, and (N) Neuroscience.

Michaelmas Term Modules

Module N1: Developmental Neurobiology (D, N)

(Inter-departmental module with Zoology)

Module organiser: Prof. Clare Baker (cvhb1@cam.ac.uk)

This module addresses how the nervous system is assembled during embryonic development. Although we now understand a considerable amount about the processes involved, many fascinating questions remain.

We begin by discussing the formation of the vertebrate neural tube (future brain and spinal cord), and how this is patterned to generate distinct neuronal and glial cell fates in different regions, including the cerebral cortex. We also consider the evolution of the cerebral cortex. We discuss the formation of the peripheral nervous system from the migratory neural crest and cranial neurogenic placodes (good models for understanding the control of cell migration and fate-choice). Once neurons have formed, they extend axons to their targets to 'wire up' the nervous system: the process of axon guidance is considered in detail. We explore how axons make and refine the synapses that will generate functional neural circuits, and discuss how circuit designs lead to function.

This is an interdepartmental course (with Zoology), given by researchers in the Departments of PDN, Genetics, Zoology, and the MRC Laboratory of Molecular Biology.

It is best suited for students who have studied some neurobiology in Part IB, either in MedST/VetST or in NST, but others will be able to take it if they are prepared to do some background reading.

Module N2: Experimental Tools for the Neuroscientist and how they are Shaping Scientific Discovery (N)

Module organiser: Prof. Angela Roberts (acr4@cam.ac.uk)

This module **cannot** be taken with Cell Assembly and Interactions (P9)

This module will consider the current generation of experimental tools available to the neuroscientist and how their application is contributing to our understanding of brain organisation and function. The range of state-of-the-art technologies and approaches will include opto- and chemo-genetics, multichannel recording, single and multiphoton calcium imaging, multimodal MRI, computational modelling and brain organoids. Not only will you learn about the neurobiological foundations of each experimental tool, but also how it is transforming our understanding of neuroscientific topics ranging from sensory perception and motor control to memory and higher-order decision making.

Teaching will be a mixture of traditional lectures, interactive sessions and student-led presentations. Along the way, you will gain core generic skills of scientific presentation, scientific debate and critical reading of primary scientific papers. By the end of the module, we hope you

will have a comprehensive overview of the landscape of neuroscientific research and how the different techniques and experimental approaches provide insight into brain function across multiple levels of analysis from molecules and cells at single synapses to local and large-scale neural networks.

This module complements any of the other neuroscience modules. It is recommended especially for those neuroscientists wishing to take the 'neuroscience theme' in PDN, taking four neuroscience modules alongside a two-term neuroscience research project. It replaces the workshops for 'neuroscience theme' students that we have run in PDN for many years

Module N3: Neuroscience: Circuits and Systems (N)

Module organiser: Dr David Parker (djp27@cam.ac.uk)

We know a lot about the brain in terms of its molecular and cellular properties, and of the role of different brain regions in behaviour. What we lack is insight into how the molecular, cellular, and circuit properties of brain regions generate cognitive functions and behaviours. This is widely considered to be the major problem facing neuroscience and of biology generally.

This module will consider this problem by considering how cellular interactions in neuronal circuits and neural systems generate cognitive functions and behaviours.

The module will focus on various conceptual aspects and experimental approaches to circuit/system understanding. Lectures will start with an introduction to neural circuits/systems and their analysis. This will be followed by consideration of connectomic analyses of neural circuits underlying sensory and motor function. Lectures will then focus on hypothalamic circuits underlying reproductive functions and metabolism. Neural systems will then be considered, with lectures on visual system pathways and the role of the vestibular system in perception and spatial navigation. The module will finish with an introduction to artificial neural networks and their role in system and circuit understanding.

A large number of students have taken the module in the two years it has run, and this makes it difficult for all lecturers to give conventional supervisions or read and comment on essays. At a minimum each lecturer will give a Q&A session a week after their lectures to address questions from the lecture material. In previous years some lecturers have done additional Q&A sessions when there is demand and held sessions where they work through approaches to essay questions.

The module will include interactive student debates that will discuss topics that cover the content of the module. In the past this has included the relative merits of experimental approaches (e.g., imaging compared to electrophysiology, will the 'photon replace the electron'); the relative merits of experimental and computational analyses to claims to understanding; what we can learn about brain function from brain injuries; and the relative merits of naturalistic behaviours vs those examined under controlled conditions.

This module complements any of the neuroscience modules. P1N4 provides complementary cellular detail, and P8 a complementary systems perspective.

Module P1N4: Cell Signalling (P, N)

Module organiser: Dr Ali Rasooli-Nejad (smar4@cam.ac.uk)

Deep mechanistic understanding of organs and systems must include an appreciation of cellular and molecular properties and interactions. Neuronal and non-neuronal cells detect and respond to changes in their external environment using many signalling pathways. In this module we look at cellular signalling involving ions, including sodium, calcium and protons.

The lectures will cover: how ions enter cells via voltage and ligand gated ion channels; how their concentrations are regulated in cellular microdomains; how they influence cell signalling; and what the consequences of this are for neuronal and non-neuronal cells, including action potential firing, sensory transduction, synaptic plasticity and glial cell function. The lectures will emphasise research approaches used to study these signalling pathways.

This Module works particularly well with N1, N2, N3, N9, and P8.

Module P3: Fetal and Placental Physiology (D, P)

Module organiser: Prof Dino Giussani (dag26@cam.ac.uk)

The study of the fetus and placenta is a unique aspect of physiology with relevance for basic and clinical sciences. This module will explore a wide range of topics, including the normal development of the fetus and placenta, adaptations to the intrauterine environment, responses to challenges in utero, mechanisms of parturition and the transition at birth. The scientific basis underlying the aetiology of miscarriage, preeclampsia and sudden infant death syndrome, and the consequences of prematurity, maternal obesity and intrauterine growth retardation will be discussed.

In addition, the course will give insight to current ideas on the developmental programming of health and disease.

Modules that compliment P3 are: P2 for a developmental focus, P4/ P6 for students interested in cellular/morphological changes and P7/P8 for a wider physiology or pathophysiology theme.

Module P4: Early Development & Patterning: Genetic and Cellular Mechanisms (D)
(Inter-departmental module with Genetics and Zoology)

Module organiser (for both Departments of Genetics and PDN): Dr Felipe Karam Teixeira (fk319@cam.ac.uk)

This course is the first of two complementary modules (with P6), which can also be taken on their own. This module will look at:

Early embryo development
How animals' body plans are formed
Gene regulatory & signalling interactions
Dynamic cell behaviours & morphogenesis

You will therefore learn about the key principles of embryonic development, taking examples from a range of early developmental events, such as cell fate determination, germline development, gastrulation, segmentation, and somitogenesis, in both invertebrate and vertebrate systems.

During the course of the module you will be introduced to a range of modern techniques applicable to the study of development including molecular, genetic and imaging technologies.

The module will compare mechanisms across a broad range of experimental organisms and processes, in order to highlight the essential principles of developmental biology.

The module works well in combination with all other PDN modules.

Module P9: Cell Assembly and Interactions (D)
(Inter-departmental module with Zoology)

Module organiser: Dr Milka Sarris (ms543@cam.ac.uk)

This module **cannot** be taken with Experimental Tools for the Neuroscientist (N2)

Cells are highly organised and dynamic structures. In this module we will explore how the architecture of the cell is constructed and how cells interact with each other and their environment in order to fulfil their myriad roles in animals. Our current knowledge of these vital topics will be presented in depth, with a focus on the molecular mechanisms that regulate cell behaviour. We examine how cells use basic cell biological mechanisms in their complex activities within animals, including cellular behaviour during development and how cellular activities provide key physiological functions in the adult.

We study how cells become polarized and adhere together to form higher order multicellular assemblies, how membrane compartments are constructed, and the dynamics of transfer between them. We will discuss current ideas about how cells were created during evolution, and how eukaryotic cells arose from prokaryotes. We will explore how cells sense and respond to the mechanical properties of their surroundings and the key role of the cytoskeleton in determining cell shape, organisation and movement.

We switch focus to the nucleus and how the genome architecture determines gene expression and discuss how cells maintain protein homeostasis, and the important process of autophagy in cellular physiology. Thus, we provide a comprehensive picture of different fundamental cellular processes and introduce a broad range of techniques to visualise and study these processes in live cells, in vitro and in intact animals.

This is an interdepartmental course (with Zoology). In addition to lectures there are several interactive sessions (such as journal clubs) in which there will be discussions of key papers, experimental techniques and major concepts in the field.

P9 works well with the other ‘Developmental and Reproductive Biology (‘D’) Theme’ modules.

Lent Term Modules

Module N6: Higher Order Function and Dysfunction (N)

Module organiser: Prof Angela Roberts (acr4@cam.ac.uk)

This module considers the neurobiological basis of a range of higher-order functions in the brain including (i) perception, recognition and decision making in the visual domain, (ii) executive functions and their relationship with intelligence and (iii) positive and negative emotions and their regulation. These are the product primarily of the functioning of high-order association cortices found in the temporal and frontal lobes. They will be discussed in relation to findings from a range of experimental approaches in humans and animals including non-human primates and rodents.

Vision is a main source of information for primates, and our life greatly depends on the ability to recognise behaviourally relevant objects. This section will consider how a visual input is analysed to detect objects including faces, and how such information can be memorised and recalled to guide our behaviour. It will consider how the physical shape of an object is analysed along the ventral visual stream to create a neuronal representation of the object independent of angle and size in viewing; how memorised objects are represented by neurons in medial temporal lobe; how these memories can be recalled through local processing as well as global interaction of brain regions and how new information can be stored in the brain as detectable changes within specific neurons.

In considering executive function, a particular focus will be placed on the important role of the prefrontal cortex and associated networks, in particular the hippocampus. The unity and diversity of executive functions and their instantiation within prefrontal cortical networks alongside the specific relationship between the hippocampus and prefrontal cortex will be discussed. This section will finish by considering the dysregulation of executive functions that occur across a range of psychiatric disorders including Schizophrenia, Depression, Obsessive Compulsive disorder and anxiety and the failure of current therapies to treat cognitive symptoms.

Finally, the circuits involved in both the regulation and dysregulation of positive and negative emotion will be described. Emphasis will be placed on the contribution the prefrontal cortex makes to the top down regulation of subcortical circuits known to induce appetitive approach and negative avoidance behaviour. Throughout this module use of state-of-the-art technology to measure and intervene in brain function will be highlighted alongside the translational potential of studies in animals to inform our understanding of higher-order functions and dysfunctions in humans.

This module works best when taken with any of the other neuroscience modules.

Module N9: Modulation, Plasticity, and Behaviour (N)

Module organiser: Dr Sue Jones (sj251@cam.ac.uk)

A fascinating feature of the nervous system is neuronal plasticity: the ability for neurons and their connections to be modified in response to specific patterns of activity in an ever-changing external or internal environment. Alongside neuronal plasticity, the modulatory effects of neurochemicals provide additional flexibility in the response repertoire of neurons. In the mature mammalian brain, neuronal plasticity and modulation enables complex neural networks to remain dynamic and adaptive.

Two key questions in modern neuroscience are: what are the mechanisms of neuronal plasticity, and how do neuronal plasticity and modulation contribute to behaviour? This module will focus on both of these questions, and will explore examples of plasticity and modulation in defined neuronal systems, ranging from endocrine modulation of hypothalamic circuits in the context of sexual maturation and behaviour, to the neuronal plasticity in sensory, motor and cognitive networks. Contemporary as well as traditional research methods for investigating neuronal plasticity and modulation will be considered, including opto- and chemogenetic approaches, imaging and electrophysiology. The first lecture will include an introduction to different forms of cellular and synaptic plasticity and modulation.

This module works best when taken with any of the other neuroscience modules.

Module P2: Development and Stem Cells: Embryonic and Extra-embryonic Tissues (D, P)

Module organisers: Dr Erica Watson (edw23@cam.ac.uk) and Dr Claire Senner (ces07@cam.ac.uk)

A mammalian zygote is a remarkable cell because it carries the molecular and genetic information required to form an adult organism with reproductive potential. The initial cell divisions of an embryo are crucial to lay down the framework for reproductive success since the first cell fate decisions establish the embryonic and extra-embryonic lineages. For development to continue, the free-floating embryo must implant into the uterus, a process that requires complex interactions of cells from two different individuals. As embryogenesis occurs internally in the female reproductive tract, it is a logistical and ethical challenge to study these normal developmental processes in human pregnancy and to identify when and why they go awry to cause pathologies or embryo loss.

In this module, we delve into the earliest stages of mammalian embryogenesis in the pre-, peri-, and post-implantation embryo to consider how the cell fate decisions are taken and what signalling cascades, transcriptional networks, and epigenetic modifications play a role in their establishment and maintenance. We consider how genetic mouse models can be used to study these early developmental events as well as the recent exciting advances in human stem cell models of mammalian embryogenesis that allow better access to key developmental questions at these early stages of life. These models include stem cell derivation from embryonic and extraembryonic lineages, embryoid bodies, gastruloids, stem cell-derived embryo structures, trophoblast and endometrial organoids, and the co-culturing of embryos with uterine cells to model implantation. We will ask questions such as: can researchers really grow a mammalian embryo in a dish and what can it teach us about *in vivo* development? What are the benefits and limitations of stem cell models? How is the regulation of embryogenesis altered by environmental change, such as occurs during assisted reproduction (e.g., IVF), alteration of parental diet including vitamin intake, or toxicant exposure. Should researchers consider events in germ cell development and maturation to fully appreciate the factors required for early embryogenesis?

The module will involve lectures, Q&A sessions, workshops, and journal clubs.

Useful combination modules include: P3 Fetal and placental physiology (M), P4 Early Development & Patterning: Genetic and Cellular Mechanisms (M), P6 Development: Cell differentiation and organogenesis (L).

Module P6: Development: Cell Differentiation and Organogenesis (D)
(Inter-departmental module with Zoology)

Module organiser: Dr Emma Rawlins (elr21@cam.ac.uk)

This course is the second of two complementary Developmental Biology modules (with P4) that can also be taken on their own.

This module examines a second phase of embryonic development, following the initial steps of defining axes, major cell layers, and broad pattern domains (covered in P4). P6 works well with any of the other developmental and cell biology modules, particularly P2 Development and stem cells, P4 Early development and patterning and P9 Cell assembly and interactions. It can also complement P3 Fetal and placental physiology.

A series of topics will be presented, each using particular tissues or organs to highlight individual developmental mechanisms. Thus, the diverse mechanisms to make tubular organs will be used to highlight the importance of cell polarity and cell shape changes, and used as a framework for discussing key techniques in the study of developmental biology; the development of the heart will be used to discuss the transcriptional programmes that drive differentiation, and to highlight different strategies for organ morphogenesis; the importance of stem cells in the formation and maintenance of organs will be discussed using a variety of examples, including oesophagus and intestine; the formation of the vertebral column illuminates mechanisms of cell allocation and morphogenesis, including the role of mechanics; and limb development illustrates how patterning mechanisms are coordinated with cell proliferation.

A mixture of examples from simpler invertebrate models and vertebrates will show how developmental mechanisms have diversified with increasing cell number. We will also discuss human diseases that impact on the development of these organs, and how our understanding of organogenesis provides the foundation for regenerative medicine approaches to the treatment of these diseases.

This interdepartmental course (with Zoology) will consist of three lectures per week, and seven interactive sessions (such as journal clubs) in which we will aim to discuss key references and the concepts presented in the lectures.

Module P7: Pathophysiology of Cancer (D, P)

Module organisers: Prof Hugh Robinson (hpcr@cam.ac.uk) and Dr Maria Alcola (mpa28@cam.ac.uk)

We will examine cancer and malignant progression of solid tumours as examples of how to integrate a physiological approach to disease, giving consideration to modern genetic tools and techniques as well as to the unique physiological challenges of malignancy. We will also discuss how this impacts therapeutic choices and drug development. Consideration will be given to how research on pathophysiology is influenced by modern understandings of systems biology and physiology. The course will include lectures and interactive question and answer sessions of selected relevant articles. The course is suited to both NST and MVST students and works well with all other modules.

Module P8: Systems and Clinical Physiology (P)

Module organiser: Prof Stewart Sage (sos10@cam.ac.uk)

Systems physiology is central to the practice of scientific medicine. This module gives students a more detailed view of some aspects of systems physiology and includes some clinically oriented material that is of particular importance to the practising doctor. Cardiovascular topics include cardiac arrhythmias and the genetics and energetics of heart failure. Renal physiology covers autoregulation of renal blood flow and glomerular filtration rate, acute kidney injury and chronic renal failure. Several areas of endocrine physiology are explored in the form of pancreatic islet and gut hormones, brain control of food intake, the pathophysiology of obesity and the physiology and pathophysiology of bone.

The lecturers giving this course are from the Department of Medicine and the Institute of Metabolic Science as well as PDN.

This module is reasonably self-contained and can be taken in combination with any other modules. There is a small amount of overlap with some of the material covered in other P modules, including P1N4, P3 and P7, but it is not necessary to take any of these modules in order to understand the material in P8.

PDN MODULE FOR BBS STUDENTS ONLY

Minor 137: Surgical and Radiological Anatomy
Maximum of 30 students

Organiser: Prof Cecilia Brassett (hacteach@pdn.cam.ac.uk)

This course introduces students to areas of anatomy that are especially relevant to surgical and radiological procedures. The need for a good working knowledge of anatomy in surgical and radiological practice is of course paramount in clinical safety. Applicants for Core Surgical Training and Specialty Radiology Training may improve their scores in the "Experience in and commitment to specialty" component by having chosen to take a relevant module such as this course. Students also choose one practical activity from the following options: attendance at operating theatre sessions; diagnostic and/or interventional radiology session; or preparation of an anatomical prosection (for Natural Sciences students). Assessment includes a 1-hour Single Best Answer MCQs paper, a written report (2,500-3,000 words) and oral presentation on the practical session. Lecturers are current consultant radiologists and surgeons. Veterinary students are very welcome, as the lectures are still relevant, and they can obtain placements at the Vet School.

Further details can be found in the Surgical and Radiological Anatomy Subject Fair Moodle page https://www.vle.cam.ac.uk/course/view.php?id=213951&section=10

Course Booklet: https://www.biology.cam.ac.uk/files/sara_booklet_25-26_updated_200225.pdf

RECENT RESEARCH PROJECTS: Some topics of recent PDN dissertations

Two-term Experimental Projects 2024-25	
Supervisor	**Experimental Project Title**
Richard Adams	3D computer graphics for Neuroanatomy Teaching
Maria Alcolea	Investigating the Interplay between Early Commitment and Competitive Fitness on Cell Fate Plasticity in the Oesophageal Epithelium
David Bainbridge	Are the aspects of neural architecture we think of as characteristically human actually more general adaptations present in all primates? Could these considerations change the way we think about human CNS disease?
David Bainbridge	Can Ozempic be used to protect against maternal diabetes-induced neural tube defects?
Clare Baker, Dr Christine Hirschberger	The development of lateral line electroreceptors in teleost fishes: insights into the evolution of novel cell types
Sumru Bayin	Molecular and cellular mechanisms of regeneration in the brain
Thorsten Boroviak, Sik Yin Ho	Decoding the signals of the second lineage decision in the primate embryo
Cecilia Brassett, Mr Chandra Pasapula	Does Medial Column Instability contribute to Lateral Column Instability in Pes Cavus?
Cecilia Brassett, Mr John Somner, Mr Tony Vivian, Mr Robert Brady	Investigating inferior oblique anatomy with respect to strabismus surgery
Cecilia Brassett, Mr Niel Kang, Miss Salma Chaudhury	Delineating the Variable and Topographical Anatomy of the Suprascapular Nerve for Clinical Applications
Sarah Bray, Carmina Santa Cruz Mateus	The role of Broad in modulating the response to Notch Signalling
Sarah Bray, Javier de Haro Arbona	Mysteries of a Mastermind isoform with links to neural development
Albert Cardona	The connectome of a fly model of Parkinson disease
Tereza Cindrova-Davies	Bioengineering a multicellular endometrial model using collagen scaffolds
Hannah Clarke	Prefrontal-hippocampal parvalbumin expression in a marmoset model of schizophrenia
Kristian Franze, Eva Kresing	The mechanical regulation of neuronal maturation
James Fraser	Computer modelling of action potential conduction velocity supernormality
James Fraser	Investigating conduction velocity supernormality in earthworm nerve axons.
Dino Giussani	Tadalafil therapy for fetal origins of heart disease: Studies in the chicken embryo
Coutney Hanna, Emma Siragher	The ‘matrisome’ in placental development
Allan Herbison, Dr. Paul Morris	Influence of GABA transmission on synchronised activity of the arcuate kisspeptin neuron network
Sue Jones, Bill Colledge	Are kisspeptin neurons in different brain regions the same?
Sue Jones, Bill Colledge	Investigating changes in the excitatory input to arcuate kisspeptin neurons across puberty
Omar Mahroo	Investigating human retinal signals in vivo using the electroretinogram
Omar Mahroo	Investigating human retinal signals in vivo using the electroretinogram
Matt Mason	Functional morphology of the stapes footplate
Matt Mason	Structure and function of the malleus-incus articulation in mammals
Hugh Matthews	A stand-alone system for quantitative measurement of the stretch reflex.
Hugh Matthews	Modulation of the stretch reflex in athletes

Hugh Matthews, Chris Huang	Effects of modified cellular Ca2+ homeostasis on Na+ current activation in mouse skeletal muscle.
Hugh Matthews, Chris Huang, Ollie Bardsley	Sarcoplasmic reticular Ca2+ fluxes during amphibian skeletal muscle excitation contraction coupling
Andrew Murray, Abby Fowden	Fetal cortisol and hepatic mitochondria
Kathy Niakan, Dr. Ahmed Abdelbaki	Role of glucose in early preimplantation mammalian development
Kathy Niakan, Dr. Ahmed Abdelbaki	The Role of Pyruvate in Preimplantation Mammalian Development
Ewa Paluch, Marta Urbanska	The role of tissue fluidity in gastruloid elongation
David Parker	Variability: Ignore, Acknowledge or Harness?
Ole Paulsen	Analysis of network bursts in human cerebral organoids
Jasper Poort	Visual processing during visual detection and discrimination.
Eleanor Raffan	Investigating the genetic associations of common diseases in the Golden Retriever: A GWAS Approach
Eleanor Raffan, Anna Morros-Nuevo	Canine obesity – effects of neutering of food motivation and adiposity
Eleanor Raffan, Dr Ben Keep	How do owner caregiving styles affect dog behaviour?
Emma Rawlins, Claire Bunn	Heterogeneity and Dynamics of Epithelial Stem Cells in the Developing Human Airway
Angela Roberts, Kevin Mulvihill	Investigation of the relationship between early life social development and trait-anxiety in adulthood in the common marmoset.
Alberto Rosello Diez, Isha Goel	Defining spatiotemporal dynamics of gene expression in rat and mouse limb development
Benedicte Sanson	Do Sidekick cell surface molecules have a role in vertebrate morphogenesis?
Milka Sarris	Characterisation of Reverse-Migrating Neutrophils in an E.coli-Injected Zebrafish Model
Wolfram Schultz	The neural representation of economic value in intergenerational sustainability dilemmas: A neuroeconomic analysis and potential policy implications
Christof Schwiening	Altered blood vessel dynamics associated with ageing.
Christof Schwiening	Use of an Arm Raising Protocol to Investigate Altered Blood Vessel Dynamics Associated with Age
Amanda Sferruzzi-Perri	Metabolites as biomarkers of pregnancy health
Keita Tamura	Developing a method for gaze estimation in a freely-moving marmoset
Erica Watson	Folate and the adult heart

Two-term Theory Projects 2024-2025	
Supervisor	**Theory Project Title**
David Bainbridge	What is the therapeutic potential of nitric oxide-enhancing drugs in menopause-related cognitive dysfunction?
Hugh Matthews, Chris Huang, Ollie Bardsley	Modelling ephaptic conduction in cardiac muscle
Christof Schwiening	The relationship between maximal metabolic rate and duration.
Stephen Sawiak	Mind the gap: Can brain age prediction-error predict trait anxiety in marmosets?
Claire Senner	Derivation and characterisation of embryonic stem cells with disrupted nonsense mediated decay

BBS Dissertations 2024-2025	
Supervisor	**Dissertation Title**
David Bainbridge	To what extent can ultrasound be used to diagnose equine placental pathology? An investigation into the efficacy of the diagnostic tool to prevent abortion and pre-term delivery
Riccardo Beltramo	How does the brain represent the spatial location of others?
Cecilia Brasset, Stephen McDonnell (in minor 137)	Evaluating the use of platelet-rich-plasma and corticosteroids in the treatment of knee osteoarthritis
Hannah Clarke	To what extent can schizophrenia be considered a disorder of the entire body, rather than just the brain
Angeleen Fleming	The neurodevelopmental component of neurodegenerative disease
Angeleen Fleming	The neurodevelopmental origins of neurodegeneration: the potential to suppress disease and sculpt the plastic trajectory of our brain health
Alison Forhead	Double trouble: consequences of sharing the intrauterine environment
Alison Forhead	Double Trouble: The developmental programming of type 2 diabetes mellitus in twins
Alison Forhead	Prenatal determinants of ovarian reserve
Dino Giussani	Extracellular vesicles in reproductive research
Courtney Hanna	Convergent Evolution of placentation and genomic imprinting
Sue Jones	Cross-Modal Plasticity in Sensory Deprivation: Understanding Brain Adaptation in Blind Individuals
Sue Jones	Health implications of a diet high in phytoestrogens
Taylor Lynn-Jones	Neurobiological Development of Cognitive Abilities Related to Theory of Mind in Non-Human Primates and Their Relevance to Schizophrenia and Autism
Andrew Murray	Old at heart - myocardial metabolic ageing as a disease
David Parker	Cognitive enhancement
David Parker	Cognitive enhancement
David Parker	Why are there so many neurotransmitters?
Ole Paulsen	What are brain oscillations good for?
Ali Rasooli	An assessment of therapeutic approaches toward Alzheimer’s disease
Angela Roberts	Compare and contrast the role of orbitofrontal cortex and its sub-domains in obsessive-compulsive disorder and anxiety
Stewart Sage	Osmoregulation and the importance of the thirst mechanism
Amanda Sferruzzi-Perri	Are there sexually dimorphic fetal and postnatal outcomes post antenatal corticosteroid exposure for risk of preterm delivery or other health conditions?
Amanda Sferruzzi-Perri	Pregnancy and future maternal risks
Keita Tamura	Decomposing cortical homunculus: organising principles of cortical motor maps revealed by novel technologies
Erica Watson	The role of placental lactogens in the pathophysiology of viviparity
Darin Weinberg (in minor 108)	Critical reflections on the role of formal diagnostic criteria in the psychiatric care of affective disorders

RECENT PUBLICATIONS RESULTING FROM PART II RESEARCH PROJECTS

Recent published papers resulting from, or including work from, Part II projects (with student's name in bold):

Batavanis, M.A., Marway, P., Brassett, C. & Adams, R. (2022). Developing a digital 3D model of the middle ear from micro-CT scans for anatomy teaching. *Clinical Anatomy,* DOI: 10.1002/ca.23836.

Burford, C.M., Cornwall, H.L., **Farr, M.R.B.**, **Santoni, C.M.**, Mason, M.J. (2023) Development and anatomy of the human middle ear. In: Goycoolea, M.V., Selaimen da Costa, S., de Souza, C., Paparella, M.M. (eds) Textbook of Otitis Media, pp.29-48. Springer, Cham.

Campbell, A.S., Minařík, M., Buckley, D., **Anand, T.**, Gela, D., Pšenička, M., Baker, C.V.H. (2025) Molecular insights into electroreceptor ribbon synapses from differential gene expression in sturgeon lateral line organs. *bioRxiv* 2025.02.04.636467.
DOI: https://doi.org/10.1101/2025.02.04.636467

Candia AA, Lean SC, Zhang CXW, McKeating DR, **Cochrane A,** Gulacsi E, Herrera EA, Krause BJ, Sferruzzi-Perri AN. (2024) Obesogenic Diet in Mice Leads to Inflammation and Oxidative Stress in the Mother in Association with Sex-Specific Changes in Fetal Development, Inflammatory Markers and Placental Transcriptome. Antioxidants (Basel). 2024 Mar 28;13(4):411. doi: 10.3390/antiox13040411.

Chadda, K.R., Blakey, E.E., Huang, C.L-H. & Jeevaratnam, K. (2022). Long COVID-19 and postural orthostatic tachycardia syndrome-is dysautonomia to be blamed? Frontiers in Cardiovascular Medicine, section Cardiac Rhythmology. 9:860198. doi: 10.3389/fcvm.2022.860198

Garrud TAC, Teulings NEWD, Niu Y, **Skeffington KL**, Beck C, Itani N, **Conlon FG**, Botting KJ, Nicholas LM, Tong W, Derks JB, Ozanne SE, Giussani DA (2023). Molecular mechanisms underlying adverse effects of dexamethasone and betamethasone in the developing cardiovascular system. FASEB J. 37(6): e22887. doi: 10.1096/fj.202200676RR.

Griffiths, B., Thirunavukarasu, A., Jarvis, G., Brassett, C. & Sarkies, N. (2023) Novel investigation of the dimensions of the optic canal using 3D reconstructions from micro-CT scans. *Clinical Anatomy*, DOI 10.1002/ca.24044.

Guo, Y., Sparks, J., Brown, J. & Brassett, C. (2023) Novel factors affecting barrier function at the oesophagogastric junction. *Clinical Anatomy*, DOI: 10.1002/ca.24131.

Han S.Y, Morris P.G, Kim J.C, **Guru S**, Pardo-Navarro M, Yeo S-H, McQuillan H.J, Herbison A.E (2022) Mechanism of kisspeptin neuron synchronization for pulsatile hormone secretion in male mice. Cell Reports 42(1):111914. doi: 10.1016/j.celrep.2022.111914.

Hilton JR, **Simpson SR**, Sherman ER, Raby-Smith W, Azvine K, **Arribas M, Zou J,** Deiana S, Hengerer B, Cahill EN (2023) Reactivity to conditioned threat cues is distinct from exploratory drive in the elevated plus-maze. European Journal of Neuroscience. doi: https://doi.org/10.1101/2022.03.21.485161

Hutchinson, L., Lambert, S., Brassett, C. & Grainger, A. (2023). Developing a novel ultrasound protocol to measure movement of the subscapularis tendon in shoulder abduction. *Clinical Anatomy*, DOI: 10.1002/ca.24131.

Hutchinson, L., Omer, T., Pizzimenti, M., Grainger, A., Brassett, C. & Lambert, S. (2023) Cadaveric study investigating variation in the nerve supply of subscapularis in relation to its morphology. *Clinical Anatomy*, DOI 10.1002/ca.24044.

Kane AD, Herrera EA, Niu Y, Camm EJ, Allison BJ, Tijsseling D, Lusby C, Derks JB, **Brain KL**, Bronckers IM, Cross CM, Berends L, Giussani DA (2023). Combined Statin and Glucocorticoid Therapy for the Safer Treatment of Preterm Birth. Hypertension 80(4):837-851.

Lakshmi, A., Grainger, A., Brassett, C. & Lyall, H. (2023) Anatomical variations in extensor tendons of the thumb: a study using cadaveric dissection and ultrasound scanning. *Clinical Anatomy*, DOI 10.1002/ca.24044.

Lean SC, Candia AA, Gulacsi E, **Lee GCL,** Sferruzzi-Perri, AN. (2022) Obesogenic diet in mice compromises maternal metabolic physiology and lactation ability leading to reductions in neonatal

viability., AN.Acta Physiol (Oxf). 2022 Oct;236(2):e13861. doi: 10.1111/apha.13861. Epub 2022 Aug 3. PMID: 35880402; PMCID: PMC9787084.

Leavy, A., Salahudin, D., Dowell, J. & Brassett, C. (2023) What factors might be useful in predicting the degree of overlap of latissimus dorsi on the inferior scapula? *Clinical Anatomy*, DOI: 10.1002/ca.24131.

Li, Z-K, Jarvis, G., Nava T., Li, Z-H., **Maxwell, L.**, Brassett, C., Potten, S., Norrish, A., & Pasapula, C. (2024) The "Deep deltoid paradoxical intact sign": Anterior talofibular ligament laxity prevents medical anteroposterior laxity development in the presence of induced planus: a cadaveric study. *Foot & Ankle Orthopaedics*, in press.

Lim, A., Biosse-Duplan, G., Gregory, A., Mahbubani, K., Riche, F., Brassett, C, & Scott, J. (2022) Optimal location for fibular osteotomy to provide maximal compression to the tibia in the management of delayed union and hypertrophic non-union of the fibia. Injury 53(4), 1532-1538.

Lopez, A, **Gorb, A**, Palha, N, Fleming, A, Rubinsztein D.C. (2022). A New Zebrafish Model to Measure Neuronal α-Synuclein Clearance In Vivo. Genes (Basel) 13(5):868. DOI: 10.3390/genes13050868

Lopez-Tello J, Jimenez-Martinez MA, Salazar-Petres E, **Patel R,** George AL, Kay RG, Sferruzzi-Perri AN (2022) Identification of Structural and Molecular Signatures Mediating Adaptive Changes in the Mouse Kidney in Response to Pregnancy., Int J Mol Sci. 2022 Jun 3;23(11):6287. doi: 10.3390/ijms23116287.

Lopez-Tello J., Yong H.E.J., Sandovici, I., Dowsett G.K.C., Christoforou, E.R., Salazar-Petres, E., **Boyland, R.**, Napso, T., Yeo, G.S H., Lam B.Y.H., Constancia, M., Sferruzzi-Perri, A.N. (2023) Fetal manipulation of maternal metabolism is a critical function of the imprinted Igf2 gene. Cell Metab. 2023 Jul 11;35(7):1195-1208.e6. doi: 10.1016/j.cmet.2023.06.007

Maghsoudi, D., West, C., Brassett, C. & Chitnavis, J. (2022) Are there common intraosseous patterns of vascularity in the knee? *Clinical Anatomy,* DOI: 10.1002/ca.23836

Manoharan, S.M., Gray, R., Hamilton, J. & Mason, M.J. (2022) Internal vascular channel architecture in human auditory ossicles. Journal of Anatomy 241:245-258.

Mason, M.J. & **Lewis, M.A**. (2024) Structure and scaling of the middle ear in domestic dog breeds. *Journal of Anatomy* 245: 324-338.

Maxwell, L., Nava, T., Norrish, A., Pizzimenti, M., Brassett, C. & Pasapula, C. (2023) Locking vs. non-locking plate fixation in comminuted talar neck fractures: A biomechanical comparison using cadaveric specimens. *Clinical Anatomy*, DOI 10.1002/ca.24044.

Minařík, M., Modrell, M.S., Gillis, J.A., Campbell, A.S., **Fuller, I.**, Lyne, R., Micklem, G., Gela, D., Pšenička, M., Baker, C.V.H. (2024) Identification of multiple transcription factor genes potentially involved in the development of electrosensory versus mechanosensory lateral line organs. *Frontiers in Cell and Developmental Biology* 12, 1327924. DOI: 10.3389/fcell.2024.1327924

Mohideen, F., El-Khoury, M., Mouritsen-Luxhøj, C., Townend, R., **Choo, A., Wong, E.**, Jarvis, G., Gregory, A., Brown, J., & Brassett, C. (2022) Morphological analysis of the ileocaecal junction and associated clinical implications. *Clinical Anatomy*, DOI:10.1002/ca.23836.

O'Brien, K. A., Gu, W., Houck, J.A., Holzner, L.M.W., Yung, H.W., Armstrong, J.L., Sowton, A.P., **Baxter**, **R.,** Darwin, P.M., Toledo-Jaldin, L., Lazo-Vega, L.V., Moreno-Aramayo, A.E., Miranda-Garrido, V., Shortt, J.A., Matarazzo, C.J., Yasini, H., Burton, G.J., Moore, L.G., Simonson, T.S., Murray, A.J., Julian, C.G. (2023). Genomic selection signals in Andean highlanders reveal adaptive placental metabolic phenotypes that are disrupted in preeclampsia. Hypertension, In Press.

Morris, J. A., **Bardsley, O**. J., Salvage, S. C., Jackson, A. P., Matthews, H. R, & Huang, C. L.-H. (2023). Nernst-Planck-Gaussian modelling of electrodiffusional recovery from ephaptic excitation between mammalian cardiomyocytes. Frontiers in Physiology, section Cardiac Electrophysiology. 14:1280151. doi: 10.3389/fphys.2023.1280151, Manuscript ID: 1280151.

Nayak, S., Dowell, J., Grainger, A., Jarvis, G., Ashwood, N. & Brassett, C. (2024). Morphological variation of Lister's tubercle and its association with the extensor pollicis longus tendon. *Clinical Anatomy*, in press.

Parkin, RA., Murray, AJ., The therapeutic potential of irisin to mitigate the risk of metabolic syndrome in postmenopausal women. (2024) Front Reprod Health, 6:1355922

Salahudin, D., Leavy, A., Dowell, J. & Brassett, C. (2023) How much variation exists in the size and morphology of the thoracolumbar fascia? Clinical Anatomy, DOI: 10.1002/ca.24131.

Sherman ER, **Thomas JJ**, Cahill EN (2022) Review: The bed nucleus of the stria terminalis in threat detection: task choice and rodent experience. Emerging Topics in Life Sciences. https://doi.org/10.1042/ETLS20220002

Sinha, A., **Thirunavukarasu, A.J.**, **Bonshahi, A.** & Brassett. C. (2025) Impact of anatomical research projects for medical students: A cross-sectional survey of academic and professional skills, clinical aspirations and appreciation of anatomy. *Clinical Anatomy*, DOI: 10.1002/ca.24259. Online ahead of print.

Smith, A., Brassett, C., Gooding, C., Abood, A. & Norrish, A. (2022) Vastus lateralis versus rectus femoris muscle flaps for recalcitrant hip joint infection: An anatomical study comparing the effectiveness of acetabular dead space control. Clinical Anatomy, 35(7), 961-973.

Sowton AP., Holzner, LMW., Krause, FN., **Baxter, R.,** Mocciaro, G., Kryzyzanska, DK,. Minnion, M., O'Brien, KA., Harrop, MC., Darwin, PM., Thackray, BD., Vacca, M., Feelisch, M., Griffin, JL., Murray, AJ.. (2025) Chronic inorganic nitrate supplementation does not improve metabolic health and worsens disease progression in mice with diet-induced obesity. Am J Physiol Endocrinol Metab, 328:E69-E91

Talks, C., Brady, R., Jarvis, G., Brassett, C., Vivian, A., & Somner, J. (2024) Investigation of anatomical variation in the superior oblique tendon and its clinical significance. *Clinical Anatomy*, in press.

Tandon, A., Brassett, C. & Wong, K.Y. (2023) Investigating the lumbar artery perforator flap using cadaveric dissection and Doppler ultrasound assessment: An alternative flap for autologous breast reconstruction. *Clinical Anatomy*, DOI 10.1002/ca.24044.

Tong W, Ganguly E, Villalobos-Labra R, Quon A, Spaans F, Giussani DA, Davidge ST (2023). Sex-Specific Differences in the Placental Unfolded Protein Response in a Rodent Model of Gestational Hypoxia. Reprod Sci. 30(6):1994-1997.

Wallis NJ, McClellan A, Mörseburg A, Kentistou KA, Jamaluddin A, Dowsett GKC, Schofield E, Morros-Nuevo A, Saeed S, Lam BYH, Sumanasekera NT, **Chan J, Kumar SS,** Zhang RM, Wainwright JF, Dittmann M, Lakatos G, Rainbow K, Withers D, Bounds R, Ma M, German AJ, Ladlow J, Sargan D, Froguel P, Farooqi IS, Ong KK, Yeo GSH, Tadross J, Perry JRB, Gorvin C, Raffan E, Canine genome-wide association study identifies DENND1B as an obesity gene in dogs and humans, In Press.

West, C., Maghsoudi, D., Wilson, B., Jarvis, G., Brassett, C. & Chitnavis, J. (2022). Detailing vasculature of the infrapatellar fat pad and implications for knee surgery. *Clinical Anatomy*, DOI: 10.1002/ca.23836.

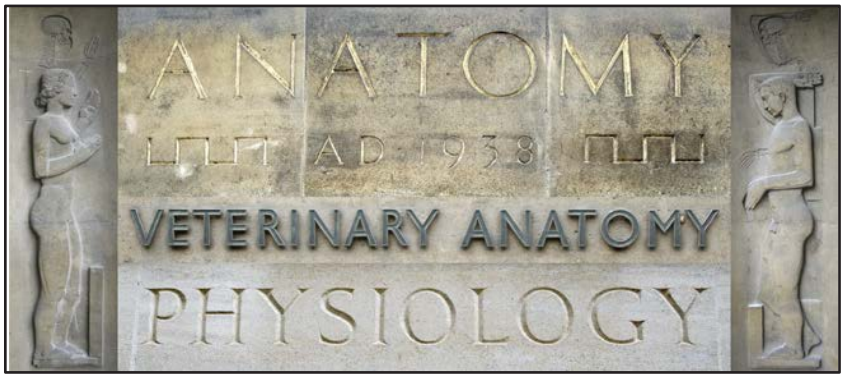
Young R, Lewandowska D, Long E, Wooding FBP, De Blasio MJ, Davies KL, Camm EJ, Sangild PT, Fowden AL & Forhead AJ (2023) Hypothyroidism impairs development of the gastrointestinal tract in the ovine fetus. Frontiers in Physiology 14: 1124938. doi: 10.3389/fphys.2023.1124938.

PROVISIONAL PART II PDN TIMETABLE 2025/26

MICH	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
9-10	**P1N4** Cell Signalling		**P1N4** Cell Signalling	**N1** Developmental Neurobiology	**P1N4** Cell Signalling
10-11	**N1** Developmental Neurobiology		**N3** Circuits and Systems	**P3** Fetal & Placental Physiology	**N1** Developmental Neurobiology
11-12	**P4** Early Development and Patterning	**N3** Circuits and Systems	**P4** Early Development and Patterning	**N3** Circuits and Systems	**P4** Early Development and Patterning
12-1	**P3** Fetal & Placental Physiology				**P3** Fetal & Placental Physiology
1-2					
2-3	**N3** Circuits and Systems (2-4 optional)	**P4** Early Dev. and Patterning (2-4 optional)		**N1** Developmental Neurobiology (2-3 optional)	**N4** Cellular Neuroscience (2-4 optional)
3-4	**N3** Circuits and Systems (2-4 optional)	**P4** Early Dev and Patterning (2-4 optional)	**N2 Experimental Tools** (3-5)	**N2** Experimental Tools **P9** Journal Club (3-5 optional)	**N4** Cellular Neuroscience (2-4 optional)
4-5	**P9** Cell Assembly & Interactions *Adrian Seminar*		**N2** Experimental Tools (3-5) **P9** Cell Assembly & Interactions	**P9** Journal Club (3-5 optional) *Foster Club Talk*	**P9** Cell Assembly & Interactions

LENT	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*
9-10		**N9** Modulation, Plasticity & Behaviour			**N9** Modulation, Plasticity & Behaviour
10-11	**P7** Cancer Pathophysiology		**N9** Modulation, Plasticity & Behaviour	**N6** Higher Order Brain Function and Dysfunction	**P7** Cancer Pathophysiology
11-12	**P8** Systems Physiology	**N6** Higher Order Brain Function and Dysfunction	**P8** Systems Physiology	**P2** Journal Club *(some weeks only)*	**P8** Systems Physiology
12-1	**N6** Higher Order Brain Function and Dysfunction	**P2** Development & Stem Cells	**P2** Development & Stem Cells	**P2** Development & Stem Cells	
1-2					
2-3	**P6** Dev: Cell Differentiation & Organogenesis	**P6** Journal Club (2-4 optional)	**P6** Dev: Cell Differentiation & Organogenesis	**P7** Cancer Pathophysiology	**P6** Dev: Cell Differentiation & Organogenesis
3-4		**P6** Journal Club (2-4 optional)		**P7** Cancer Pathophysiology (optional)	
4-5	*Adrian Seminar*			*Foster Club Talk*	

Students wishing to take PDN-based courses MUST submit BOTH a PDN Application Form via https://www.pdn.cam.ac.uk/undergraduate/part-ii-courses AND the formal NST form.



Department of Physiology, Development and
Neuroscience Downing Street
Cambridge
CB2 3EG

http://www.pdn.cam.ac.uk/