Haematology

Haematology is a clinical discipline that has been at the forefront of molecular medicine. The Haematology BSc will appeal to those who wish to meet patients, develop their understanding of evidence-based patient management and understand how modern molecular approaches are providing improved diagnosis of blood diseases and leading to novel therapeutic agents. Because the issues in many of the topics covered are generic, this course will appeal not only to those who may wish to specialise in haematology, but also to those who may in the future wish to be work in areas where advances in therapy are based on modern molecular approaches (embracing genetics, protein structure and gene therapy). The integrated approach used for the Haematology BSc is proving extremely popular.

**Coordinators**

Dr Carolyn Millar, Hammersmith Hospital Campus, Tel: 020 8383 2153

Email: [c.millar@imperial.ac.uk](mailto:c.millar@imperial.ac.uk)

Professor David Lane, Hammersmith Hospital Campus, Tel: 020 8383 2295

Email: [d.lane@imperial.ac.uk](mailto:d.lane@imperial.ac.uk)

**Aims**

* To provide the student with some of the core knowledge necessary for an understanding of the scientific basis of medicine – gene structure and function, protein structure and function
* To revise some core skills for acquiring knowledge – critically reading and summarising scientific articles, including interpreting clinical trials.
* To provide core knowledge of the scientific basis of some fields of haematology –normal and abnormal haemopoiesis, globin genes and their disorders, the normal platelet, normal haemostasis, the scientific practice of blood transfusion, immunological aspects of haematology

**Objectives**

By the end of the foundation course the student should be able to

* Critically evaluate a scientific article, distinguish a good article from a poor article, explain the relevance of statistical tests used, including those applied to clinical trials, and summarize the key points of the article
* Perform basic statistical tests and report on the statistical significance and scientific relevance of the results
* Be able to explain/discuss
* Normal haemopoiesis
* The genetic control of haemoglobin synthesis and the clinicopathological features of sickle cell disease
* The domain structures of the coagulation proteins, their importance in localising and accelerating the coagulation cascade
* How haemostasis is achieved
* How clots and thrombi are lysed
* How the coagulation system is regulated by anticoagulant proteins
* How platelets are produced, how they function and how their actions can be inhibited
* How and why leukaemia occurs,
* The scientific basis of blood transfusion
* Some of the functions of human blood group systems
* Which red cell and platelet antibodies are of clinical significance and mechanisms of associated disease states.

**Content**

* How to evaluate a scientific article and distinguish a good article from a bad article
* How to evaluate statistical tests used in scientific articles
* The scientific method and ethics in research (including confidentiality, honesty)
* Normal haemopoiesis
* The genetic control of haemoglobin synthesis
* Sickle cell disease and important variant haemoglobins
* Platelet production and function
* The coagulation system, its protein families and how they interact
* The formation of the fibrin clot and its subsequent
* Fibrinolysis
* How the coagulation system is regulated by anticoagulant proteins.
* An illustrative inherited abnormality of platelet function and of a coagulation factor
* Aetiology, pathogenesis and molecular mechanisms of leukaemia in general
* The science of blood transfusion
* Haemoglobinopathy and leukaemia morphology.

**Specific skills**

* Ability to use a microscope
* Ability to critically assess scientific articles and other sources of information

**Format of teaching**

Lectures, journal club, practical classes, computer-assisted learning, study of relevant clinical cases and laboratory results illustrating basic principles.

**Textbooks**

There is no specific textbook that covers the BSc course. Bain BJ, Haematology: a Core Curriculum, Imperial College Press is an appropriate basic text book (useful for the pathology course) but the BSc goes into some topics in more depth. Previous students found Postgraduate Haematology a useful reference book. A copy of Essential Guide to Blood Groups is held in St Mary’s library.

**Introduction - Week 1, St Mary’s Hospital and Hammersmith**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Monday 24Sept Hammersmith Campus** | **Tuesday 25 Sept**  **St Mary’s Campus** | **Wednesday 26 Sept**  **Hammersmith Campus** | **Thursday 27 Sept**  **Hammersmith Campus** | **Friday 28 Sept**  **St Mary’s Campus** |
| 10.00-11.00  Introduction to the course  **Dr C Millar, Professor D Lane**  WEC Lecture Theatre 2 | 10.00-11.00 Haemoglobin, structure and function and genetic control of haemoglobin synthesis  **Professor B Bain**  Cockburn Lecture Theatre | 10.00-11.00  Pathogenesis of sickle cell disease  **Professor I Roberts**  SB-Seminar Room 1&2, CWB | 10.00-11.00  Review of haemostasis  **Professor D Lane**  SB-Seminar Room 1&2, CWB | 10.00-11.00  Study skills and medical writing  **Professor B Bain**  Cockburn Lecture Theatre |
| 11.00-12.00 Haemopoiesis  **Dr Georg Bohn**  WEC Lecture Theatre 2 | 11.00-12.00  **Professor B Bain**  Methods in haemoglobinopathy  diagnosis  Cockburn Lecture Theatre | 11.00-12.00  Journal Club  **Dr Georg Bohn**  SB-Seminar Room 1&2, CWB | 11.00-12.00  Coagulation factors  **Professor D Lane**  **& Dr J Ahnstrom**  WEC Seminar Room 1 | 11.00-12.00  Statistics for the non-statistician  **Professor B Bain**  Cockburn Lecture Theatre |
| 12.00-13.00  Structure and function of red cells  **Dr Mark Layton**  WEC Lecture Theatre 2 | 12.00-13.00  CAL Variant Hbs  (half group)  **Professor B Bain**  Hynds Computer Lab | 12.00-13.00  Microscopy Sickle  **Dr C Millar/ Dr R Babb**  CWB-7S2 Level 7  Commonwealth Building | 12.00-13.00  Anticoagulant mechanisms  Dr J Crawley  WEC Seminar Room 1 | 12.45-13.45  Staff Round  Cockburn Lecture Theatre |
|  | 13.00-14.00  CAL Variant Hbs  (half group)  **Professor B Bain**  Hynds Computer Lab | Sports afternoon |  |  |
| 14.00-15.00  Haematological Immunity - Part 1  **Professor F Dazzi**  WEC Lecture Theatre 2 | 14.00-15.00  **Professor B Bain**  Practical data interpretation, Hbs  Cockburn Lecture Theatre | 14.00-15.00  Platelets  **Professor D Lane**  SB-Seminar Room 1&2, CWB | PRIVATE STUDY |
| 15.00-16.00  Haematological Immunity - Part 2  **Professor F Dazzi**  WEC Lecture Theatre 2 | 15.00 – 17.00  PRIVATE STUDY  Preparation for Journal Club | 15.00-16.00  Anti-platelet agents – paper evaluation,  **Professor D Lane**  WEC Seminar Room 1 | PRIVATE STUDY |
| 16.00-17.00  Gene structure and function  **Dr A Porter**  WEC Lecture Theatre 2 |  |  |

**Venues**

WEC = Wolfson Education Centre; SR = Seminar Room;

CWB = Commonwealth Building; SB = Sub-Basement Seminar Room; LT = Lecture Theatre

SM = St Mary’s**Introduction - Week 2, Hammersmith**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mon 1Oct**  **Hammersmith Campus** | **Tues 2 Oct**  **Hammersmith Campus** | **Wed 3 Oct** | **Thurs 4 Oct**  **Hammersmith Campus** | **Friday 5 Oct**  **Hammersmith Campus** |
| 09.30-10.15  Introduction to Flow cytometry  **Dr Aristeidis Chaidos**  WEC Lecture Theatre 1 | 9.00-10.00  Cellular concepts of oncogenesis  **Dr Donald Mcdonald**  WEC Lecture Theatre 2 |  | 09.00-10.00  Planning for your Project choice  **Dr J Crawley**  WEC Seminar Room 1 | PRIVATE STUDY |
| 10.15-11.00  Molecular techniques  **Dr L Foroni**  WEC Lecture Theatre 1 | 10.00-11.00  Aetiology of leukaemia  **Professor B Bain**  WEC Lecture Theatre 2 | PRIVATE STUDY | 10.00-11.00  Evolution and function of human Blood groups  **Andy Miller**,  Guest Lecturer, National Blood Service  WEC Seminar Room 5 | PRIVATE STUDY |
| 11.15–12.45  Avoiding Plagiarism  **Ms Jackie Cousins**  WEC Lecture Theatre 1 | 11.00-12.00  What is acute leukaemia and what is lymphoma  **Professor B Bain**  WEC Lecture Theatre 2 | PRIVATE STUDY | 11.00-12.00  Cell antigens, antibodies, blood components and cross matching  **Dr Fiona Regan**  WEC Seminar Room 5 |  |
| 13.15-14.45  Use of Refworks, searching the literature (½ group)  **Ms Jackie Cousins**  Library Training Room  1st floor, CWB | 12.00-13.00  CAL leukaemias  **Professor B Bain**  ½ group in the Library Training Room, CWB and ½ group in the 6th floor Labs, Cyclotron Building | Sports afternoon | 12.00 – 13.00  Transfusion problems? HDN and NAIT, Acute and Delayed TR, TRALI, PTP  **Dr Fiona Regan**  WEC Seminar Room 5 | PRIVATE STUDY |
| 15.00-16.30  Use of Refworks, searching the literature (½ group)  **Ms Jackie Cousins**  Library Training Room  1st floor, CWB | PRIVATE STUDY |  |  |
| 16.30–17.30  How a Physician assesses a patient**\***  **Dr Carolyn Millar**  **\*This session is compulsory for BMS & MBBS students who have not done a year of clinical medicine**  Seminar Room 4th floor, Commonwealth Building |  |  | 14.00-15.00  Cross match demonstration  **Mohammed Salad,**  Senior Biomedical Scientist  Room 7S2- Level 7 CWB | 14.00-16.00  Assessment  **Professor D Lane & Dr C Millar**  WEC Lecture Theatre 1 |
|  |  | 15.00 -16.00  Transfusion video and blood components  **Dr F Regan**  WEC Seminar Room 2 |
|  |  |  | 16.00-17.00  Leukaemias Microscopy  **Dr D Marin**  Room 7S2- Level 7 CWB |  |

**Venues:** WEC = Wolfson Education Centre; SR = Seminar Room; CWB = Commonwealth Building; SB = Sub-Basement Seminar Room; LT = Lecture Theatre; SM = St Mary’s