A Guide to Learning and Teaching of Pathology in the Medicine Program at the University of NSW

Overview of learning and teaching in Pathology
Pathology is a scientific discipline which involves the study of diseases, such as infections and cancers, at the genetic, molecular, cellular, and organ levels. It is also a medical specialty that focuses on making diagnoses, but contrary to popular belief, it is not all about blood tests! Pathology examines:

- How and why diseases develop;
- The disease process - what happens to our bodies when we are ill; and
- The effects of diseases, including their symptoms and complications.

Thus a deep knowledge of Pathology is critical to medical practice.

All academic staff of the Department of Pathology at UNSW are passionate about ensuring that you graduate with the necessary knowledge, skills and attitudes to become competent medical practitioners. For that reason, we are involved in curriculum design, teaching and assessment at all levels of the Medicine program, from the very first course in Phase 1 to the last course in Phase 3. You are expected to develop an understanding of Pathology over the course of the Medicine program, and to graduate with the ability to use your knowledge of Pathology and pathological processes in the diagnosis and management of common, classical and critical conditions. We also expect that in the years following graduation, you will continue to use your knowledge of Pathology to develop your skills in whatever branch of Medicine you choose to pursue. In that regard, we have introduced a Pathology selective course in Phase 3 of the Medicine program, which together with a Pathology-based ILP or Honours year and selection of appropriate clinical terms in the first two years after graduation, will provide advanced standing for specialisation in Pathology.

This document sets out in clear terms our expectations (the “what, when, and how”) of your learning in Pathology over the six years of the Medicine program. The information contained here should be read in conjunction with material provided in Program and Course Outlines, as well as in the eMed Curriculum Map.

Pathology in Phase 1

Goals and learning styles in Phase 1
Phase 1 will provide you a foundation on which to build your understanding of Pathology. Many of your learning experiences will be interactive and independent, but there will also be some formal teaching. By the end of Phase 1, you should achieve the following important milestones:

1. An understanding of the common ways in which cells and tissues respond to injury. These responses occur in fairly consistent patterns, which are often referred to as “pathological processes”. They include inflammation, repair, vascular disorders (thrombosis, embolism and infarction) and disorders of growth, including neoplasia. Since these pathological processes form the basis for our modern understanding of disease, a clear understanding of each of these processes is central to the practice of medicine.
2. A more detailed understanding of specific disease states that are common, classical or critical examples of those processes, and which relate directly to the various scenarios considered in Phase 1. There is no attempt to provide comprehensive coverage of all relevant disease states, just moderately in-depth coverage of representative examples.

**Formal learning activities in Phase 1**

During Phase 1, three types of formal learning activities will facilitate the development of your knowledge of Pathology:

**Lectures** are an important way of providing factual information and key concepts on disease states and processes. The Foundations lecture series is particularly important, since it lays out in simple terms the common pathological processes you will encounter in this and subsequent phases. You may not have fully integrated the material presented in the Foundations series for a year or more, but it is essential that you do so by the end of Phase 1.

**Practical classes** are also critical to an understanding of pathology. This is because “pathological processes” were first identified, and are currently defined, by changes in the appearance of cells and tissues. Understanding these microscopic changes will strengthen your grasp of the underlying concepts. Practical classes also allow us to explore the clinical manifestations that arise from abnormalities in cells and tissues (clinicopathological correlation), and introduce the role of laboratory investigations as a critical element of the diagnosis and management of disease. Practical classes will be integrated with the study of relevant Histology (the normal appearance of tissues), since disease states can only be appreciated with reference to changes in normal structure and function.

**Tutorials** will be provided on specific topics that are both important and conceptually challenging. Tutorials will not cover new material, but are an opportunity for you to better understand material that has been presented in lectures and practicals. These sessions utilise macroscopic specimens of diseased tissue from the Museum of Human Disease to assist in your understanding of disease processes and clinicopathological correlation.

The following table captures the broad plan for Pathology in Phase 1. Full details of Pathology teaching sessions are available through eMed Map.

<table>
<thead>
<tr>
<th>Processes</th>
<th>Key disease entities</th>
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</table>
| Foundations | Introduction to pathological processes  
Responses of cells to injury  
Acute inflammation |
| BGDA | Healing and Chronic inflammation  
Pelvic inflammatory disease |
| HMA | Thrombosis, Embolism and Infarction  
Atherosclerosis  
Myocardial infarction  
Cardiac failure |
| AEB | Cellular degeneration  
Vascular disease  
Disorders of growth including neoplasia  
Dementia; Parkinson’s disease  
Stroke  
Lymphadenopathy  
Breast cancer |
| SH | Acute inflammation, repair, chronic inflammation Neoplasia | Pneumonia; Tuberculosis; Asthma; Lung cancer |
| HMB | Inflammation, necrosis, repair, regeneration | Diabetes mellitus; Hepatitis; Cirrhosis; Acute kidney injury |
| AEA | Degeneration Neoplasia including carcinogenesis Haematological disorders | Arthritis; Metabolic bone disease Bowel cancer Anaemia |

**Resources for independent learning in Phase 1**

- *Glossary of terms* – this should assist you to become familiar with the language of Pathology, which is the language of Medicine.
- *Text* – Robbins Basic Pathology (9th Ed) – this provides background information to aid your understanding of pathological processes, morphology and clinicopathological correlation.
- *Museum of Human Disease* – “Specimens of the Week” – these encourage you to utilise the vast learning resources of the Museum of Human Disease to learn about diseases relevant to the current scenario.
- *e-Learning*
  - Images of Disease online – contains digitised images of macroscopic specimens of diseased tissue, correlated with clinical manifestations of disease, as well as microscopic and radiological images. Images of Disease is now available as an interactive app for iPhones and iPads, and can be downloaded free after logging in with zID and zPass from [http://iod.med.unsw.edu.au](http://iod.med.unsw.edu.au). A version for Android devices and Windows phones will become available soon. The program can also be viewed using standard web browsers on tablet computers and laptop or desktop computers. More information is available from: [http://iod.med.unsw.edu.au/iod.nsf/Online_Help.pdf](http://iod.med.unsw.edu.au/iod.nsf/Online_Help.pdf).
  - Virtual slides – these are digitised images of tissue sections, which can be viewed in a web browser, simulating use of a real microscope. All practical classes use virtual slides. We have created online virtual microscopy adaptive tutorials using some of these slides, to assist in your interpretation of microscopic changes in tissue, and to remediate common misconceptions.
  - Testable online concept maps (pathogenesis maps) related to topics covered in several courses. It is intended that these testable maps will help you to connect the underlying mechanisms of disease with resulting clinical manifestations. We have recently shown that the use of such maps enhances learning.

**Assessment in Phase 1**

Assessment will largely be through short answer questions and/or objective item (multiple choice) questions in each end of course exam, as well as in the end of Phase theory exam. We will not test everything, but we will sample your knowledge of Pathology in a manner that can reliably determine if you have acquired the basic knowledge required to progress. There is also a Pathology component in all practical assessments during the Phase, and you must also pass this component to progress.
Exams should not be a daunting challenge if you work consistently and diligently, and ensure that you understand fully the key pathological processes you will encounter during Phase 1.

**Pathology in Phase 2**

**Goals and learning styles in Phase 2**
Phase 2 presents opportunities to consolidate your understanding of pathological processes acquired during Phase 1, to expand your breadth of knowledge of common diseases, and to develop your skills in the rational use of diagnostic investigations.

**Formal learning activities in Phase 2**
During Phase 2, there are two types of formal learning activities that will facilitate the development of your knowledge of Pathology. Please be aware that there are also increasing opportunities for you to understand the role of pathology in the diagnosis and management of disease, both in Case Method Tutorials, and in your clinical work within hospital settings.

Lectures provided as part of the on-campus sessions in Phase 2 will cover a range of common diseases.

**Practical classes** will be on a smaller scale than those you experience in Phase 1, and will give you a chance to again appreciate the microscopic and macroscopic appearance of common diseases. They will also have a strong clinical focus, with an emphasis on clinicopathological correlation, and on the appropriate use of investigations.

The following table captures the broad plan for pathology in Phase 2.

<table>
<thead>
<tr>
<th>Processes</th>
<th>Key disease entities</th>
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<tbody>
<tr>
<td>BGD</td>
<td>Leukaemia, Cervical cancer</td>
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<tr>
<td>Adult Health 1 Acute inflammation</td>
<td>Pneumonia, Appendicitis, Pancreatitis, Infective endocarditis</td>
</tr>
<tr>
<td>Chronic inflammation</td>
<td>Valvar heart disease</td>
</tr>
<tr>
<td>Vascular disease</td>
<td>Myocardial infarction, Pulmonary embolism</td>
</tr>
<tr>
<td>Adult Health 2 Chronic inflammation</td>
<td>Arthritis</td>
</tr>
<tr>
<td>Healing and Repair</td>
<td>Fracture healing</td>
</tr>
<tr>
<td>Oncology Neoplasia</td>
<td>Common malignancies, including those of the lung, prostate, oesophagus, stomach, pancreas, thyroid, bladder</td>
</tr>
<tr>
<td>Hyperplasia</td>
<td>Common hyperplastic diseases, including those of the thyroid and prostate</td>
</tr>
<tr>
<td>SH</td>
<td>Environmental lung diseases, including chronic obstructive pulmonary disease (COPD) and pulmonary fibrosis</td>
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<tr>
<td>Neoplasia</td>
<td>Skin neoplasms, including melanoma</td>
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**Resources for independent learning in Phase 2**
As per Phase 1, plus:
• eDiagnostic - an online resource for learning about the rational cost-effective use and interpretation of diagnostic investigations – accessible via the “Quick Links” menu in eMed (login required);
• A suite of online adaptive tutorials relating to common imaging investigations, including Chest X-Rays, CT scans, MRI and molecular imaging – accessible via the Phase 2 Coursework Moodle module.

Assessment in Phase 2
Pathology contributes to an online objective item examination focusing on Biomedical Sciences, Clinical Medicine, Public Health, Quality Medical Practice and Ethics which is a barrier component of the Phase 2 Integrated Clinical Examination. Hence it is important that you integrate your understanding of Pathology with your clinical learning during this phase.

Pathology in Phase 3

Goals and learning styles in Phase 3
In Phase 3, learning in Pathology will build upon the material dealt with in Phase 1 and Phase 2. Most teaching will be in Biomedical Science tutorials, delivered within the hospital setting by local specialist pathologists, university academics, or other clinicians. Topics that were comprehensively covered in earlier Phases are assumed knowledge in Phase 3 and will not be dealt with in detail again. Please note that the biomedical sciences correlation viva at the end of 5th Year may include references to knowledge from all Phases.

The Phase 3 program stresses understanding of the Biomedical Sciences in the context of clinical scenarios. The focus is on clinical presentations, and an approach to diagnosis and management in terms of the underlying science. Relevant biomedical science knowledge includes, but is not limited to anatomical structures, the pathophysiological processes that affect those structures, and the effect of pharmacological treatment on those processes.

Formal learning activities in Phase 3
To assist in your development of a sound approach to diagnosis and management based upon knowledge of biomedical sciences, the Phase 3 program includes a series of teaching sessions which cover many of the important topics for study. Teaching in the biomedical sciences will consist of 24 hospital-based tutorials, as well as a total of 4 theme-based Campus Days, as well as Diagnostic Imaging seminars.

Hospital-Based Tutorials
During Year 5 Medicine and Surgery clinical terms, you will be expected to attend 24 x 1.5-hour hospital-based biomedical science tutorials. In the major metropolitan hospitals, tutorials will be led predominantly by conjoint members of academic staff and staff specialists in the Departments of Anatomical Pathology, Clinical Biochemistry, Microbiology and Haematology. Tutorials will be replicated at RCS campuses.

<table>
<thead>
<tr>
<th>Tutorial Title</th>
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<tbody>
<tr>
<td>Acute dyspnoea and haemoptysis</td>
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<tr>
<td>Anaemia</td>
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<tr>
<td>Anaphylaxis, Allergy and Shock</td>
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The Phase 3 Biomedical Sciences Student Manual contains learning objectives and case protocols associated with each tutorial topic. This information provides a useful guide to the depth of knowledge and understanding that you are expected to achieve. It should also serve to remind you about material covered in earlier Phases that is included within the scope of knowledge expected by the end of 5th Year. This is supplemented by a CD-ROM containing 20 self-learning modules.

**Campus Days**

Biomedical Sciences Campus Days are based on the following themes:

- Obesity and cardiovascular disease
- Infectious diseases
- Acute surgical emergencies and post-surgical care (including fluid replacement, analgesia and fluid balance)
- Head and spinal injury

Learning activities include multidisciplinary case-based seminars, in which Pathology plays a prominent role.

**Resources for independent learning in Phase 3**

Resource materials for Biomedical Sciences in Phase 3 include:

- The learning objectives, case protocols and reference materials in the Student Manual;
- A series of 20 computer-assisted self-learning modules available from a self-enrolment module in Moodle, titled ‘Phase 3 Biomedical Science Modules’. To enrol, please follow this link (log in using zPass and zID required) then enter the enrolment key: [http://moodle.telt.unsw.edu.au/course/view.php?id=14483](http://moodle.telt.unsw.edu.au/course/view.php?id=14483)
  
  Student enrolment key: P3BMS
Images of Disease online, available for smart phones, tablet computers and laptop or desktop computers – http://iod.med.unsw.edu.au (see further information about this program via http://iod.med.unsw.edu.au/iod.nsf/Online_Help.pdf)

- eDiagnostic – an online resource for learning about the rational cost-effective use and interpretation of diagnostic investigations – accessible via the “Quick Links” menu in eMed (login required);
- A suite of online adaptive tutorials relating to common imaging investigations, including Chest X-Rays, CT scans, MRI and molecular imaging – accessible via the Biomedical Sciences component of the Phase 3 Moodle module.
- Online self-assessments for a number of topics;
- Online recordings of Biomedical Sciences tutorials and macroscopic Pathology demonstrations.

A major focus of Biomedical Sciences in Phase 3 is to develop your understanding of the rational use of diagnostic investigations. To this end, we want you to learn how common investigations are performed, through your own study or discussion with your tutors. In addition, you are required to complete a number of educational activities which should give you some insight into the provision of diagnostic services. They include:

- Attendance at four hospital laboratories (e.g. Clinical Biochemistry, Clinical Pharmacology, Haematology, Molecular Genetics, Immunology, Microbiology, Anatomical Pathology).
- Attendance at four macroscopic Pathology demonstrations, of which no more than 1 can be derived from attendance at autopsies carried out by the Institute of Forensic Medicine (IOFM).

**Assessment in Phase 3**

All students must pass the Phase 3 Biomedical Sciences Correlation Viva examination prior to graduation. The intention of this barrier examination is to test your understanding of biomedical sciences in the context of clinical scenarios. Assessment of knowledge of material covered in macroscopic pathology demonstrations and laboratory visits will comprise part of the examination. Anatomical and pathological specimens, microbiological reports, diagnostic laboratory results and imaging investigations may also be used as a focus of discussion during the viva voce examination.

Please note that viva stations will be based on learning activities and/or supporting materials in the Phase 3 Biomedical Sciences curriculum, including:

- Hospital-based tutorials and their associated case protocols in the Phase 3 Biomedical Sciences Student Manual;
- Mandatory attendance at hospital-based diagnostic laboratories and macroscopic Pathology demonstrations, documented in your Clinical Skills Acquisition booklets;
- Computer-assisted learning modules in the Phase 3 "Survival Pack" CD-ROM; and
- Phase 3 Campus Day activities and Diagnostic Imaging seminars.
Summary of formal teaching activities in Pathology in MED3802

<table>
<thead>
<tr>
<th>Phase</th>
<th>Lecture</th>
<th>Science Practical</th>
<th>Tutorial</th>
<th>SGS</th>
<th>Seminars</th>
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<tr>
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<td>52</td>
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