



UNSW
AUSTRALIA

Medical Sciences
Medicine

PATH 3205

**Molecular Basis of Inflammation and
Infections
MBII**

**Semester 1
2016**

CRICOS Provider Code 00098G

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Please read this outline in conjunction with the following pages on the [School of Medical Sciences website](#):

- [Advice for Students](#)
- [Learning Resources](#)

(or see "STUDENTS" tab at medicallsciences.med.unsw.edu.au)

Course staff

Department of Pathology, School of Medical Sciences

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A/Prof N Tedla

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Dr M Dziegielewski

Dr C Herbert

Guest Lecturers and Tutors, Faculty of Medicine

Prof M Grimm

Dr K Bryant

A/Prof W Sewell

Dr T Thai

A/Prof J Post

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Dr P Phillips

Ms M Watson

Dr G Sharbeen

Guest Lecturers, UNSW Australia

Ms Gwyn Jones, Learning Centre UNSW Australia

Course objectives

PATH3205 Molecular Basis of Inflammation and Infection builds on fundamental principles of human disease taught in PATH2201 Processes in Disease. This is achieved in PATH3205 by focusing on the underlying molecular basis or 'molecular mechanisms' of the disease process in humans.

Core topics in Pathology are presented as themed '*Modules*' and the '*Research Lecture and Laboratory Series*' will use examples and 'state-of-the-art' research techniques that address these molecular mechanisms primarily in the context of Inflammation and Infection. Students will have opportunities for interactive learning and engagement in practical and research laboratory settings and upon course completion should have a better understanding of molecular mechanisms that underlie human disease and research topics in the areas of Inflammation and Infection.

Course details

This course is offered during Semester I and counts for six units of credit (6OC).

PATH2201/PATH2202 (Processes in Disease/Processes in Disease for Health and Exercise Science) are prerequisites for the course. It is also advantageous for students to have undertaken previous or concurrent study in ANAT3231 Cell Biology and BABS3041 Immunology I.

Course aims

The course **PATH3205 Molecular Basis of Inflammation and Infection** aims to:

1. Promote understanding of the molecular basis of inflammation, immune responses to infection, allergy, autoimmunity, and diseases of the cardiovascular and respiratory systems. These concepts are introduced in the context of common human diseases or disease processes.
2. Relate the above concepts of processes in human disease to biomedical research via the '*Research Lecture and Laboratory Series*', which provides introductory lectures on start-of-the-art areas of medical research, as well as associated laboratory-based workshops.
3. Develop oral and written communication skills, which underpin dissemination of discoveries in human disease via medical research.
4. Develop professional skills such as reflective practice and teamwork.

These aims will be achieved by specialist teaching of core concepts and research techniques by academic pathologists who are clinically and/or scientifically trained.

The course aims to integrate molecular aspects of human disease into the context of histopathology and macroscopic specimens for each above mentioned disease topics.

Furthermore, course aims mesh well with other disciplines including Anatomy, Biochemistry, Immunology, Microbiology, Pharmacology and Physiology.

Student learning outcomes

At the completion of this course, you should be able to:

1. Describe the causes, pathogenic mechanisms, macroscopic and microscopic appearances and clinical consequences of inflammation, immune responses to infection, allergy, autoimmunity, and diseases of the cardiovascular and respiratory systems.
2. Work in collaborative teams to communicate concepts of disease in an oral presentation to non-specialist audiences.
3. Work independently to communicate, report and evaluate '*Research Lecture and Laboratory Topics*' in written form by using specialist scientific journal articles and information from the *Research Lecture and Laboratory Series*. Demonstrate an understanding of findings and interpretations within Laboratory Reports.
4. Understand the relevance of laboratory techniques in the diagnosis of human disease.
5. Demonstrate reflective practice and teamwork in your development of professional skills.

Learning and teaching rationale

The intended learning outcomes are achieved through study of the common patterns of response to injury, which are often referred to as pathological processes. To understand these processes, you will draw on your knowledge of normal anatomy, histology, biochemistry and physiology.

PATH2201 Processes in Disease has introduced the fundamental concepts for the specific diseases to be addressed in PATH3205. This will involve more detailed discussion of recent advances in knowledge pertaining to the molecular basis of inflammation and infection, autoimmunity, as well as research and diagnostic techniques.

Future directions

The course complements PATH3206 *Cancer Pathology*, ANAT3212, BABS3041, PATH3207 *Musculoskeletal Diseases* and PATH3208 *Cancer Sciences: Research Design, Measurement and Evaluation*, which also run in the same academic year.

For those wishing to pursue a career in research or hospital based laboratory work, PATH3205 will not only develop your basic knowledge of molecular processes, but also provide a framework for understanding how these processes link to the modern practice of medicine and medical research.

Similarly, for those who may wish to pursue a career in the health sciences, the course will provide an understanding of the cellular and molecular processes underlying the clinical manifestations of disease. Furthermore, development of ePortfolios will assist students in reflecting on their development of professional skills and in understanding career pathways in medical research and beyond.

Teaching strategies

The course comprises lectures, tutorials, practical classes, '*research lectures and laboratories*' and assignments, which cover general and specialist aspects of the molecular basis of disease.

The course employs a variety of teaching modes in order to facilitate your learning:

- 1) A **collaborative, team-based approach** to learning. It is anticipated that students will have an enhanced learning experience through the use of team quizzes, peer teaching and team projects. You are also encouraged to utilise your allocated teams as study groups and build your e-Portfolios.
- 2) A series of **lectures** introduce you to pathological processes, as well as specific examples of those processes affecting organs and tissues. The core lecture series focuses on specific diseases such as meningitis, HIV infection and diabetes. The tutorials are designed to be complementary to lectures and place these topics in the larger context of human disease. A list of aims and objectives is included for each lecture and tutorial, along with points for discussion and a list of suggested additional resources available on the web.
- 3) Small group **tutorials** are intended to extend and amplify your understanding of material presented in lectures in an interactive format, where you are encouraged to clarify any difficulties regarding the concepts discussed. Students will be allocated into teams and will complete individual and team quizzes and work collaboratively on interpretation of clinical problems and/or investigation results. Pre-reading will be assigned for each tutorial;
- 4) **Practical classes** employ computer-based virtual microscopy, in order to permit correlation between disease processes, changes in cells and tissues at the microscopic level and the manifestations of disease. Practical classes and tutorials in Molecular Basis of Inflammation and Infection are aimed at amplifying and extending your understanding of the topics gleaned from attendance at lectures and reading of the recommended text, as well as correcting any misconceptions. Practical and tutorial classes will reinforce the clinico-pathological correlations associated with each topic. They are intended to help you to acquire the ability to recognize the macroscopic and microscopic features of pathology specimens and to relate the pathology to clinical application. Macroscopic “pots” will be generally used in conjunction with projected microscopic slides, x-rays and other materials;
- 5) The course also includes several ‘**Research Lecture and Laboratory Series**’ topics that, as the name would suggest, focus on recent research-led advances in molecular medicine. This section of the course is an innovation for the Department of Pathology and introduces the ‘world of medical research’ by way of specialist lectures that directly relate to research workshop laboratories; demonstrating ‘state-of-the-art’ molecular techniques that are key in diagnosis of disease. We hope it will provide you with an exciting and challenging glimpse of current approaches in medical research.

Prizes

Two prizes will be awarded for Molecular Basis of Inflammation and Infection:

1. Best team performance in tutorial quizzes (based on both team and individual scores);
2. Best performance by team members in a combination of mid-session and end of course exam.

Research experience

Opportunities exist for all students wishing to undertake undergraduate and postgraduate research program within the School of Medical Sciences. Information can be accessed via the directory for the School of Medical Sciences at:

<http://medicallsciences.med.unsw.edu.au/research>

Course administration

Administrative and general problems related to your attendance, or the content and conduct of the course, can in the first instance be addressed by consulting A/Prof. Patsie Polly (patsie.polly@unsw.edu.au) by e-mail. Students wishing to see other members of staff should make an appointment via e-mail. If students have difficulties of a personal nature, or with the course, they should contact the School's Grievance Officer, A/Prof Nick Di Girolamo (n.digirolamo@unsw.edu.au).

Resources

Recommended text

You are expected to acquire the following text:

Robbins. Basic Pathology, 9th Ed. V. Kumar, RA.K. Abbas & J. Aster (2012). Saunders & Co. Philadelphia PA; Elsevier Saunders (eBook available via UNSW Library website).

Reference

Students wishing to study the molecular biology or clinical features of diseases in greater depth might consider the following texts:

Robbins and Cotran Pathologic Basis of Disease. 9th edition. Eds. V. Kumar, A.K. Abbas, N. Fausto and J. Aster. (2015) Elsevier Saunders (eBook available via UNSW Library website).

Janeway's Immunobiology 8th Edition. Kenneth Murphy. 2012. Garland Science, Taylor & Francis Group, LLC. <http://www.ncbi.nlm.nih.gov/books/NBK10757/>

See also: [Learning Resources](#)

Assessment

The breakdown of assessments in the course is as follows:

Research team presentation	15%
Lab Reports	7.5%
Individual and team performance in tutorial quizzes	15% (4 x 3.75%)
On-line progress assessments (x2)	5%
ePortfolios/Workshop UNSW	2.5%
Practical Examination	10%
Final examination (2 hours)	45%

Research Team presentation (15%)

Students will work in research teams to prepare a 15 minute PowerPoint presentation on a topic to be allocated in week 2, S1. Several one-hour sessions will be set aside for students to present their work to the rest of the group. One student from each team will be designated to deliver the presentation by random draw (so all students must come prepared), and the remaining students in the team will be responsible for answering questions relating to the presentation.

Prior to the formal student presentations, The Learning Centre will run two presentation skills sessions and a follow-up session. This is an important part of developing skills for the research team presentation.

The group project will be assessed by peers and academics. The peer assessment mark will weigh 25% and the academic assessment mark will weigh 75% of the total mark for this assessment. Sample assessment forms are included below.

Lab Reports (7.5%)

Students will be required to complete a literature review and methodology report on research lab-work on their allocated research topic. Completed laboratory reports must be submitted via Turnitin within Moodle by Week 12 by 10am 25/05/2015. Topics will be allocated by a random draw. Late Lab Reports will attract a penalty of 10% of the report mark per week or part thereof.

On-line progress assessments (5%)

Students will be offered two online assessments during the course. These are to be completed during the 10 days in which each is available (students will be notified in lectures when this will be). The assessments will include objective items in the same style as the final examination. Students may attempt the assessments as often as they wish within the time allowed until they receive a satisfactory score (>90%). The aim of these assessments is to provide students with feedback on their progress rather than to rank students. Students will receive 2.5% of the total mark for satisfactory completion of each of the assessments.

Individual and team performance in tutorial quizzes (15%: 4x 3.75%)

Small group tutorials are intended to extend and amplify your understanding of material presented in lectures in an interactive format, where you are encouraged to clarify any difficulties regarding the concepts discussed. Students will be allocated into teams and will complete individual and team quizzes and work collaboratively on interpretation of clinical problems and/or investigation results. Pre-reading will be assigned for each tutorial.

ePortfolios/Workshop UNSW

(2.5%)

Students will be asked to reflect on many aspects of their learning journey in this course within Moodle. This will include 1. Reflections on their research team project using their ePortfolios and teamwork using Workshop UNSW, 2. Reflections on their research lab experiences and 3. Reflections on tutorial quizzes.

When reflecting on their research experience within their ePortfolios, students should **NOTE** the following: The ePortfolio should be used as a reflective space, rather than discussing research content and any data or unpublished methods that may be presented in the research lectures and laboratories. Students should NOT upload research data into their ePortfolio. If using WordPress as a personal blog, always set your ePortfolio to 'private' in order to avoid general visibility.

Assessment of ePortfolio will be based on the following criteria: demonstration engagement with ePortfolio, reflective practice, building an awareness of skills, including subject/course related skills, professional development and related skills, transferrable skills, development of career awareness and skills for future employability or post-graduate programs, work experience, personal values, strengths and weaknesses.

Practical examination

(10%)

Students will complete a practical examination during the final week of term (scheduled in normal teaching time). This will consist of a series of 6 stations each with questions based on material presented during term. Students will rotate around the stations, spending 5 minutes per station.

Final examination

(45%)

Students will complete a two-hour written exam at the end of session that will contribute 45% of your overall mark. This will include objective items and five short answer questions. Some of the short answer questions may be directly from the Trial Examination Questions in the manual, the learning objectives or the on-line self-assessment. Marks will be weighted as follows:

Short answer	75% (5 x 15 mins each)
Objective items	25%

The short answer questions vary in style, but are intended to provide you with the opportunity to demonstrate your understanding of the topic and your ability to integrate ideas rather than simple "regurgitation of facts".

Supplementary examination

If required, it is intended that supplementary exams for the School of Medical Sciences in Semester 1, 2016 will be held on the 12th, 13th and 14th July, 2016. Special considerations

sought outside the 3 day time period WILL NOT be accepted except in TRULY exceptional circumstances.

Students who believe that they are eligible for further assessment must contact A/Prof Polly to seek further information.

PATH3205 Course Timetable

NOTE: Changes in the timetable will be announced on Moodle.

Week	Date	Time	Location	Lecturer	Title
1	Mon 29/2	12-1pm	CLB1	Polly/Luo Luciani	Introduction to Molecular Basis of Inflammation and Infection Orientation to Immunology Concepts ** Presentation topics announced**
Module 1: Immunology of Infection					
		1-2pm	CLB1	Luciani	Basic Concepts: Immune Responses against Pathogens
	Thurs 3/3	11am-12pm	Teaching lab: G06/G07	Luciani/Bull	Interactive Immunology: From Basics to Immunotherapy Hepatitis C Lecture and Laboratory Series
		5-6pm	CivEng 109	Bull	Hepatitis C: Understanding the Virus – I
		6-7pm	CivEng 109	Bull	Host immune response to Hepatitis C – II
2	Mon 7/3	12-1pm	Teaching Labs: G16/G17	Bull/Luciani	Hepatitis C – Virology / Immunology Lab – III
		1-2pm	CLB1	Bryant	Researching Rheumatoid Arthritis
	Thurs 10/3	4-5pm	Mat B	Jones/Polly	Science communication I: Presentation and collaborative learning skills
		5-6pm	Teaching Labs: G6/G7	Polly	Museum Study Session 1 – Acute and Chronic inflammation
		6-7pm	Tutorial rooms: G6/G7 G16/G17	See allocation	Tutorial 1 – Acute and Chronic inflammation QUIZ 1
Module 2: Disturbances of Immunity and Inflammation, HIV and Autoimmunity					
3	Mon 14/3	12-1pm	CLB1	Wakefield	Autoimmune disease I
		1-2pm	CLB1	Wakefield	Autoimmune disease II
	Thurs 17/3	4-5pm	Mat B	Jones/Polly	Science communication II: Presentation and collaborative learning skills
		5-7pm	Teaching Labs: G6/G7	Bryant	<i>Rheumatoid Arthritis Research Lecture; Rheumatoid Arthritis Research Lab</i>
4	Mon 21/3	12-1pm	CLB1	Post	HIV – the biological basis of disease, treatment and prevention - I
		1-2pm	CLB1	Post	HIV – the biological basis of disease, treatment and prevention – II
	Thurs 24/3	4-5pm	Mat B	Di Girolamo	Stem Cells and Stem Cell Deficiency - Relationship to Ocular Inflammation
		5-7pm	Teaching Labs: G6/G7	Di Girolamo/ Richardson	Stem Cells Research Lab
Mid semester break 25 Mar - 3 Apr					
Module 3: Immune Responses in Inflammation, Asthma and Inflammatory Bowel Diseases (IBD)					
5	Mon 4/4	12-1pm	CLB1	Tedla	Terminating immune response: an essential component of host immunity
		1-2pm	CLB1	Dziegielewski	Renal Disease - Principles/Examples
	Thurs 7/4	4-6pm	Teaching Labs: G16/G17	Tedla	<i>Practical class – Autoimmunity</i>
		6-7pm	Tutorial rooms: G6/G7 G16/G17	See allocation	Tutorial 2 – HIV and Autoimmune disease QUIZ 2
6	Mon 11/4	12-1pm	CLB1	Sewell	Molecular basis of Allergy
		1-2pm	CLB1	Kumar	Molecular basis of Asthma
	Thurs 14/4	4-5pm	Mat B	Kumar	Smoking and the Lung
		5-7pm	Teaching Labs: G6/G7	Herbert	<i>Asthma Research Lecture; Asthma Research Lab</i>
7	Mon 18/4	12-1pm	CLB1	Grimm	Immune-mediated Bowel Diseases – Inflammatory Bowel Diseases and Coeliac Disease
		1-2pm	CLB1	Luo	<i>IBD Research Lecture</i> On-line assessment I
	Thurs 21/4	4-6pm	Teaching Lab: G08	Luo	<i>IBD Research Lab</i>
		6-7pm	Tutorial rooms: G6/G7 G16/G17	See allocation	Tutorial 3 – Immune Responses in Inflammation eg. Allergy, Asthma and IBD QUIZ 3
Module 4: Systemic Inflammation: Effects					

Research Team Presentations					
9	Mon 2/5	12-1pm	CLB1	Polly	Student presentations
		1-2pm	CLB1	Polly	Student presentations
	Thurs 5/5	4-5pm	Mat B	Polly	Inflammation and Musculoskeletal Effects – Cachexia
		5-7pm	Teaching Labs: G6/G7	Polly	Cachexia Research Lab
10	Mon 9/5	12-1pm	CLB1	Polly	Student presentations
		1-2pm	CLB1	Polly	Student presentations On-line assessment II
	Thurs 12/5	4-5pm	Mat B	Phillips	Inflammation and Pancreatic Cancer
		5-7pm	Teaching Labs: G6/G7	Phillips/Sharbeen	Pancreatic Disease Research Lab
11	Mon 16/5	12-1pm	CLB1	Polly	Student presentations
		1-2pm	CLB1	Polly	Student presentations
	Thurs 19/5	4-5pm	Mat B	Thomas	Inflammation and Cardiovascular Dysfunction
		5-7pm	Teaching Labs: G6/G7	Thomas	Inflammation and Cardiovascular Disease Research Lab
12	Mon 23/5	12-1pm	CLB1	Polly	Student presentations
		1-2pm	CLB1	Polly	Student presentations **Research Lab reports due 10am 25/05/2016-G27 Biological Sciences**
	Thurs 26/5	4-5pm	Mat B	Kumar	Cardiovascular Disease Examples and Complications
		5-6pm	Teaching Labs: G6/G7	Polly	Museum Study Session 2 –Cardio-respiratory
		6-7pm	Tutorial rooms: G6/G7 G16/G17	See allocation	Tutorial 4 – Cardiovascular disease QUIZ 4
13	Mon 30/5	12-1pm	CLB1	Polly/Jones/Luo	'Feedback'
		1-2pm	CLB1	Kumar	Revision
	Thurs 2/6	5-7pm	TBA	Polly	** Practical examination **

KEY:

Di Girolamo	A/Prof Nick Di Girolamo	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Dziegielewski	Dr Mark Dziegielewski	Department of Pathology, UNSW
Grimm	Prof Michael Grimm	Inflammation and Infection Research Centre (IIRC); St George and Sutherland Clinical School; St George Hospital
Jones	Ms Gwyn Jones	The Learning Centre, UNSW
Kumar	Prof Rakesh Kumar	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Herbert	Dr Cristan Herbert	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Polly	A/Prof Patsie Polly	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Luo	Dr Annie Luo	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Richardson	Mr Alex Richardson	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Bull	Dr Rowena Bull	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Luciani	Dr Fabio Luciani	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Wakefield	Prof Denis Wakefield	Department of Pathology, Associate Dean-Faculty of Medicine, UNSW
Velan	Prof Gary Velan	Department of Pathology, UNSW
Thomas	A/Prof Shane Thomas	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Tedla	A/Prof Nicodemus Tedla	Inflammation and Infection Research Centre (IIRC); Department of Pathology, UNSW
Sewell	A/Prof William Sewell	St Vincent's Hospital
Post	A/Prof Jeffrey Post	Prince of Wales Clinical School, UNSW and Prince of Wales Hospital
Sharbeen	Dr George Sharbeen	Prince of Wales Clinical School, UNSW
Phillips	Dr Phoebe Phillips	Prince of Wales Clinical School, UNSW
Bryant	Dr Katherine Bryant	Inflammation and Infection Research Centre (IIRC); Liverpool Hospital

PATH3205 Student Manual

The PATH3205 Student Manual clearly outlines the learning objectives for each tutorial topic and practical class. Although these learning objectives may not all be covered within a particular class it is imperative that you address each of these issues during your own period of study and revision. Trial examination questions are included where appropriate, so that you can assess your own progress by answering the question pertaining to the relevant topic at the end of each week.

The Pathology Manual contains a large amount of valuable information that will facilitate your study. In particular you should become familiar with the Glossary of Terms and the Table of Reference Ranges in Pathology.

In addition, there are many resources available on the web, which vary from simple patient information brochures to on-line pathology courses to information on the latest research. Some general sites you may find useful are:

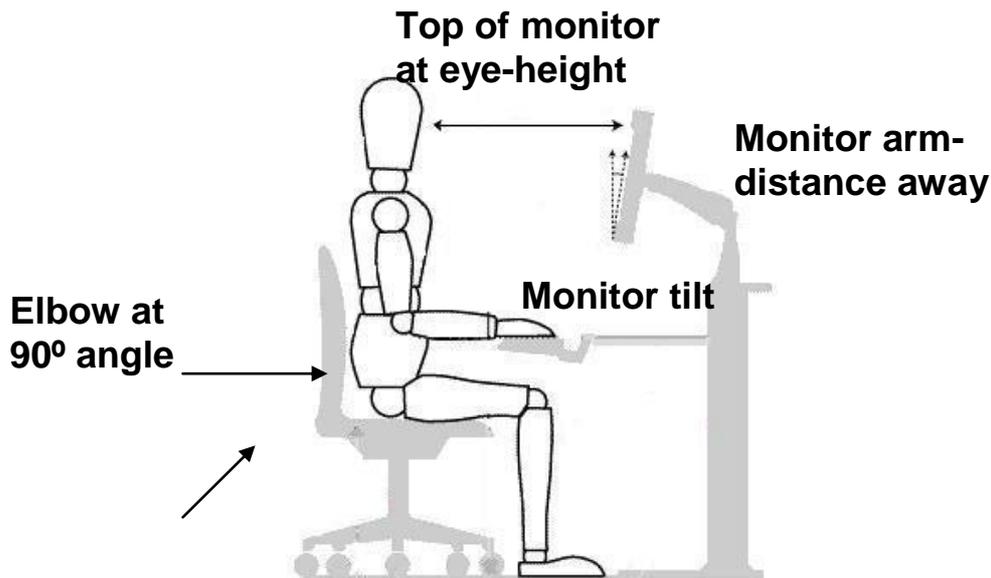
1. Centre for Disease Control (see especially 'health topics A-Z')
<http://www.cdc.gov/>
2. University of Utah (tutorials and images on many of the topics covered)
<http://library.med.utah.edu/WebPath/webpath.html#MENU>
3. Medline Plus ('health topics' index of diseases with information)
<http://www.nlm.nih.gov/medlineplus/healthtopics.html>

Other resources are indicated for some lectures in the PATH3205 Student Manual.

Student Risk Assessments.

Medicine Teaching Laboratory Student Risk Assessment	 UNSW THE UNIVERSITY OF NEW SOUTH WALES	Pathology practicals in G6/G7 & G16/G17 in Wallace Wurth for PATH3205 MBII, 2016
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Workstation set-up



Personal Protective Equipment Required



Closed in Footwear

All pots contain real human tissue that has been generously donated to medical science and **must be treated with appropriate respect and dignity.**

Specimens are preserved in Perspex and contain a range of preserving chemicals that may be harmful. Chemicals used include **formalin, pyridine, sodium dithionate**. A full list of chemicals and associated MSDS information is available in the H&S Station and on the SoMS website.

MANUAL HANDLING OF POTS

It is recommended that all students wash their hands thoroughly as they leave practical class. Chemical residues may be present on pots.

Carry one pot at a time. Use two hands at ALL TIMES and support the base of pot.

Avoid rough handling and/or tilting of pots. This can cause leaking joints or tear tissue in specimen.

Limit the number of pots on a table at any one time.

SPILLS AND LEAKAGES

If a specimen is leaking or broken, do not attempt to wipe up the spillage. Clear the area and immediately inform the Museum Manager or a member of academic staff. A spill kit will then be used to absorb the chemicals.

Emergency Procedures

In the event of an alarm, follow the instructions of the demonstrator. The initial sound is advising you to prepare for evacuation and during this time start packing up your things. The second sound gives instruction to leave. The Wallace Wurth assembly point is in the lawn in front of the Chancellery. In the event of an injury inform the demonstrator. First aiders and contact details are on display by the lifts. There is a first aid kit in the laboratory.

Clean up and waste disposal

Not necessary in these practicals.
No open-toe shoes allowed

Declaration

I have read and understand the safety requirements for this practical class and I will observe these requirements.

Signature:..... Date:.....
Student Number:.....

Date for review: 13/2/2017



Hazards	Risks	Controls
Physical Sharp plastic	'Stabbing' wound of hand	<ul style="list-style-type: none"> Use disposable gloves
Biological Antibody	Inoculation/Irritant	<ul style="list-style-type: none"> Do not eat, drink or smoke in the teaching laboratory Use disposable gloves
Chemical Acrylamide Azide ...PBS	Corrosive/Flammable Irritant/neurotoxic Irritant Mild Irritant	<ul style="list-style-type: none"> Low concentrations of chemicals used Use disposable gloves

Pipetting ergonomics

Pipetting is another work aspect that can cause aches and pains. Here are some handy hints:

- Adjust your chair or stool so that your elbow is at a 90° angle while pipetting.
- Adjust the height and position of sample holders, solution container, and waste receptacle so that they are all approximately the same.
- Try to work with your hands below shoulder height.
- Let go of the pipette from time to time and give the fingers/hand a break
- Do not twist or rotate your wrist while pipetting
- Use minimal pressure while pipetting
- Try to switch periodically between different types of work.

For more information on preventing repetitive strain while pipetting click on <http://www.anachem.co.uk/rsi>

Personal Protective Equipment required

 Closed in Footwear	 Lab. Coat optional	 Gloves	 Safety Goggles optional
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Emergency Procedures

In the event of an alarm sounding, stop the practical class and wait for confirmation to evacuate from demonstrators. Then wash your hands and pack up your bags.

Follow the instructions of the demonstrators regarding exits and assembly points.

Clean up and waste disposal

- Remove your gloves and dispose in the biowaste bins provided.
- Dispose of all pipette tips in the bin provided.

Ethics Approval

This type of practical does not require ethics approval.

Declaration

I have read and understand the safety requirements for this practical class and I will observe these requirements.

Signature:.....Date:.....