HGV

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The HGV aims to provide a dynamic continuing education program in which all persons with an interest in Histology and Histotechnology are freely invited to participate.

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Committee Page

The members of the Histology Group of Victoria 2018 are:

Name	Institution
Kellie Madigan	Leica Biosystems
Adrian Warmington	Clinicallabs (Ballarat)
Mark Bromley	Sullivan Nicolaides Pathology
Elizabeth Baranyai	Cabrini Health
Samantha Arandelovic	Clinicallabs (Geelong)
Alison Boyd	St. Vincent's Pathology
Kellie Vukovic	Sullivan Nicolaides Pathology
Sue Sturrock	Peter MacCallum Cancer Centre
Meghan Leo	Peter MacCallum Cancer Centre
Darcee Mc Nair	Clinicallabs (Geelong)
Kerrie Scott-Dowell	Dorevitch Pathology/Leica
Emma Pan	Walter & Eliza Hall Institute

Contact us at
http://www.hgv.org.au/contact-us
Membership enquiries: membership@hgv.org.au
General enquiries: secretary@hgv.org.au
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President's Report

Welcome to a new year – I hope that 2018 is a good one for you all.

We kicked off the HGV calendar with our first educational evening, which was very well attended by over 70 people. It's great to have such a high level of support for these evenings. We aim to try new things this year with more first-time speakers and are including an opportunity to visit one of our local trade companies. We also plan to still have some the favourites on our calendar such as the Trivia Night. If you have an interesting presentation or idea to share with the local Victorian Histology community, or there is a topic that you and your colleagues would be keen to hear and learn more about, please contact one of the committee members and we will see how we can incorporate this into our educational calendar.

This is a good opportunity to thank all our trade supporters sponsors who enable the HGV to hold educational events, put on nibbles at events and hold social nights such as the Trivia Night. We are exceptionally well supported by all the trade companies, large and small and consider them an integral part of the Histology community in Australia. Please always welcome the trade into your labs and allow them to showcase new and exciting items.

Look forward to seeing all of you at one of the HGV calendar events throughout 2018.

Kellie Madigan

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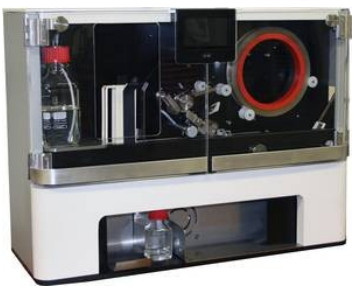

Under the Microscope with Melanie Kramer

Anatomical Pathology

Reported by: Kellie Vukovic

1. What was your first part-time job?

I worked in a tiny flower shop as an assistant floral designer; I loved it.

2. How long have you worked in histology?

A bit over three years**.**

3. When people ask, "So, what do you do?" How do you explain Histology?

Sometimes I say: "I cut up body parts for a living".
Most the time I say: " I am scientist in a pathology lab in a hospital."

4. What is a skill you'd like to learn and why?

Furniture restoration and renovation; I think it would be rewarding and fun.

5. If money was no object, what would you do all day?

Eat delicious food in lots of different picturesque locations.

6. What's an ideal weekend for you?

Nice out: Go on a walk someplace pretty and have a picnic or a barbecue. Rainy out: Curled up comfy reading a good book with a mug of tea.

7. If you could take only THREE items with you to a deserted island, what would they be?

Sunscreen, fresh drinkable water, and a knife?

8. What is the best conference you have ever attended?

I once went to a magician's conference with my uncle who was interested in magic. It was, needless to say, super magical.

9. What's on your bucket list this year?

To start a productive veggie patch.

10. Where do you most want to travel, but have never been?

Japan at the moment.

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No thanks.

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Review of February Scientific Meeting by Meghan Leo

The first scientific meeting of the year deviated from the traditional student presentations and instead delivered two complimentary presentations on controls.

Darcee McNair was the first presenter for the night and a new face in the histology world. Darcee is in her final year of her Lab Med degree and is currently doing placement at Australian Clinical Labs in Geelong.
Darcee's presentation 'Controls … (and why I should have paid more attention in class!)' went over the importance of controls and also the major importance of knowing when a control hasn't worked the way it should.
She mainly focused her presentation on IHC controls, going over positive and negative controls, the best controls to utilize, what controls can reveal and the advantages and disadvantages of controls.
The talk was well presented and Darcee certainly impressed me with the amount of knowledge she has acquired in her limited time working in histology.
Although this may have been the first many people have heard of Darcee, I'm sure it won't be the last!

The second presenter of the night was a very familiar face, Kerrie Scott. Kerrie almost needs no introduction as she's been working in histology for 30 years in a wide variety of places (well for histology anyway!).
Kerrie's presentation 'Is your lab under control?' expanded on Darcee's presentation and delved deeper in the world of controls.
Kerrie enlightened us on factors that can cause discrepancy between test sections and the control tissue such as fixation time, processing, microtomy and slide preparation. She also went over sourcing and validating controls and different ways different labs utilize controls.
I found it interesting when she covered buying control blocks from commercial sources and the cost involved in that (new side business anyone?).
Kerrie's presentation definitely gave us a lot to consider when it comes to controls especially that fixation is the most important factor and that with the use of extensive IHC and molecular studies, the standardization of preprocedures is extremely important.
The talk was delivered with Kerrie's humor and flair and was not only informative but also very entertaining.

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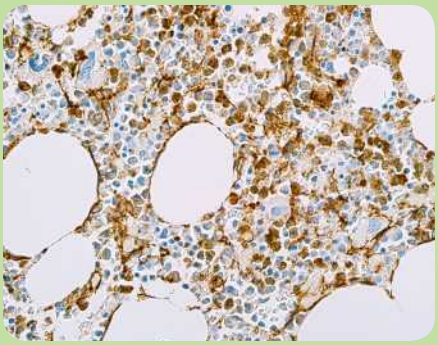

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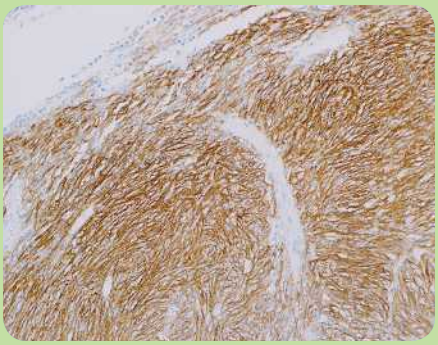

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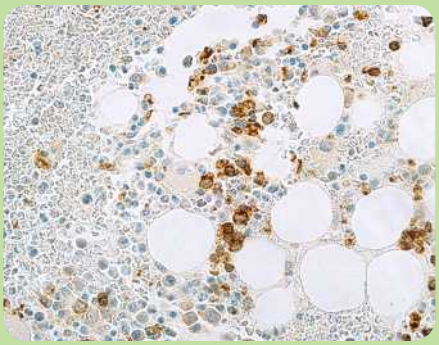

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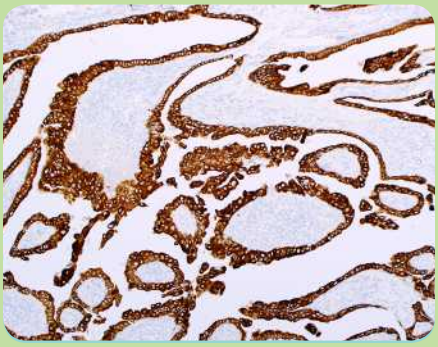
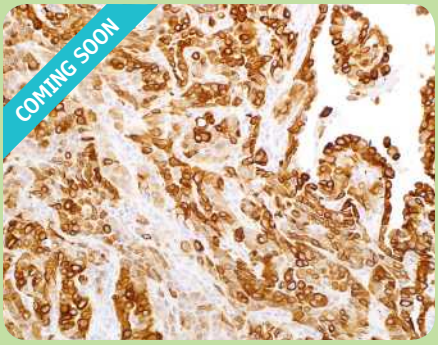
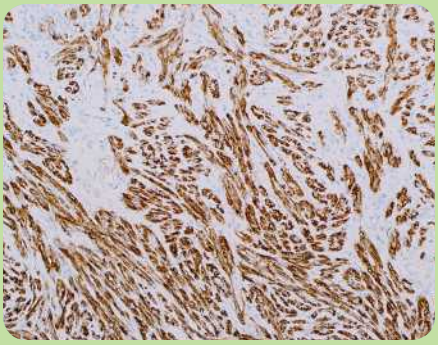


Cytokeratin 19 (EP72)



Cytokeratin 5 & 6 (EP24 & EP67)



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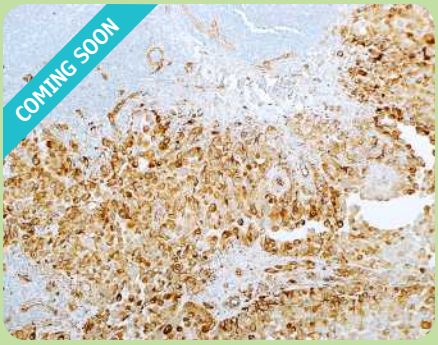

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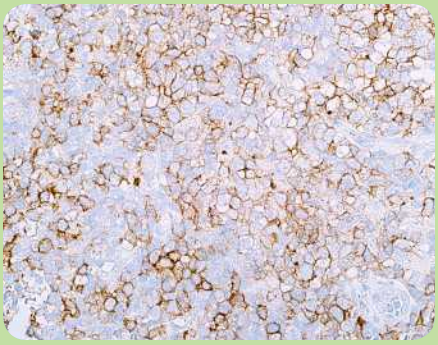

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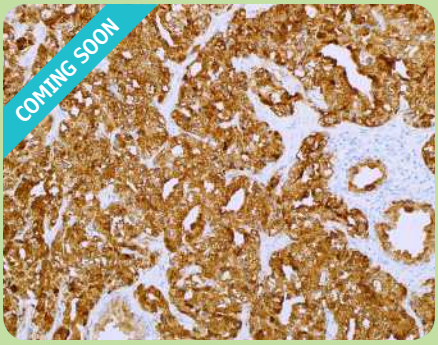

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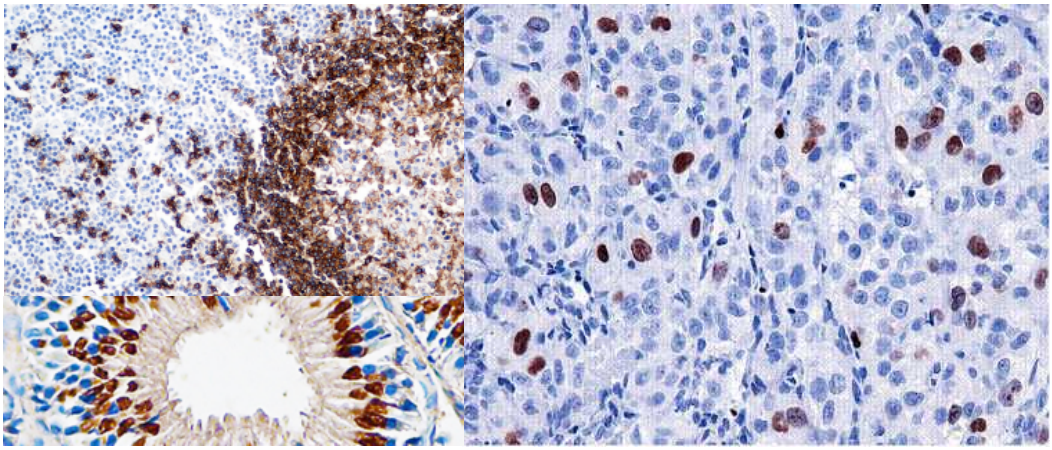
IHC Stain of the Month

January 2018

Darcee McNair



Understanding the method and purpose of all the various types of immunohistochemistry stains in histology can be quite overwhelming.... Especially if you're a student like me.

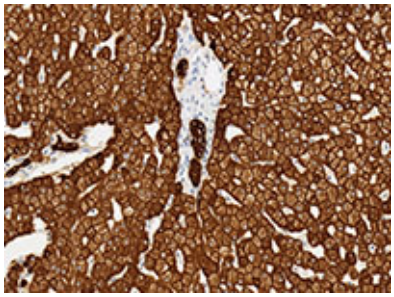
I'm still trying to learn all of them myself. So thought I'd share this crash course with all you other students out there! Let's aim for one stain per month.

Cytokeratin AE1/AE3

- Most commonly referred to as CK AE1/3 -

This is an IHC stain that I see requested probably most frequently. The antibody qualitatively stains cytokeratins in sections of formalin fixed, paraffin embedded tissue.

Species	Mouse
Antigen	Cytokeratin
Clone	AE1/AE3
Isotype	IgG_1
Positive control	Intestine, liver
Localization	Cytoplasmic
Intended Use	Tissue with epithelial cells (e.g. cervix, GI track, skin, tonsil, uterus, kidney, placenta)



CK AE1/3 positive control: liver

Keratins are a family of water insoluble intracytoplasmic structural proteins that are predominantly found in the epidermis. They function as a cytoplasmic scaffold for epithelial cells, providing dynamic structure throughout normal epidermal differentiation.

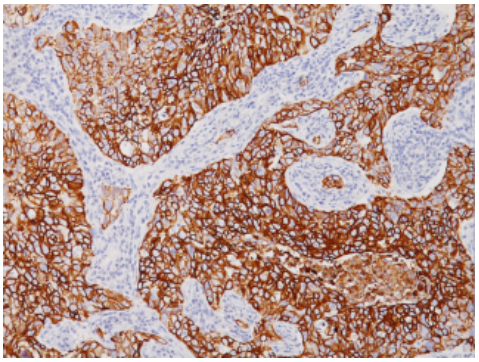
Keratin intermediate filaments are often reorganized during mitosis and apoptosis, with expression depending on cell type and differentiation status. Overall, the family is divided into two types:

- Type I: acidic
- Type II: neutral-basic

Cytokeratin AE1/AE3 is a mixture of two different clones of anti-cytokeratin monoclonal antibodies. Both AE1 and AE3 detect certain high and low molecular weight keratins. By combining these two antibodies, a broad spectrum of reactivity against both high and low molecular weight cytokeratins is obtained.

IHC staining with this pan keratin cocktail provides specific markers of epithelial cell differentiation. AE1/3 specifically binds to antigens located in the cytoplasm of simple and complex epithelial cells.

It has therefore been a widely used tool in tumour identification and classification. More specifically, it facilitates typing of normal, metaplastic and neoplastic cells. The stain primarily helps distinguish carcinomas from nonepithelial tumours such as sarcomas, lymphomas and neural tumours.



Breast carcinoma stained with CK AE1/3

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Review of Book by Judy Brincat

Fundamentals of Biomedical Science

HISTOPATHOLOGY Second Edition

Edited by Guy Orchard and Brian Nation

Oxford University Press 2018

This book is the second edition of one of a series "Fundamentals of Biomedical Science" and its introductory pages explain that the series is "blends essential basic science with insights into laboratory practice to show how an understanding of the biology of disease is coupled to the analytical approaches that lead to diagnosis". The series is produced in collaboration with the Institute of Biomedical Science (UK) and is supported by an on-line resource centre which has the potential to provide extra material for students, trainees and lecturers.

Histopathology consists of an additional 6 chapters to the original 11 (published in 2012) provided by 18 contributors including the editors. Their contributions, as well as those from the original authors who do not appear in the 2nd edition are acknowledged by the editors. This book reflects the changing needs in our educational and professional training and aims to complement traditional scholarly textbooks or reference books. Each chapter adheres to the following structure: Learning objectives are set out at the beginning of each chapter, case studies and clinical correlations are provided (where relevant), additional information to the main text appears in a variety of boxes: methods; health and safety; clinical correlations. Key points and summaries as well as key terms and self -check questions appear throughout each chapter. The answers to the self-check questions are available on the website www.oup.com/uk/orchard2e. Chapter illustrations include photographs, photomicrographs, diagrams and tables. The end of each chapter comprises a chapter summary, further reading and useful websites, and a set of discussion questions. A glossary of terms and list of abbreviations are found towards the end of the book, followed by the index.

Chapter 1: *What is histopathology?:* provides a comprehensive introduction and summary of the science of histopathology and its role in the diagnosis of disease. The journey of the specimen through the laboratory is outlined. This is a book written in the first instance for UK users, so legislation described is UK specific, eg The Human Tissue Act 2004, the principles of which are described. Laboratory management systems, Health and Safety, and Quality Assurance Programs are also introduced.

Chapter 2: *Fixation and Specimen Handling:* covers all aspects and the importance of: speedy specimen transport to the laboratory from clinical areas; specimen packaging; specimen details and the patient's clinical details; the importance, principles and mechanisms of fixation and fixatives used; and decalcification of bony specimens.

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Review of Book by Judy Brincat

Chapter 3: *Data recording and histopathological dissection:* is extensive and is an expansion of part of Chapter 1 in the first edition. The dissection (or cut-up or grossing) room is briefly discussed, as is specimen triage and pre-dissection, with the bulk of the chapter being given over to specimen types and their dissection protocols.

Chapter 4: *Routine processing, embedding and staining*: is another chapter that has arisen from part of Chapter 1 in the 1st edition. This chapter comprehensively discusses tissue processing including equipment and reagents; likewise embedding; sectioning including cryotomy; routine H & E staining and quality assurance.

Chapter 5: *Stains in Action:* covers the use of specialised chemical staining techniques to demonstrate specific tissue components and pathologies. Methodologies are not described, however the demonstration of glycoproteins and carbohydrates; infective agents; pigments and minerals; external proteins; and lipids are discussed. Panels and specialised techniques for renal, liver; muscle and nerve biopsies are covered.

Chapter 6: *Artefact:* This is a new chapter, and notably lists Leica Microsystems' Artefacts Handbook as key further reading. The chapter summarises and to a certain extent illustrates the myriad of artefacts that can and do occur as tissue is prepared for histological examination from pre- to post-analytical and anywhere in-between.

Chapter 7: *Mohs procedures*: is another new chapter describing the process and procedures involved in Mohs techniques; the role of Mohs and slow Mohs in the modern histopathology laboratory and benefits to the patient; troubleshooting; the role of rapid immunohistochemistry staining in association with Mohs specimens and the potential offered by improved imaging technologies to increase the accuracy and precision of skin tumour excision.

Chapter 8: *Immunocytochemical techniques:* or as we know it in Australia "Immunohistochemistry". This chapter does not vary much from the original in the first edition (Chapter 5), there are a couple of additions (external quality assessment programmes) and expansions (automation). The chapter covers the concept; historical perspective and role of immunocytochemistry (ICC) in diagnostic pathology; tissue preparation; antigen retrieval; labelling methods; automation; quality control; health and safety; and remains optimistic of the future of ICC.

Chapter 9: *Analytical immunocytochemistry:* is the new title for "Immunocytochemistry in action" from the 1s edition, however on first inspection the learning objectives are identical and nothing much has changed. This chapter embarks on a journey through the pathology of cancer: the difference between benign and malignant; the key malignant tumour groups; most common forms of cancer; the difference between in situ and invasive disease and discusses the key antibodies used for diagnosis. Surprisingly, the list of commonly used antibodies remains unchanged from the 1st edition, despite the introduction into daily use of many new antibodies such as CDX-2, SOX10, Napsin A, PAX 5 and Alk-1. Antibodies in the investigation of specific diseases such as breast, prostate and lung cancer and lymphoma are

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discussed, as well as tumours of unknown primary malignancy. Case studies are helpful and well illustrated. The chapter summary puts all the information provided in the chapter nicely into context: in short ICC is an extremely valuable diagnostic and prognostic tool, but should never be used in isolation. Morphology, panels, and an algorithmic approach to delineate tumours all contribute to providing the answer.

Chapter 10: *In situ hybridization: key concepts and applications*- a new chapter devoted entirely to ISH, previously part of Chapter 7 1st edition. This chapter outlines the principle of in-situ hybridisation and demonstrates its usefulness in identifying nucleic acids in their cellular localisation to further classify pathological conditions. Various types of ISH technology are explained, including principles of signal amplification and detection methods for low-copy targets in cells are discussed. The technical steps are described under the headings of probe preparation; sample preparation; hybridization; detection and appropriate use of controls. Diagnostic applications for the detection of genes; infective agents; mRNA and microRNA are illustrated.

Chapter 11: *Molecular diagnostics: techniques and applications* is an expansion of the original chapter in the 1st edition and deals with methods of exploiting the chemical and physical properties of DNA and RNA derived from tissue and cells, which have not already been discussed in previous chapters. Essential background knowledge takes the form of the description of nucleic acids and their basic structure and function and explanation of key terms such as denaturation; hybridisation; and the enzymatic processes of replication, transcription and translation of RNA. The polymerase chain reaction (PCR) and various analysis methods (Sanger sequencing, Real-time PCR, pyrosequencing and next-generation sequencing) are described in detail.

Chapter 12: *Molecular diagnostics in action* is a new chapter which expands further on Chapter 7 from the 1st edition and deals with the application of molecular techniques to solid tumour testing to add information regarding diagnosis, prognosis and prediction to therapy. The targets can be chromosomes, genes or proteins. This is a rapidly progressing area of complex pathology testing and this chapter covers the pitfalls and requirements of providing such a service now and in the future.

Chapter 13: *Histopathology reporting:* another new chapter enlarging on the initial mention of the Histopathology report in Chapter 1. The preparation of a conventional report is discussed in detail specifically mentioning requirements for standardised cancer data sets in the UK, USA and Australia. The chapter describes inflammation and neoplasia and proceeds to give clinical correlations and case studies including the histopathology report to illustrate the concepts discussed. Also discussed are the educational requirements and options for scientists employed in histopathology laboratories in the UK, Australia and New Zealand.

Chapter 14: *Light microscopy and digital pathology:* Of course all the material in the preceding chapters is useless without the means to examine the results! This chapter deals with the scientific principles associated with light microscopy, the components of a compound microscope and a valuable text box describing the method for achieving Koehler illumination. A variety of microscopy techniques are

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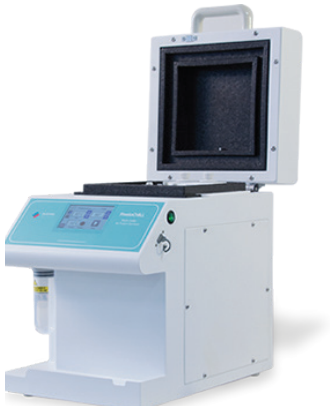

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discussed including fluorescent microscopy, as well as alternative microscope designs. Finally the chapter devotes some space to the sharing of the microscopic image and the use of digital cameras, and describes microscopes that have no eyepieces, using integrated cameras and display monitors. Telemicroscopy and slide scanning are also introduced.

Chapter 15: *Electron microscopy:* introduces the technique of transmission and scanning electron microscopy, discusses the design and function of an electron microscope, imaging associated with recording what is seen on examination of the sample, tissue preparation for electron microscopy, including health and safety issues, and the incorporation of immunocytochemistry into the specimen preparation protocol. The application of electron microscopy for diagnostic purposes is demonstrated by the use of specific, well-illustrated cases studies for tumour diagnosis, muscle biopsies, renal disease and virus identification. Scanning electron microscopy and associated techniques also rate a mention. The list for further reading is extensive.

Chapter 16: *Mortuary practice:* As many histopathology laboratories are associated with the provision of mortuary services, no text book on the subject of Histopathology would be complete without a comprehensive discussion on the function and facilities of the mortuary, including the many associated regulations and legislations which again are specific to the UK, however where relevant, legislation in other countries such as the USA and Australia is mentioned. Post mortem procedures are described at length, including safety considerations with regard to infection and other potential risks, observations made and the most common samples taken at autopsy to aid in the establishment of cause of death. Case studies have been added to illustrate post mortem findings. Further information is provided in the form of websites, reading and various legislative publications.

Chapter 17: *Essentials of laboratory management:* This chapter has been re-written from the 1st edition, but still describes good laboratory management as a difficult concept to define! "! Topics covered include: roles in laboratory management, quality management systems and clinical governance, risk management, risk assessment, dealing with complaints, The Human Tissue Act of 2004 (which is of course specific to the UK) and training and qualifications for managers. Several of the topics are supported by case studies in the form of questions posed in response to potential sources of error eg the receipt a sample where the details on the request form do not match those on the specimen container. An extensive list of useful websites and further reading complements the information contained within the chapter.

Any potential biomedical scientist with an interest in histopathology, and sound knowledge of the contents of this well- written and nicely-illustrated text together with appropriate practical experience would be well on their way to becoming a valuable member of the team that comprises the core of today's histopathology laboratory. The text will make a valuable addition to any library associated with laboratories performing histopathological techniques.

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Gram Stain – Hints and Tips

Speaker: Elizabeth Baranyai

Date: Thursday 3rd May 2018

Time: 6:00 – 6:45 Refreshments

6:45 – 7:45 Presentations

Venue: Foyer - Level 7 Lecture Theatre B
Peter MacCallum Cancer Centre
VCCC Building
305 Grattan Street, Parkville
(Opposite Royal Melbourne Hospital)

Parking:

1) **VCCC - enter off Flemington Road ($14 for 1-2 hours)**
2) **Wilson Parking – 33 Bedford Street, North Melbourne (Pay by credit card at machine & display ticket - $3 after 4pm)**
3) **University of Melbourne Royal Parade Car Park-10 Royal Parade, Parkville (Pay & display - $8 after 5pm)**

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Future Events:

2018

Thursday 3rd May

Educational Evening- Gram Stain – Hints and Tips

Venue- Peter Mac

Thursday 5th July or 12th July

Educational Evening- Manufacturing and Supply Tour

Venue- Trajan Scientific, Ringwood

Thursday 20th September

Educational Evening- Multiplex and other IHC

Venue- Peter Mac

Thursday 15th November

Educational Evening- TBA

Venue- Peter Mac

May 2019

National Histology Conference

Adelaide