Students’ reflections on the introduction of virtual microscopy into general pathology training.

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Who learns histology & pathology?

- Year 1: Basic Histology
- Year 2: Further Histology
- Year 3: General Pathology
- Year 4: Systemic pathology
- Year 4: Other units
- Year 5: Post-mortem & biopsy clinical rotations
- Year 5: Other units & clinical practicum

Specialties:
- Veterinary
- Chiropractic
- Animal Science
- Biomedical Sci.
Lectures (mixed cohorts, with cohort-specific lectures where applicable)

Resources: texts, internet

N=370
Powerpoint self-paced tutorials (delivered via WebCT)
Teaching media

Laboratory workshops

Topics in Comparative Mammalian Anatomy

Higher magnifications

On the diagram below label some of the features described above, maybe adding more arrows if you see fit!

Unit Information and Learning Guide 2006

VET108 Histology – Week 6

- Identify the following at low magnification:
  - Air-filled alveoli
  - Larger airways
  - Blood vessels
  - Smooth pleural surface

Now we will examine the characteristics of epithelial tissues. Find the largest airway within your section of lung. See how it has a thick and folded lining. The lining is made of tightly apposed epithelial cells. It is not always possible to see the outline of each cell clearly. Make a note of the following characteristics of the cells:
  - Nuclear shape
  - Nuclear position
  - Cytoplasmic outline
  - Cytoplasmic colour
  - Any specialised structures of the apical surface

Epithelial cells form cohesive sheets and other solid structures covering body surfaces and lining ducts, as well as forming secretory lobules in glands. They are firmly joined together. They have further specialisations according to their role in absorption, secretion, or barrier formation. They are classified according to shape and how they join to one another. Choose the appropriate label for each of the epithelial diagrams below (pseudostratiﬁed ciliated columnar, simple cuboidal, simple columnar, ciliated columnar, stratiﬁed squamous, transitional).

- A.
- B.
- C.
- D.
- E.
- F.
Our concerns

• Do some students find working a light microscope a technical barrier to learning?
• Do all cohorts need to learn technical skills in light microscopy?
• Do some students take only a passive role on the multiheader microscopes?
• Limited time for private study and revision in the multiheader microscope suite
• Can we make it better?
Our study

• Introduction of a virtual microscope in laboratory classes
• Random allocation to either optical or virtual microscope group for labs
• Complete ASSIST at the beginning of semester and again at the end.
Our study

- ASSIST
  - Entwistle’s Approaches and Study Skills Inventory for students ASSIST (1998) to identify deep, surface and strategic learners

- Lectures, Labs, virtual microscope, blended environment (eLearning: images and questions)

- Gather both qualitative and quantitative data (Log book (lab time), eLearning tracking – use of resources (images and formative assessments).

- Longitudinal case study
Choose good examples from class slide set

Aperio slide scanning

Implementation

computer labs

wireless network

RCPA QAP Pty Ltd Anatomical Pathology - VIC
Likes Optical Microscope

- enhanced clarity: 35%
- better group work: 30%
- authenticity: 18%
- more sense of control: 5%
- more teacher interaction: 5%
- gaining experience: 3%
- superior slide quality: 3%
- nothing particular: 3%

Optical microscopy +ve

- enhanced clarity: 35%
- better group work: 30%
- authenticity: 18%
- more sense of control: 5%
- more teacher interaction: 5%
- gaining experience: 3%
- superior slide quality: 3%
- nothing particular: 3%
Optical microscopy +ve

- “The group atmosphere was probably the highlight of the optical microscopes”
- “… at higher magnification it was a lot clearer to view slides in comparison to virtual”
- “You get to see everything for real and you get experience using a microscope”
- “Can look at slide with naked eye view first, it made things seem very real, a computer cannot replicate that”
- “Give a realistic and relevant element to learning (i.e. its real tissue), Gets you to learn how to use a microscope and the problems you have with it. It not just another simulation”
Optical microscopy - ve

dislike everything 3%
needs experience 5%
missing slides 8%
time consuming 15%
not in control 30%
difficult to use 35%
health issues 40%
Optical microscopy - ve

- “They gave me constant headaches and sore eyes”
- “In addition, using the microscope gave me motion sickness when other people were operating it”
- “Can be a bit complicated to operate because of all the parameters that can be adjusted.”
- “The time spent looking for slides that had not been put back into the correct box”
- “Sometimes you want to look at something a bit longer or sketch something, but you don’t want to have to make the group wait”
Likes Virtual Microscopes
65%
63%
23%
20%
15%
13%
10%
3%
3%

enhanced freedom and accessibility
more convenient
easier to work in groups
fewer health problems
more examples
better time management
handy tools (photo, measure, side by side, naked eye navigator,)
more examples of pathology
easy to use
freedom & accessibility
reduced health issues
more convenient
provides more examples of pathology
easier to work in groups
Virtual microscopy +ve

- “Ease of use, don't need to know how to use a microscope and since I'll never have to use one in my career that is ideal for me”
- “It is so much easier to use than optical. You can change the magnification quickly and easily. You can zoom into the exact area you want"
- “You can take photos of it and email to yourself (you can take it home virtually)”
- “…it was available on a variety of computers, which made it very accessible”
- “It would have been nice to access it from home”
- “Probably the best part is that all the slides are there to use there is no need to sort through hundreds of glass slides to find the one you need”
- “No headaches either”
Virtual microscopy -ve

- reduced clarity 38%
- waiting for slide upload 13%
- restricted access 13%
- no dislikes 10%
- less group work 5%
- unreliable technology 5%
- less engagement 5%
- less authentic 5%
Virtual microscopy -ve

• “Images at higher magnifications are not as sharp and clear”
• “Would be better if you could access the slides from home”
• “Took too long to load up sometimes”
• “There was also less group discussion involved as each student has an individual program”
• “You feel more of a distance to what you are looking at when you can't "put hands" on it”
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**Improvements**

- Deliver via DVD as well as network (home study)
- Encourage students to work in groups
  - Description games
  - Alter laboratory layout for better group work
  - Assigning a slide to a group for annotation & presentation to rest of class via data projector
- Alternate between virtual & optical groups
- Use virtual slides for take home exam (description & diagnosis)
- Use annotation files to answer queries via online learning systems (WebCT/CE6)
- Align assessment with objectives and activities (examine via structured image-based questions)
• The work presented here forms part of the PhD programme of Diana Jonas-Dwyer, Medical Education (Managed Learning System) Education Centre, University of Western Australia.
Students’ self-rating of IT skills
You should be able to compare and contrast features of three muscle types. One feature unique to cardiac muscle is seen here. What is the feature shown?

What is the name, and function, of these cells, unique to myocardium?

Purkinje fibres – specialised for electrical conduction.

Note the pale and enlarged cytoplasm of these specialised cells.
You should be able to see cross striations in heart in LS, but don’t confuse them with intercalated disks.