Reimagining Assessment

BSc Medical Science, ATU

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Project

- What?
- Why?
- How?
- Did it work?

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Haematology 2

- 15 credit, L8
- Delivered in Y4
- 7 module learning outcomes
- Practical competencies
- 20 weeks
  - 4.5 hours lecture/week
  - 12 x 3 hours laboratory

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Module Assessment

- 40% Continuous assessment
  - Practical element
  - Theory
- 60% Final examination

Module Assessment

- **Practical Work**
- 20%

- **Theory CA**
- 20%

- **End of Year Exam**
- 60%

Why?

Move away	Move away from traditional report-writing
Provide	Provide a more authentic assessment tool while balancing the workload
Examine	Examine critical, analytical and communication skills

How?

Take a year 4 “practical” module and “reimagine” it

Focus on one area of assessment – Practical Element

Reimagined laboratory reports

Original Assessment

- Lab reports:
  - Traditional laboratory report, one for every laboratory activity
  - Up to 12 lab reports

Validating the Beckman Coulter ACL 1000 Instrument for Measuring Factor VIII Levels in Plasma and Evaluating the Assay's Precision

Materials & Methods

Factor VIII assay was measured using HemosIL Factor deficient Substrate Plasma. Patient Venous blood sample was collected in a sodium citrate blue-capped coagulation tube. It was filled appropriately to achieve a 1:9 anticoagulant: blood ratio. The standard sodium citrate bottle contains 0.5 mL of 0.105 moles/L concentration of citrate and requires the addition of

Experiment 10: Investigation of hereditary Non-immune haemolytic anaemias

Introduction:

Haemolytic anaemias can be caused by a number of factors including membrane defects, damage to the cells by oxidising agents and defects within the cells themselves. These factors will cause either intravascular or extravascular haemolysis or a combined presentation of the two.
In order to distinguish the type of haemolytic anaemia in question there are a series of practical questions that must be asked; does the patient show evidence of haemolysis

Systemic approach to blood film examination.

1. Clean optic parts of microscope and ensure the slide is clean as well.

2. Exam the slide by naked eye, notify bluish tingle (abnormal plasma protein or gross leucocytosis), not even staining and presence of smears.

3. First observe slide at low magnification. Ensure the right position of condenser, right aperture of diaphragm and optimal illumination.

4. Exam slide on suitability – the single layer of blood cells which do not overlap each other should only be used for blood film examination. The edges and tail are not suitable for examination due to RBC tend to assume false appearance

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Re-imagined Assessment

- Formative Assignments
  - Case study
  - Quizzes
- Summative Assignments (4 best used for final grade)
  - Mini Literature Review
  - Mini Method Comparison
  - **Poster Assignment and Peer Review**
  - Critical Review of Lab Activity in the context of National/International Guidelines
  - Design a Case Study

Poster Assignment and Peer Review: Guidelines Part 1

"Your laboratory wants to use ***a standardised and systematic approach*** for the review of blood films.

Using one side of a single A4 page, (you can use MS PowerPoint, MS Word, or software of your choice), design a laboratory aid in the form of a poster or infographic to describe the review of a blood film for your colleagues.

The poster/infographic will be displayed on the wall beside the microscope in your laboratory. Therefore, you need to provide clear and concise instructions based on everything you know about the steps involved in reviewing a blood film and that are appropriate for medical scientists trained in the area.

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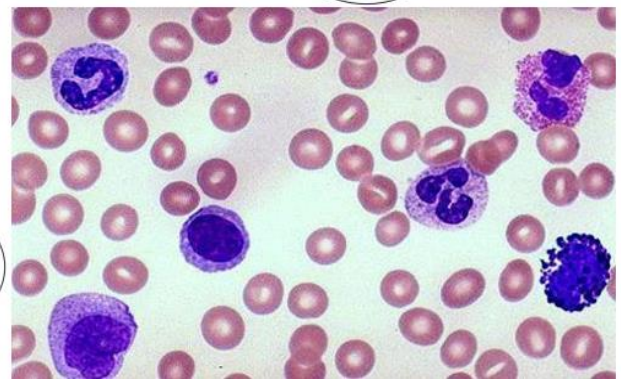
Review of a Blood Film

1. **Look at the slide macroscopically:**
   - Is the staining and spreading of blood appropriate?
   - Does the label on the slide match the patient?
2. **Look at the slide under x10 magnification:**
   - Are the cells evenly stained?
   - Are the cells evenly distributed?
   - Identify any agglutination, rouleaux or platelet clumps
   - Preform an estimated white cell count

3. **Look at the slide under x40 magnification:**
   - Comment on red cell morphology
   - Comment on white cell morphology
   - Make a comment of any abnormalities observed /

4. **Look at the slide under x100 magnification:**
   - Preform an estimated platelet count
   - Comment on the platelet morphology
   - Carry out a white cell differential count if required



The systematic approach to the review of a peripheral blood film

Aim

To describe the steps followed for the examination of a peripheral blood film

1. Macroscopic examination

1. **Check the label of the slide**
   ✓ Ensure patients' name and DOB is correct
2. **Examine the blood film for unusual characteristics**
3. **Check the blood is properly spread**
   ✓ Smear should take up approx. 2/3 the width and 3/4 the length of the slide
   ✓ Has a feathered edge that's almost square
4. **Check the film is properly stained**
   ✓ Stain should not be too light or too dark
   ✓ Smear should be pinkish purple in colour

2. Microscopic examination

X100 magnification (x10 objective)

1. **Scan the slide to assess the general appearance and distribution of WBCs, RBCs and platelets.**
   ✓ RBCs – observe for agglutination, rouleux and immature cells i.e. NRBCs
   ✓ WBCs – observe for smudge cells and immature WBCs i.e. myeloid precursors
   ✓ Platelets – observe for clumps and satellitism
2. **Carry out a WBC estimation**
   ✓ Average no. of WBCs in 5 fields of view and applying the calculation formula
   ✓ Estimate should correlate with the automated WBC count ±25%

X400 magnification (x40 objective)

1. **Determine the critical area of the smear - this will be used perform morphological examination**
   ✓ Area of the film where RBCs are uniformly distributed and hardly touch/overlap

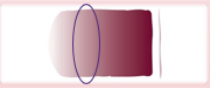


Figure 1: Blood film showing the critical area

X1000 magnification (x100 objective)

1. **Evaluate RBC morphology by examining size, shape, colour and presence/absence of occlusions**
   ✓ Normal RBCs are normocytic and normochromic
   ✓ Note any variations outside the normal RBC morphology
2. **Evaluate platelet morphology**
   ✓ Normal platelets are 2-3µm
3. **Carry out a platelet estimation**
   ✓ Average no. of platelets in 5 fields of view and applying the calculation formula
   ✓ Estimate should correlate with the automated platelet count ±25%

(Total no. of platelets counted)/5 x 15x10^9/L = Plateletsx10^9/L

4. **Evaluate WBC morphology**

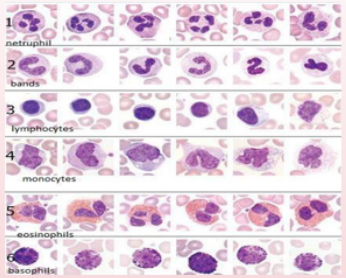


Figure 2: Types of normal WBCs seen on a peripheral blood film

5. **Carry out a WBC differential**
   ✓ Count 100 WBC by moving through the film employing the pattern illustrated in figure 3
   ✓ Place each WBC encountered in the appropriate category, i.e. neutrophil, monocyte, lymphocyte, eosinophil
   ✓ Report the number of cells in each category as a percentage.

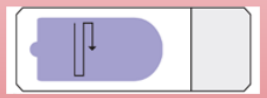


Figure 3: Blood film showing how to scan the slide during a WBC differential

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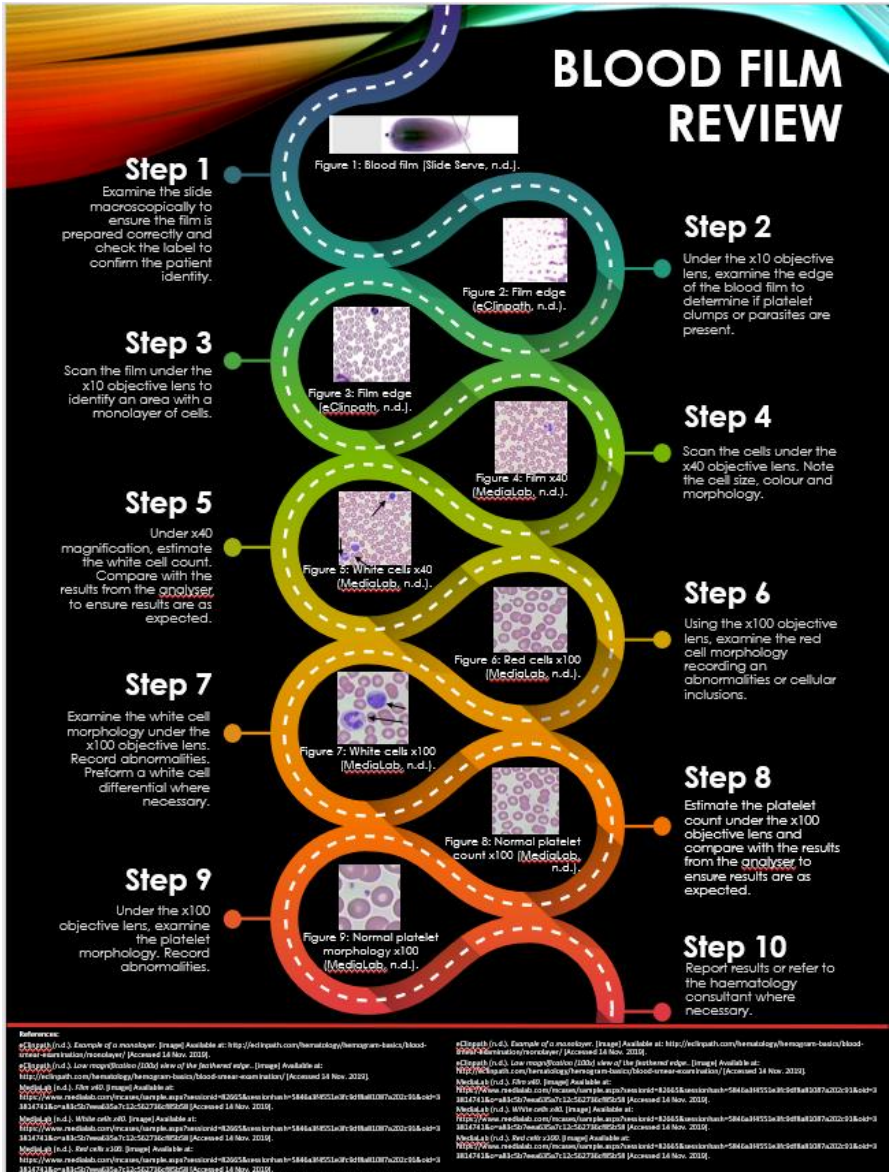

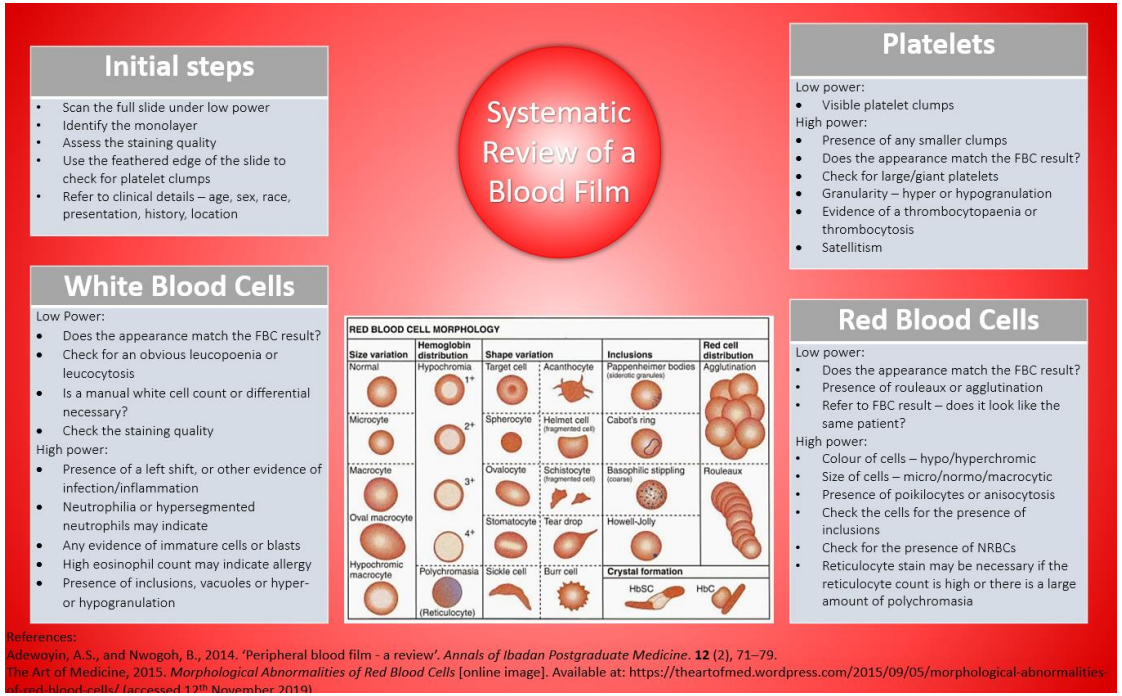

References:
Adewoyin, A.S., and Nwogoh, B., 2014. 'Peripheral blood film - a review'. *Annals of Ibadan Postgraduate Medicine*. **12** (2), 71–79.
The Art of Medicine, 2015. *Morphological Abnormalities of Red Blood Cells* [online image]. Available at: https://theartofmed.wordpress.com/2015/09/05/morphological-abnormalities-of-red-blood-cells/ [accessed 12th November 2019].

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Poster Assignment and Peer Review: Guidelines Part 2

"It turns out that some colleagues have carried out the same activity. You need to decide which poster/infographic is the most suitable. Use the following criteria to assess the posters:

Layout

Comprehensiveness

Clarity and conciseness

Appearance

Peer review of posters

Haematology 2

Year 4 Medical Science

Use the following criteria to award marks:

- Layout – easy to follow instructions/guidelines [4]
- Clarity and conciseness – easy to read and understand [6]
- Comprehensiveness – All of the information necessary to systematically review the blood film is included [6]
  - **Macroscopic** – Check film for suitability and proper staining/check details on film
  - **X10 Objective** – Check film for suitable area to review (i.e. monolayer and proper distribution of cells), perform an estimated WCC
  - **X40/x100 Objective** – Perform WC differential, check morphology of WC, perform estimated Plt count, check morphology of plts, review red cell morphology
  - **Comments** – record and **grade** findings (where appropriate) in patient file
- Appearance – overall attractive and eye-catching appearance [4]

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Did it work?

Demonstrate a detailed knowledge of the diagnostic tools used in the haematology laboratory

Million Dollar Question!

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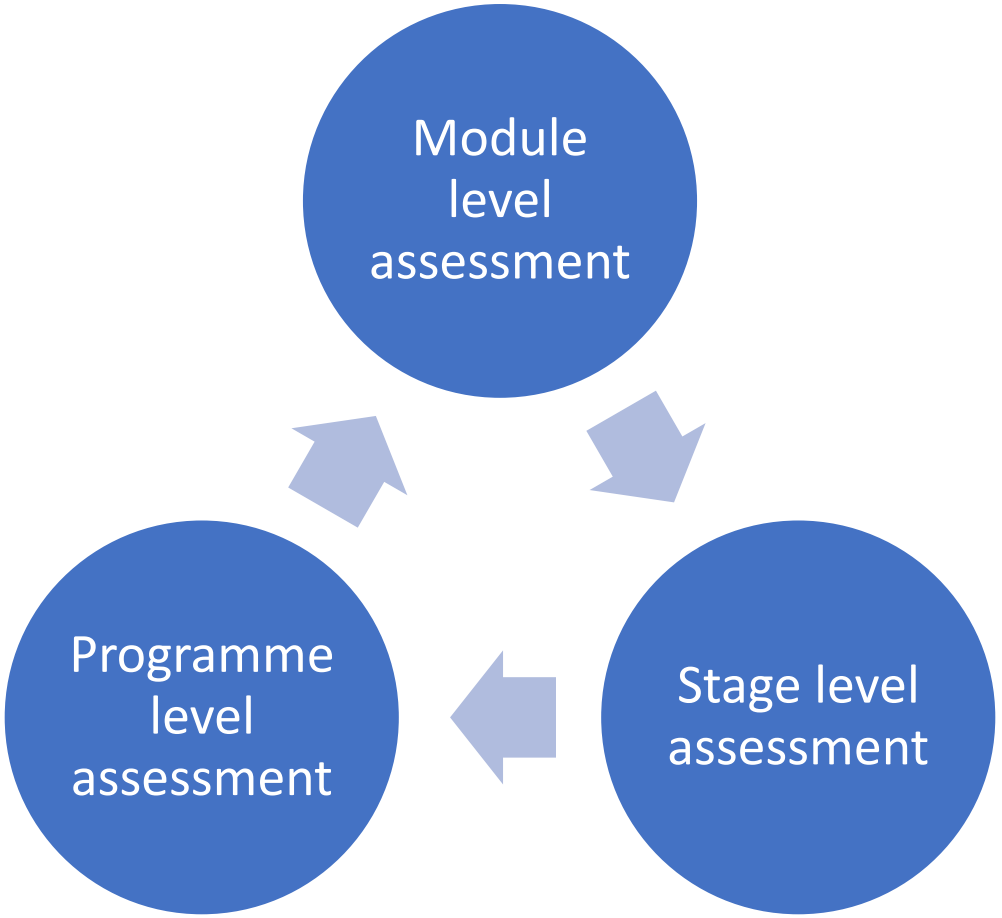
What next?



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- Communication, professional skills
- Medical Science Disciplines
- Physics and Instrumentation, Chemistry and Biochemistry – general science skills and instrumentation applicable to diagnostic laboratory
- Human Biology and Physiology, Genetics
- Maths, calculations, stats

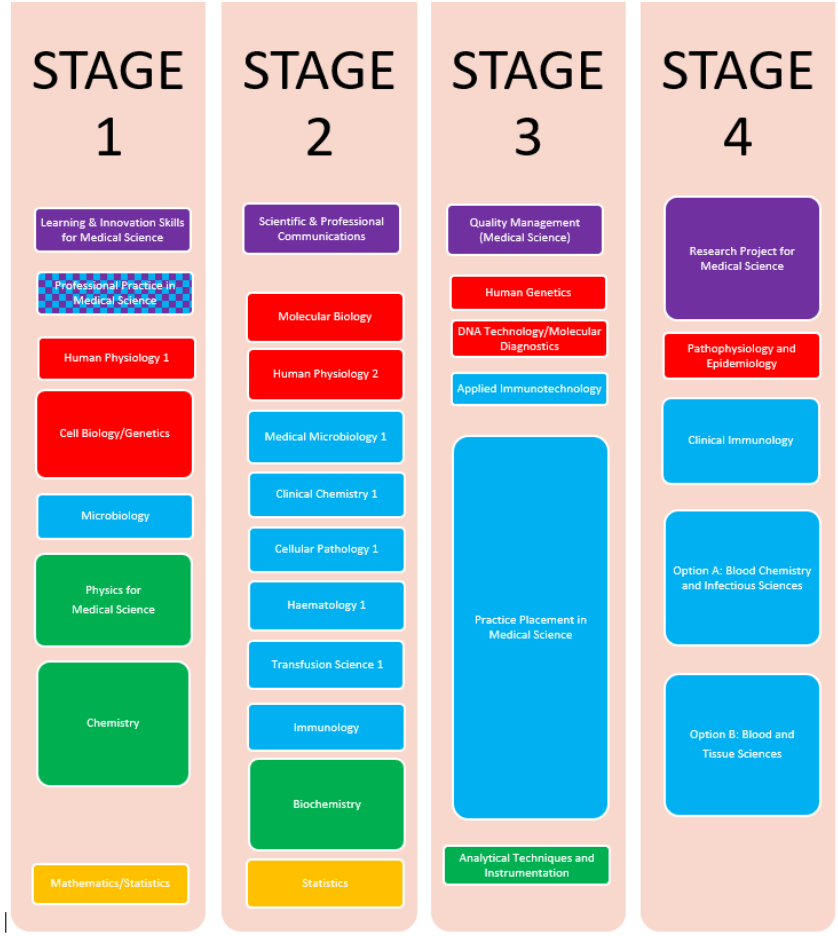

Figure 1: BSc Sequencing and Integration of Programme Elements

- Thank you for listening!

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