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Total Blood Count by Cell Analyser

Experiment 7 - Practical Notes

Name: _____ Roll no.: _____ Date: _____

Aim

To observe a cell-analyser demonstration, identify the main CBC parameters and check the consistency of a teaching report.

Principle

Automated haematology analysers may use impedance, optical methods and haemoglobin photometry. A CBC reports red cells, white cells, platelets and derived red-cell indices. Instrument flags, quality-control status and specimen quality must be considered before interpretation.

Requirements

- Laboratory cell analyser, its operating instructions and acceptable control results.
- Instructor-provided appropriately collected specimen or demonstration material.
- An anonymised or fictional CBC printout.

Procedure

1. Check the demonstration

Confirm instrument readiness and the current control result with the instructor. Observe the specified start-up and identification process.

2. Check the specimen

Review correct identification, suitable anticoagulant, mixing and absence of visible clot. Trained staff manage collection and analyser loading.

3. Observe analysis

Note the basic measuring principles and the distinction between directly measured and calculated parameters.

4. Read the report

Record the units, instrument flags and laboratory intervals. Confirm whether the report includes a differential count.

5. Check consistency

Use the red-cell-index formulas below on a fictional report. Discuss discrepancies or flags with the instructor; do not diagnose from one number.

Parameters and Meaning

Parameter	Meaning	Interpretive point
RBC, Hb, Hct	Cell number, haemoglobin concentration and red-cell volume fraction	Assess together, not interchangeably
WBC / differential	Total white cells / types of white cells	Use absolute counts when appropriate
Platelets	Platelet number	Count is not the same as platelet function
MCV, MCH, MCHC	Red-cell size and haemoglobin indices	Support classification, not a diagnosis alone

Observations and Record

Parameter	Usual reporting unit	Teaching report / own record
RBC / WBC	10^{12}/L / 10^{9}/L	_____
Haemoglobin / haematocrit	g/dL or g/L / % or L/L	_____
Platelets / MCV	10^{9}/L / fL	_____

Worked Example

The numbers below are illustrative; enter your own observations in the record.

- Fictional report: Hb 13.5 g/dL, Hct 42%, RBC 4.8 million/µL.
- MCV = Hct(%) × 10 ÷ RBC(million/µL) = 42 × 10 ÷ 4.8 = 87.5 fL.
- MCH = Hb(g/dL) × 10 ÷ RBC(million/µL) = 28.1 pg. MCHC = Hb × 100 ÷ Hct(%) = 32.1 g/dL.
- Unit checks: RBC 4.8 million/µL = 4.8 × 10^{12}/L; WBC 6800/µL = 6.8 × 10^{9}/L.

Result

The analyser principles and ____ reported parameters were identified. Calculated indices were checked using the fictional data, and the instructor reviewed any flags.

Precautions

- Do not interpret a flagged result as valid until reviewed under laboratory procedures.
- Do not run a clotted or unidentified specimen as an ordinary valid specimen.
- Intervals vary with laboratory, age and other factors; use the interval printed on the report.

Viva Questions and Answers

1. What does MCV describe?

Average red-cell volume.

2. Is a CBC always a differential count?

No; verify whether a differential was included in the requested analysis.

3. Why run quality controls?

They help establish that the analytical system is performing acceptably.

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