

Name of Block	Block 1
Name of Elective	Role of RBC indices in patients with anemia
Location of hospital Lab or research facility	Clinical Pathology Laboratory, Department of Pathology
Name of internal preceptor(s)	Dr. Vikram Narang
Name of external preceptor (if applicable)	-
Learning objectives of elective	1. To understand various RBC morphologies in patients with anaemia. 2. To enumerate and define various RBC indices and their correlation with RBC morphology 3. To understand principal, functioning and Standard Operating Procedure of automated cell counters 4. To learn to interpret RBC histograms and RBC indices and diagnose anemia through it 5. To learn how to make a good peripheral blood smear (PBS) and stain it using standard protocol 6. To examine a peripheral blood smear for RBC morphology, DLC and platelet count and morphology 7. To correlate peripheral blood smear findings with RBC histograms
Number of students that can be accommodated in this elective	4
Prerequisites for elective	Universal precautions and Good laboratory practice Understanding of etio-pathogenesis of Anemia
Learning resources for students	1. Text book of hematology DrTejinder Singh 2. Robbins and Cotran Pathological basis of disease, Tenth edition 3. ABC of CBC
List of activities of student participation	1. Obtain history of anemic patients directly or from HIS whose blood samples are received for hemogram in clinical pathology laboratory 2. Observe, perform and learn the procedure of smear making and staining 3. Understand the Standard operating procedure of cell counters 4. Learn how to examine a peripheral blood smear 4. Learn to interpret a RBC histogram 5. Correlate histogram with peripheral blood smear in patients with anemia 6. Work with supervisor in making observations, collect data and documents as per protocol 7. Document details in excel worksheet 8. Write report of work done 9. Assessment
Portfolio entries required	1. No of cases worked up. 2. Summary of the results of the entire one month data analysis 3. Important points about Histograms 4. Reflections about what they have learnt in one month period
Log book entry required	Completion of posting signed by preceptor with a “meets expectation ‘(M)’ grade”
Assessment	Formative: 1) Attendance (minimum 75%) 2) Day-to-day participation in laboratory activity 3) No of cases satisfactorily worked up 4) Completion of objectives of elective posting topic

Anaemia is not a disease in itself, but a manifestation of many underlying pathologies. Here, the red blood cell (RBC) mass is insufficient to deliver oxygen to the tissues. That may be due to reduced RBC mass and/or reduced haemoglobin (Hb) content of RBC.

Management of anaemia begins with laboratory assessment of complete blood count (CBC) that includes Hb%, RBC count, RBC indices, total leucocyte count, differential leucocyte count, platelet count, reticulocyte count. RBC indices include mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) and red cell distribution width (RDW). RBC morphology is assessed from peripheral blood smear (PBS) under light microscope.

Previously, all the components of CBC were calculated manually. With the introduction of automated haematology analyser the reporting of CBC has become faster. It minimized manual error and saved many working hours.

RDW is the new RBC index that is completely machine derived. It correlates with RBC size variation and hence gives indication regarding the degree of anisocytosis.

Several studies have shown that long term sample storage, presence of RBC agglutinin, RBC fragmentation, hyperglycaemia, hyperlipidaemia, high lymphocyte count can affect analyser estimates.

Giant platelets are mistaken by analyser as micro-erythrocyte giving rise to raised RDW. Presence of malaria parasite within the RBC increases RBC size and may give false impression of macrocytosis and hypochromia in the analyser results. These can lead to altered MCV, MCH values.

Hence examination of PBS is important