

# General Hematology Overview

The Vet ABC hematology analyzer provides 17 parameters plus 3 histograms. The following is a brief overview of each. Please be advised that this is a summary and does not encompass every possible disease or condition. Please refer to veterinary clinical pathology and/or internal medicine textbooks for detailed information.

1. RED BLOOD CELL COUNT (RBC) – total number of RBCs in a cubic mm of blood.
  - Decreased RBC = anemia
    - A. Blood loss, hemolysis = presence of polychromatic, immature RBCs (reticulocytes) on blood smear
      - Increased RDW and MCV
      - Decreased MCHC
    - B. Bone marrow disease = no immature RBCs noted
      - Normal MCV, MCHC, RDW
    - C. Iron deficiency
      - Decrease MCV, MCHC
  - Increased RBC = polycythemia
    - A. Dehydration (majority of cases)
    - B. Renal disease
    - C. Polycythemia vera
2. HEMATOCRIT (HCT) – percentage of blood volume comprised of RBCs.
  - Most commonly used parameter to assess anemia
  - Equivalent to “packed cell volume” (PCV)
  - $HCT = \frac{MCV \times RBC}{10}$
3. HEMOGLOBIN (HGB) – measured as grams of hemoglobin per deciliter of blood.
  - Typically 1/3rd of the PVC
  - Variations often indicate laboratory error, hemolysis, or lipemia
4. MEAN CORPUSCULAR VOLUME (MCV) – average size of RBCs
  - Elevated MCV = macrocytosis. Commonly caused by marked RBC regeneration.
  - Decreased MCV = microcytosis. Commonly seen with iron deficiency and liver shunts.
5. MEAN CORPUSCULAR HEMOGLOBIN CONCENTRATION (MCHC) – average concentration of hemoglobin in RBCs.
  - Increased MCHC = not physiologically possible. Commonly caused by sample hemolysis and lipemia.
  - Decreased MCHC = hypochromasia. Commonly results from large numbers of immature RBCs or iron deficiency.
  - $MCHC = \frac{HGB \times 100}{HCT}$
6. MEAN HEMOGLOBIN CONCENTRATION (MCH) – read same as MCHC.
7. RED BLOOD CELL DISTRIBUTION WIDTH (RDW) – measurement of the width of the RBC size distribution curve.
  - Increased RDW = presence of abnormally sized RBCs
  - Decreased RDW = not possible



# General Hematology Overview

8. PLATELET COUNT (PLT) – total number of platelets in a cubic mm of blood.
  - Increased PLT = thrombocytosis. Seen with blood loss and iron deficiency.
  - Decreased PLT = thrombocytopenia. Causes include immune-mediated destruction and/or bone marrow suppression.
9. MEAN PLATELET VOLUME (MPV) – size of the average platelet.
  - Increased MPV = presence of immature platelets as these are slightly larger than their more mature counterparts.
10. WHITE BLOOD CELL COUNT (WBC) – total number of white blood cells in a cubic mm of blood.
  - Increased WBC = leukocytosis. Results from elevation of one or more of the five subgroups.
  - Decreased WBC = leukopenia. Results from decrease in one or more of the five subgroups.
  - Five subgroups:
    - Neutrophil
    - Lymphocyte
    - Monocyte
    - Eosinophil
    - Basophil (very rare)
11. The Vet ABC analyzer categorizes these 5 subgroups into a 3-part differential in dogs, cats, and horses:
  1. GRA = neutrophil, eosinophil, basophil
  2. LYM = lymphocyte
  3. MON = monocyte
12. GRANULOCYTE (GRA) – absolute count and percentage
  - Neutrophils
    - i. Increased Neutrophils = neutrophilia. Commonly caused by inflammation, infections, and/or stress.
    - ii. Decreased Neutrophils = neutropenia. Can be the result of severe infection
  - Eosinophils (EOS)
    - i. Increased EOS = eosinophilia. Often seen with parasitism and allergic diseases.
    - ii. Decreased EOS = eosinopenia. Clinically unimportant.
  - Basophils – increased similar to EOS.
13. LYMPHOCYTE (LYM) – absolute count and percentage.
  - Increased LYM = lymphocytosis. Caused by excitement (esp. cats and horses) and neoplasia.
  - Decreased LYM = lymphopenia. Caused by stress/steroids and viral diseases.
14. MONOCYTE (MON) – absolute count and percentage.
  - Increased MON = monocytosis. Especially common with chronic inflammation and stress.
  - Decreased MON = monocytopenia. Clinically insignificant.
15. EOSINOPHIL FLAG (EOS) – percentage of WBC measured as eosinophils.
  - Recommended trigger setting of 5%.
  - Prompts operator to review blood smear.

