Hematology

Veterinary technicians play an important role in the analysis and reporting of laboratory findings. This PowerPage reviews aspects of hematology including the types of data that are reported and terminology related to hemogram findings. Bolded terms are the most commonly used.

The Complete Blood Count (CBC)

**Red blood cell (RBC) parameters**
- **RBC count**: The number of RBCs per microliter of whole blood
- **Hemoglobin (Hgb) measurement**: Grams of hemoglobin per microliter of whole blood
- **Hematocrit (Hct) measurement**: Percentage of whole blood volume composed of RBCs
- Mean Corpuscular Volume (MCV) measurement: Average size of red blood cells in femtoliters
  - A femtoliter is \( 1 \times 10^{-15} \) liters
- RBC Distribution width (RDW) measurement: Percent variation in size of the RBC population
- Mean Corpuscular Hemoglobin (MCH) measurement: Average weight of hemoglobin per RBC in picograms
- Mean Corpuscular Hemoglobin Concentration (MCHC) measurement: Average concentration of hemoglobin per RBC in grams per deciliter
- Comments on RBC morphology (see list in section below)

**White blood cell (WBC) parameters**
- WBC count
- The number of WBCs per microliter of whole blood
- Differential count
- The percentage and absolute number of each WBC
  - Neutrophils (also known as “Segs”)
  - Lymphocytes
  - Monocytes
  - Eosinophils
  - Basophils
- Comments on WBC morphology (see list in section below)

**Platelet parameters**
- Platelet count
- The number of platelets per microliter of whole blood
- Mean platelet volume (MPV): Average platelet size in femtoliters
- Comments on platelet morphology (see list below)

**Terminology and Morphologic Description on a CBC**

Red blood cell morphology and descriptions:

**Cell number and distribution**
- Anemia - decreased number of RBCs
- Polycythemia - increased number of RBCs
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- **Rouleaux** - RBCs that form stacks
- **Agglutination** - RBCs that form irregular clumps

### Cell size
- **Microcytosis** - decreased RBC size
- **Macrocytosis** - increased RBC size
- **Anisocytosis** - increased variation in cell size

### Cell color
- **Hypochromia** - decreased pigment (increased pallor)
- **Hyperchromia** - increased pigment (lack of central pallor)
- **Anisochromasia** - increased variation in pigmentation
- **Polychromasia** - RBCs with a blue or lilac tinge

### Cell shape
- **Poikilocytosis** - increased variation in RBC shape
- **Spherocytosis** - cells that are spherical in shape with lost central pallor
- **Target cell** - cell with strongly staining area in the middle of the central pallor region
- **Schistocyte** - fragmented RBCs that are usually angular
- **Echinocyte** - crenated RBC with many (20-30) small, regular, blunt projections
- **Acanthocyte** - cell with irregularly distributed small projections

### RBC inclusions
- **Howell-Jolly bodies** - round dense staining inclusions, usually toward one edge of the cell; represents a nuclear fragment
- **Basophilic stippling** - the presence of small basophilic inclusions distributed throughout the RBC; represents abnormally staining ribosomes
- **Nucleated RBCs (nRBCs)** - RBCs that have not completed maturation and still have a nucleus

### White blood cell morphology and descriptions
- **Toxic changes** in neutrophils
  - Cytoplasmic basophilia - streaky diffuse blue appearance to cytoplasm
  - Dohle bodies - round to linear blue aggregates in the cytoplasm
  - Cytoplasmic vacuolation - indistinct vacuoles throughout the cytoplasm creating a frothy appearance
  - Nuclear immaturity - less clumped chromatin in the nucleus
- **Immature forms of white blood cells in circulation**
  - Myeloblast, myelocyte, metamyelocyte - myeloid (neutrophil, eosinophil, basophil) precursors
  - Lymphoblast - lymphocyte precursor

### Platelet morphology and descriptions
- **Platelet clumps** - common at edge of a blood smear; can cause artificially low platelet counts
- **Macroplatelets** - larger than normal platelets in circulation