Blood film review

A blood film should be examined every time a blood sample is analysed for haematological purposes, as an analyser count does not represent the cell morphology, clumping or any abnormalities that may be present in the blood film. Blood smear analysis allows quantitation of the different types of leukocytes (called the differential count), estimation of the platelet count, and detection of morphologic abnormalities that may be indicators of pathophysiologic processes. Though some automated haematology analyzers provide a differential count as part of their output, this does not fully take the place of a microscopic exam by an experienced observer.

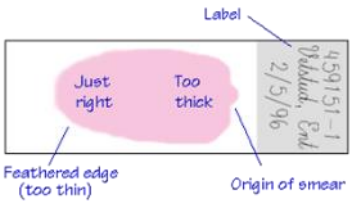
Materials required:

Microscope slides*, EDTA blood, capillary tubes*, Diff Quik stain*, microscope, microscope oil*

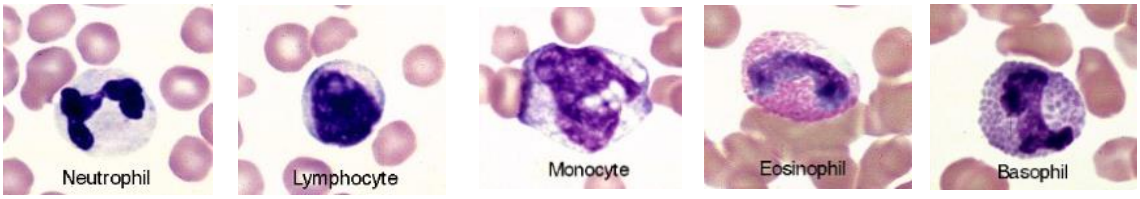
** Can be obtained from Awanui Veterinary using online ordering.*

How to:

1. Make a fresh blood film as soon as possible after collection of blood in an EDTA tube (see Blood Film Preparation guide).
2. Air dry blood film and then stain using an in-house stain such as Diff Quik (see Staining a blood / cytology smear guide).
3. Review film under microscope using a systematic approach—assess if film is of good quality, perform 100 cell differential, calculate absolute results.
4. Scan - 10x objective (dry)
   - > Look at cell distribution, clumps, atypical cells and parasites. Make notes on what you see.
   - > If large clots or clumps of blood are present do not use film for review.
5. WBC estimate - 40x objective (dry)
   - > Average number WBC/field x 2
   - > Check to see that estimate WBC count is similar to analyser count
6. WBC differential - 50x / 100x oil objectives
   - > Differentiate 100 white blood cells by cell type (neutrophils, lymphocytes, monocytes, eosinophils, basophils) in sequential fields
   - > Count 200 cells if WBC >25.0 x 109/L
   - > Count fewer cells if WBC <2.0 x 109/L
   - > Report differential results as % (results should add to 100%)
   - > Calculate absolute values: % x WBC = cells x 109/L (absolute values should add to total WBC count)

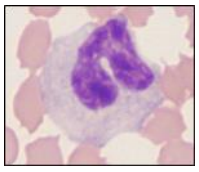
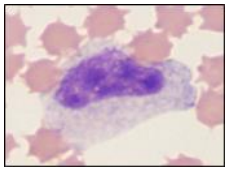


One pattern for differential counting

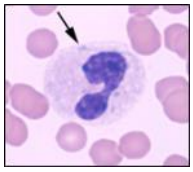


Images left: Normal feline WBC.

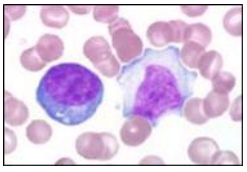
7. WBC morphology
   - Note any immature forms (bands, metamyelocytes, myelocytes or myeloblasts), left shift or toxic changes in granulocytes (Döhle bodies, basophilic cytoplasm, and vacuolated cytoplasm), any reactive changes in lymphocytes and monocytes (size of nucleus, basophilic cytoplasm), or any 'abnormal' changes in any of the white cells.

Immature neutrophils: left band, right metamyelocyte

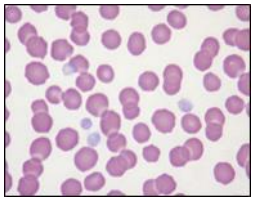
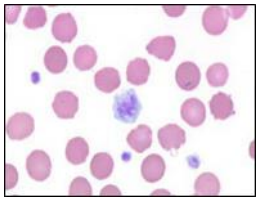
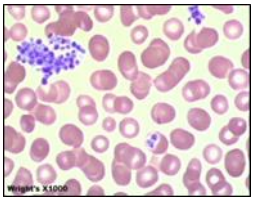


Feline neutrophil with Döhle body



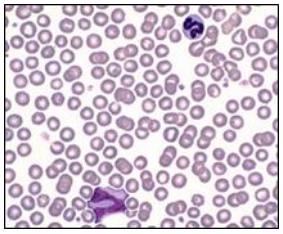
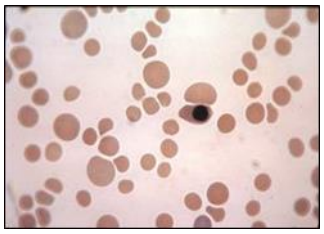
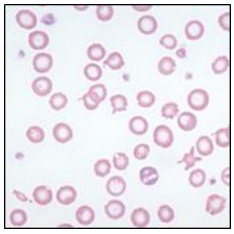
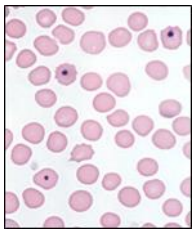
Reactive lymphocytes

8. Assess platelets
   - Note size (normal, large, giant forms) look for platelet clumps which are very common.
   - Platelet clumps – platelet clumps falsely lower both automated and manual platelet count, are very common in cats; can be due to excess EDTA (small sample), a traumatic venepuncture and sample collection using a syringe and delayed transfer to EDTA. Review on low power, check the feathered edge of film.

Platelets (left to right) – normal, giant forms, clumped

9. Assess erythrocytes
   - Examine monolayer (RBCs just touching). Note distribution (rouleaux, agglutination), size (normal, microcytes, macrocytes, and anisocytosis), shape (normal, echinocytes, acanthocytes, keratocytes, and spherocytes), colour (hypochromasia, polychromasia), and inclusions (Heinz bodies, Howell Jolly bodies and RBC parasites such as Mycoplasma sp.).

Erythrocytes (left to right) – normal, macrocytic and microcytic, hypochromic, Howell-Jolly bodies

Notes:

- *This information sheet is intended as a guide only.*
- *RBC and WBC morphology varies in different animal species - the photographs included here are not representative of all animal species.*
- *Complete haematology review of blood films should always be carried out by trained and experienced personnel.*