

## What are dot plots?

Dot plots are a visual representation of the complete blood count (CBC); each dot represents a single cell. Dot plots are a critical element of the CBC, providing a snapshot of cellular morphology. This document will help you identify various feline and canine disease states.

## What are the disease states?

### Reticulocytosis

Reticulocytosis (an increased number of reticulocytes) is the hallmark and most objective indicator of a regenerative anaemia. Reticulocytosis without anaemia may also be an indicator of resolving anaemia or other occult disease processes. Reticulocytes are easily identified as the magenta dots to the right of the mature red blood cell population (red dots). The new methylene blue dye binds to the residual reticulum, capturing the reticulocytes' increased complexity compared to the normal mature red blood cells. In a normal dot plot, there are few reticulocytes and their density is much less than shown in an abnormal dot plot. Rapid review of the dot plot allows for a quick validation of the reticulocyte count.

### Thrombocytopenia

Thrombocytopenia can be a critical finding in a complete blood count (CBC), so rapid validation of results from the haematology analyser is essential. In red blood cell and platelet dot plots, severe thrombocytopenia is easily validated. In normal patient dot plots, there are dense accumulations of blue dots representing individual platelet optical profiles. During severe thrombocytopenia, the density of the blue dots is dramatically reduced. Blood film microscopic review for possible platelet clumping is recommended for any case with a reported low platelet count. Clumped platelets may cause a false low platelet count, resulting in platelet events not appearing on these dot plots.

### Platelet clumping

Platelet clumping is a common problem in veterinary medicine, especially with feline samples. Any time a difficult sample collection results in a delay in filling the EDTA tube or delay in proper mixing, there is a potential for platelet clumping. There are different degrees of platelet clumping, and most advanced analysers recognise large platelet clumps. When platelet clumps are identified and the platelet count is below the reference interval, you'll receive a message alerting you to the presence of platelet clumps. A rapid review of the dot plots provides you with a very quick validation if large platelet clumps are present. Large platelet clumps are recognised as a light blue cluster of digitised events at the bottom of a white blood cell (WBC) dot plot. A rapid blood film review can also allow for quick recognition of large platelet clumps and verification of results reported. If platelet clumps are reported or observed on a blood film, collection of a new sample for analysis is recommended.

### Leukopaenia/neutropaenia

Leukopaenia (decreased total leukocyte numbers) and, in particular, neutropaenia (decreased neutrophil numbers) often have high clinical significance related to overwhelming inflammatory disease and possible effects of chemotherapy; immediate knowledge of these situations is critical to the veterinarian. Marked decreases in leukocytes can be rapidly validated by examining dot plots. When an isolated cell type such as the neutrophil is significantly decreased, it is easily recognised because of the obvious lack of or a dramatic decrease in density of the dot plot cloud associated with that particular leukocyte. In each of the cases shown in this document, there is a leukopaenia characterized by a marked neutropaenia (note the absence of the cloud of lavender dots representing individual neutrophils in the sample).

### Lymphoid leukaemia

Leukaemia has multiple presentations—one of the most common is lymphoid leukaemia, either as a result of progression of malignant lymphoma or primary lymphoid leukaemia originating in the bone marrow. Most advanced haematology analysers cannot accurately characterise these circulating malignant cells and have difficulty in differentiating the various types of leukocytes. In normal WBC dot plots, there are distinctly identified clouds of different colored dots representing the various populations of leukocytes typically seen in the peripheral blood; however in the dot plots of lymphoid leukaemia patients, clear distinction between the different leukocyte clouds is not present. In ProCyte One\* Haematology analyser dot plots, there is often extension of the lymphocyte and monocyte clouds vertically on the y axis and an unclear distinction between cell populations.

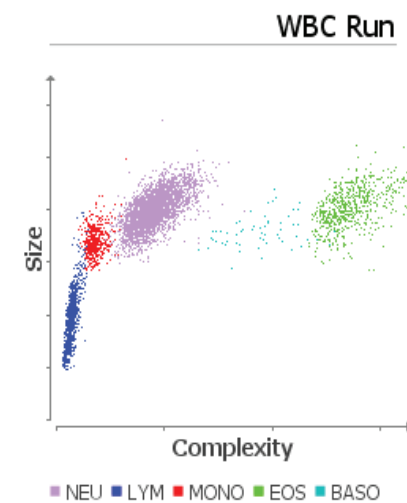
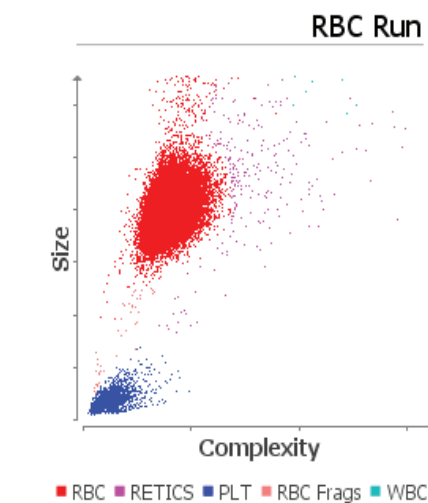
For more information about ProCyte One dot plots, contact IDEXX Customer and Technical Support or visit [learn.idexx.com](https://learn.idexx.com).



Client: Cooley (1)  
Patient Name: Zombo  
Species: Canine  
Breed: Labrador Retriever

Gender: Male/Castrated  
Weight:  
Age: 9 Years  
Doctor:

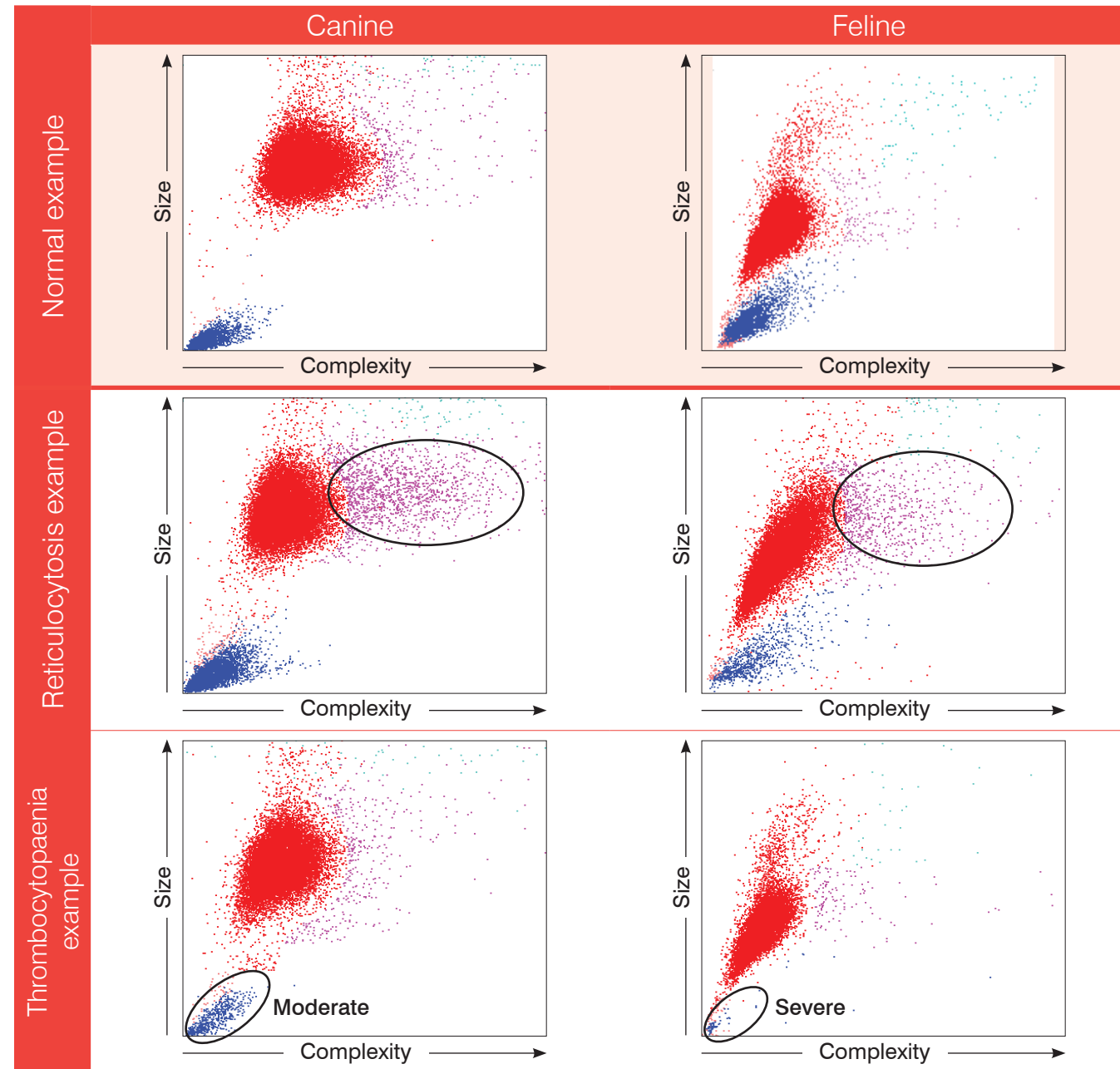
| Test                                | Results         | Reference Interval | LOW | NORMAL | HIGH |
|-------------------------------------|-----------------|--------------------|-----|--------|------|
| ProCyte One (July 19, 2021 7:57 AM) |                 |                    |     |        |      |
| RBC                                 | 6.93 M/ $\mu$ L | 5.65 - 8.87        |     |        |      |
| HCT                                 | 46.3 %          | 37.3 - 61.7        |     |        |      |
| HGB                                 | 16.2 g/dL       | 13.1 - 20.5        |     |        |      |
| MCV                                 | 66.8 fL         | 61.6 - 73.5        |     |        |      |
| MCH                                 | 23.4 pg         | 21.2 - 25.9        |     |        |      |
| MCHC                                | 35.0 g/dL       | 32.0 - 37.9        |     |        |      |
| RDW                                 | 16.7 %          | 13.6 - 21.7        |     |        |      |
| %RETIC                              | 0.2 %           |                    |     |        |      |
| RETIC                               | 16.5 K/ $\mu$ L | 10.0 - 110.0       |     |        |      |
| %NEU                                | 66.1 %          |                    |     |        |      |
| %LYM                                | 22.4 %          |                    |     |        |      |
| %MONO                               | 4.8 %           |                    |     |        |      |
| %EOS                                | 6.1 %           |                    |     |        |      |
| %BASO                               | 0.6 %           |                    |     |        |      |
| NEU                                 | 8.11 K/ $\mu$ L | 2.95 - 11.64       |     |        |      |
| LYM                                 | 2.75 K/ $\mu$ L | 1.05 - 5.10        |     |        |      |
| MONO                                | 0.58 K/ $\mu$ L | 0.16 - 1.12        |     |        |      |
| EOS                                 | 0.75 K/ $\mu$ L | 0.06 - 1.23        |     |        |      |
| BASO                                | 0.07 K/ $\mu$ L | 0.00 - 0.10        |     |        |      |
| PLT                                 | 192 K/ $\mu$ L  | 148 - 484          |     |        |      |
| MPV                                 | 12.4 fL         | 8.7 - 13.2         |     |        |      |
| PDW                                 | 13.1 fL         | 9.1 - 19.4         |     |        |      |
| PCT                                 | 0.24 %          | 0.14 - 0.46        |     |        |      |



Interpreting ProCyte One dot plots



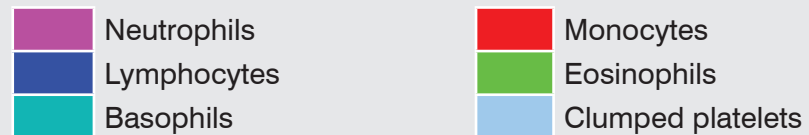
## Red blood cell and platelet dot plots



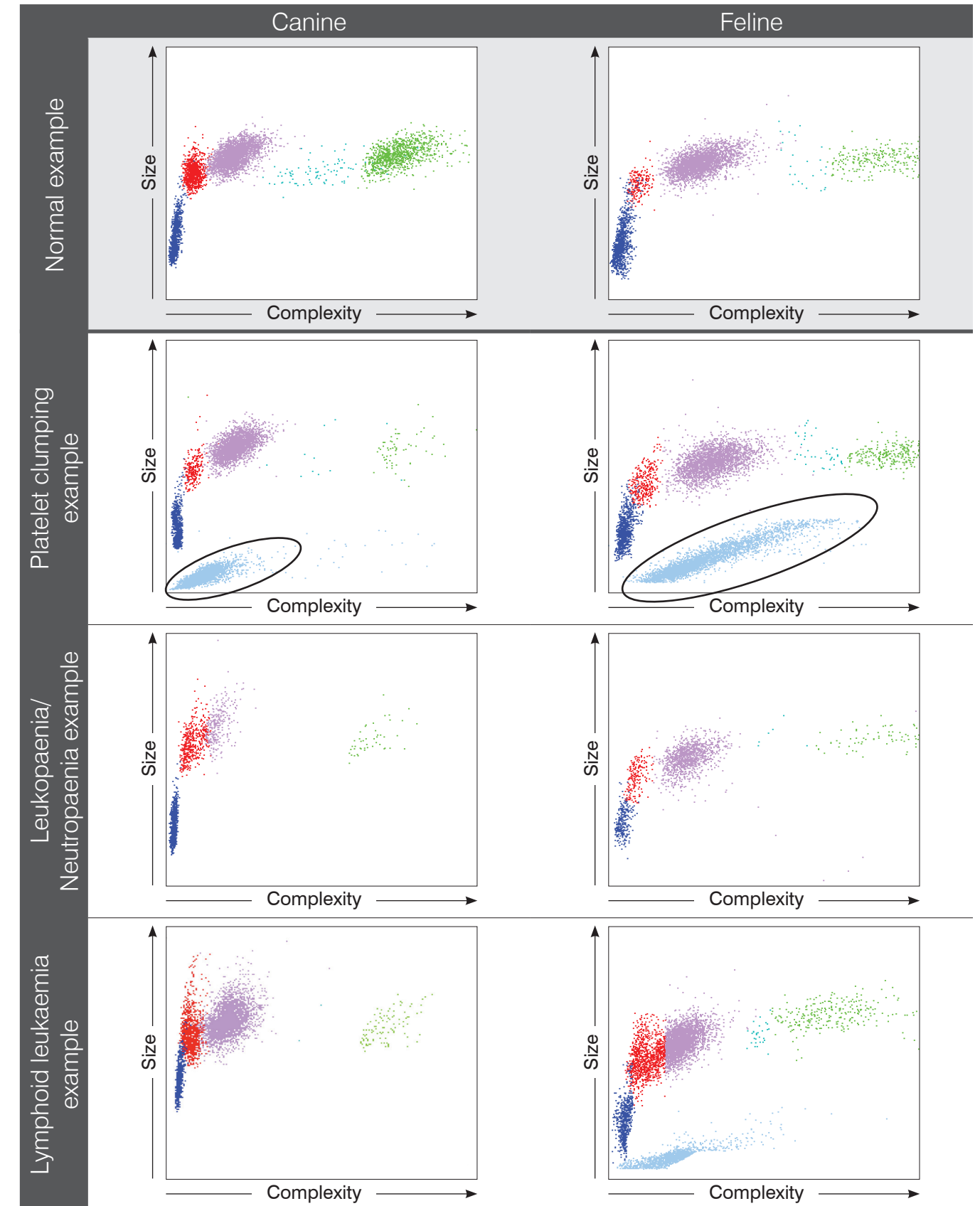
### Red blood cell dot plot legend



### White blood cell dot plot legend



## White blood cell dot plots



Normal example

Platelet clumping example

Leukopaenia/  
Neutropaenia example

Lymphoid leukaemia example