

A 3D-rendered illustration of various blood cells. Red blood cells are shown as red, biconcave discs. White blood cells are depicted as larger, more irregularly shaped cells with visible nuclei. The background is a dark blue gradient with faint, glowing yellow and green patterns, suggesting a microscopic or cellular environment.

# Practical Hematology Leukopenia

Wendy Blount, DVM  
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# Practical Hematology

1. Blood Loss Anemia
2. Hemolysis
3. Bone Marrow Disease
4. Transfusion Medicine
5. Polycythemia
6. Coagulopathy
7. Central IV Lines
8. Leukophilia
9. Leukopenia
10. Splenic Disease

A vertical strip on the left side of the slide shows a microscopic view of several red blood cells (erythrocytes) in a fluid medium. The cells are depicted as biconcave discs with a reddish hue, set against a background of green and yellowish light. The lighting creates a sense of depth and movement.

## Neutropenia

- DDx:
  - Excessive peripheral consumption
    - Infection
    - Necrosis
    - IM neutropenia
  - Bone marrow disease
    - See non-regenerative anemia
  - Test for parvovirus
    - Diarrhea
    - < 2 years of age
    - Immunosuppressed
    - Swab tonsils then rectum

A vertical strip on the left side of the slide shows a microscopic view of several red blood cells. The cells are depicted as biconcave discs, with a reddish-brown color and a darker center. They are set against a background of soft, out-of-focus green and yellow light, suggesting a biological or medical context.

## Neutropenia

- Treatment
  - Treat obvious causes of infection, necrosis or inflammation
  - If no obvious causes, work up for occult infection
  - Discontinue myelosuppressive drugs
  - Prophylactic antibiotics
    - 1500-2000/uI - amoxicillin
    - <1500/uI – amoxicillin and quinolone
      - Clindamycin and quinolone
      - Metronidazole and quinolone
    - If septic, IV antibiotics

A vertical strip on the left side of the slide shows a microscopic view of red blood cells. The cells are depicted as red, biconcave discs of various sizes and orientations, set against a background of blue and green hues with some yellowish-green spots, suggesting a fluid environment.

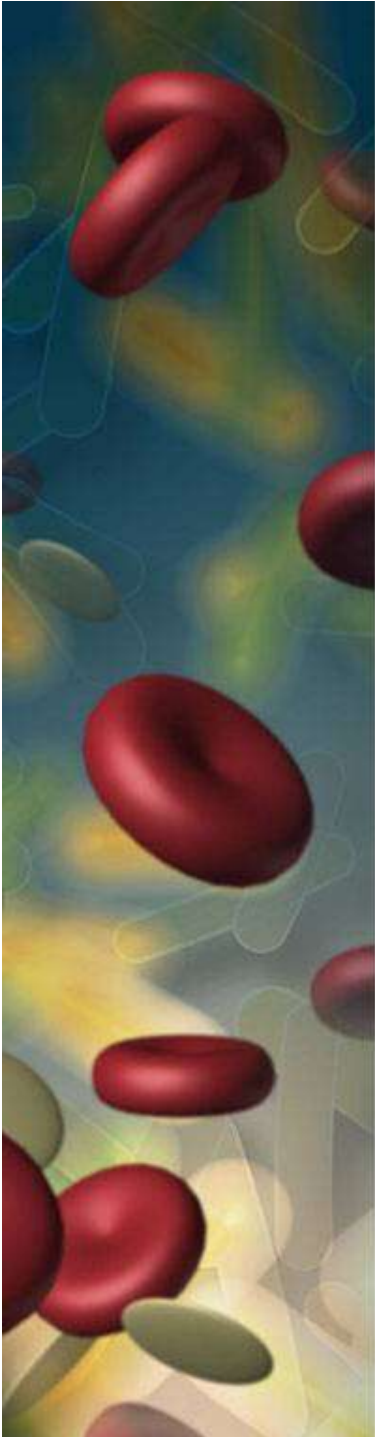
## Neutropenia

- Treatment
  - Recheck CBC weekly
  - Bone marrow sampling of no response
    - Sooner if bicytopenia or pancytopenia
    - FeLV IFA in cats
  - Neupogen if maturation arrest
    - GCSF - Granulocyte colony stimulation factor
  - Doxycycline then Immunosuppressive therapy for IM neutropenia



## Degenerative Left Shift

- Due to overwhelming inflammation
  - Normal pyramid of maturation is interrupted
  - So there are more young cells than mature
  - Usually, the more mature forms are more plentiful
    - Most Segs
    - Then bands
    - Then metamyelocytes
    - Then myelocytes
    - Then promyelocytes
    - Fewest myeloblasts



A vertical strip on the left side of the slide shows a microscopic view of several red blood cells (erythrocytes) in a fluid medium. The cells are depicted as biconcave discs with a reddish-brown color. The background is a soft-focus, light-colored fluid with some greenish-yellow highlights.

## Lymphopenia (& Eosinopenia)

- Severe stress
- corticosteroid administration
- Hyperadrenocorticism
- Some viral infections
  - FIP
  - Infectious canine hepatitis
  - Canine distemper virus
  - Parvovirus
  - Coronavirus
- Acute inflammation
- Loss of lymphocyte rich lymph
  - Chylothorax
  - Protein losing enteropathy, lymphangiectasia
  - Lymphatic disruption by infection, inflammation, neoplasia

A vertical strip on the left side of the slide shows a microscopic view of blood cells. Several red blood cells are visible, appearing as bright red, biconcave discs. There are also some white blood cells, which are larger and have a more irregular, multi-lobed shape. The background is a mix of blue and green, suggesting a fluid environment.

## Leukocyte Function Defects

- Canine CD11/CD187 Adhesion Protein Deficiency (CLAD)
- Chronic granulomatous Disease in Doberman Pinschers
- Myeloperoxidase deficiency
- Recurring infections in Weimeraners
- Congenital myelodysplasias
- **Pups die at a young age**
  
- Acquired neutrophil dysfunctions
  - FeLV, FIV and other immunosuppressive diseases





# Acknowledgements

## Chapter 2: The Complete Blood Count, Bone Marrow Examination, and Blood Banking

- Douglass Weiss and Harold Tvedten
- Small Animal Clinical Diagnosis by Laboratory Methods, eds Michael D Willard and Harold Tvedten, 5<sup>th</sup> Ed 2012

## Chapter 4: Leukocyte Disorders

- Harold Tvedten and Rose Raskin
- Small Animal Clinical Diagnosis by Laboratory Methods, eds Michael D Willard and Harold Tvedten, 5<sup>th</sup> Ed 2012