INTRODUCTION TO REPTILE HEMATOLOGY & CYTOLOGY

Blood Cells of Reptiles

- Erythrocytes
- Leukocytes
- Thrombocytes

- Similar diagnostic principles as Mammals.
- Similar in function as Avian.
- Much more unknowns and variables in Reptiles.
  
  Seasons
  Temperature
  Age & Sex
  Physiological status (Shedding, Brumation)

Blood Cells of Reptiles

- **Erythrocytes**
  - Large nucleated RBC
  - Long live RBC
  - Slow turnover rate

Blood Cells of Reptiles

- **Erythrocytes**
  - Mature RBC
  - Immature RBC (Polychromasia)
  - Very immature RBC (Rubricytes)

- Signs of regeneration
- During shedding
- After brumation

Iguana RBC. Fig 20.8 Veterinary Hematology and Clinical Chemistry 2nd Ed.

Blood Cells of Reptiles

- **Erythrocytes**
  - RBC morphology – blood smear.
  - PCV – capillary tube.
  - Total RBC count – manual dilution, counting chamber.
  - Hb (probably not possible)

Blood Cells of Reptiles

- **Thrombocytes**
  - Similar to mammalian platelet.
  - Polymorphic.
  - Not to confuse with lymphocytes.

Clinical Evaluation:
- Adequate in number.
- Adequate in morphology.
Blood Cells of Reptiles

- **Thrombocytes**

Blood Cells of Reptiles

- **White Blood Cells**
  - Non-granulocytes:
    - Monocytes (Azurophils)
    - Lymphocytes
  - Granulocytes:
    - Heterophils
    - Eosinophils
    - Basophils

Clinical Evaluation:

- WBC morphology – blood smear.
- Estimated total WBC count – blood smear.
  1. 平均視野WBC數量 x (物鏡倍率)²
  2. 平均視野 WBC: RBC 值 x RBC 倍數
- WBC Differential – blood smear.

*Quality of blood smear is extremely important!!!*

Blood Cells of Reptiles

- **White Blood Cells**
  - Non-granulocytes:
    - Monocytes (Azurophils)
  - Lymphocytes

Blood smear of a snake

Monocytosis /Azurophilia
- Infection
- Inflammation (chronic?)

Blood Cells of Reptiles

- **White Blood Cells**
  - Non-granulocytes:
    - Monocytes (Azurophils)
  - Lymphocytes

Blood smear of a Rosy boa

Veterinary Hematology and Clinical Chemistry 2nd Ed

- Lymphocytes of iguana. Fig 20.23
- Lymphocytes of a Rosy boa. Fig 20.22

Lymphocytes of a Rosy boa. Fig 20.22
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Lymphocytes of iguana. Fig 20.23
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Blood Cells of Reptiles

- **White Blood Cells**
  - Non-granulocytes:
    - Monocytes (Azurophils)
  - Lymphocytes

What are the functions of reptilian granulocytes?
- Infective agents
- Antigen presentation

What is the normal WBC differential in this reptile?

What are the functions of reptilian granulocytes?

What is the normal WBC differential in this reptile?
Reference Range vs Normal Range!

- Be careful with what you are reading!
- Be careful with how you interpret a result!
- How was the study performed?
- Selection of animal? (Health evaluation?)
- Juveniles or Adults?
- Captive or Wild?
- Methodology of tests?

Blood Cells of Reptiles

- White Blood Cells
  - Granulocytes:
    - Heterophil

Blood Sample Preparation

1. Blood collection
2. Selection of anticoagulant
3. Quality blood smear (Very very very important!!!)
4. Staining of blood smear

Blood Collection

- Jugular vein
- Subcarapacial vein or sinus
- Tail veins
- Cardiocentesis

Selection of Anticoagulant

- EDTA (紫頭管):
  - May cause hemolysis in some species.
- Heparin (綠頭管):
  - Can be use for blood chemistry analysis.
  - Thrombocyte clumps.

Heterophilia

- Acute inflammation
- Infection

Clinical Evaluation:

- Number of heterophils
- Morphology of heterophils:
  - Maturity of heterophils
  - Toxic change?
  - Degree of toxic change?

Blood Sample Preparation

- EDTA Tube
- Heparin Tube
Quality blood smear!!!
- Use push-smear technique (推片法)
- Critical for estimate WBC count !!!
- Critical for cell morphology evaluation.

Staining of blood smear
- Wright-Giemsa Stain – standard, traditional
- Diff Quik Stain – universal modified Wright-Giemsa
- Liu’s Stain? – Taiwan produced, for human use, questionable for exotic species!!

Case Study
Boa constrictor blood smear (H&E stain)
- Adult female, 5.5 kg
- History:
  - Anorexia for 4 months, weight loss, (BCS 2/5).
  - Two boas that were housed together recently died of anorexia.
- Palpation: excess gas in GI
- Total WBC: 40,000/μL (4,000–10,000/μL)
- Marked lymphocytosis, mild azurphilia

Case Study
Amazone tree boa blood smear (H&E stain)
**Case Study**

*History:* Depressed, anorexia, poor response to supportive cares.

**Case Study**

食蛇龟

*History:* Depressed for couple days, normal appetite, hemocyst on one of the forelimb.

*PCV:* <10

**Sample Collection**

- Cytological Preparations
  - Direct smear of tissue sample, discharge, feces
  - Lung/tracheal wash
  - Stomach/gastric wash

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- Cytological Preparations
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**Case Study**

*Burmeese python*

- Adult, 8 kg
- *History:* Anorexia for several months, had not been eating for a month, a lot of discharge in the mouth.
- *X-ray:* no apparent sign of pneumonia
Further Readings...