INTERPRETATION OF MEDICAL IMAGES: END OF SUBJECTIVITY?

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1. INTRODUCTION

Informatics has enabled the development of numerous applications in the area of Medicine.

In medical environments, there are a lot of software that allow a multiplicity of tasks such as: storage / retrieval of textual information of patients, processing and analysis of medical images.

Fonte: J. S. Duncan et. Al (2000)

…for a image to be really useful, it is necessary to understand what is represented in it.

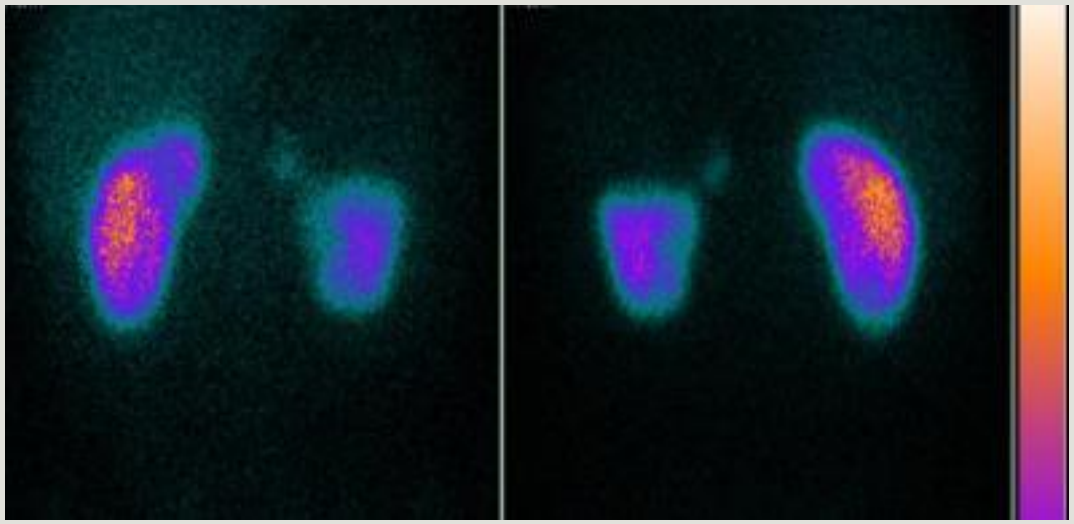
In computer science terms, it means understanding and describing the content of the image.

In order to reach this level of understanding, it is necessary for each type of image to establish the relevant aspects that must be analyzed.

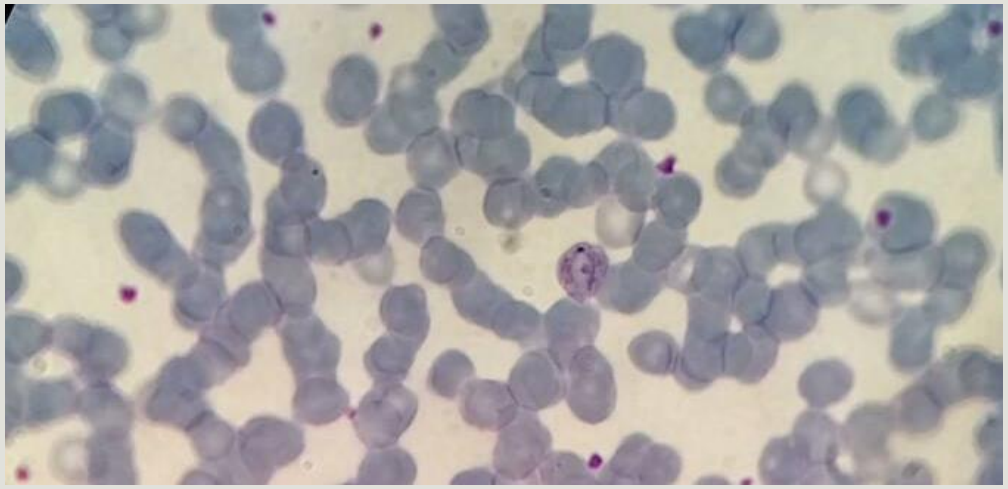
1. INTRODUCTION

Among the numerous medical images…..

1. RENAL SCINTIGRAPHY



2. BLOOD SMEARS



2. Objective

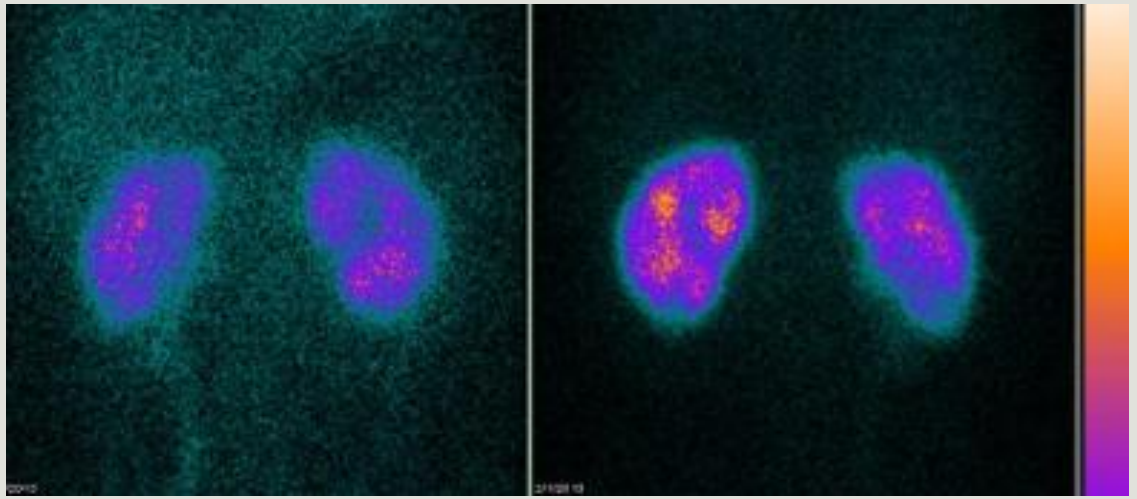
To describe the importance of blood smears images, and the renal scintigraphy, in clinic diagnosis and to describe the relevant aspects that must be analyzed in such images, taking into account the reduction of the subjectivity and variability in the interpretation of the findings.

3. RENAL SCINTIGRAPHY

Nuclear Medicine image-based examination, which allows the study of kidney, by intravenous administration of a radiopharmaceutical (^{99m}Tc-DMSA*):

- Size;
- Morphology
- Location;
- Evaluation of the renal cortex mass

From: *http://www.gruporph.com.br/www/images/prod/02.png*



Renal scintigraphy with ^{99m}Tc-DMSA – Posterior (left) and Anterior (right)

*^{99m}Tc-DMSA -Dimercaptosuccinic Acid labeled by Technetium-99m

3. RENAL SCINTIGRAPHY

*^{99m}**Tc-DMSA scintigraphy** is nowadays recommended as the **technique of choice for evaluation of renal sequelae**, revealing a **higher sensitivity** than ultrasound and intravenous urography, **in acute and chronic pyelonephritis**.*

Piepsz, 2009

*Planar-image ^{99m}**Tc-DMSA is the gold standard** for the **diagnosis of acute pyelonephritis and renal scars**, especially **relevant within the pediatric population.***

Sampedro, 2017

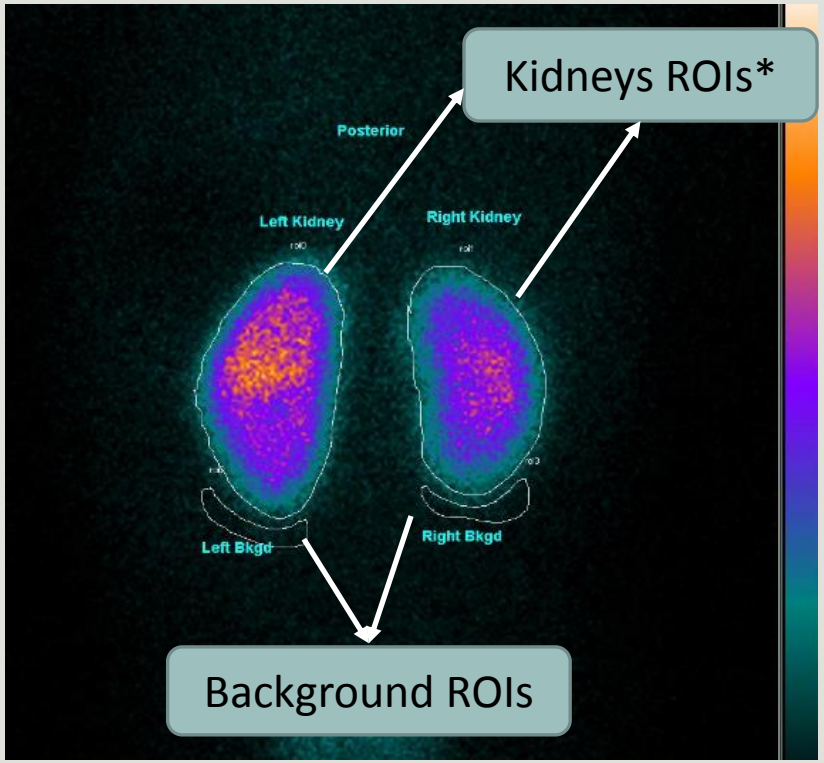
3.RENAL SCINTIGRAPHY

Estimation of Clinical Quantitative Parameters:

Relative Renal Function (RRF) - *^{99m}Tc-DMSA renal uptake*

> *The **geometric mean (GM)** method is used more often and it is also usually considered as more valid to compensate kidney depth.*

Chroustová, 2016



Renal scintigraphy Image in Posterior

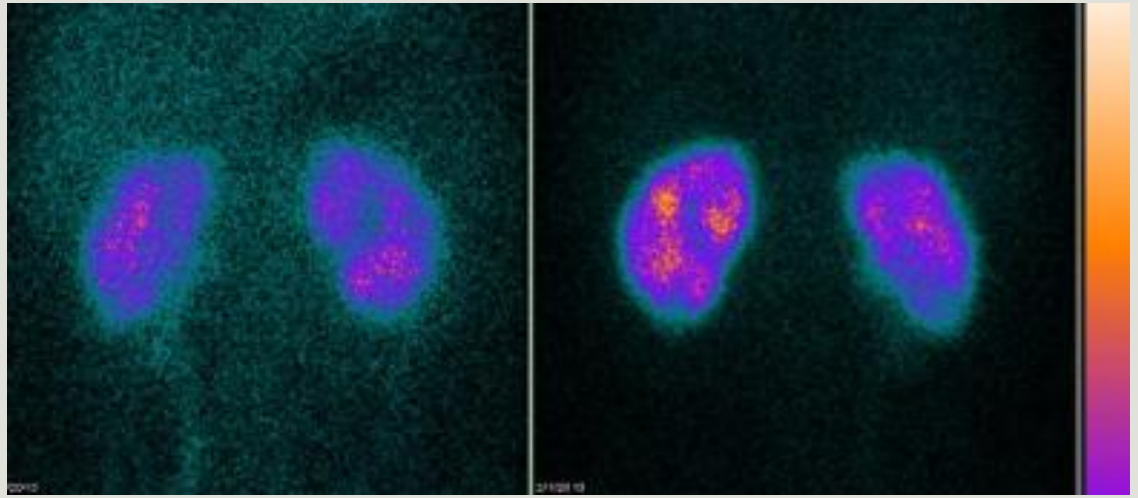
*ROI- regions of interest

3.RENAL SCINTIGRAPHY

Segmentation and quantification renal damage

Traditional segmentation methods *generally* ***stance difficulties*** *due to the renal scintigraphy images, followed by noise. (…)*

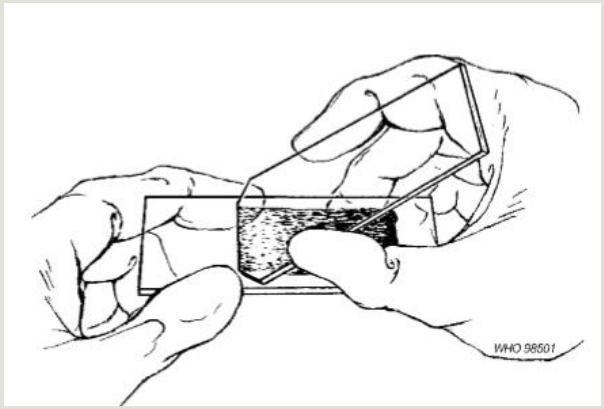
Some ***mathematical methods based on morphology****, such as* ***gradient based methods****, and* ***intensity threshold techniques*** *tend to* ***provide unsatisfactory segmentation results****.*



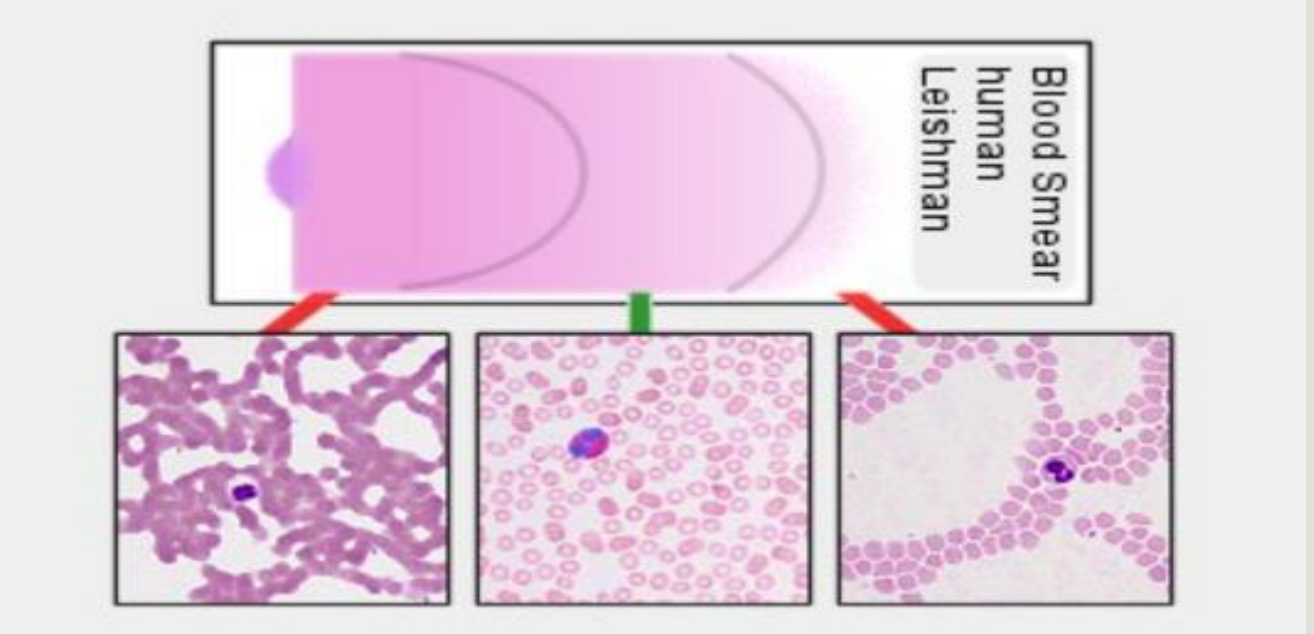
Renal scintigraphy with ^{99m}Tc-DMSA – Posterior (left) and Anterior (right)

4. BLOOD SMEARS

Microscopic examinations of blood smears remain the “gold standard” for laboratory confirmation in same pathologies, such as malaria, and is an important tool in the diagnostic of other diseases as leukemia and anemia.



4. BLOOD SMEARS



Blood smear with Leishman stained

Source: http://lecannabiculteur.free.fr/SITES/UNIV%20W.AUSTRALIA/mb140/CorePages/Blood/blood2.htm

4. BLOOD SMEARS

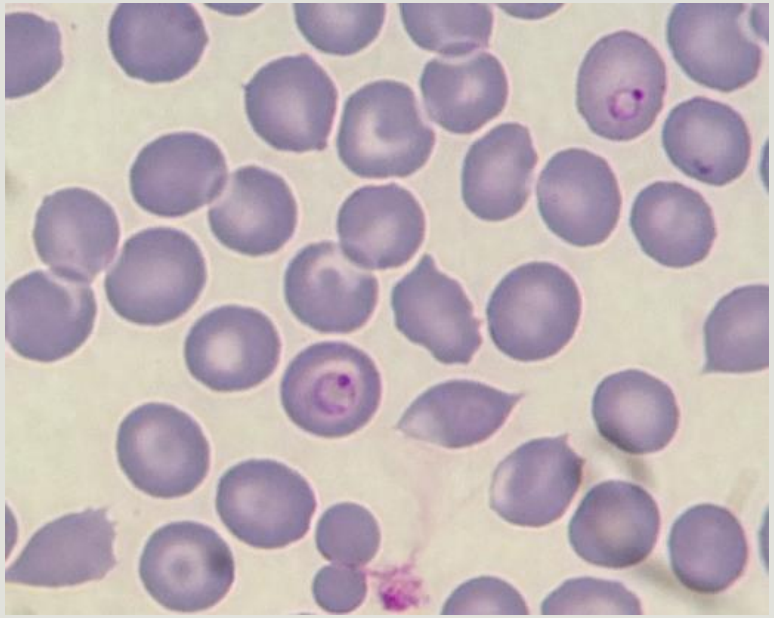
Automated analyzers for complete blood count based in three techniques:

(1) Coulter principle - based on cell conductivity;

(2) Light scatter

(3) Flow cytometry.

4. BLOOD SMEARS



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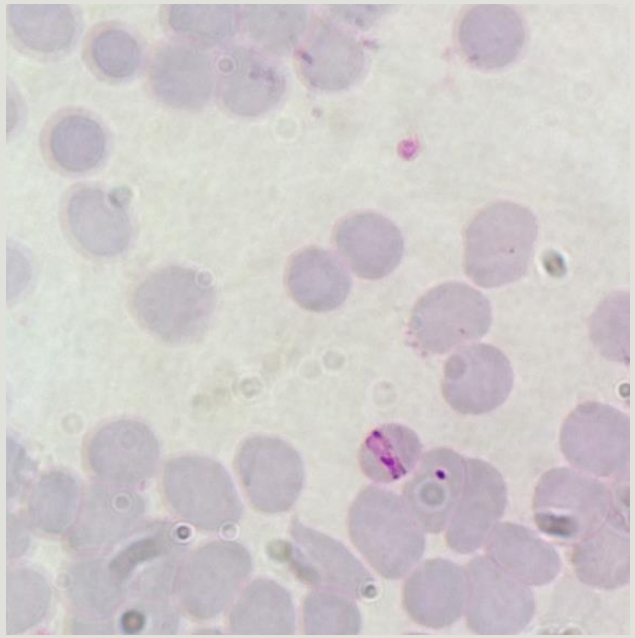

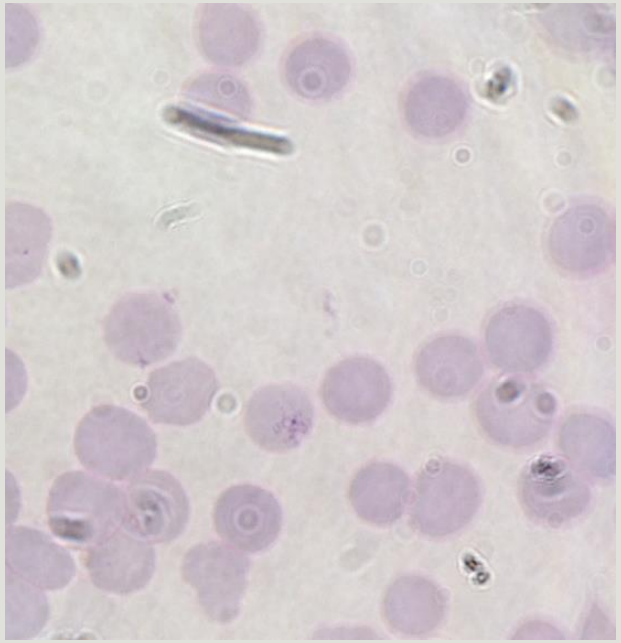

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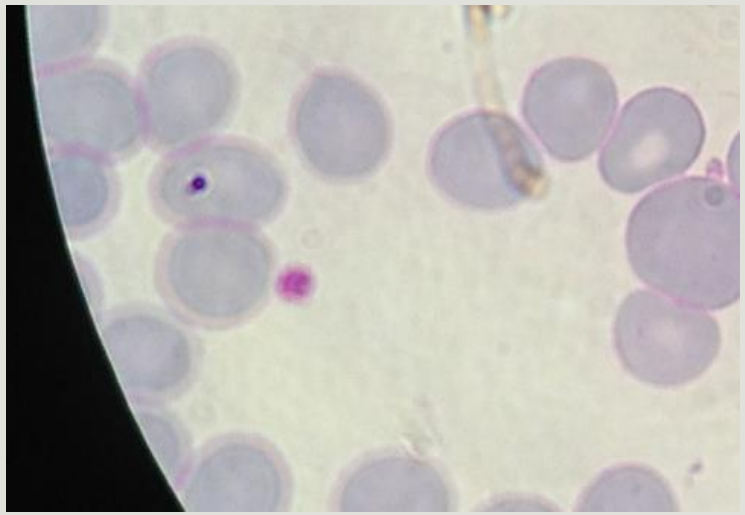

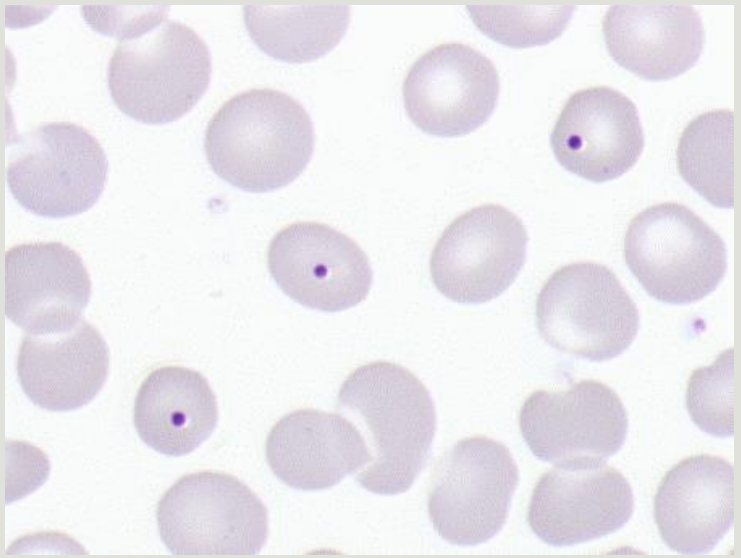

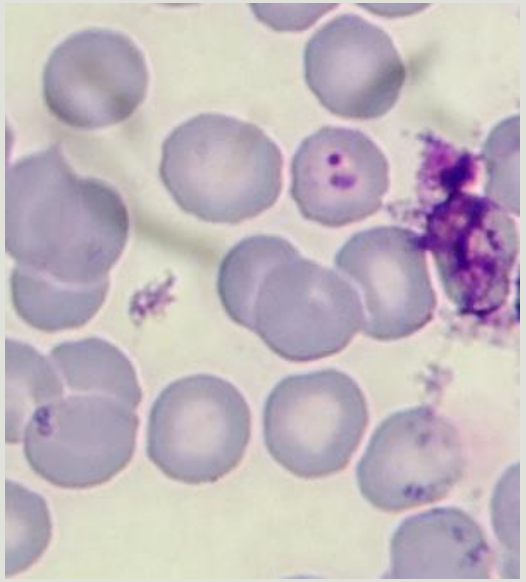

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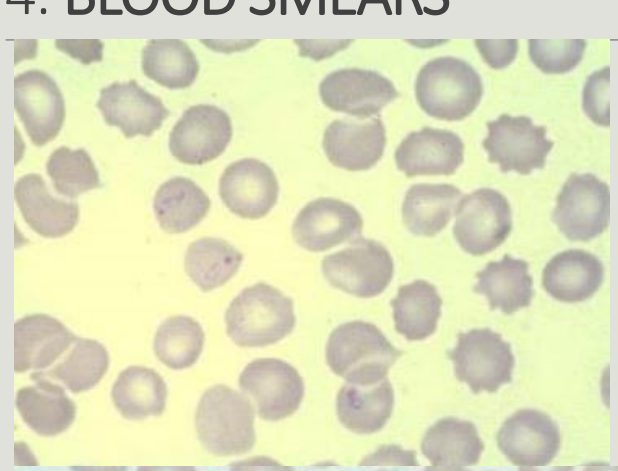

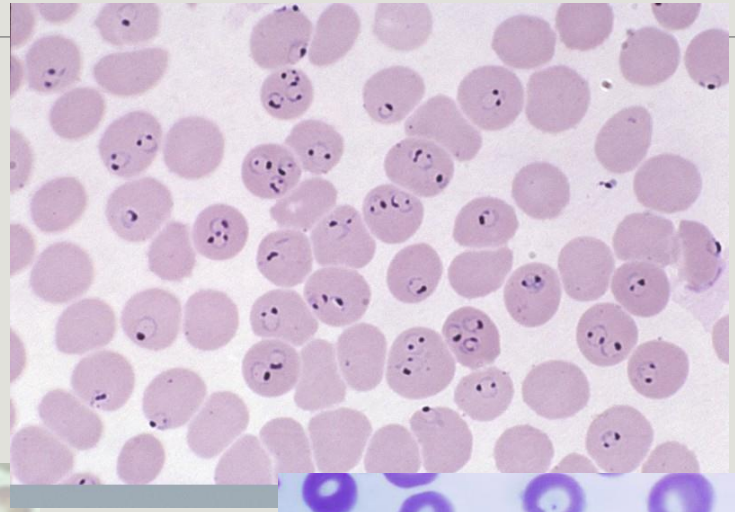

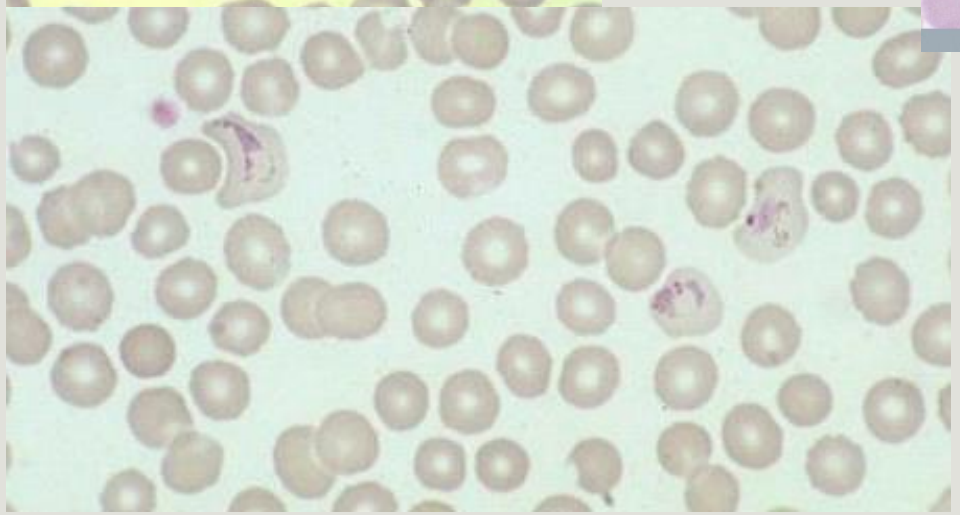

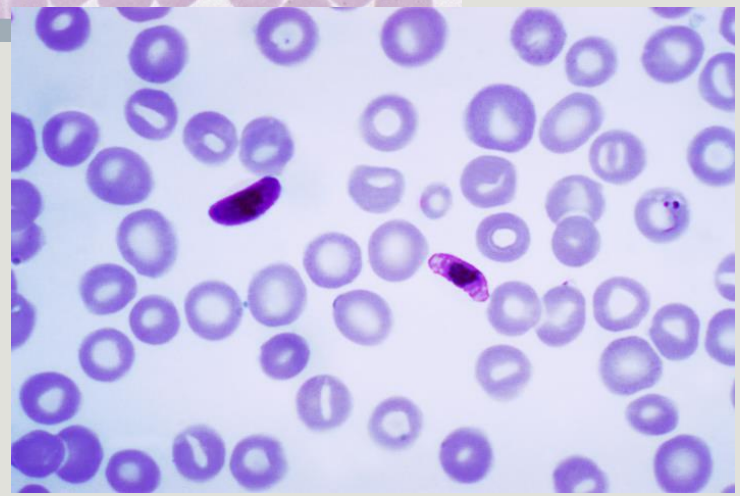

5. FINAL CONSIDERATIONS

Interpretation of either blood smears or renal scintigraphy is associated with training and expertise. These are allied to the subjectivity of the observer, being a limitation in the quality and reproducibility of the results.

Thank you for your attention!

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