NEW YORK STATE

Parasitology Proficiency Testing Program

Blood Smears Only
30 September 2014

The purpose of the New York State Proficiency Testing Program in the category of Parasitology - Blood Smears Only is to monitor the performance of applicant laboratories that detect and identify parasites on blood smears. Below please find the results for the May 2014 proficiency test in Blood Smears Only.

This category is divided into two sub-categories. **Parasite Identification** is intended for labs that identify parasites and report them to the genus or species level on patient reports. **Parasite Screen** is intended for labs that report "Parasites Seen" but do not identify organisms on patient reports. Participants in both sub-categories examine the same samples, however the scoring criteria for the two sub-categories are different. When reading this critique, please ensure that you are comparing your performance to other laboratories in your sub-category.

Sample Preparation and Quality Control

All slides used in this test were prepared and stained by a commercial source. Samples of each test specimen were selected at random by the Parasitology Laboratory at the Wadsworth Center, NYS DOH, and were assayed for quality and confirmation of contents. The supplying vendor also conducted extensive quality control tests and a detailed quality control report was submitted to the Parasitology Laboratory for inspection and verification. Samples were authenticated by 80% of participating laboratories and/or referee laboratories.

14B-K

Correct Identification: No Parasites Seen

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
No Parasites Seen	22/22	100	10/10	**Correct**

Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
No Parasites Seen	6/6	100	10/10	**Correct**

Quality Control and Referee Information

All participating and referee laboratories agreed that **No Parasites Seen** was the correct response. Quality control examination of 4% of the slides for this sample showed erythrocytes of normal size and staining characteristics. Normal blood elements are present and exhibit typical staining characteristics. The overall staining quality was good.

14B-L

Correct Identification: *Plasmodium vivax*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Plasmodium vivax	18/23	78	8/10	**Correct**
Plasmodium malariae	3	13	1	**Incorrect**
Plasmodium ovale	2	9	1	**Incorrect**

Results of Participating Laboratories Who Perform Parasite Screen

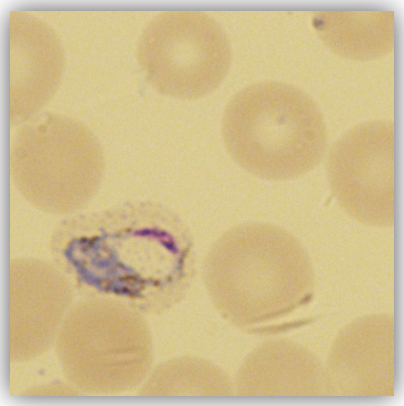
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	5/5	100	10/10	**Correct**

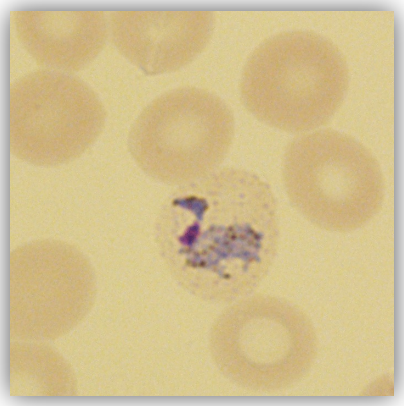
Quality Control and Referee Information

Participating and referee laboratories agreed that ***Plasmodium vivax*** was the correct response (78 and 80% respectively). Quality control examination of 4% of the slides for this sample showed numerous trophozoites, 1 - 2 parasites in every ten 100X oil immersion fields. Staining quality was good.

Diagnostic Characteristics

Plasmodium vivax infected red blood cells are usually enlarged and may stain paler than uninfected ones. This specimen exhibited enlarged pale cells with amoeboid trophozoites and Schüffner's stippling. Characteristics of *P. vivax* infected cells are most similar to *P. ovale*. *P. vivax* infected cells are larger, up to twice the size of uninfected cells, more irregularly shaped, and have finer, less coarse-sized pigment.





14B-M

Correct Identification: *Loa loa*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Loa loa	5/21	24	4/10	**Correct***
Mansonella sp.	16	76	6	**Correct***

* Credit was given for *Loa loa* and *Mansonella* species as this sample was authenticated only as microfilaria.

Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	3/6	50	10/10	**Correct**
No Parasites Seen	3	50	0	**Incorrect**

Quality Control and Referee Information

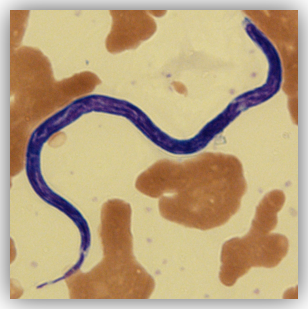
This sample contained microfilariae of ***Loa loa***, the African eye worm. Because participating and referee laboratories were split between identification as *Mansonella* and *Loa loa* the specimen was authenticated as microfilaria. Quality control examination of 4% of the slides for this sample showed an average of 8 organisms per slide. The overall staining quality is good.

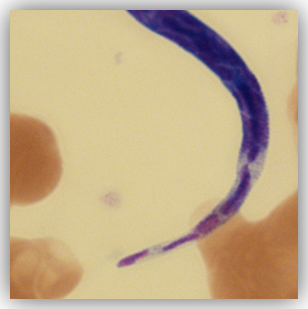
Diagnostic Characteristics

Microfilariae of *Loa loa*, are sheathed, measure between 250-300 μm, and have nuclei that are irregularly spaced but extend to the tip of the tail. However, the sheath of *Loa loa* does not always stain well with Giemsa and the microfilaria can lose their sheath. This situation is likely to have lead to misidentification as *Mansonella*. *Mansonella perstans* is also found in the blood and has nuclei that extend to the tip of the tail, though they have no sheath and the nuclei are more regularly spaced.

In the initial analysis of blood smears, it is critical to scan the slide under low (10-20X) power to screen for microfilaria. The appearance of the short headspace and irregularly spaced nuclei extending to the tip of the tail are important characteristics for identification.

Both *Loa loa* and *Mansonella perstans* are found in Africa, though *M. perstans* is also found in South America. Deer or mango flies transmit *Loa loa* while midges transmit *Mansonella* species. In both cases the larvae are deposited into the bite wound. *Loa loa* is most likely to be found in peripheral blood between 10 AM and 2 PM, and is the only filarid known to have diurnal periodicity.





14B-N

Correct Identification: *Trypanosoma cruzi*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Trypanosoma cruzi	21/21	100	10/10	**Correct**

Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	6/6	100	10/10	**Correct**

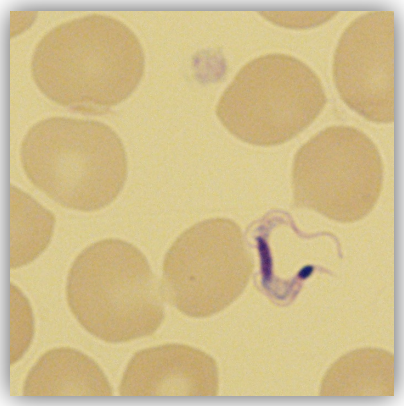
Quality Control and Referee Information

All participating and referee laboratories agreed that ***Trypanosoma cruzi*** was the correct response. Quality control examination of 4% of the slides for this sample showed an average of 1 organism per 100X oil immersion field. Staining quality was good.

Diagnostic Characteristics

Trypanosoma cruzi is the causative agent of the zoonosis Chagas disease. Trypomastigotes are detected in the blood on thin and thick smears. They measure approximately 20 µm long and usually are C or U shaped. The nucleus is located in the middle of the organism and a large kinetoplast (mitochondrial DNA) is located at the posterior end.

About one third of the trypomastigotes in this specimen did not exhibit typical morphology. Some appeared as thin structures and others appeared swollen. However, the large stained terminal kinetoplast was still visible in most structures observed. *Trypanosoma cruzi* is distinguished from *Trypanosoma brucei* primarily by the prominence of the kinetoplast, which is much larger in *Trypanosoma cruzi.*



14B-O

Correct Identification: *Leishmania* species

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Leishmania sp.	20/20	100	9/9	**Correct**

Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	6/6	100	9/9	**Correct**

Quality Control and Referee Information

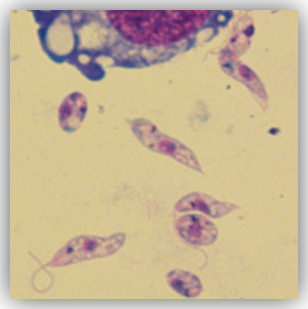
All participating and referee laboratories agreed that ***Leishmania* sp.** was the correct response. Quality control examination of 4% of the slides for this sample showed numerous parasites in every 40X oil immersion field. Staining quality was good.

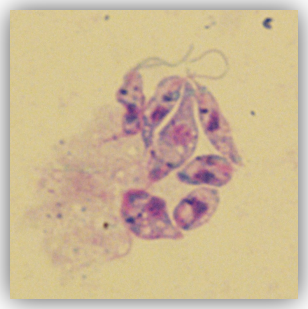
Diagnostic Characteristics

***Leishmania* sp**. is intracellular protozoan parasites transmitted to humans through the bite of infected sand flies. Promastigotes with typical large nucleus and kinetoplast in the anterior end were observed. A flagellum is clearly visible in most structures.

Leishmaniasis is a disease found primarily in the tropics and subtropics. Infection causes two main types of disease cutaneous leishmaniasis and visceral leishmaniasis. The disease type is determined by the infecting species, geographic location and the immune response of the host. Cutaneous leishmaniasis causes skin lesions that can range in severity from self-healing lesions to debilitating mucocutaneous lesions. Visceral leishmaniasis also has a wide range of disease severity from subclinical to disseminated visceral disease, which leads to death in untreated patients.

This parasite is found in two morphological forms, amastigotes and promastigotes. Diagnosis is traditionally made by detecting amastigotes on Giemsa stained slides made from the infected tissue i.e. skin, bone marrow or spleen. The amastigotes are small, oval intracellular forms that have a nucleus and a kinetoplast. Promastigotes are elongated extracellular forms that have a flagellum and are transmitted from the vector to the host during a bite.





Scoring Information

Distribution of Scores

Score	# of labs	% of labs
100	20	71
90-99	0	0
80-89	8	29
70-79	0	0
60-69	0	0
0-59	0	0

Answer Key

Sample	Correct Answer
14B-K	No Parasites Seen
14B-L	*Plasmodium vivax*
14B-M	*Loa loa* *
14B-N	*Trypanosoma cruzi*
14B-O	*Leishmania* sp.

* This sample was authenticated as microfilaria.

Grading

The answer key was derived from the response of all participating laboratories as per **CLIA Regulations**, CFR Title 42, Part 493, Subpart I, Section 493.917. These regulations can be viewed at www.cdc.gov/clia/Regulatory/default.aspx. These regulations state that 80% or more of participating laboratories **or** referee laboratories must identify the parasite for it to be authenticated as a correct answer. Similarly, reporting of a parasite identified by less than 10% of the participating laboratories **or** referees is an incorrect response. Organisms that are not authenticated, but which were reported by more than 10% but less than 80% of the participating laboratories **or** referees are "Unauthenticated", and are not considered for grading.

Credit is given according to the formula:

[# of Correct Responses / (# of Correct Responses + # of Incorrect Responses)] X 100

For example, if a sample contained one principal parasite and the laboratory reported it correctly but reported the presence of an additional parasite, which was not present, the sample grade would be:

$1/(1+1)\times 100 = 50$ percent.

Important Reminders

The next Parasitology Proficiency Test is scheduled for **February 3, 2015.** Participating labs will need to notify us **before February 10, 2015** if the samples are not received. Proficiency test results must be electronically submitted through EPTRS by **February 18, 2015** or the laboratory will receive a score of zero. This and additional information can be found in the NYS Proficiency Testing Program Guide provided by the NYS Clinical Laboratory Evaluation Program, which can be accessed via the Internet at:
http://www.wadsworth.org/labcert/clep/ProgramGuide/WebGuide.pdf