NEW YORK STATE

Parasitology Proficiency Testing Program

Blood Smears Only
6 October 2015

The purpose of the New York State Proficiency Testing Program in the category of Parasitology - Blood Smears Only is to monitor the performance of laboratories that detect and identify parasites in blood smears. Below please find the results for the October 2015 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.

15B-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	20/20	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	6/7	86	10/10	**Correct**
Parasites Seen	1	14	0	**Incorrect**

Quality Control and Referee Information

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.

15B-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	16/21	76	10/10	**Correct**
Plasmodium ovale	3	14	0	**Incorrect**
Plasmodium malariae	2	10	0	**Incorrect**

Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	4/6	67	10/10	**Correct**
Plasmodium species*	2	33	0	**Correct**

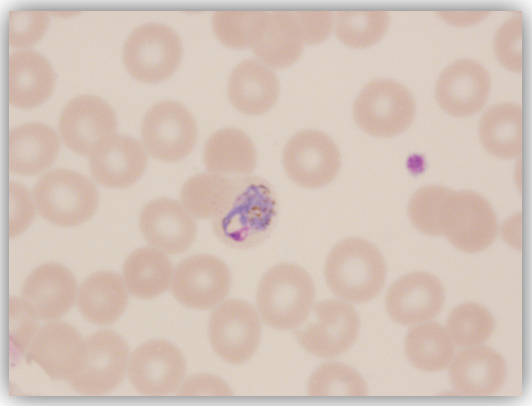
* *Plasmodium* sp. - Would Refer Per SOP (ONLY for laboratories that do not speciate)

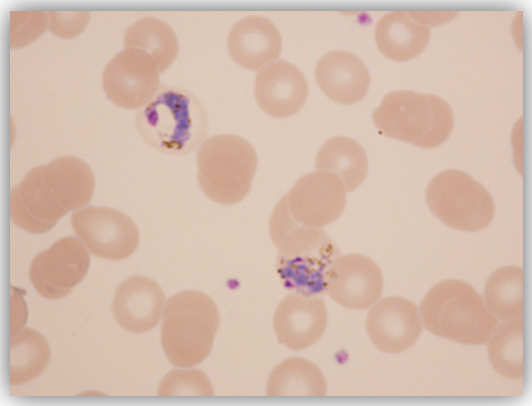
Quality Control and Referee Information

Participating and referee laboratories agreed that ***Plasmodium vivax*** was the correct response (76 and 100% respectively). Quality control examination of 4% of the slides for this sample showed an average of 1 organism in every 4-5 100X oil immersion fields. Staining quality was good.

Diagnostic Characteristics

Plasmodium vivax infected red blood cells may be enlarged, up to 2x the size of uninfected red blood cells. The cells often take on an irregular or ameboid shape and the parasite fills, or nearly fills, the cell. This specimen exhibited amoeboid trophozoites and in some cases Schüffner's stippling. Although some parasites resembling basket or band forms were observed, the enlarged size of the parasitized red blood cells ruled out *P. malariae*. Typically the characteristics of *P. vivax* infected cells are most similar to *P. ovale*. However, *P. vivax* infected cells are larger, more irregularly shaped, and have finer, less coarse-sized pigment.





15B-M

Correct Identification: *Trypanosoma brucei*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Trypanosoma brucei	19/20	95	10/10	**Correct**
Trypanosoma cruzi	1	5	0	**Incorrect**

Results of Participating Laboratories Who Perform Parasite Screen

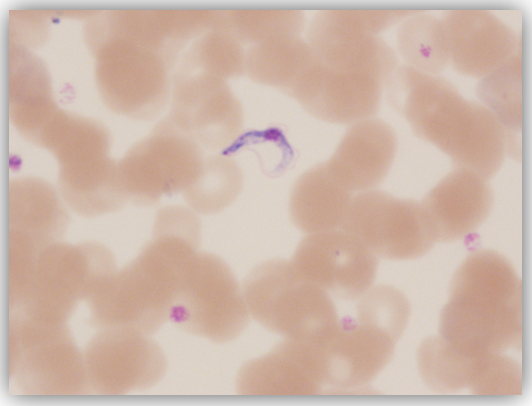
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	6/7	86	10/10	**Correct**
Plasmodium species	1	14	0	**Incorrect**

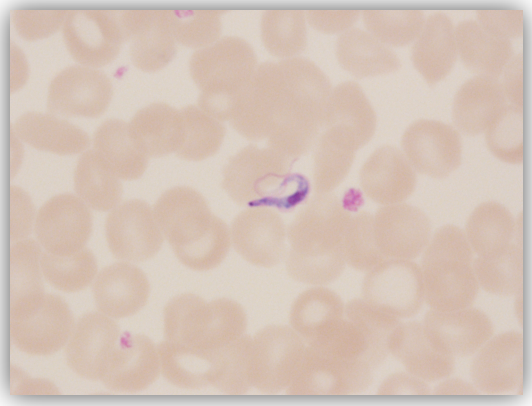
Quality Control and Referee Information

Participating and referee laboratories agreed that ***Trypanosoma brucei*** was the correct response (95 and 100% respectively). Quality control examination of 4% of the slides for this sample showed an average of 1 organism in every 100X oil immersion field. Staining quality was good.

Diagnostic Characteristics

This blood slide contained trypomastigotes of ***Trypanosoma brucei*** the causative agent of African sleeping sickness, also know as human African trypanosomiasis (HAT). This flagellated protozoa is most similar to *T. cruzi*, which causes Chagas' disease, and is found primarily in South and Central America. The major morphological difference is the large kinetoplast (mitochondrial DNA) observed in *T. cruzi* compared to *T. brucei*.
African trypanosomiasis is limited to the tse-tse fly endemic area of Sub-Saharan Africa, where it has caused serious economic and social problems. If left untreated the infection is fatal.





15B-N

Correct Identification: *Plasmodium falciparum*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Plasmodium falciparum	20/22	91	10/10	**Correct**
Babesia species	2	9	0	**Incorrect**

Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	4/5	80	10/10	**Correct**
Plasmodium species *	1	20	0	**Correct**

* *Plasmodium* sp. - Would Refer Per SOP (ONLY for laboratories that do not speciate)

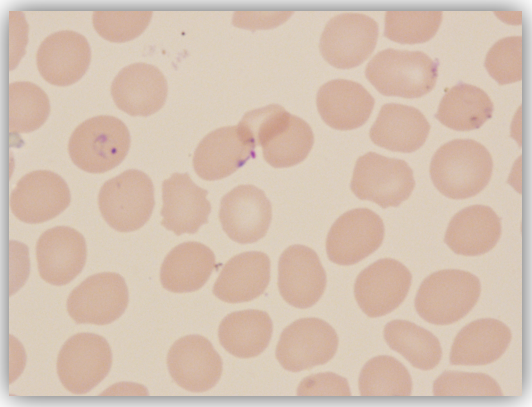
Quality Control and Referee Information

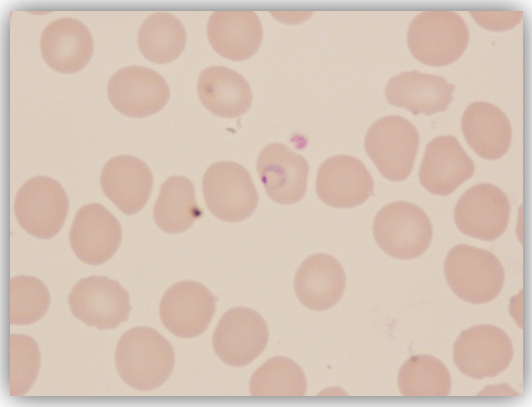
Participating and referee laboratories agreed that ***Plasmodium falciparum*** was the correct response (91 and 100% respectively). Quality control examination of 4% of the slides for this sample showed numerous trophozoites, an average of 1 organism per 100X oil immersion field. Staining quality was good.

Diagnostic Characteristics

Plasmodium falciparum generally causes the most severe malaria as the parasite invades all ages of red blood cells and has a reproductive cycle of 36-48 hours. As a result the parasitemia can exceed 30%. For *P. falciparum*, the stage seen in peripheral blood is early trophozoites, or rings. Both cells with more than one ring and applique forms were present in this specimen as is common in *P. falciparum* infections. The presence of only early trophozoites and a high parasitemia are also characteristic of this species.

While *P. falciparum* and *Babesia* can have similar features several key differences distinguish them. *B. microti* rings are typically smaller and cells may contain 3 or 4 parasites. Applique forms are common to *P. falciparum* but not *Babesia*. Extracellular parasites are only seen with *Babesia* and pigment is only observed with *Plasmodium*.





15B-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 species	19/19	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	5/6	83	10/10	**Correct**
Plasmodium species	1	17	0	**Incorrect**

Quality Control and Referee Information

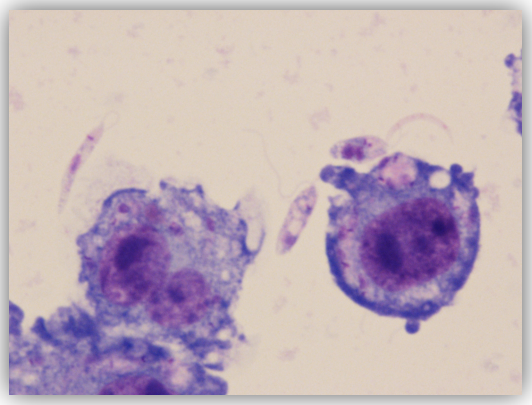
Participating and referee laboratories agreed that ***Leishmania* species** was the correct response. Quality control examination of 4% of the slides for this sample showed numerous parasites in every 40X field. The overall staining quality was good.

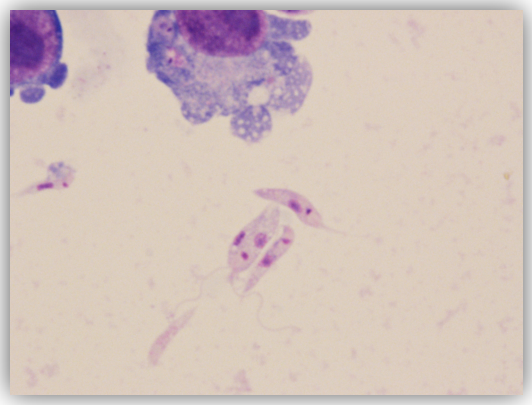
Diagnostic Characteristics

***Leishmania* sp**. is an 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 three types of disease cutaneous, mucocutaneous, 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, while mucocutaneous lesions are often debilitating to the nose, mouth, oropharynx, and trachea. 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 detection of 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	17	63
90-99	0	0
80-89	9	33
70-79	0	0
60-69	1	4
0-59	0	0

Answer Key

Sample	Correct Answer
15B-K	No Parasites Seen
15B-L	*Plasmodium vivax*
15B-M	*Trypanosoma brucei*
15B-N	*Plasmodium falciparum*
15B-O	*Leishmania* species

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

This is the last Parasitology Proficiency Testing event to be administered by New York State. All participants should have selected an alternative approved program to meet their proficiency testing requirements.