



NEW YORK STATE

Parasitology Proficiency Testing Program

Blood Borne Parasites 06 October 2009

The purpose of the New York State Proficiency Testing Program in the category of Blood Borne Parasites is to monitor the performance of applicant laboratories in detecting and identifying parasites on blood films. This document reports the results for the October 2009 proficiency test in Blood Borne Parasites.

Sample Preparation and Quality Control

All slides used in this test were prepared and stained by a commercial source. Numerous samples of each test specimen were selected at random by the Parasitology Laboratory of the Wadsworth center, NYSDOH, and were assayed for quality and confirmation of contents. Extensive quality control tests were also conducted by the supplying vendor 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.

09B-K

Correct diagnosis: *Plasmodium falciparum*.

Results of Participating Laboratories

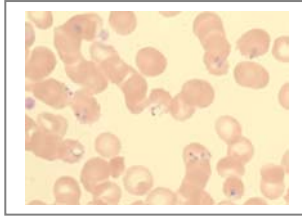
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Plasmodium falciparum</i>	19/19	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that *Plasmodium falciparum* was the correct response (100%). Quality control examination of 4% of this sample showed parasites in every 100 X oil immersion field. Infected cells are not enlarged and no Schüffner's stippling is present. The only stage seen was the ring stage trophozoite. Small numerous rings, appliqué forms and parasites with double chromatin are present. The overall staining quality is good.

Diagnostic Characteristics

Plasmodium falciparum is one of the four species of *Plasmodium* known to infect humans. It causes the most dangerous and severe form of malaria and is always considered to be a medical emergency. Death may occur rapidly if proper treatment is not started immediately. Its distribution is limited to the tropics, primarily Africa and Asia. *P. falciparum* invades all ages of RBCs and so the parasitemia can exceed 50%. The usual stages seen in the peripheral blood are rings and gametocytes. Schizogony occurs in the internal organs so it is rare to see other stages although they may be present in cases of severe malaria. The infected RBCs are not enlarged nor do they contain Schüffner's dots. The rings are generally small, and may have one or two chromatin dots. Appliqué forms are also characteristic. Gametocytes are rounded to banana-shaped and contain a single well-defined chromatin and coarse rice-grain like pigment.



09B-L

Correct diagnosis: *Trypanosoma cruzi*.

Results of Participating Laboratories

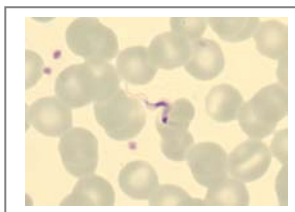
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Trypanosoma cruzi</i>	19/19	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that *Trypanosoma cruzi* was the correct response (100%). Quality control examination of 4% of this sample showed parasites in every 8-10 100 X oil immersion fields. The parasites have a large centrally located nucleus and a large posterior kinetoplast. They often are comma shaped. The staining quality is fair.

Diagnostic Characteristics

Trypanosoma cruzi is the causative agent of the zoonosis Chagas' disease. It is a major health problem in Central and South America. The organism is transmitted through the feces of the reduviid bug when it takes a blood meal. Trypomastigotes are detected in the blood on thin and thick smears. They measure approximately 20µm and usually are C or U shaped. The nucleus is located in the middle of the organism and a large kinetoplast is located at the posterior end. A flagellum arises from the area near the kinetoplast and follows the undulating membrane to the anterior end where it projects as a free flagellum. On Giemsa-stained smears the cytoplasm stains blueish while the nucleus and kinetoplast stain purple or red.



09B-M

Correct diagnosis: *Plasmodium ovale*.

Results of Participating Laboratories

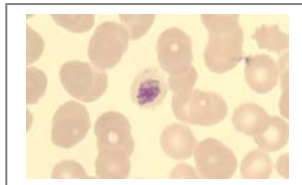
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Plasmodium ovale</i>	5/19	26	5/10	Unauthenticated
<i>Plasmodium malariae</i>	7	37	4	No Penalty
No Parasites Seen	7	37	1	No Penalty

Quality Control and Referee Information

Participating and referee laboratories failed to agree that *Plasmodium ovale* was the correct response (26% and 50% respectively). Quality control examination of 4% of this sample showed a low parasitemia with parasites in every 20-30 100 X oil immersion fields. The infected cells are oval and fimbriated. The parasites have compact cytoplasm, a large nucleus, and scattered coarse pigment. The only stage seen was the mature trophozoite.

Diagnostic Characteristics

Plasmodium ovale infections occur primarily in Central West Africa and some South Pacific Islands



and account for fewer than 5% of all malaria cases. *P. ovale* malaria is usually less severe than other malarias and often ends in spontaneous recovery. The infected cells are usually enlarged, fimbriated, and have Schüffner's stippling. The cytoplasm of the trophozoites is usually less amoeboid than that of *P. vivax* and the schizonts have 4-12 merozoites compared to 12-24 for *P. vivax*. The chromatin is usually very

pronounced and the pigment is coarse. Cells infected with *Plasmodium malariae* are never enlarged and in fact are often smaller than uninfected cells.

09B-N

Correct diagnosis: No Parasites Seen.

Results of Participating Laboratories

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
No Parasites Seen	19/19	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that No Parasites Seen was the correct response (100%). Quality control examination of 4% of this sample showed erythrocytes of normal size and staining characteristics. Normal blood elements are present and exhibit typical staining characteristics.

09B-O

Correct diagnosis: *Trypanosoma brucei*.

Results of Participating Laboratories

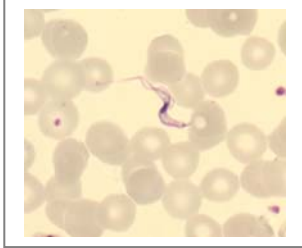
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Trypanosoma brucei</i>	19/19	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that *Trypanosoma brucei* was the correct response (100%). Quality control examination of 4% of this sample showed parasites in every 7-10 100 X oil immersion fields. The organisms are slender with a centrally located nucleus and a small posterior kinetoplast. The staining quality is good.

Diagnostic Characteristics

Trypanosoma brucei is the causative agent of African sleeping sickness. It is limited to the tse tse fly endemic area of Central Africa where it has caused serious economic and social problems. Trypomastigotes are detected in the blood on thick and thin Giemsa-stained smears. They measure 14-33 μm long and in some cases the undulating membrane and flagellum may be seen. The nucleus is located in the middle of the organism and the kinetoplast is located at the blunt posterior end. On a Giemsa stained smear the cytoplasm will stain blue and the nucleus and kinetoplast will stain red or purple. Trypomastigotes of *T. cruzi* are similar but are generally shorter, have a 3-5X larger, more prominent kinetoplast at a pointed posterior end and assume a C or U shape. It is impossible, based on Giemsa-stained smears, to distinguish between the subspecies of *Trypanosoma brucei*. Our glossary and drop down menus will be changed to more accurately reflect the reporting of this organism.



Scoring Information

Distribution of Scores

Score	# of labs	% of labs
100	19/19	100

Answer Key

Sample	Correct Answer	Points
09B-K	<i>Plasmodium falciparum</i>	20
09B-L	<i>Trypanosoma cruzi</i>	20
09B-M	<i>Plasmodium ovale</i>	20
09B-N	No parasites seen	20
09B-O	<i>Trypanosoma brucei</i>	20

TOTAL POSSIBLE POINTS 100

Grading

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

Each sample has a maximum value of 20 points. Credit is given according to the formula:

$$\frac{\text{Number of correct responses by lab}}{\# \text{ Correct Parasites Present} + \# \text{ Lab's Incorrect Answers}} \times 100$$

Important Reminders

The mailout dates for Parasitology have been changed from the first Monday to the first Tuesday of February, June, and October.

The next Parasitology Proficiency Test is scheduled for **February 2, 2010**. You are responsible for notifying the New York State Parasitology Unit **before February 9, 2010** if you do not receive your test. Proficiency test results must be electronically submitted through EPTRS by **February 16, 2009** or you will receive a zero. These requirements are clearly stated in your NYS Proficiency Testing Handbook provided by the NYS Clinical Laboratory Evaluation Program, and can be accessed via the Internet at:

<http://www.wadsworth.org/labcert/clep/ProgramGuide/WebGuide.pdf>

News and Notes

Beginning with the February 2009 proficiency exam, the **grading policy changed**. In order to make the score on the NYS Parasitology PT exam more accurately reflect laboratory performance, and be more consistent across categories, a new scoring system is in effect. Under the new scoring system, grades will be based only on the specimen or organism types processed by your laboratory. Laboratories that process all of the types of samples included in the exam will not observe any changes in scoring method.