



NEW YORK STATE

Parasitology Proficiency Testing Program

Parasitology (General)

01 February 2011

The purpose of the New York State Proficiency Testing Program in the category of Parasitology (General) is to monitor the performance of applicant laboratories in detecting and identifying parasites in fecal emulsions, fecal smears, and blood films. This document reports the results for the February 2011 proficiency test in Parasitology (General).

Sample Preparation and Quality Control

All emulsions and slides used in this test were prepared by a commercial source. The emulsions were dispensed into the vials from pools which were continuously mixed during the loading process. Numerous samples of each test specimen were selected at random by the Parasitology Laboratory of the New York State Department of Health, and were assayed for quality and confirmation of organisms. 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.

11-A (Helminths Only)

Correct diagnosis: *Strongyloides stercoralis*.

Results of Participating Laboratories

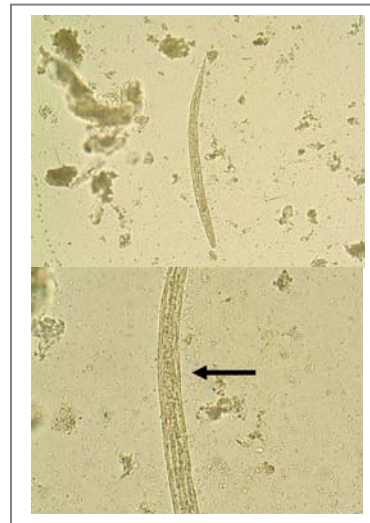
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Strongyloides stercoralis</i>	114/115	99	10/10	Correct
<i>Necator americanus</i> / <i>Ancylostoma duodenale</i>	1	1	0	Incorrect

Quality Control and Referee Information

Participating and referee laboratories agreed that *Strongyloides stercoralis* was the correct response (99 and 100%). Quality control examination of 4% of this sample showed an average of 10 larvae per coverslip. Other tests performed include a Direct Immunofluorescent Assay and ELISA for *Giardia lamblia* and *Cryptosporidium* sp. which were negative for both organisms. A modified acid-fast stained smear was also negative.

Diagnostic Characteristics

Strongyloides stercoralis is an intestinal nematode with a very complex life cycle. Infection is acquired when filariform larvae in the soil penetrate the skin and are carried in the blood to the lungs. From the lungs they travel up the trachea and are swallowed. Once in the intestine they develop into mature female worms and begin to produce eggs by parthenogenesis. These eggs, which are rarely seen, hatch in the intestine into rhabditiform larvae. The larvae pass in the feces and develop into male and female worms in the soil where they complete their life cycle.



The diagnostic stage is the rhabditiform larvae passed in the stool. These larvae measure 180-380µm, and are most easily confused with the rarely seen rhabditiform larvae of hookworms. They can be distinguished from hookworms by their short **buccal cavity**, which is the narrow part of the gastrointestinal tract directly posterior to the mouth. *Strongyloides* also has a visible genital primordium, indicated by the arrow in the second image.

11-B (Helminths Only)

Correct diagnosis: *Taenia* sp.

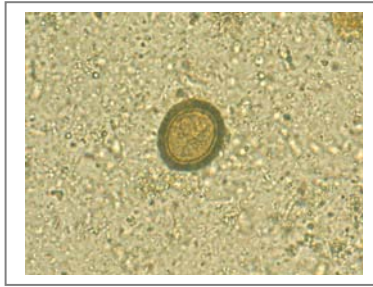
Results of Participating Laboratories

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Taenia</i> sp.	114/115	99	10/10	Correct
<i>Necator americanus</i> / <i>Ancylostoma duodenale</i>	1	1	0	Incorrect

Quality Control and Referee Information

Participating and referee laboratories agreed that *Taenia* sp. was the correct response (99 and 100%). Quality control examination of 4% of this sample showed an average of 10 ova per coverslip. Other tests performed include a Direct Immunofluorescent Assay and ELISA for *Giardia lamblia* and *Cryptosporidium* sp. which were negative for both organisms. A modified acid-fast stained smear was also negative.

Diagnostic Characteristics



The diagnostic stage of the intestinal cestode *Taenia sp.* is the characteristic egg found in stool. These eggs are yellow-brown, round to oval in shape, and measure 35-40 micrometers. They have a thick radially striated shell and contain an oncosphere with visible hooks. A thin, transparent sac may be visible around some of the eggs.

Infection with *Taenia* species occurs when raw or poorly cooked beef or pork containing encysted larvae is ingested. The larvae are digested out of the meat in the stomach and attach to the wall of the small intestine. The adult worms mature in about 5-12 weeks and begin to produce proglottids containing infective eggs. These eggs are passed in the stool to the environment where the cycle is continued.

11-C (Helminths Only)

Correct diagnosis: No Parasites Seen.

Results of Participating Laboratories

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
No Parasites Seen	115/115	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 no organisms present. Other tests performed include Direct Immunofluorescent Assay and ELISA for *Giardia lamblia* and *Cryptosporidium sp.* which were negative for both organisms. A modified acid-fast stained smear was also negative.

11-D (Protozoa Only)

Correct diagnosis: *Giardia lamblia*.

Results of Participating Laboratories

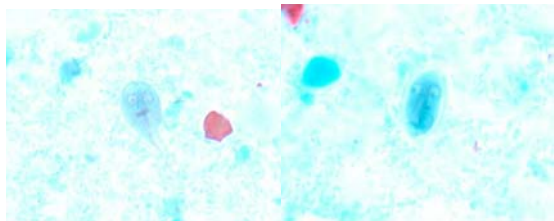
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Giardia lamblia</i>	114/115	99	10/10	Correct
No Parasites Seen	1	1	0	Incorrect

Quality Control and Referee Information

Participating and referee laboratories agreed that *Giardia lamblia* was the correct response (99 and 100%). Quality control examination of 4% of this sample showed parasites in nearly every 100X oil immersion field. Both cysts and trophozoites were present.

Diagnostic Characteristics

Giardia lamblia is the most commonly diagnosed flagellate in humans. It has a worldwide distribution and is more prevalent in children than in adults. Trophozoites are pear shaped and measure 10-20 μm . They have 2 nuclei, 4 pairs of flagella, 2 axonemes, and 2 median bodies (the dark-staining masses at the center of the parasite). The infective cysts are oval and measure 11-15 μm . They contain 4 nuclei (usually seen in a cluster at one end), filaments, and median bodies.



Trophozoite (l) and cyst (r) of *Giardia*.

11-E (All Parasites)

Correct diagnosis: *Plasmodium falciparum*.

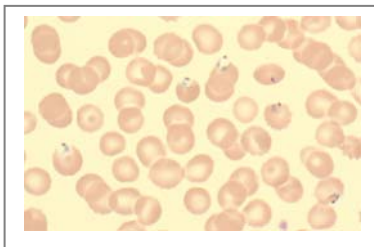
Results of Participating Laboratories

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Plasmodium falciparum</i>	105/108	97	10/10	Correct
<i>Babesia</i> sp.	2	2	0	Incorrect
<i>Plasmodium malariae</i>	1	1	0	Incorrect

Quality Control and Referee Information

Participating and referee laboratories agreed that *Plasmodium falciparum* was the correct response (97 and 100%). Quality control examination of 4% of this sample showed parasites in every 100X oil immersion field. The infected cells are not enlarged and no stippling is present. The only stage seen was the ring stage trophozoite.

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.

Scoring Information

Immunoassay Results

<i>Cryptosporidium</i>	11-A		11-B		11-C	
METHOD	-	+	-	+	-	+
Meridian ImmunoCard STAT Cryptosporidium/Giardia	26	0	26	0	26	0
Meridian Merifluor Cryptosporidium/Giardia	17	0	17	0	17	0
Remel ProspecT Cryptosporidium EIA	21	0	21	0	21	0
TechLab Cryptosporidium II ELISA	1	0	1	0	1	0
Remel Xpect Giardia/Cryptosporidium	5	0	5	0	5	0
TechLab/Wampole Test EIA	5	0	5	0	5	0

<i>Giardia</i>	11-A		11-B		11-C	
METHOD	-	+	-	+	-	+
Meridian ImmunoCard STAT Crypto/Giardia	27	0	27	0	27	0
Meridian Merifluor Crypto/Giardia	13	0	13	0	13	0
Remel ProspecT Giardia EIA	26	0	26	0	26	0
Remel ProSpect Giardia EZ	2	0	2	0	2	0
Remel Xpect Giardia	2	0	2	0	2	0
Remel Xpect Giardia/Cryptosporidium	4	1	5	0	5	0
TechLab/Wampole Test EIA	8	0	8	0	8	0
TechLab Giardia II ELISA	1	0	1	0	1	0

Distribution of Scores

Score	# of labs	% of labs
100	121	95
90-99	0	0
80-89	4	3
70-79	0	0
60-69	0	0
0	1	1

Answer Key

Sample	Correct Answer	Points
11-A	<i>Strongyloides stercoralis</i>	20
11-B	<i>Taenia</i> sp.	20
11-C	No Parasites Seen	20
11-D	<i>Giardia lamblia</i>	20
11-E	<i>Plasmodium falciparum</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 wwwn.cdc.gov/clia/regs/toc.aspx 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 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:

$$(\# \text{ of Correct Responses} / (\# \text{ of Correct Responses} + \# \text{ of Incorrect Answers})) \times 100$$

Important Reminders

The next Parasitology Proficiency Test is scheduled for **May 17, 2011**. You are responsible for notifying us **before May 24, 2011** if you do not receive your samples. Proficiency test results must be electronically submitted through EPTRS by **May 31, 2011** or the laboratory will receive a score of zero. These requirements are stated in the NYS Proficiency Testing Handbook provided by the NYS Clinical Laboratory Evaluation Program or can be accessed via the Internet at:

<http://www.wadsworth.org/labcert/clep/ProgramGuide/pg.htm>

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 was put into effect. Under the new scoring system, grades are based only on the specimen or organism types processed by your laboratory.