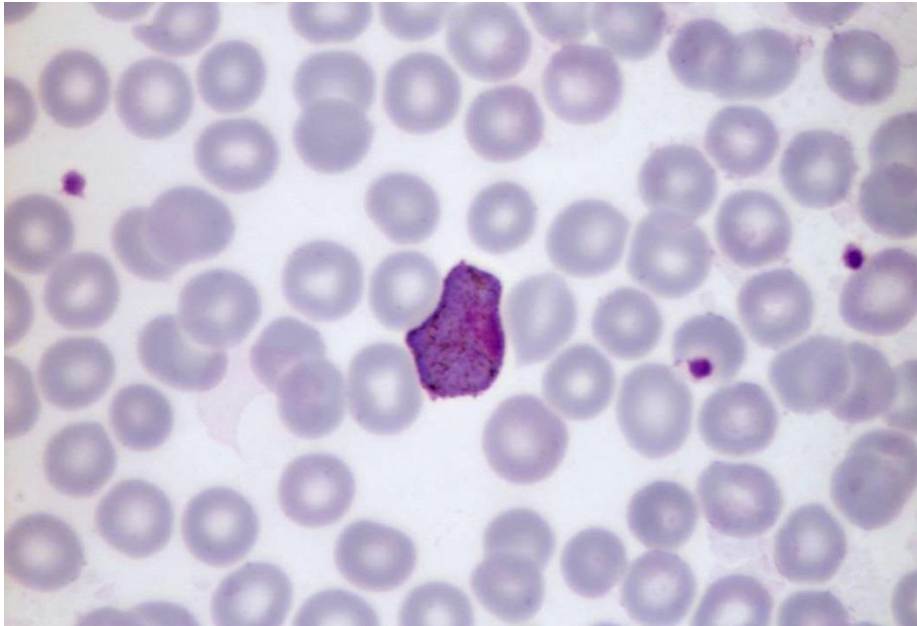


1.



Identify the species and stage of the parasite shown in the image. (2 marks)

Name a drug used to prevent relapses of infection. (1 mark)

Answers:

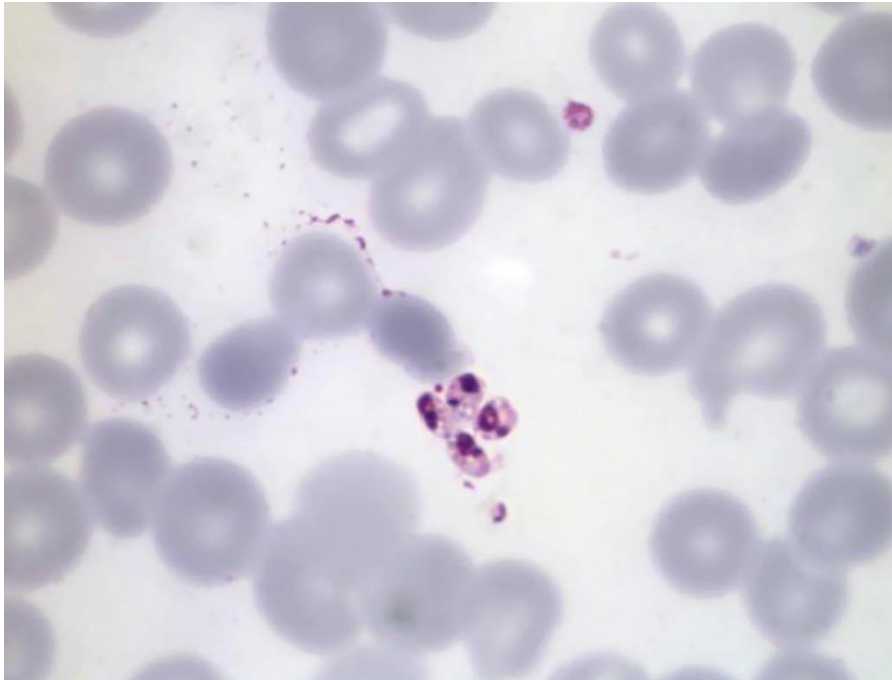
- *Plasmodium vivax* (1 mark); gametocyte (1 mark)
- primaquine (1 mark)

Explanation:

P. vivax gametocyte

The red cell is enlarged and moulded around neighbouring cells. Plasticity of the infected RBCs is frequently seen in *P. vivax*. The parasite is filling almost the entire RBC. There is evidence of stippling or Schuffner's dots around the periphery, therefore this is *P. vivax*. The parasite is solid and has a single nucleus and scattered pigment and therefore a gametocyte

2.



Identify the disease that causes the pathology seen in this bone marrow section. (1 mark)

Name two species of the organisms that cause this disease. (2 marks)

Answers:

- leishmaniasis (1 mark)
- *Leishmania donovani* (1 mark); *Leishmania infantum* (1 mark)

Explanation:

Leishmania amastigotes

The organisms shown are small and each contains two purple bodies. The smaller body is the kinetoplast and the larger body the nucleus. These are amastigotes of *Leishmania* spp. It is not possible to differentiate species based on morphology.

3.



Identify this parasite (size 82 μ m). (2 marks)

Name the definitive host. (1 mark)

Answers:

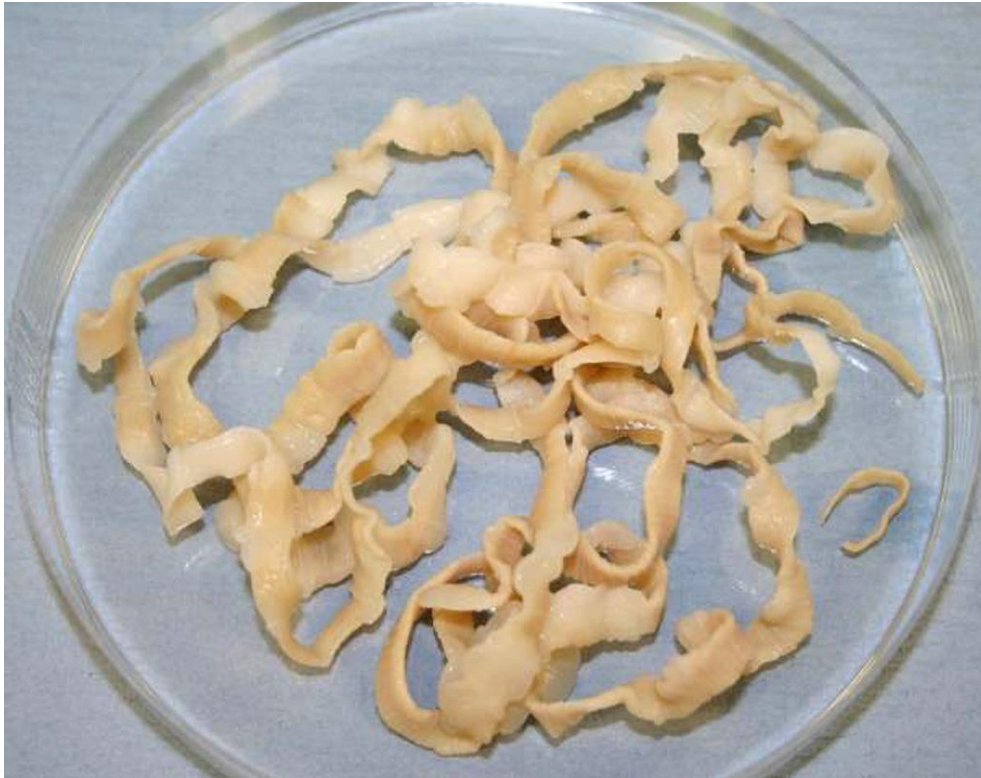
- *Toxocara (1) canis* (1 mark)
- Dog (1 mark)

Explanation:

Toxocara canis egg

This egg is oval and is a pale golden colour. It measures 82 μ m, the size range for *T.canis* eggs is 80-85 μ m. It has a thick pitted wall sometimes described as 'plaited' or 'pie-crust' and a central mass that is the developing embryo.

4.



This parasite, measuring 9 m, was passed following administration of a purging agent.

Give the full name of the parasite and name the stage shown. (2 marks)

What simple confirmatory test will confirm the species? (1 mark)

Answers:

- *Diphyllobothrium latum* or *Taenia saginata* (1 mark) (tapeworm only scores 0); adult stage (1 mark)
- Stool microscopy for passage of typical *eggs or proglottids* (1 mark) of carrier

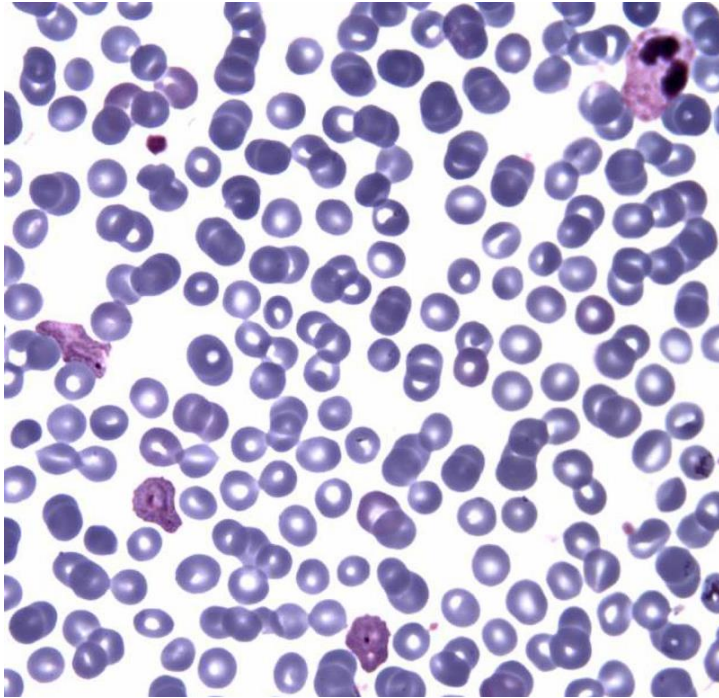
Explanation:

Diphyllobothrium latum

This is an adult tapeworm. It is a cream colour and flattened dorso-ventrally. Close examination reveals that it is composed of individual segments or proglottids. This is a *D.latum* adult because each individual proglottid is wider than it is long.



5.



This image shows a blood film taken from a febrile traveller.

What is the most likely diagnosis? (1 mark)

Describe two features which support this diagnosis. (2 marks)

Answers:

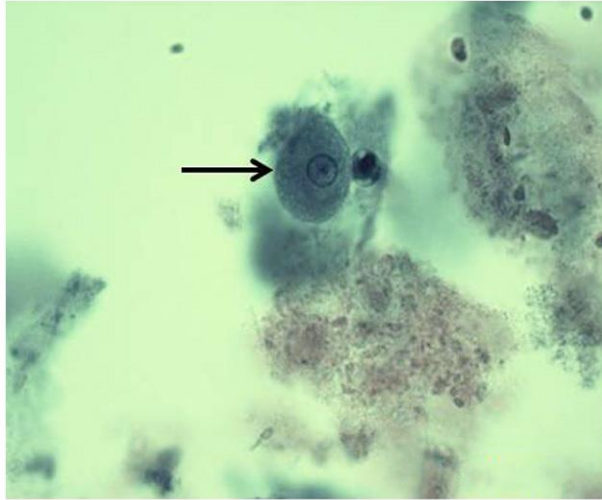
- *Plasmodium vivax* malaria (1 mark)
- enlarged red blood cells, Schuffner's dots, amoeboid trophozoites (1 mark each, up to 2 marks)

Explanation:

P. vivax trophozoites

The infected red cells are enlarged. They are moulded around the neighbouring red cells. Plasticity of the infected RBCs is frequently seen in *P. vivax*. The trophozoites are amoeboid or untidy. At this magnification it is difficult to see but the infected cells have an even carpet of pink dots which are Schuffner's dots.

6.



Identify this parasite (size 20 μm) (2 marks) and stage (1 mark) in this stained faecal smear.

Answers:

- *Entamoeba histolytica* or *Entamoeba dispar* (either scores: 2 marks; indistinguishable because ingested red cells not visible); trophozoite (1 mark)

Explanation:

Entamoeba histolytica/dispar trophozoite

This trophozoite has a ring and dot 'Entamoeba' type nucleus. The nucleus is well defined and has a clear karyosome. Fine details in the nuclear morphology would distinguish this from *E.coli*.

7.



Identify the parasite (size 10 μm) and its life cycle stage. (2 marks)

What is the most appropriate treatment? (1 mark)

Answers:

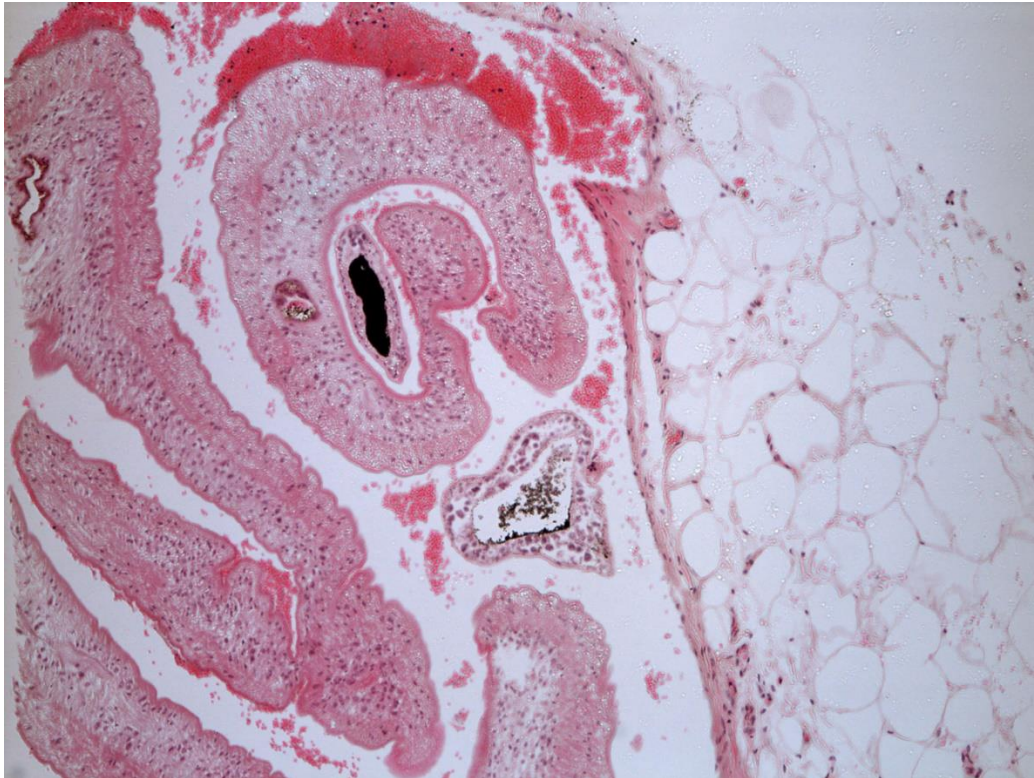
- *Giardia lamblia/ intestinalis* (1 mark); cyst (1 mark)
- metronidazole or tinidazole (1 mark)

Explanation:

Giardia intestinalis cyst

The cyst is oval shaped. It is 10 μm which is in the size range of Giardia (av 9-12 μm). It has a line running along its long axis which is the axoneme.

8.



A histological section of a gut vessel is shown.

Identify this specimen to genus, and give the stage. (2 marks)

Name one drug used to treat infection with this parasite. (1 mark)

Answers:

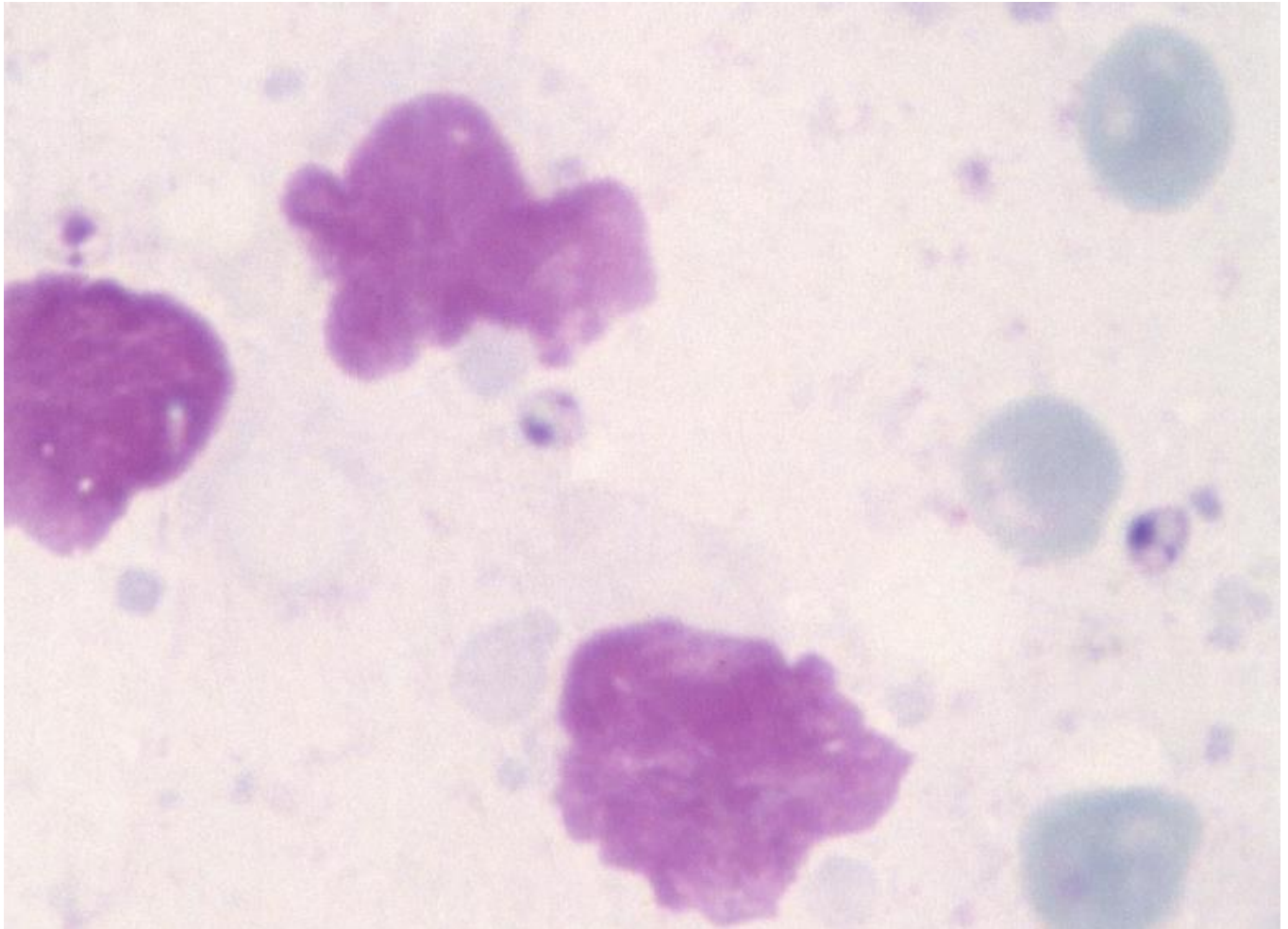
- Schistosoma (1), adults (1)
- praziquantel (1)

Explanation:

Schistosoma adults in section

This is a cross section of paired Schistosoma adults in a vessel. The male is the larger body curled around the smaller female. The female has a black mass inside which is ingested blood.

9.



This sample was taken from an ulcerating dermal nodule in a man from Amazonian Ecuador.

What is the likely causative agent? (1 mark)

What features support the diagnosis? (2 marks)

Answers:

- *Leishmania (Viannia) guyanensis* or *L. (V.) braziliensis* are amongst causative agents identified. (Allow *L. (V.) lainsoni*) (1)
- (Three) amastigotes (1) are shown, each approx. 2x3um, with oval shape, distinct nucleus and kinetoplast (any one 1 mark up to 2 marks)

Explanation:

Leishmania amastigotes

The organisms shown are small and each contains two purple bodies. The smaller body is the kinetoplast and the larger body the nucleus. These are amastigotes of *Leishmania* spp. It is not possible to differentiate species based on morphology.

10.



Size: 0.3 mm

Identify this arthropod by its scientific name to species. (2 marks)

Describe typical clinical symptoms caused by this arthropod. (1 mark)

Answers:

- *Sarcoptes scabiei* (2 marks)
- Severe itching (1 mark)

Explanation:

Sarcoptes scabiei

It has 4 pairs of legs and no obvious body division. The mouthparts are conspicuous, but this is not a head. Therefore, it is likely to be a tick or a mite.

It has a round body and short, stumpy legs. The hind legs do not extend beyond the margins of the body. Pulvilli are present on the first two pairs of legs.

11.



Identify this arthropod to genus. (1 mark)

Identify the sex (1 mark) stating your reasons. (1 mark)

Answers:

- *Culex* (genus) (1 mark)
- Female (1 mark)
- the mosquito has simple antennae that are not plumose (very hairy) and the palps are short - therefore a female (1 mark)

Explanation:

Culex

- The resting position shows the abdomen pointing downwards (therefore a culicine mosquito).
The mosquito is plain brown in coloration (therefore typical Culex).
The mosquito does not have conspicuous white or silver markings (therefore not Aedes).
The mosquito body and wings are not covered in large speckled scales (therefore not Mansonia).
The mosquito is not covered in iridescent blue/purple scales (therefore not Haemagogus).