Protozoan Parasites of Veterinary importance
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VPM-122 Laboratory 4

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To see the images on the web, go to:
VPM-122 Laboratory 4 Images

• The following images have been generated for your reviewing and studying pleasure...honest!
• I have typically provided two views of the same image
  – 1) so you can see diagnostic details
  – 2) a “boxed” image so you can see the relative size the parasite looks on the specified microscope objective (e.g. 10X).
  – Comments for improving this handout are welcome and encouraged!
  – Thanks, Spencer
1) Giardia

*Giardia cysts* - 10X objective, Zinc sulphate flotation from a dog.
**Giardia cysts** - 10X objective, Zinc sulphate flotation from a dog Lugol’s iodine stain
**Giardia cysts - 40X objective, zinc sulphate flotation**

**Note:** the distinct osmotic artifact (A) as the cytoplasm is compressed against the cyst wall (B).
**Giardia trophozoite - 100X objective, direct smear.** Light microscopy, **Note:** the flagella & two prominent nuclei (arrows).

**Giardia trophozoite - direct smear.** A & B 100X objective, images taken at two different focal planes of the same trophozoite surrounded by bacteria and debris. **Note:** the flagella & two nuclei (‘eyes’ of the ‘monkey face’).
2) Coccidia - *Isospora & Eimeria*

*Isospora* sp. oocysts - 20X objective, sucrose flotation from a cat. A, unsporulated oocyst, containing a single sporont or sporoblast. B, two-cell stage. Both these oocysts are unsporulated and would not be infective to the definitive host.
*Isospora* oocysts and *Giardia* cysts - 20X objective, sucrose flotation from a cat.

A, *Isospora* oocyst two-cell stage. B, *Giardia* cysts, 

Note: osmotic artifact also occurs in sucrose flotation.
*Eimeria sp.* - *fecal flotation from a sheep.* Features to note are the size (~20 x 20 µm), clear oocyst with a single large sporont. 40X objective. **Note:** the micropyle on the ‘pointed’ end through which the sporozoites ‘escape’ to infect the host.
*Eimeria* sp. - *fecal flotation from a sheep*. Features to note are the size (~20 x 20 µm) in relation to the huge *Nematodirus* sp. egg, 10X objective.
*Eimeria* sp. - fecal flotation from a rabbit. Features to note are the size (~40 x 15 µm) in relation to a strongyle-type egg, 10X objective.
*Eimeria leuckarti* - *fecal flotation from a horse*. Features to note are the large size (~85 x 55 µm), distinct brown colour, & the single large sporont. **A**, 20X objective **B**, 100X objective. **Note:** the prominent micropyle (arrow) from which the sporozoites ‘escape’.
3) Toxoplasma & Neospora

*Toxoplasma gondii* oocysts - 20X objective fecal flotation from a cat Multiple oocysts and a single *Isospora* oocyst (arrow). Compare the relative size of *Isospora felis* to the *Toxoplasma* oocysts.

NOTE: (1) If this fecal was from a dog, the small oocysts would be *Neospora caninum* oocysts and the large oocysts would be *Isopora canis*. Assuming the dog did not eat cat feces!

(2) The non-pathogenic coccidia, *Hammondia* sp. have oocysts that are identical in size to both *Toxoplasma* & *Neospora* oocysts and may be present in both dogs & cats (confounding organism).
Toxoplasma gondii oocysts - fecal flotation from a cat. 100X objective, Compare the relative size of *Isospora felis* to the *Toxoplasma* oocysts.
4) *Sarcocystis*

*Sarcocystis* sp. sporocyst - fecal flotation from a dog – 40X objective.
Sporocysts are small (~10 µm)
*Sarcocystis* sp. sporocyst- 100X objective. **A**, thin cyst wall. **B**, sporozoite (each sporocyst will contain 4 sporozoites). **C**, residual body. **Note:** cyst wall and residual body often refractile.
5) *Cryptosporidium*

*Cryptosporidium* oocysts from a calf - 40X objective, sucrose flotation. Note the slight ‘pinkish’ tinge to the oocysts
Cryptosporidium oocysts from a calf - 100X objective, sucrose flotation.
Cryptosporidium oocysts acid-fast stain - 40X objective.
6) *Balantidium* sp.

*Balantidium* sp. from the GI tract of a pig. H & E stained section of pig lumen. **Trophozoites** are large ~120 µm and found within the lumen and more rarely embedded into the mucosal wall. Note the large kidney bean shaped macronucleus. The tissue is sectioned to produce the slides which reveals the ciliates cut in varying planes of section. Therefore, some cells and nuclei appear differently.
**Balantidium sp.** from the feces of a pig. **Trophozoite** are large cells (~100 µm). Note: the kidney bean shaped nucleus (blue arrow). You can also see the funnel shaped cytostome or gullet (red arrow) and a large posterior vacuole (black arrow). You can almost make out the cilia surrounding the cell.

**Balantidium sp.** from the feces of a pig. **Cyst** (~100 µm). Note: it is hard to make out any internal structures in this cyst but sometimes you can see the kidney bean shaped nucleus.