LECTURE 4 (2022-2023)

Microscopic examination of stool

Examine fecal specimens under (10X and 40X objectives) of light microscope and report the presence of:

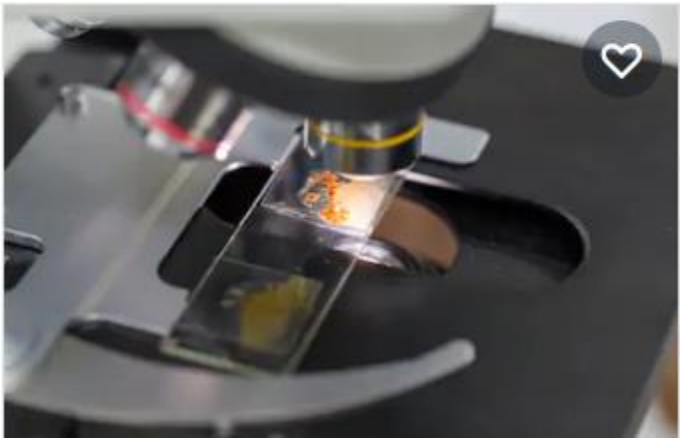
1-Pus (Leukocytes)

- Large numbers of pus cells:Clumps of pus cells of > 50 cells per high power field along with macrophages and erythrocytes are typical of shigellosis.
- A smaller number of pus cells of <20 per high power field are found in salmonellosis and in infections which are caused by invasive *E.coli.*
- In amoebic dysentery the cells are mostly degenerated (ghost cells).
- Leukocytes and erythrocytes are also found in about half the cases of diarrhoea due to *Campylobacter* spp.
- Few leukocytes (2–5 cells per high-power field) are present in cases of cholera, enterotoxigenic and enteropathogenic *E. coli*, and viral diarrhoea

2-RBCs

3-Amoebas, flagellates

4-Eggs, larvae & cysts.



Stool examination for parasites

Using of Saline: Normal saline (0.85%) is used for routine examination of stool samples; it is used to detect worms, eggs, larvae, protozoan trophoziot and cysts. In addition, it can reveal the presence of RBCs and WBCs, as it is isotonic.

Using of Iodine: Iodine is used to examine the nuclei of cysts and to stain the glycogen.

Using of Eosin 1%: this provides a pink background and that will help to clear the unstained objects.

Concentration techniques

If the number of parasites in the stool specimens is low, the examination of a direct wet mount may not reveal them and hence the stool should be concentrated. Eggs, cysts and larvae can be recovered after the concentration procedure, whereas trophoziot can get destroyed during this procedure.

Chemical examination of stool

(a) PH: normal stool PH is (7-7.5).The pH of stools is acidic in amoebic dysentery and is alkaline in bacillary dysentery.

(b) Occult blood: Occult blood may be present in a number of diseases including **malignancy of the gastrointestinal tract (colon, rectum, stomach**).

(c) Reducing factors: mono sugar and di sugar ,there level in stool (0.25mg/dl) any increase in that level indicate disturbance in enzymes that digest sugar (e.g. Lactase, Sucrase).

Stool analysis

Normal:	The stool appears brown, soft, and well-formed in consistency.
	The stool does not contain blood, mucus, pus, undigested meat fibres, harmful bacteria, viruses, fungi, or parasites.
	The stool is shaped like a tube.
	The pH of the stool is 7-7.5.
	The stool contains less than 0.25 (g/dL) of reducing sugar.
	The stool contains 2-7 grams of fat per 24 hours
Abnormal:	The stool is black, red, white, yellow, or green.
	The stool is liquid or very hard.
	There is too much stool.
	The stool contains blood, mucus, pus, undigested meat fibres, harmful bacteria, viruses, fungi, or parasites.
	The stool contains low levels of enzymes, such as trypsin or elastase.
	The pH of the stool is less than 7.0 or greater than 7.5.
	The stool contains 0.25 g/dL or more of sugars (reducing factors).
	The stool contains more than 7 g/24h of fat (if your fat intake is about 100 g a day).

Other stool tests:

- **Rotavirus rapid test:**

The rotavirus test is a stool test used to diagnose a rotavirus infection. Rotavirus affects the intestines and causes vomiting and diarrhea. This infection is especially common in young children, but it can affect adults, too.

A rotavirus infection causes a condition called viral gastroenteritis. To perform the Rotavirus rapid test, an aliquot of diluted stool sample is added to the sample well of the Rotavirus rapid test cassette. The sample flows through a label pad containing rotavirus antibody.

If the sample on the Rotavirus rapid test contains rotavirus antigens, the antigen will bind to the antibody coated on the colloidal gold particles to form antigen-antibody-gold complexes.

- ***H. pylori* antigen stool test**

Helicobacter pylori (*H. pylori*) bacteria are a common cause of peptic ulcers (sores in the lining of the stomach, small intestine, or esophagus). In this test, a stool (feces) sample is used to determine if *H. pylori* antigens are present in the gastrointestinal (GI) system.

Stool Culturing

A stool culture is done to find out if bacteria may be causing an infection.

1-Culture media:

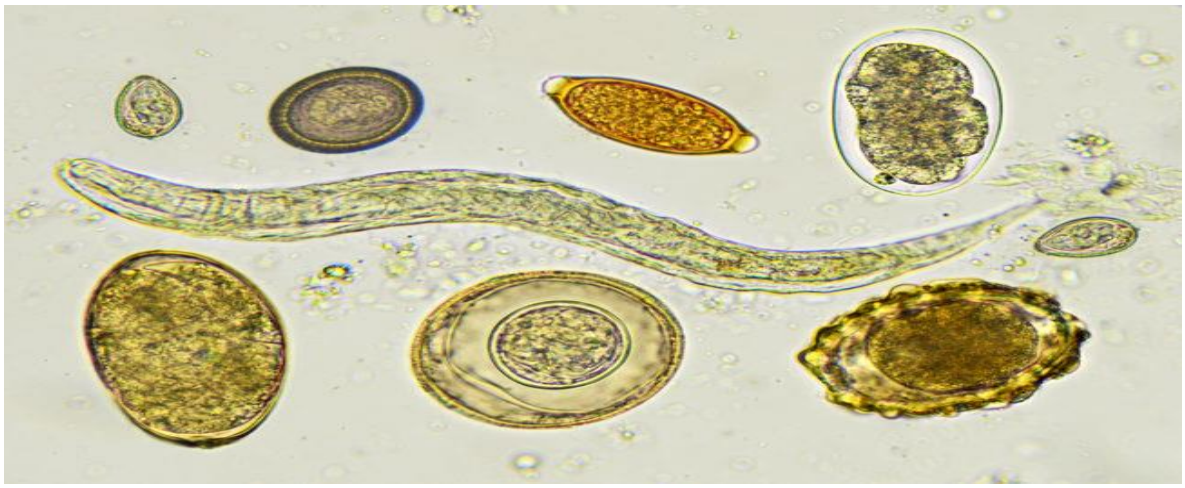
MacConkys Agar: inhibits most of the gram positive organisms, differentiation between lactose fermenters and nonlactose fermenters.
Xylose lysine deoxycholate (XLD) agar: This selective medium has been recommended for the isolation of Salmonella and particularly Shigella from fecal samples

Thiosulphate citrate bile salt sucrose (TCBS) agar: This is an excellent, selective medium for the primary isolation of Cholerae.

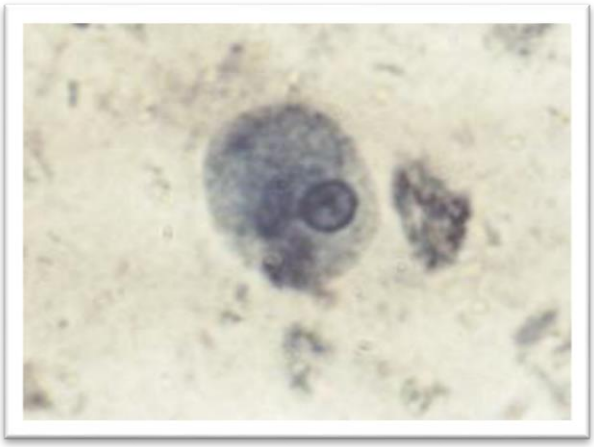
Sorbitol MacConkys agar: This MacConkys agar contains sorbitol instead of lactose. E.coli 0157 produces colorless colonies on this medium because it does not ferment sorbitol so; this medium is useful for screening 0157 E.coli.

2-Culturing of sample: Stool cultured on selective media by streaking a loop full of stool specimen, the stool macroscopic examination may aid in selecting the suitable culture media. After the identification of the microbe the antibiogram should be done.

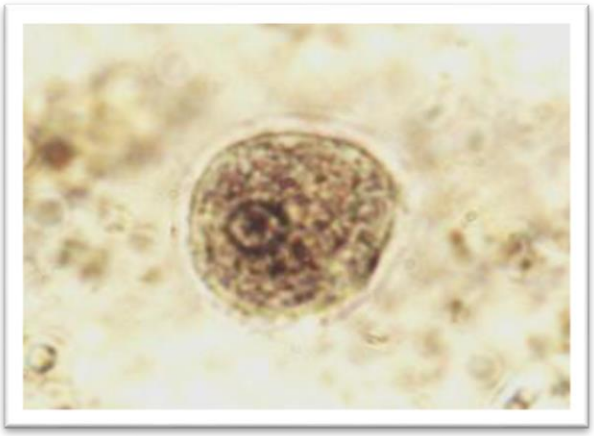
Morphology of some common helminthes ova that found in stool specimen



Pictures of parasites in different stages as seen under microscope

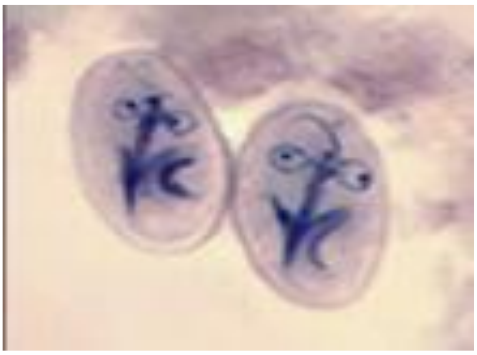


Entamoeba histolytica(trophoziot**)**

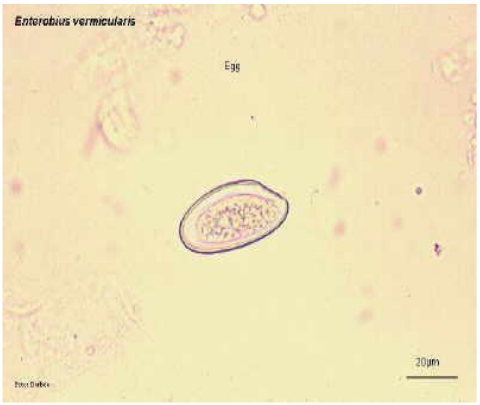


Entamoeba histolytica(cyst)

Giardia lamblia (trophoziot)

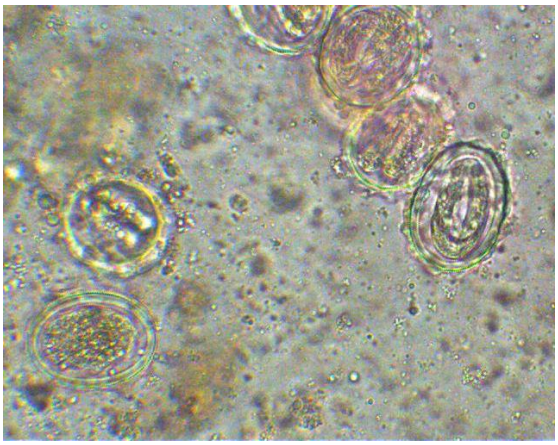


Giardia lamblia (cyst)

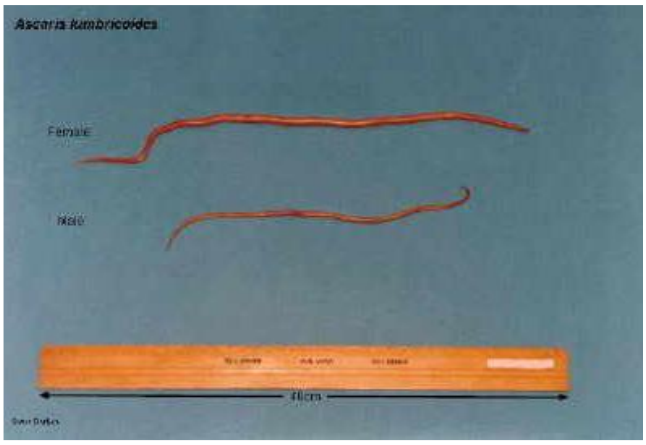


Enterobius vermicularis (Adult)

Enterobius vermicularis (Egg)

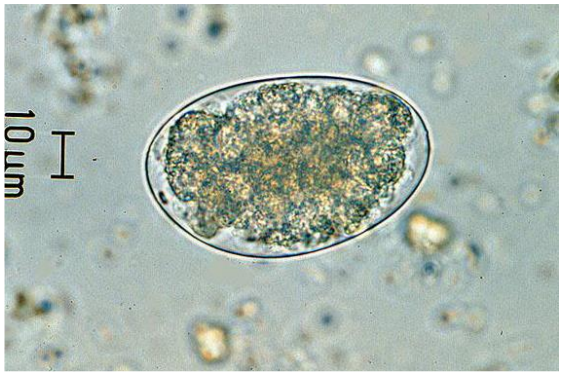


Safaris l Egg



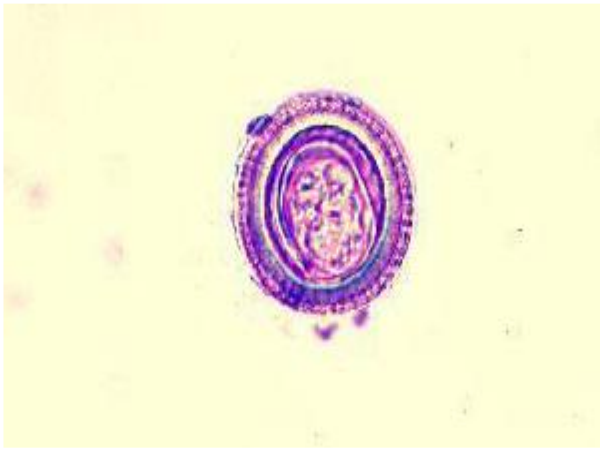
Safaris l. Adult worm

Hook worms



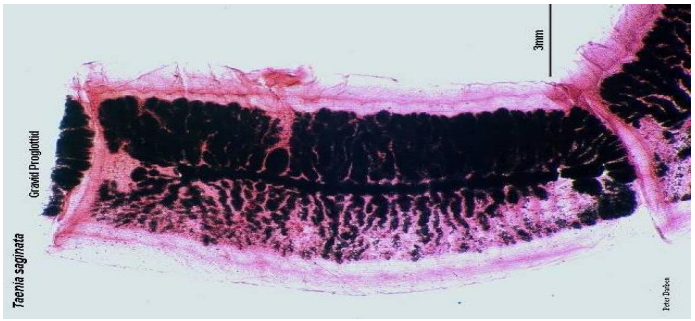
Egg

Adult worm



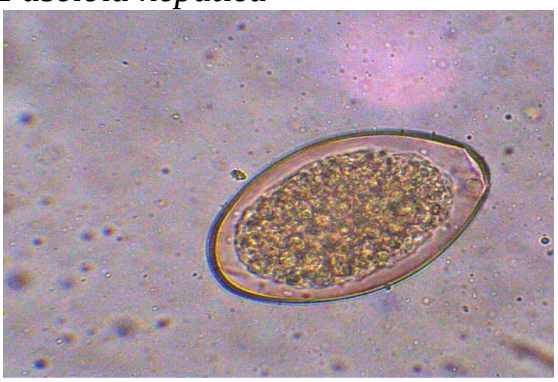
Gravid proglottid

Tania *saginata*

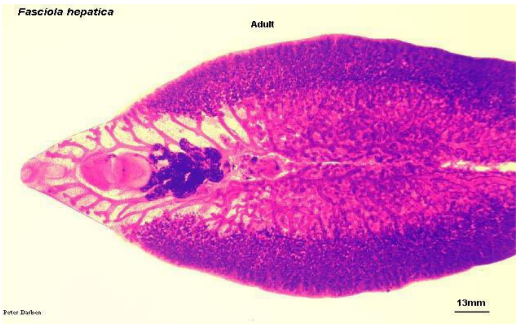


Egg

Fasciola hepatica

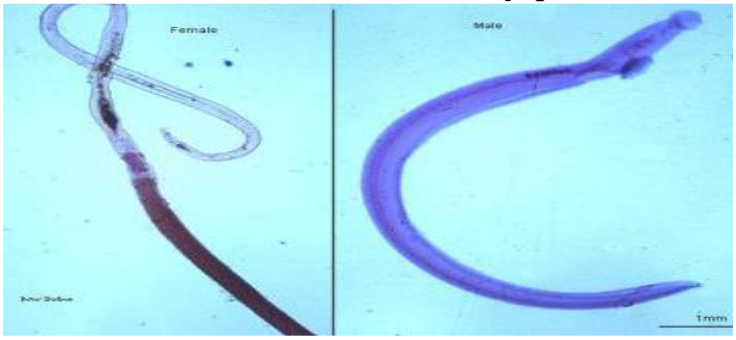


Egg



Adult worm

Schistosoma japonicum

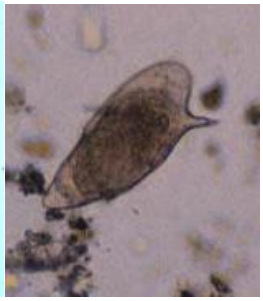


Adults

Egg

Schistosoma mansoni

Adults



Eg