

Lab Objectives for stool examination

- The purpose of stool examination
- Collection of fecal specimen
- Methods of examination
- A – macroscopic examination
- B- microscopic examination
- Concentration techniques
- A-Flotation.
- B- sedimentation.
- Preservatives commonly used for fecal samples
- Reporting of results

Complete stool analysis

What is the stool analysis test?

A stool analysis is a series of tests done on a stool (feces) sample to help diagnose certain conditions affecting the digestive tract.

Stool analysis may be done for these patients:

- Patient with abdominal pain or abdominal discomfort
- Patient with diarrhea
-
- Patient with anemia
- Patient who is too thin or do not grow well
- Patient with stool color that is changed to abnormal color
- Patient with skin disease as Urticaria which may due to parasitic infection with helminthes.

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Collection of Fecal Specimens

- Collect about 10-15 gm the stool in a dry, clean, container. Make sure no urine, water, soil or other material gets in the container.
- **If it is not possible to obtain faeces collect a specimen by inserting a cotton wool swab into rectum for about 10 sec.**
- Label the specimen with **the patient's name, date and time of collection.** and send it with a request form to reach laboratory as soon as possible.
- **Fresh stool should be examined immediately, or preserved .**

Preparation methods

Direct saline wet mount

Place a drop of saline on the slide.

Pick up a small amount of fecal material on the end of an applicator stick.

Emulsify in the saline and cover with a cover slip.

Examine on low and high power.

The entire preparation must be examined for the presence of eggs, larvae and protozoa.

Note: *Take small amounts of material from several different areas (stool surface and deep inside), especially from bloody and/or mucoid areas.*

Preservation

- Ø 5 - 10% formalin:
- **wet mount/concentrate; cysts, eggs, larvae are preserved for long time**
- 1-Polyvinyl mercuric chloride (PVA): (mercury chloride: fixative
- •polyvinyl alcohol: resin aids adherence)
- 2-Merthiolate-iodine-formalin (MIF):

A- Macroscopically

- 1- The color of stool
- 2- Odour
- 3-PH (reaction)
- 4-Consistency of stool

- 5-Naked eye parasite
- 6- Diarrhea type
- 7-Gross blood
- 8-Mucus

Gross examination

Color

Normal:

Brown color is the normal color of stool

Why stool color is brown? The characteristic brown color of feces is due to *stercobilin* and *urobinin*, both of which are produced by bacterial degradation of bilirubin.

Abnormal: **Black color:** indicate iron medication (for treatment of anemia) or upper GIT bleeding (due to peptic ulcer, stomach carcinoma or esophageal varices).

Note: *The black color is caused by oxidation of the iron in the blood's hemoglobin.*

Bright red color (Hematochezia): indicate lower GIT bleeding (due to piles and anal fissure).

Clay color (gray-white): indicate obstructive jaundice

Pale brown color: with a greasy consistency indicate pancreatic deficiency causing malabsorption of fat (often with offensive odor).

Yellow-green color: occurs in the stool of breast-fed infants who lack normal intestinal flora (low bile. conversion) and may also occurs due to rapid transit of feces through the intestines.

Red brown color: indicate drugs as Tetracyclines, and Rifambicin antibiotics

Note: *if stool color is black and there is no history of iron medication **False occult blood test (FOBT)** is recommended.*

Odour

Normal:

Normally offensive

Why stool odour is offensive? Fecal odor results from gases produced by bacterial metabolism, including skatole, mercaptans, indole and hydrogen sulfide formed by bacterial fermentation and putrefaction.

Note: Consumption of foods **with spices** may result in the spices being undigested and adding to the odor of feces.

Abnormal:

Very offensive: usually seen in cases of constipation and with certain types of food that produce excessive gases, Bacterial infection and malabsorption. Foul-smelling stool: are characteristic of steatorrhea.

pH (reaction)

Normally variable and diet dependent and is based on bacterial fermentation in the small intestine.

Why stool pH is variable? Because stool pH mainly depends on the type of diet.

Abnormal:

High alkaline stool **Physiological** cause by using High protein diet

Pathological : Secretory diarrhea, Colitis or Antibiotic use (impaired colonic fermentation)

High acidic stool

Physiological : High carbohydrate diet

Pathological Poor fat absorption

- Poor absorption of sugars as in lactose intolerance

Note: Breast-fed infants have slightly acid stool; bottle-fed infants have slightly alkaline stool.

CONSTIPATION	Type 1		Separate, hard pellets or lumps (may require straining).
	Type 2		Lumpy and sausage-shaped.
NORMAL	Type 3		Like a sausage with cracks on the surface.
	Type 4		Long, smooth, soft, and snake-like.
DIARRHEA	Type 5		Soft, distinct blobs (may be covered in mucous and pass easily).
	Type 6		Fluffy, ragged, and mushy.
	Type 7		Watery; entirely liquified.
	Type 8		Mucous-like, bubbly, foul-smelling, and may spray out.

Common Indigestions		
These are examples of common indigestions. Generally, they are reactions to mild stresses and changes, but monitor your ferret's input and output closely for a day or so to judge whether a vet trip is necessary.		
	Mucousy	Mucous is the body's natural protectant. Mucousy poops indicate a bowel upset, usually from the addition of a new food or treat or some minor life stress. If they persist, they can indicate an underlying issue and need to be monitored.
	Watery	Mostly liquid poops are cause by foods being passed too quickly, usually the symptom of mild stress or new food items. Make sure your ferret stays hydrated as loose poops can often cause dehydration.
	Seedy	The seedy texture of these poops is cause by foods being improperly digested. The pods are actually fats and proteins that haven't been processed.
	Jelly-like	These poops are entirely mucous blobs and need to be monitored closely for dehydration or intestinal blockage.
	Foamy/Bubblely	Usually these are the result of a new food or treat, though some bacterial infections are known to present as foamy and bubblely poops, so it's important to watch your ferret closely after seeing one of these in the litter box. Foamy fries and cheweasels are common treats that can cause these kinds of poops.
	Green	Green coloration in poops indicate that foods haven't been digested properly. Oftentimes it's due to minor stresses or changes in diet, but ECE is known as the "green slime disease" for a reason.

Consistency

Normal:

Normally well formed

Abnormal:

Abnormal consistency may be graded as follow:

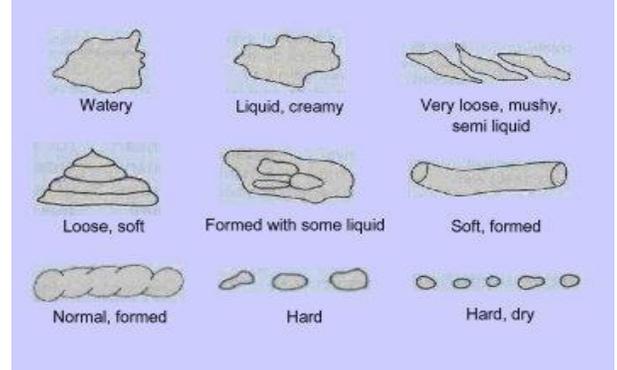
Very hard: seen in cases of constipation

Semi formed: seen in the cases of parasitic infection

Soft: seen in the cases of parasitic infection

Loose: seen in the cases of diarrhea

Watery: mostly seen in cases of bacterial infection



Mucus

Normal:

Normally undetectable amount produce by GIT and found in the stool.

Abnormal:

Abnormal mucus in the sample appears as white patches and according to the amount of mucus it can be graded using signs (+, ++, +++)

Mucus abnormally can be found in the stool in the following cases:

- ▶ Excessive straining at stool
- ▶ Spastic colon (translucent mucus on the surface of stool)
- ▶ Ulcerative colitis
- ▶ Bacillary dysentery (mucus with fresh pus)
- ▶ Amoebic dysentery (mucus with fresh blood)

Appearance pus

Normal:

Normally not found. (you cannot see it by naked eye).

Usually detected with mucus and appear as white patches in the stool, it indicate ulcerative colitis or bacterial infection as *bacillary dysentery*.

Also it can be graded using signs (+, ++, +++).

Presence of detectable pus by naked eye means that the microscopic pus must be over 100.

◆ Gross blood

Normal:

Normally no blood seen in the stool (you cannot see it by naked eye).

Abnormal:

Abnormal fresh blood (**Hematochezia**) seen in cases of lower GIT bleeding and also known as "bright red blood per rectum" and abbreviated **BRBPR**.

Note: It is distinguished from melena, which is stool with blood that has been altered by the gut flora and appears black **Causes:** blood that is mixed with stool ulcerative colitis colorectal cancer

blood that is not mixed with stool

- ▶ Bilharzias (schistosom mansoni infection) anal fissure piles

blood with diarrhea and mucus

- ▶ amoebic dysentery

◆ Naked eye parasite

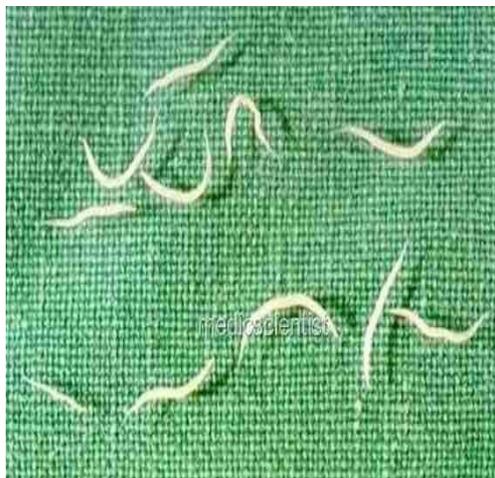
Normal: no parasites or larva appear in the stool but in some cause the whole worm or part of its body appear in the stool and can be seen by naked eye like (segment of tap worm)

Two worms can be seen by naked eye in the stool:

Ascaris lumbricoides



Enterobius vermicularis



Diarrhea

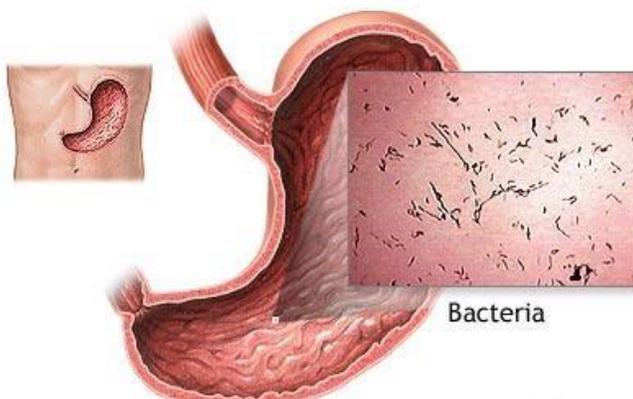
Diarrhea is an increase in the volume of stool or frequency of defecation (having three or more loose or liquid bowel movements per day). It is one of the most common clinical signs of gastrointestinal disease.

Note: *The loss of fluids through diarrhea can cause dehydration and electrolyte imbalances.*

Types of diarrhea

There are numerous causes of diarrhea, but in almost all cases, this disorder is a manifestation of one of the four basic mechanisms.

Diarrhea may be caused by bacteria or parasites found in food and water



Type of Diarrhea

1-Secretory diarrhea means that there is an increase in the active secretion, or there is an inhibition of absorption. The most common cause of this type of diarrhea is **bacterial toxins such that associated with cholera.**

In addition to bacterial toxins, a large number of other agents can induce secretory diarrhea by turning on the intestinal secretory machinery, including: hormones secreted by certain types of tumors (e.g. **vasoactive intestinal peptide**) a broad range of drugs (e.g. **some types of asthma medications, antidepressants, cardiac drugs**)

3-Osmotic diarrhea Osmotic diarrhea occurs when too much water is drawn into the bowels.

Osmotic diarrhea typically results from one of two situations:

1-Ingestion of a poorly absorbed substrate: as carbohydrate or divalent ion.

2-Malabsorption: A common example of malabsorption, afflicting many adults humans and pets is lactose intolerance resulting from a deficiency in the brush border enzyme lactase.

↔3- Motility-related diarrhea

Motility-related diarrhea is caused by the rapid movement of food through **the intestines (hypermotility)**. If the food moves too quickly through the GIT there is not enough time for sufficient nutrients and water to be absorbed. This can be due to **a diabetic neuropathy**, as a complication of menstruation or **Hyper thyroidism which can produce hyper motility**.

Disorders in motility than accelerate transit time could decrease absorption, resulting in diarrhea even if the absorptive process per se was proceeding properly.

→4-Inflammatory diarrhea

Inflammatory diarrhea occurs when there is damage to the mucosal lining or brush border, which leads to a passive loss of protein-rich fluids, and a decreased ability to absorb these lost fluids. It can be caused **by bacterial infections as Salmonella , viral infections as rotaviruses, parasitic infections as Entameba histolytica or autoimmune problems such as inflammatory bowel diseases .**

5-Steatorrhea (or steatorrhoea) is the presence of excess fat in feces. Stools may also float due to excess lipid, have an oily appearance and be especially foul-smelling. It can be caused **by parasitic infections as Giardia.**

causes

▶ lack of bile acids due to:

• *liver damage, Hypolipidemic drugs ,Gallbladder removal (cholecystectomy), pancreatic cancer (if it obstructs biliary outflow)*

↔Different Cells in stool

RBC

Normally few amounts of RBCs (0-3) are seen under high power field of microscope.

RBCs are counted under HPF of microscope and the range of count is written for example 30-40 HPF or more.

PUS Celle

Normally few amounts of pus (0-5) are seen under high power field of microscope.

Pus is counted under HPF of microscope and the range of count is written as in the case of RBCs.

Note: *if pus count is over 100 stool culture is recommended.*

Interpretation:

Abnormal pus under microscope is seen in:

- Bacterial infection as Shigellosis , Salmonellosis
Inflammation of the intestines, such as Ulcerative colitis .

Note: *Usually pus is absent or few in cases of:*

- *Viral diarrheas (Rotavirus infection)*
- *Parasitic infestations (e.g. Giardia, Entamoeba)*
- *In nonspecific diarrhea (e.g. drug or food induced).*

Note: *in cases of semi formed stool with pus and RBCs , widal test is recommended specially if the patients suffers from fever*

Pathogenic Parasites in stool

What are the types of parasites that attack human?

Protozoa: are microorganisms classified as unicellular eukaryotes

Helminthes: or *Parasitic worms*, a division of eukaryotic parasites that live inside their host. They are worm-like organisms that live and feed off living hosts.

What is the forms of protozoa that can appears in stool?

Trophozoite: metabolically active invasive stage.

Cyst: "vegetative" inactive form resistant to unfavorable environmental conditions they are refractile and more easily detected unstained.

In saline preparations protozoan cysts can be recognized as refractile bodies (shine brightly when focused). Cysts can be identified by their shape, size, nuclei, and inclusions as seen in an iodine preparation.

What is the forms of helminthes that ca appears in stool?

Ova: that is results from sexual reproduction of helminthes. Eggs are recognized by their:

- size,
- color (colorless, pale yellow, brown),
- morphological features.

Larva: the stage that is come from the ova.

In a fresh faecal specimen, *S. stercoralis* is the only larva that will be found. It can be easily detected in a saline preparation by its motility and large size.

Other findings

Normal constituents of stool

Bacteria: normally non pathogenic bacteria are found in the stool and usually bacilli such as *Escherichia coli* and *Lactobacillus sp.*

Note: *pathogenic bacteria may be found in stool (such as Salmonella, Shigella, and Staphylococcus aureus) and this will leads to pus formation, stool culture can differentiate between pathogenic and non pathogenic bacteria.*

Yeast : normally stool contain harmless yeast cells such as *blastocystis hominis*

Crystals : normally stool contain triple phosphate, calcium oxalate and cholesterol crystal due to food ingestion.

Fibers : normally stool contains many fibers that may arise from clothes or undigested plant food.

Air bubbles : normally found and has no clinical significance.

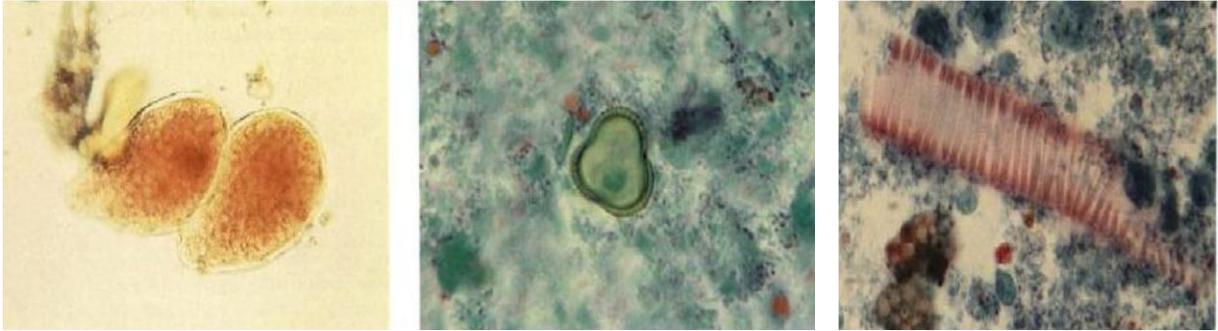
Oil droplets: normally found, they are very bright and completely rounded.

Note: *some times oil droplets are muddled with cysts but cysts are not so bright and not so rounded and if you stain the smear with iodine nucleus of cyst will be seen.*

Undigested food : normally found, it has many shapes as pollen grain , bundle of vegetables

pp

,plant cells.



Abnormal constituents of stool

Charcot-Leyden crystals

Formation

Crystals are formed from the breakdown of eosinophils and consist of the enzyme lysophospholipase, synthesized by eosinophils

Appearance

Crystals are slender and pointed at both ends, consisting of a pair of hexagonal pyramids joined at their bases.

Clinical significance

Sometimes found in parasitic infestation (especially amebiasis and ascariasis) and in cases of ulcerative colitis.

Faecal occult blood test: (FOBT)

When the bleeding is chronic with only small amounts of blood being passed in the faeces, the blood (or its breakdown products) is not recognized in the faeces and is referred to as occult (hidden) blood.

An average, healthy person passes up to 2.0 mL of blood per 150 g of stool into the GIT daily. Passage of more than 2.0 mL of blood in the stool in 24 hours is pathologically significant.

Note: *Normal stool color don't rules out the presence of occult blood where black color need more than 2 ml blood to be passes in stool*

- ▶ **Note:** *FOBT is a screening test so more tests will need to be done to*
- ▶ *diagnose the cause of the bleeding.*
- ▶

▶
▶
▶ **Principle**

- ▶ In 1864, Van Deen first developed a chemical method, to detect occult blood.
- ▶ The test is based on the principle that haemoglobin and its derivatives react in a similar way to peroxidase enzymes, i.e. they catalyze the transfer of an oxygen atom from a peroxide such as hydrogen peroxide to a chromogen such as guaiacum (extracted from trees in the genus *Guaiacum*), Benzidine , o-tolidine or aminophenazone. Oxidation of the chromogen is shown by the production of a blue or blue-green colour.



The chemical reaction involved is as follows:



Sensitivity

This method is capable of detection of 6 mg of hemoglobin per gram of feces in 90% of observations, but will fail 80% of the time to detect up to 1.5 mg/g of feces

**Immunochemical method
(iFOBT)**

Principle

In 1974, Adams first developed an immunological based method for the detection of occult blood that utilized an antigen-antibody reaction between human hemoglobin and anti-human hemoglobin antibody. Immunochemical fecal occult blood tests utilize anti-human hemoglobin antibodies attached to a solid phase to detect the globin portion of undegraded human hemoglobin in stool.

Sample required

Random stool sample can be used for the test (only a small sample is necessary)

Preparation of the patient

No special drug or dietary restrictions are required.

Results of this test are not affected by dietary peroxidases, animal blood, or vitamin C

Advantage

These tests detect the globin in feces rather than heme. By detecting globin the tests are more specific for lower gastrointestinal bleeding. (hemoglobin from the upper gastrointestinal tract is mostly degraded by bacterial and digestive enzymes before reaching the large intestine, hemoglobin from lower gastrointestinal tract bleeding undergoes less degradation and remains immunochemically reactive)



Parasitology assays

Entameoba histolytica

- Amoebiasis is usually transmitted by contamination of drinking water and foods with feces (Oral-faecal route).
- Infection can be transmitted through autoinfection (by anal-oral contact).

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Pathology

Symptoms appear after about 1 to 4 weeks later but sometimes more quickly or more slowly.

Asymptomatic amboebiasis

About 90% of cases are asymptomatic. The infected individual is still a carrier, able to spread the parasite to others through poor hygienic practices.

In asymptomatic infections the amoeba lives by eating and digesting bacteria and food particles in the gut.

It does not usually come in contact with the intestine itself due to the protective layer of mucus that lines the gut.

Cysts are found in the stool and can be present in an infected person for several years.

Amoebic dysentery

Disease occurs when amoeba comes in contact with the cells lining the intestine. It then secretes enzymes that destroy cell membranes and proteins.

Amoebic dysentery or *amoebic colitis* is the severe form of amoebiasis and it is generally known as invasive amoebiasis.

Symptoms

Amoebic dysentery usually starts slowly over several days with abdominal cramps, and occasional loose stools, but progresses to diarrhea with blood and mucus.

Blood, mucus and pieces of necrotic tissue become more evident as the number of stools increases (10-20 or more per day) and stools will often contain little fecal material.

A few patients may develop fever, vomiting, abdominal tenderness, weight loss, or dehydration (especially children) as the severity of the disease increases.

Note: *Bacillary dysentery is a bacterial infection caused by Salmonellosis and Shigellosis, in this case No faecal matter are found and there are plenty of pus*

Complication of amoebiasis:

Intestinal complications

Severe ulceration of the gastrointestinal mucosal surfaces occurs in less than 16% of cases leading to rectal hemorrhage. The most affected region of the large intestine is caecum where trophozoite invade mucosa and multiply in submucosa forming abscesses which breaks to form ulcers that is called *bouton de chemise ulcers* (flask shaped ulcer with narrow lumen and wide base).



Invasion of appendix that leads to clinical picture of appendicitis (surgery in this case may lead to peritonitis)

Repeated severe attacks may lead to amoeboma which is an inflammatory thickening of the intestinal wall around the ulcer which can be confused with cancer

Amoebic liver abscess

In fewer cases, (In about 10% of invasive cases) the amoebae enter the bloodstream and the parasite invades



the soft tissues, most commonly the liver causing abscesses.

Amoebic hepatitis is ***Characterized by:*** Fever, nausea, vomiting, weight loss, right abdominal pain, and hepatomegaly

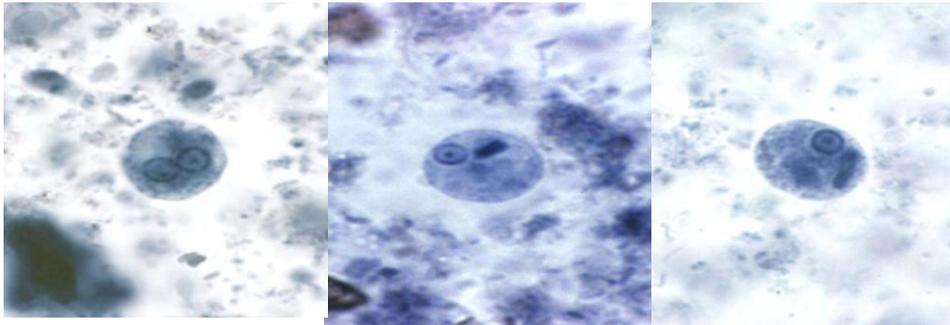
Diagnosis

1. Stool analysis

Asymptomatic infections

Are usually diagnosed by finding cysts shed in the stool

Note: *Since cysts are not shed constantly, a minimum of three stools should be examined.*



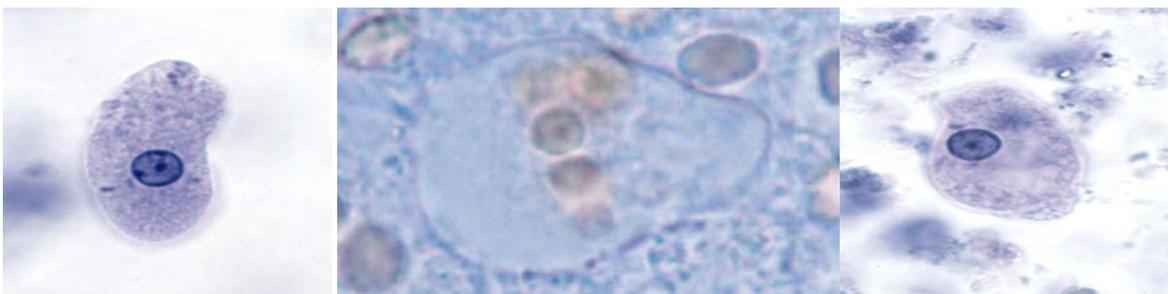
Sympomatic infections

Gross examination

In the case of acute infections gross examination of stool show blood and mucus **Microscopic examination:**

The motile form (trophozoite) can be seen in fresh feces. There are abundant RBCs with low WBCs.

Note: *anti-diarrhea drugs should not be taken until stool examination is done*



Disadvantage of stool analysis:

One problem is that other parasites and cells can look very similar to *E. histolytica* when seen under a microscope.

For example *Entamoeba histolytica* and another ameba, called *Entamoeba dispar*, which is about 10 times more common, look the same when seen under a microscope (morphologically identical) and should therefore be reported as *E. histolytica/E. dispar*.

Giardia lamblia

usually transmitted by contamination of drinking water and foods with feces (Oral-faecal route) Infection can be transmitted through autoinfection (by anal-oral contact)

Note: *Giardiasis does not spread via the bloodstream, nor does it spread to other parts of the gastro-intestinal tract, but remains confined to the lumen of the small intestine*

Pathology

Light infection

In humans, infection is Asymptomatic in about 70% of the patients.

Heavy infection

Only about 30% of patients exhibit symptoms, in this case Symptoms typically begin 1–2 weeks after infection and it includes:

- ▶ Fatty explosive diarrhea [**Steatorrhea**]
- ▶ Loose or watery stool with foul smelling
- ▶ **Epigastric pain**
- ▶ Stomach cramps
- ▶ malabsorption
- ▶ **Loss of body weight**
- ▶

Excessive gas (often flatulence or a foul or sulphuric-tasting belch, which has been known to be so nauseating in taste)

An oily anal leakage or some level of fecal incontinence may occur

Complications of Giardiasis

Lactase deficiency may develop in an infection with Giardia, however this usually does not persist for more than a few weeks, and a full recovery occurs

Some studies have shown that giardiasis should be considered as a cause of Vitamin B12 deficiency, this a result of the problems caused within the intestinal absorption system.

Diagnosis

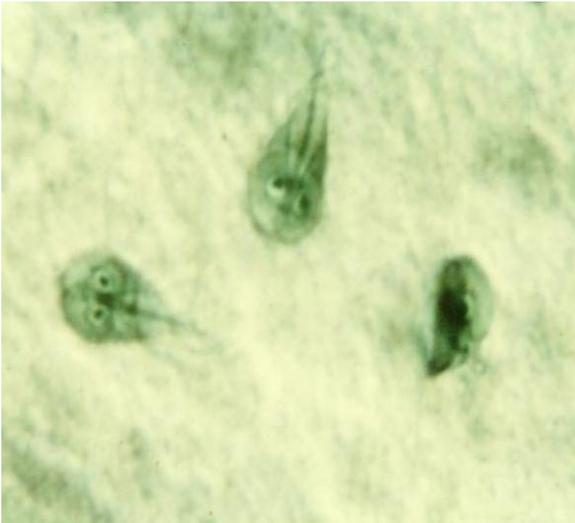
Stool analysis

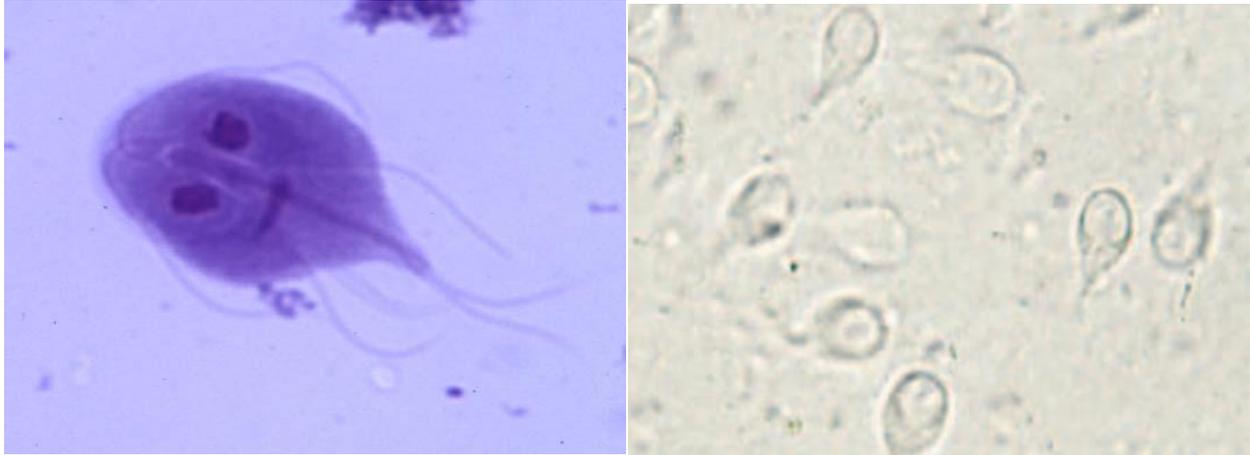
Asymptomatic infections

Finding *G. lamblia* cysts in more formed specimens. The cysts are excreted irregularly. Often large number may be present for a few days followed by fewer numbers for a week or more. Several specimens may need to be examined and a concentration technique used.

Symptomatic infections

The motile form (trophozoite) can be seen in fresh liquid feces. Finding *G. lamblia* trophozoites in fresh diarrhoeic specimens particularly in mucus. They are often difficult to detect because they attach themselves to the wall of the intestine. Several specimens collected at different times may need to be examined.





Disadvantage of stool test:

Since the cysts and trophozoites are not shed consistently so many false negatives are found, some patients should be treated on the basis of empirical evidence; treating based on symptoms.

Fecal Immunoassays for Intestinal Protozoa (Antigen Detection, No Centrifugation Recommended)

It is very important to read the kit information sheet before use.

Currently fecal immunoassays are available for *G. lamblia*, the *E. histolytica* *E. dispar* group, *E. histolytica*, and *Cryptosporidium* spp.

Depended on the published literature, fecal immunoassays are more sensitive and specific than the routine O&P exam; Specially for *G. lamblia*.

However,

unlike the O&P exam, which facilitates the recovery of many different parasites, the fecal immunoassays are limited to one or two organisms only. And it also more sensitive than the special stains (modified acid-fast stains) for the coccidia (*Cryptosporidium* spp.).

Fresh specimens can be stored at 2 to 8_C and should be tested within 48 h, or they should be frozen at -20 to -70_C (freezing is not acceptable for the FA method; the freeze-thaw cycle damages the organisms).

Kits under Development

Although not currently available commercially, several immunoassays are in various developmental phases. These include antigen detection kits for *Dientamoeba fragilis*, *Blastocystis hominis*, *Cyclospora cayetanensis*, and various species of the microsporidia.

Balantidium coli

Introduction

Balantidium coli is widely distributed in warmer climates, which is where human infections most commonly occur. The organisms inhabit the large intestine, cecum and terminal ileum where they feed on bacteria. The most common hosts being humans, pigs and rodents. Human infection is usually from pigs and is rare.

Morphology of the Trophozoite

- 1- Trophozoites of *B. coli* measure approximately 30-150µm in length x 25-120µm in width but have been known to attain lengths of up to 200µm.
- 2- They are oval in shape and covered in short cilia.
- 3- A funnel shaped cytosome can be seen near the anterior end.
- 4- Multiplication is by binary fission in the trophozoite stage.
- 5- In an unstained preparation, the organisms are easily recognized because of their size and rapid revolving rotation. In a stained preparation, the characteristic macro and micronuclei may be observed.

Morphology of the Cyst

- 1- The cyst is spherical or ellipsoid and measures from 30-200µm by 20-120µm. It contains 1 macro and 1 micronucleus.
- 2- The cilia are present in young cysts and may be seen slowly rotating, but after prolonged encystment, the cilia disappear.
- 3- Cysts form when diarrhea subsides and the rectal contents become formed. The cyst, ingested by a fresh host, excysts to liberate the trophozoite.

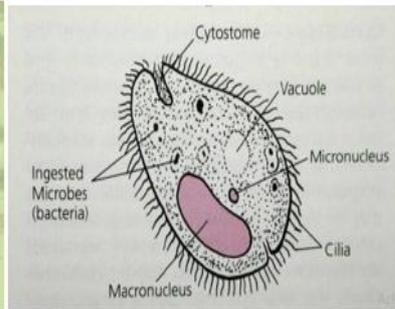
Clinical Disease

Severe *B. coli* infections may resemble amebiasis. Symptoms include

- 1- diarrhea, nausea, vomiting, and anorexia. The diarrhea may persist for long periods of time resulting in acute fluid loss.
- 2- *Balantidium coli* also has the potential to penetrate the mucosa resulting in ulceration just as those of *Entamoeba histolytica*, but perforation is more common. Metastatic lesions do not occur. Extra-intestinal disease has also been reported, but is rare.

Laboratory Diagnosis

Wet preparations of fresh and concentrated stool samples reveal the characteristic cysts and motile trophozoites. They are easier to identify in direct-smear saline preparations than permanently stained fecal smears.



Trichomonas hominis

Morphology of Trophozoites

- 1- *Trichomonas hominis* do not have a cystic stage.
- 2- The trophozoites measure from 5-15µm in length by 7-10µm in width.
- 3- The shape is pyriform and has an axostyle which runs from the nucleus down the centre of the body and extends from the end of the body.
- 4- They also possess an undulating membrane which extends the entire length of the body and projects from the body like a free flagellum (this feature distinguishes it from other trichomonads).
- 5- The characteristic number of flagella is five; there is some deviation from this number.
- 6- They also have a single nucleus at the anterior end.
- 7- Trichomonads swim with a characteristic wobbly movement, which makes them unmistakable during diagnosis .

Laboratory Diagnosis

- 1- In a fresh stool, the flagellates move very rapidly in a jerky, non-directional manner.
- 2- The axostyle and undulating membrane are diagnostic.
- 3- The flagellates are difficult to stain; however, the axostyle can be seen on a stained preparation and is diagnostic.

