Stool Analysis

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Lab training

Stool Analysis

A stool analysis is a series of tests done on a stool (feces) sample to help diagnose certain conditions affecting the digestive tract. These conditions can include infection (such as from parasites, viruses, or bacteria), poor nutrient absorption, or cancer.

Collection of the stool specimen

A clean dry container must be used for the collection of fecal samples

Ideally the specimen should be brought to the lab as soon as it is passed, to avoid deterioration of protozoa and alterations of the morphology of protozoa and helminthes.

Diarrhoea specimens, or those containing blood and mucus, should be examined promptly on arrival in the laboratory.

Rectal swabs

Only when it is not possible to obtain feces, should a specimen be collected by using a cotton wool swab. The swab should be inserted in the rectum for about 10 seconds. Care should be taken to avoid unnecessary contamination of the specimen with bacteria from the anal skin.

The adhesive tape method

This is useful for the detection of the eggs of *Vermicularis*. The eggs can be collected by wrapping a strip of clear adhesive tape around the anus. After collecting the eggs, the tape should be sticked lengthways, face down on a microscope slide.

Transport of the specimen

• The specimen must reach the laboratory within 30 minutes of passing of the stool, since the motile organisms, for example, Vibrio and amoebic trophoziot are heat sensitive and they can die or become unrecognizable after that period.

• Transport media such as the **Cary-Blair medium** can be used for Salmonella, Shigella and Yersinia.

• When **cholera** is suspected, about 1 ml of specimen should be transferred into 10 ml of **alkaline peptone water**, which will act as an enrichment as well as transport medium.

• When worms or tapeworm segments are present, these should be transferred to a container of **physiological saline** and sent to a laboratory for identification.

Macroscopic observation of the fecal sample:

Macroscopic appearance of the stool can give a clue to the type of organisms present

Consistency: Normal stools are well formed. In diarrhea and dysentery the stools are semi solid or watery in nature

Color: the normal adult stool **is brown** due **to bile pigments**.

Abnormal types of feces color:

1-Watery (like rice water) :the patient infected with cholera (*Vibrio cholerae)*

2- Clay or white colored : Obstructive jaundice

3- Reddish colored: Blood from lower gastrointestinal tract

4-Black: Bleeding from upper gastrointestinal tract,Iron.

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Macroscopic observation of the fecal sample:

Blood and mucus, it is a case of amoebic dysentery caused by ***Entameoba histolytica***

Blood and pus, the case is **bacillary dysentery, caused** by ***Shigella*, *Compylobacter* or *E.coli*.** Only blood, the diarrhea caused by ***Salmonella* or *E.coli* or *Clostridium difficile***

The presence of adult worms can also be seen in a freshly passed stool.
Example:
Ascaris lumbricoides and ***Enterobius vermicularis***.

Microscopic examination

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

1-Leukocytes(WBCs)

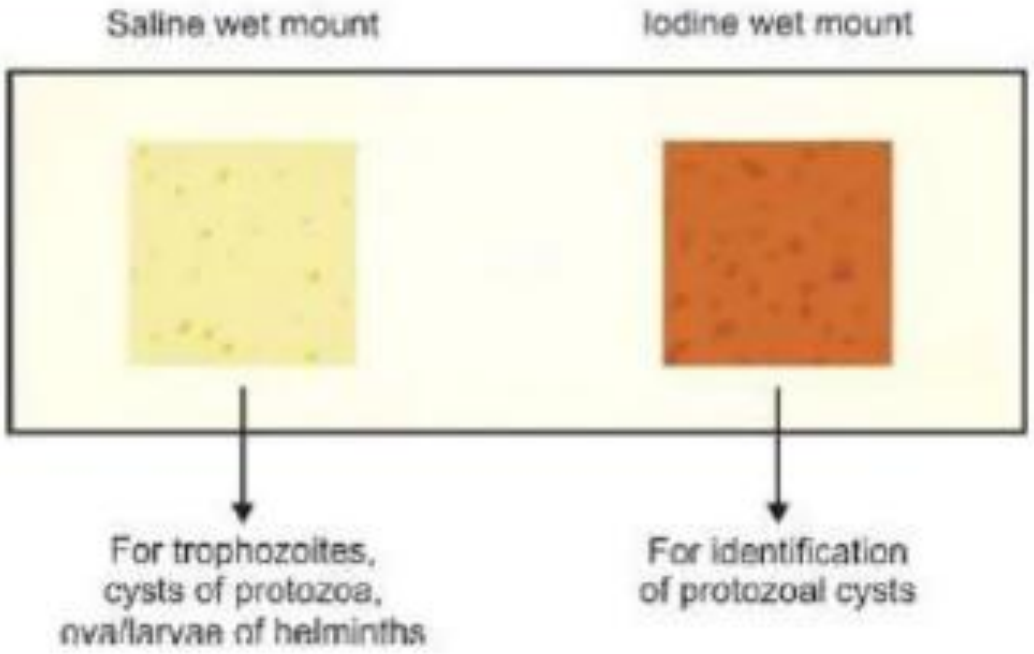
2-RBCs

3- Fats

3-Amoebas, flagellates

4-Eggs, larvae & cysts.

PREPARATION OF SLIDES



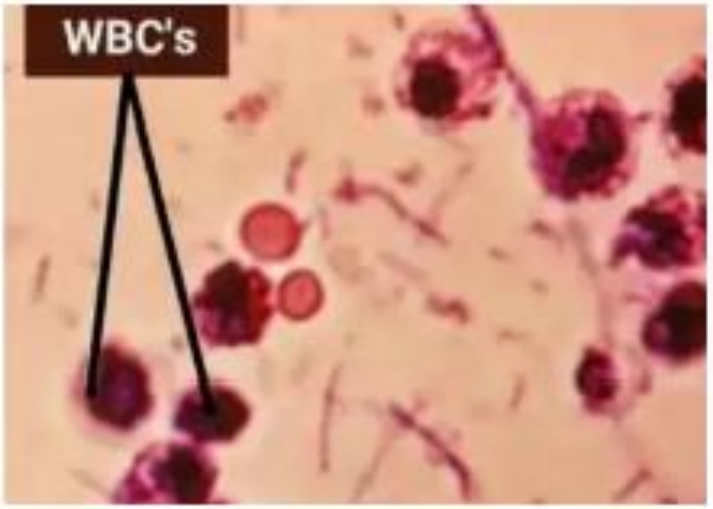
- Saline wet mount is used for demonstration of eggs and larvae of helminths, and trophozoites and cysts of protozoa.
- Saline wet mount can also detect red cells and white cells.
- The iodine wet mount is useful for identification of protozoal cysts as iodine stains glycogen and nuclei of the cysts.
- Trophozoites become non-motile in iodine mounts.
- A liquid, diarrheal stool can be examined directly without adding saline.

Microscopic examination

Leukocytes (WBCs)

Increased no. WBCs is associated with

- Bacillary dysentery
- Shigellosis
- Salmonella infections
- Invasive E.coli infections
- Amoebiasis
- Chronic ulcerative colitis



Microscopic examination

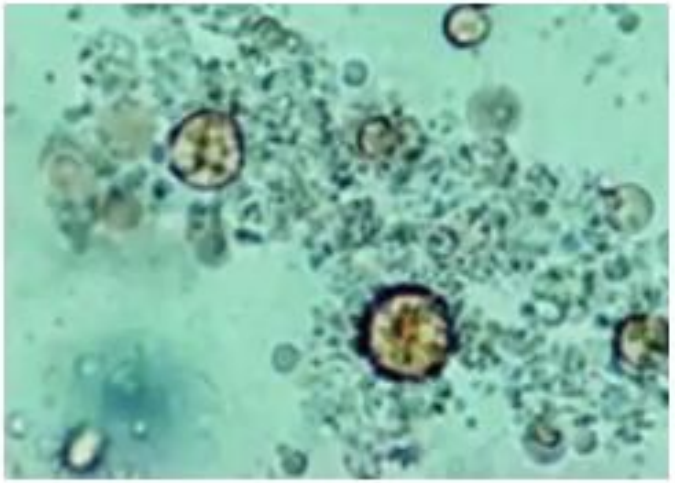
Red Blood Cells (RBCs)

- Present in
  - Dysentery
  - Hemorrhoids
  - GIT Malignancies

Fat

Present in

- Deficiency of pancreatic digestive enzyme
- Malabsorption

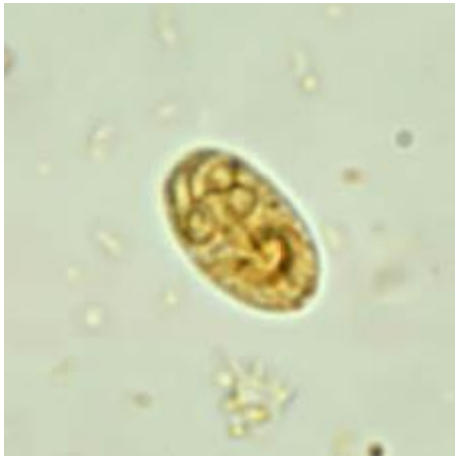


Microscopic examination

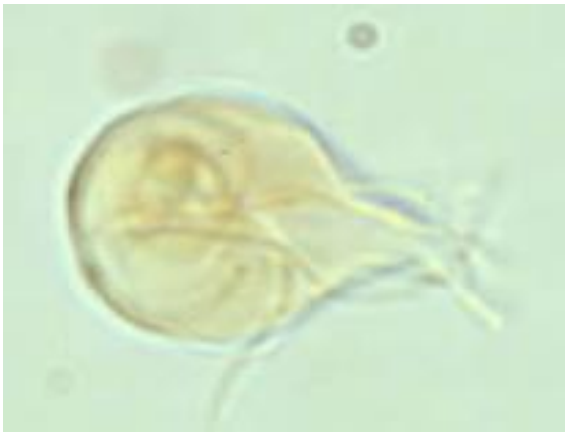
Cysts/ Trophozoites/ Ova of parasites

- Normally there are no parasites/eggs in the stool sample.
- Multiple stool samples should be examined to rule out parasitic infestations

Pictures of parasites in different stages as seen under microscope



Giardia lamblia (cyst)

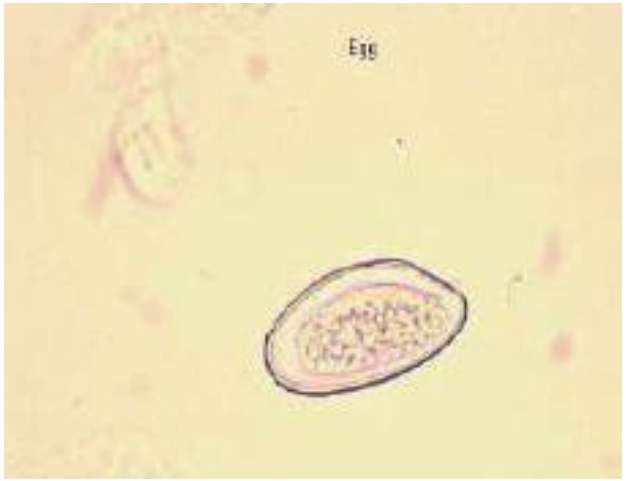


Giardia lamblia (trophoziot)

Entamoeba histolytica(cyst)

Entamoeba histolytica
(trophoziot)

Schistosoma mansoni (Egg)



Enterobius vermicularis (Egg)

CHEMICAL EXAMINATION OF STOOL

(a) PH: normal stool PH is week acidic (6).The pH of stools is acidic in amoebic dysentery and is alkaline in bacillary dysentery.

(b) Occult blood:

The fecal occult blood test is a lab test used to check stool samples for hidden (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 (6mg/g) any increase in that level indicate disturbance in enzymes that digest sugar (e.g.Lactase,Sucrase).

Stool Culturing

1-Culture media:

MacConkys Agar: inhibits most of the gram positive organisms, differentiate 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

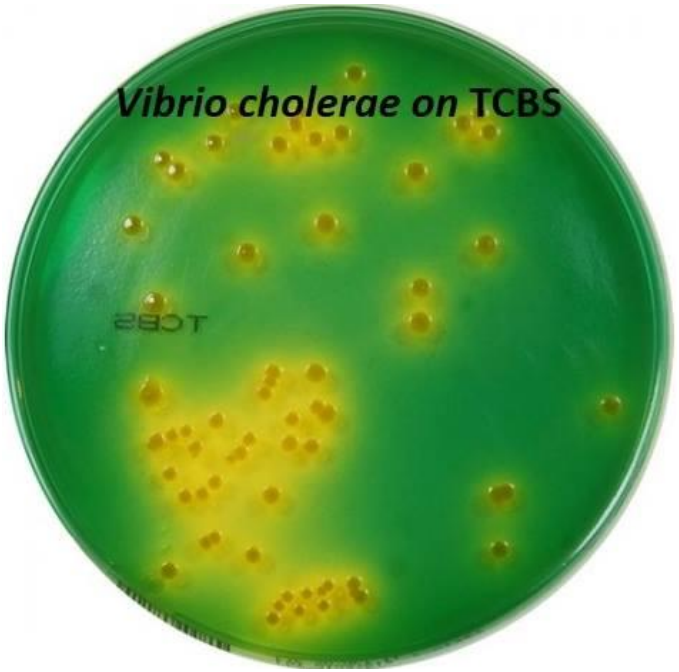
Thiosulphate citrate bile salt sucrose (TCBS) agar: This is an excellent, selective medium for the primary isolation of **Cholerae**.

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. Incubate for an appropriate time.

Salmonella typhimurium.

(XLD) agar



Thanks