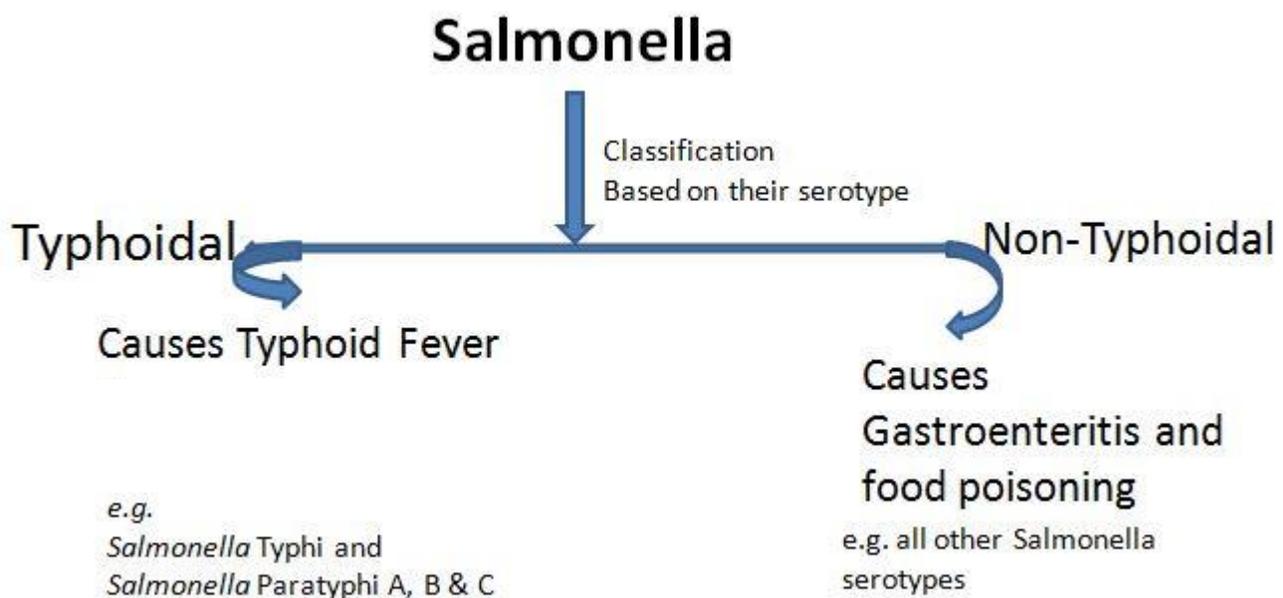


Salmonella

Salmonella species are Gram-negative, flagellated facultatively anaerobic bacilli . There are over 1800 known serotype which current classification considers to be separate species three clinical forms of **salmonellosis**: (1) gastroenteritis, (2) septicemia, and (3) enteric fevers.



Salmonella typhi

Microbiological Characteristics:

This gram-negative enteric bacillus belongs to the family Enterobacteriaceae. It is a motile, facultative anaerobe that is susceptible to various antibiotics. Diagnostic identification can be attained by growth on MacConkey and EMB agars, and the bacteria is strictly non-lactose fermenting. It also produces no gas when grown in TSI media, which is used to differentiate it from other Enterobacteriaceae.

Typhoid/EntericFever:

Infection of *S. typhi* leads to the development of typhoid, or enteric fever. This disease is characterized by the sudden onset of a sustained and systemic fever, severe headache, nausea, and loss of appetite. Other symptoms include constipation or diarrhea, enlargement of the spleen, possible development of meningitis, and/or general malaise. Untreated typhoid fever cases result in mortality rates ranging from 12-30% while treated cases allow for 99% survival.



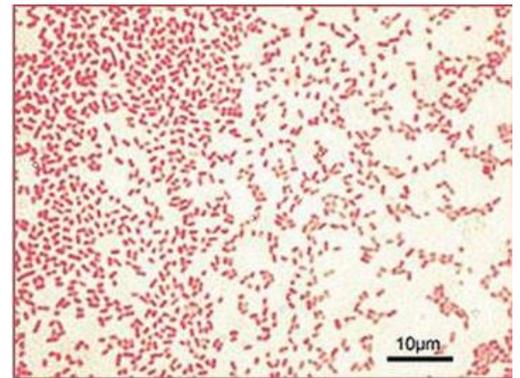
shape of *salmonella* under light microscope

Shigellae

Morphology

Shigellae are short, Gram-negative rods. They are non-motile, non sporing and non capsulated. They are aerobes and facultative anaerobes, with growth temperature range of 10-40°C and optima of 37°C and pH 7.4. They grow on ordinary media.

Deoxycholate citrate Agar (DCA) is a useful selective medium.



shape of *Shigellae* under light microscope

Shigella is a germ that causes a disease called **shigellosis**. Children younger than 5 years are most likely to get shigellosis, but people from all age groups can get this disease. Most people with shigellosis will get better within 5 to 7 days without medical treatment. However, *Shigella* bacteria can cause more severe illness in infants, the elderly, or people with immune systems weakened by cancer, cancer treatments, or other serious conditions (like diabetes, kidney failure, liver disease, and HIV/AIDS).

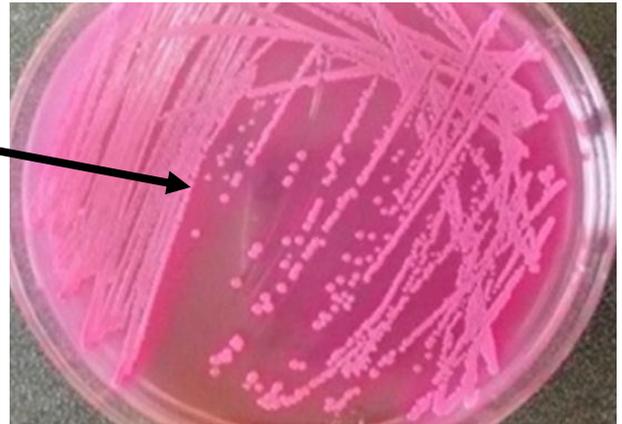
Escherichia Coli

E. coli is Gram-negative straight rod, arranged singly or in pairs. It is motile by peritrichous flagellae, though some strains are non-motile. Spores are not formed. Capsules and fimbriae are found in some strains.

Cultural Characteristics of Escherichia Coli:

It is an aerobe and a facultative anaerobe. The optimum growth temperature is 37°C. On Nutrient agar, colonies are large, thick, greyish white, moist, smooth, opaque or translucent discs. Some strains may form “**mucoïd**” colonies.

On MacConkey agar medium, colonies are bright pink due to lactose fermentation.



Eosine Methylene Blue Agar

Eosine methylene blue (EMB) agar is a differential medium for coliform bacteria. Coliforms (most commonly *E. coli*), which are lactose fermenters, form blue-black colonies with a greenish metallic sheen . Nonlactose fermenting Gram-negative bacteria will form colonies with a variety of colors, from clear to pink or amber. The medium is slightly inhibitory to Gram-positive bacteria, some of which may form small, pin-point colonies.

Shape of E. coli on Eosine methylene blue (EMB) agar



Salmonella-Shigella plates

Salmonella-Shigella (SS) plates are used to detect bacterial contamination on raw meat. *Salmonella-Shigella* agar plates contain lactose, bile salts, ferric citrate, and neutral red. The bile salts **select** for Gram-negative bacteria. The other components **differentiate** among Gram-negative bacteria.

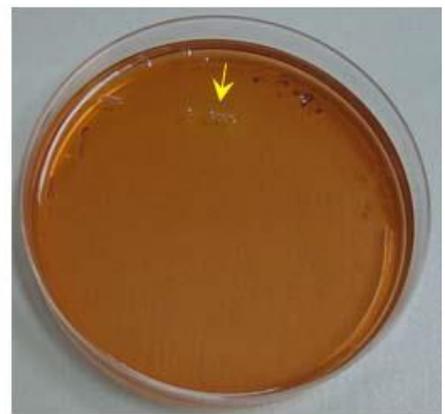
Coliform bacteria such as *E. coli* will ferment the lactose in the media, resulting in bacterial growth with a pink color. (They do not produce any hydrogen sulfide.) Members of the genus *Salmonella* will not ferment lactose, but do produce hydrogen sulfide gas. The resulting bacterial colonies will appear colorless with black centers. Members of the genus *Shigella* do not ferment lactose or produce hydrogen sulfide gas, so the resulting colonies will be colorless.



Escherichia coli



Salmonella



Shigella