Lecture 16 : ***Salmonella***

Salmonella :is a genus of rod-shaped (bacillus) gram-negative bacteria of the family Enterobacteriaceae. The two species of *Salmonella* are *Salmonella enterica* and *Salmonella bongori*. *Salmonella* species are non-spore-forming, predominantly motile enterobacteria with cell diameters between about 0.7 and 1.5 µm, lengths from 2 to 5 µm, and peritrichous flagella (all around the cell body).

Salmonella species are intracellular pathogens: certain serotypes cause illness. *Nontyphoidal serotypes* can be transferred from animal-to-human and from human-to-human. They usually invade only the gastrointestinal tract and cause *Salmonella* food poisoning; symptoms resolve without antibiotics. *Typhoidal serotypes* can only be transferred from human-to-human, and can cause *Salmonella* food poisoning, typhoid fever and paratyphoid fever. Typhoid fever occurs when *Salmonella* invades the bloodstream—the *typhoidal form*; or in addition spreads throughout the body, invades organs, and secretes endotoxins—the *septic form*. This can lead to life-threatening hypovolemic shockand septic shock and requires intensive care including antibiotics.

Taxonomy

The genus *Salmonella* is part of the family of Enterobacteriaceae. Its taxonomy has been revised and has the potential to confuse. The genus comprises two species, *Salmonella bongori* and *Salmonella enterica*, defined on the basis of the somatic O (lipopolysaccharide) and flagellar H antigens.

culture, and growth conditions

The bacteria are not destroyed by freezing, but UV light and heat accelerate their destruction. They perish after being heated to 55 °C for 90 min, or to 60 °C for 12 min. To protect against *Salmonella* infection, heating food for at least 10 minutes to an internal temperature of 75 °C is recommended.

Salmonella species can be found in the digestive tracts of humans and animals, especially reptiles. *Salmonella* on the skin of reptiles or amphibians can be passed to people who handle the animals. Food and water can also be contaminated with the bacteria if they come in contact with the feces of infected people or animals.

Typhoidal *Salmonella*

Typhoid fever and Paratyphoid fever

Typhoid fever is caused by *Salmonella* serotypes which are strictly adapted to humans or higher primates—these include *Salmonella* typhi, Paratyphi A, Paratyphi B and Paratyphi C. In the systemic form of the disease.

Treatment :Ampicillin, amoxicillin, gentamicin

Shigella :is a genus of Gram-negative, facultative anaerobic, nonspore-forming, nonmotile, rod-shaped bacteria genetically closely related to *E. coli*. The genus is named after Kiyoshi Shiga, who first discovered it in 1897.

The causative agent of human shigellosis, *Shigella* causes disease in primates, but not in other mammals. It is only naturally found in humans and gorillas. During infection, it typically causes dysentery. *Shigella* is one of the leading bacterial causes of diarrhea worldwide,

Pathogenesis

Shigella infection is typically by ingestion. Depending on the health of the host, fewer than 100 bacterial cells can be enough to cause an infection. *Shigella* species generally invade the epithelial lining of the colon, causing severe inflammation and death of the cells lining the colon. *S. dysenteriae* strains produce the enterotoxin Shiga toxin, which is similar to the verotoxin produced by enterohemorrhagic *E. coli*. Both Shiga toxin and verotoxin are associated with causing potentially fatal hemolytic uremic syndrome.

The most common symptoms are diarrhea, fever, nausea, vomiting, stomach cramps, and flatulence. It is also commonly known to cause large and painful bowel movements. The stool may contain blood, mucus, or pus. Hence, *Shigella* cells may cause dysentery. In rare cases, young children may have seizures. Symptoms can take as long as a week to appear, but most often begin two to four days after ingestion. Symptoms usually last for several days, but can last for weeks. *Shigella* is implicated as one of the pathogenic causes of reactive arthritis worldwide.

Treatment : Sulfonamides, tetracycline, Chloramphenicol.