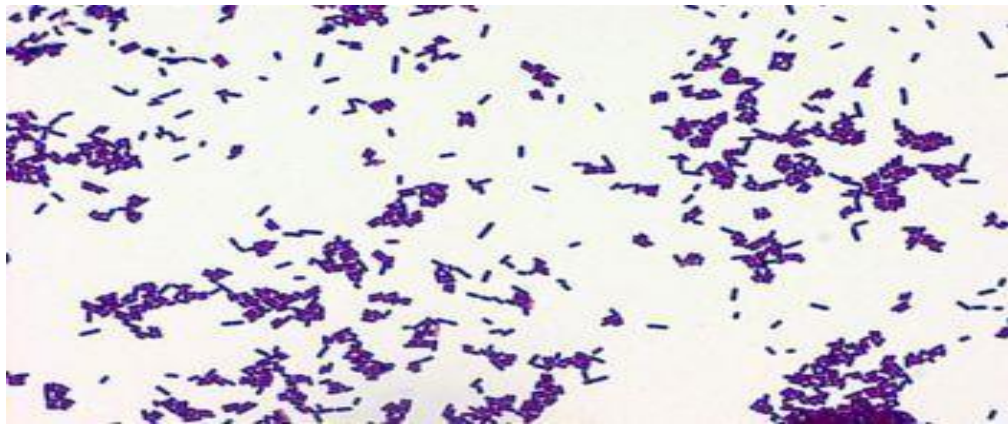
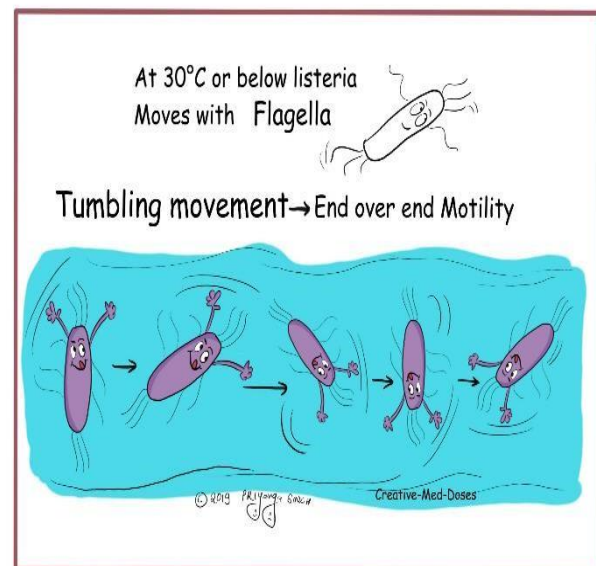


Listeria

Listeria is a Gram-positive short rod bacilli (coccobacilli), non-spore forming and non-capsulated.



Listeria monocytogenes has tumbling end-over-end motility at 22-28°C but not at 37° due to peritrichous flagella. Non or sluggishly motile and produced little or no detectable flagellin at 37 °C.



Listeria monocytogenes is aerobic or facultative anaerobic, hardy, able to grow at temperatures ranging from 4-45 or 60°C with the optimal temperature being 30–37°C, pH 4-9 and in nutrient broth supplemented with up to 10% NaCl. Therefore, it is able to overcome food preservation, making it an important foodborne pathogen. Contamination may occur after cooking and before packaging. It can be spread by contact with an infected products or surfaces such as hands or countertops during food preparation.

It has been isolated from soil, vegetation, fodder, dairy products, unpasteurized milk, ice cream, chicken, egg, sea foods, meat products, the feces of some animals, water from agricultural areas and wet areas of food processing factories.

Contamination may occur after cooking and before packaging. It can be spread by contact with an infected products or surfaces such as hands or countertops during food preparation. It is the most virulent food-borne pathogens and responsible for causing **listeriosis**, a serious infection of humans caused by eating of contaminated food.

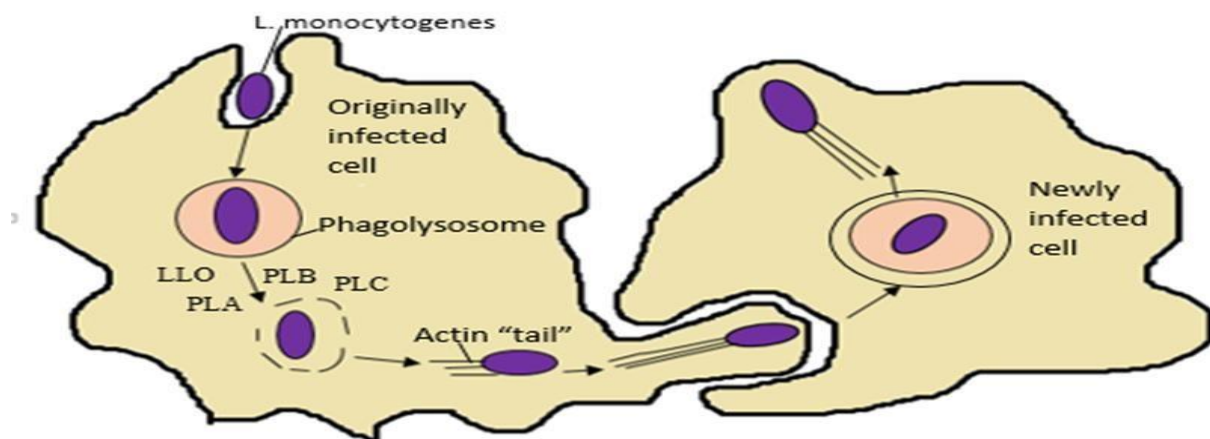
It is a facultative intracellular parasite, caused death rates with 30-40% which exceeding even *Salmonella* and *Clostridium*.

Pathogenicity

Non-invasive listeriosis (febrile gastroenteritis) can include fever, diarrhea, muscle aches, nausea, cramps, vomiting and fatigue within 24 to 48 hours after ingestion of the pathogen. Invasive listeriosis is characterized by the presence of bacteria in the blood, in the fluid of the central nervous system leading to sepsis and meningitis or infection of the uterus of pregnant women. The latter may result in abortion, stillbirth or premature labour and neonatal infection.

Pregnant women typically experience only fever, chills and headache. Asymptomatic colonization in vagina produces infertility. In bacterial meningitis, symptoms including fever, malaise, ataxia (loss of balance), seizures and altered mental status. The incubation period before onset of invasive listeriosis ranges from 3 days to 3 months.

Listeria monocytogenes usually colonizes the small intestine. The bacterium enters the cells lining the gastrointestinal tract by internalin to disrupt the host's cell membrane. Macrophages will also phagocytose the bacteria in order to neutralize it in a phagolysosome. *L. monocytogenes* will produce an exotoxin and virulence factors called listeriolysin O(hemolysin), phospholipase A, B and C in order to destroy the phagolysosome's membrane and escape. The bacterium will then multiply in the cytoplasm of the host's cell and uses the cell's actin filaments as a tail to move towards the membrane. *L. monocytogenes* will then exit from the cell using pseudopods and enters the neighboring cell forming a double membrane vacuole that the pathogen will need to escape from using the same virulence factors. The pathogen will then spread from cell to cell repeating its life cycle and hiding from the immune system.



The intracellular cycle of *L. monocytogenes* infection is governed by multiple virulence factors such as internalin (facilitate host cell invasion), hemolysin (facilitates phagosome lysis), phospholipase C facilitates intracellular growth), as well as actin polymerization protein (facilitates cell-to-cell spread), tumbling motility and growth at low temperatures.

Listeria causes severe infection in the elderly, pregnant, neonates and the immunocompromised with only a self-limited gastrointestinal infection in the immunocompetent.

Diagnosis

Listeriosis can be diagnosed using specimens from a body fluid, such as blood, spinal fluid, the placenta or amniotic fluid. Culturing on blood agar with narrow zones of beta-hemolytic and chocolate agar



Treatment

Ampicillin is often used in combination with gentamicin. In patients with penicillin allergies, trimethoprim/sulfamethoxazole can also be used. Vancomycin, ciprofloxacin and azithromycin can be used.

- Preventing of listeriosis as a food illness requires effective sanitation of food contact surfaces with alcohol and chlorine bleach

- Quaternary ammonium can be mixed with alcohol as a food contact safe sanitizer.

Two other household products that can be effective against *Listeria* on food contact surfaces are hydrogen peroxide (available in 3% concentration) and distilled white vinegar (available in 5% concentration).

- Cooking foods thoroughly will destroy any *Listeria* that may be present on the food.

- Keep the refrigerator clean and foods in the home should be kept below 4°C to inhibition of bacterial growth.