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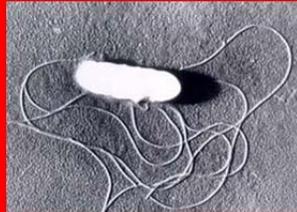
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## Listeria in the food!

**Listeria monocytogenes** is a Gram-positive rod-shaped bacterium. It is the agent of **listeriosis**, a serious infection caused by eating food contaminated with the bacteria. Listeriosis has recently been recognized as an important public health problem. The disease affects primarily pregnant women, newborns, and adults with weakened immune systems. Listeriosis is a serious disease for humans; the **overt form** of the disease has a mortality greater than 25 percent. The two main clinical manifestations are sepsis and meningitis. Meningitis is often complicated by encephalitis, a pathology that is unusual for bacterial infections.



Researchers have isolated *L. monocytogenes* from soil, leaf litter, sewage, silage, dust and water. The organism often moves through the animal and human intestinal tract without causing illness, and has been found in many domestic and wild animals, including birds and fish. Because *L. monocytogenes* is widely present in the environment, it would be impossible to prevent animals from coming in contact with the bacteria. However, farmers, animal producers, food processors and food handlers can all take steps to reduce contamination and keep food safe from *L. monocytogenes*.

*L. monocytogenes* is not "new." Since 1911, scientists have known it infects animals, and in 1929 the first case of human infection was detected. In earlier time, many believed farm animals transmitted *L. monocytogenes* to farm workers. But when listeriosis appeared in city dwellers, public health authorities realized that animal contact was not always the source of disease transmission.

It has been only in the past decade that researchers have recognized *L. monocytogenes* as an agent of foodborne illness. Fecal contamination is one way the organism is spread to raw agricultural products. For example, farm animals may pick it up from consuming improperly fermented silage, and then vegetables may become contaminated when animal manure carrying the organism is used for fertilizer. Animals in a herd also may pick up *L. monocytogenes* from other animals or manure containing the organism.

*L. monocytogenes* is a remarkable tough organism. It resists heat, salt, nitrite and acidity much better than many organisms. The bacteria survive on cold surfaces and also can multiply *slowly* at -4°C 24°F, defeating one traditional food safety defense--refrigeration. (Refrigeration at 4°C 40°F or below stops the multiplication of many other foodborne bacteria. Refrigeration does not kill most bacteria.) Commercial freezer temperatures of -18°C 0°F, however, will stop *L. monocytogenes* from multiplying.



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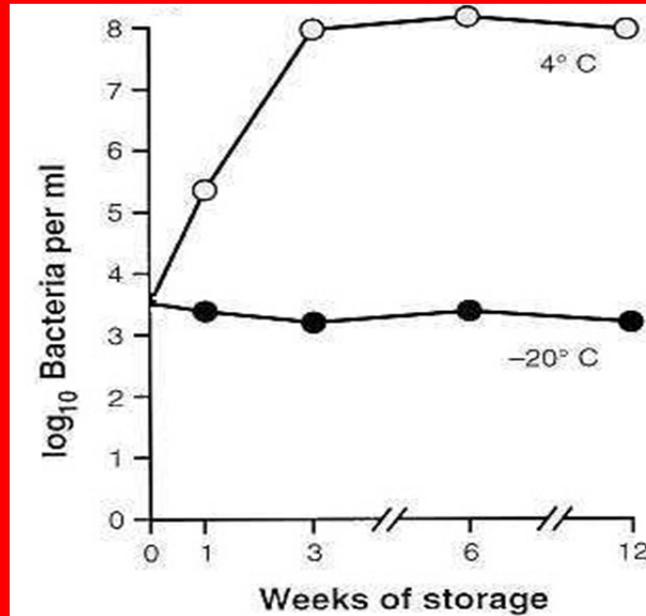


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Healthy people do not often develop noticeable listeriosis symptoms after eating food containing *L. monocytogenes*. However, some people are very susceptible to the disease.

The highest incidence of listeriosis has been in persons over 60 years old and newborns. One third of infections occur during pregnancy and may lead to spontaneous abortions or serious illness in newborns. Others most at risk include patients with immune systems compromised by cancer, AIDS, or immunosuppressive medications such as steroids; and patients suffering from cirrhosis, diabetes and ulcerative colitis. The disease symptoms are variable and depend on the individual's susceptibility. Symptoms may be limited to fever, fatigue, nausea, vomiting and diarrhea. However, these symptoms can precede a more serious illness.

The more serious forms of listeriosis can result in meningitis (brain infections) and septicemia (bacteria in the bloodstream). Pregnant women may contract flu-like symptoms of listeriosis; complications can result in miscarriage, stillbirth, or septicemia or meningitis in the newborn. In older children and adults, complications usually involve the central nervous system and blood stream, but may include pneumonia and endocarditis (inflammation of the lining of the heart and valves). Skin contact with *L. monocytogenes* can cause localized abscesses or skin lesions. It takes from one to six weeks for a serious case of listeriosis to develop, although flu-like symptoms may occur 12 hours



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after eating *L. monocytogenes*-contaminated food. Onset time probably depends on the health of the patient, the strain of *L. monocytogenes* and the dose--or amount of bacteria-- ingested.

Listeriosis can be positively diagnosed, using clinical laboratory techniques, only by culturing the organism from blood or cerebrospinal fluid. Listeriosis can be treated with antibiotic drugs such as penicillin or ampicillin.

**Hazard Analysis and Critical Control Point (HACCP) system** as the most effective strategy for controlling the presence of *L. monocytogenes* and other pathogenic bacteria on food products. In addition to encouraging adoption of this strategy by all who handle food, from farm worker to plant processor to consumer, the agencies are working with industry to design strong HACCP programs. Most of the food industry supports HACCP.

In a HACCP, points at which food risks are more likely to be introduced are identified, and interventions are introduced where control is possible to reduce the potential for consumption of unsafe products. For instance, insufficient cooking or raw meat, poultry or milk may allow the survival of pathogenic bacteria and present a hazard. Therefore, the agencies require adequate cooking temperatures to destroy the bacteria.

Areas of concern in food processing plants include plant design and layout, equipment design, process control, personnel practices, cleaning and sanitizing procedures, and verification of pathogen control.

*Listeria* bacteria do not change the taste or smell of a food. As a final check, food handlers--in homes, restaurants and institutional kitchens--must follow basic food safety procedures for destroying any potentially harmful bacteria, thereby avoiding any foodborne illness.

## **Recommendations for all Individuals:**

Although most people are at very low risk for listeriosis, the risk of listeriosis and other foodborne illnesses can be reduced by following these tips:

- Avoid raw/unpasteurized milk.
- Keep raw and cooked foods separate when shopping, preparing, cooking and storing foods. Otherwise, bacteria in juices from raw meat, poultry or fish might contaminate a cooked food. For instance, transfer cooked meat, poultry or fish to a clean platter -- never to the dish that held the raw food of animal origin.



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- Wash hands, knives, and cutting boards after handling uncooked foods.
- Wash raw vegetables thoroughly before eating.
- Thoroughly cook all food of animal origin, including eggs. Cook raw meat to an internal temperature of 71°C 160°F, raw poultry to 82°C 180°F, and raw fish to 71°C 160°F or until it is white and flaky. Reheat leftovers thoroughly.
- Read and follow label instructions to "keep refrigerated" and "use by" a certain date.
- Keep hot foods to (above 60°C 140°F). Do not keep them out for longer than two hours at room temperature - at which *L. monocytogenes* can thrive - before eating.
- Keep cold foods cold (at or below 4°C 40°F). Do not keep them out for longer than two hours at room temperature before eating.
- Divide leftovers into small, shallow covered containers before refrigerating, so that they chill rapidly and evenly.
- Keep your refrigerator *clean* and keep the temperature at 1-4°C 34-40°F.

## Recommendations to High-Risk Individuals:

Persons at increased risk for listeriosis such as pregnant women, the elderly, and those with immunosuppressive conditions can decrease the risk by:

- Avoiding soft cheese such as Mexican style, Feta, Brie, Camembert and blue cheese. Mexican-style cheeses are soft, white, ethnic (Hispanic-Latin American) cheeses such as Queso Blanco and Queso Fresco. There is no need to avoid hard cheese, processed slices, cottage cheese or yogurt.



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- Reheating leftover foods or ready-to-eat foods such as hot dogs *thoroughly* until steaming hot before eating.
- Although the risk of listeriosis associated with foods from delicatessen counters is relatively low, pregnant women and immunosuppressed persons may choose to avoid these foods or to thoroughly reheat cold cuts before eating.



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