



Listeria monocytogenes

Education

CDC/MMWR

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1. Name of the Organism:

[*Listeria monocytogenes*](#)

This is a [Gram-positive bacterium](#), motile by means of flagella. Some studies suggest that 1-10% of humans may be intestinal carriers of *L. monocytogenes*. It has been found in at least 37 mammalian species, both domestic and feral, as well as at least 17 species of birds and possibly some species of fish and shellfish. It can be isolated from soil, silage, and other environmental sources. *L. monocytogenes* is quite hardy and resists the deleterious effects of freezing, drying, and heat remarkably well for a bacterium that does not form spores. Most *L. monocytogenes* are pathogenic to some degree.

2. Name of Acute Disease:

Listeriosis is the name of the general group of disorders caused by *L. monocytogenes*.

3. Nature of Disease:

Listeriosis is clinically defined when the organism is isolated from blood, cerebrospinal fluid, or an otherwise normally sterile site (e.g. placenta, fetus).

The manifestations of listeriosis include septicemia, meningitis (or meningoencephalitis), encephalitis, and intrauterine or cervical infections in pregnant women, which may result in spontaneous abortion (2nd/3rd trimester) or stillbirth. The onset of the aforementioned disorders is usually preceded by influenza-like symptoms including persistent fever. It was reported that gastrointestinal symptoms such as nausea, vomiting, and diarrhea may precede more serious forms of listeriosis or may be the only symptoms expressed. Gastrointestinal symptoms were epidemiologically associated with use of [antacids](#) or [cimetidine](#). The onset time to serious forms of listeriosis is unknown but may range from a few days to three weeks. The onset time to gastrointestinal symptoms is unknown but is probably greater than 12 hours.

The infective dose of *L. monocytogenes* is unknown but is believed to vary with the strain and susceptibility of the victim. From cases contracted through raw or supposedly

pasteurized milk, it is safe to assume that in susceptible persons, fewer than 1,000 total organisms may cause disease. *L. monocytogenes* may invade the gastrointestinal epithelium. Once the bacterium enters the host's [monocytes](#), macrophages, or polymorphonuclear [leukocytes](#), it is bloodborne (septicemic) and can grow. Its presence intracellularly in phagocytic cells also permits access to the brain and probably transplacental migration to the fetus in pregnant women. The pathogenesis of *L. monocytogenes* centers on its ability to survive and multiply in phagocytic host cells.

4. Diagnosis of Human Illness: Listeriosis can only be positively diagnosed by culturing the organism from blood, cerebrospinal fluid, or stool (although the latter is difficult and of limited value).

5. Associated Foods: *L. monocytogenes* has been associated with such foods as raw milk, supposedly pasteurized fluid milk, cheeses (particularly soft-ripened varieties), ice cream, raw vegetables, fermented raw-meat sausages, raw and cooked poultry, raw meats (all types), and raw and smoked fish. Its ability to grow at temperatures as low as 3°C permits multiplication in refrigerated foods.

6. Frequency of the Disease: The 1987 incidence data prospectively collected by CDC suggests that there are at least 1600 cases of listeriosis with 415 deaths per year in the U.S. The vast majority of cases are sporadic, making epidemiological links to food very difficult.

7. Complications: Most healthy persons probably show no symptoms. The "complications" are the usual clinical expressions of the disease.

When listeric meningitis occurs, the overall mortality may be as high as 70%; from septicemia 50%, from perinatal/neonatal infections greater than 80%. In infections during pregnancy, the mother usually survives. Successful treatment with parenteral [penicillin](#) or [ampicillin](#) has been reported. [Trimethoprim-sulfamethoxazole](#) has been shown effective in patients allergic to penicillin.

8. Target Populations: The main target populations for listeriosis are:

- pregnant women/fetus - perinatal and neonatal infections;
- persons immunocompromised by corticosteroids,

- anticancer drugs, graft suppression therapy, [AIDS](#);
- cancer patients - leukemic patients particularly;
 - less frequently reported - diabetic, cirrhotic, asthmatic, and [ulcerative colitis](#) patients;
 - the elderly;
 - normal people--some reports suggest that normal, healthy people are at risk, although antacids or cimetidine may predispose. A listeriosis outbreak in Switzerland involving cheese suggested that healthy uncompromised individuals could develop the disease, particularly if the foodstuff was heavily contaminated with the organism.

9. Food Analysis:

The methods for analysis of food are complex and time consuming. The present FDA method, revised in September, 1990, requires 24 and 48 hours of enrichment, followed by a variety of other tests. Total time to identification is from 5 to 7 days, but the announcement of specific nonradiolabeled DNA probes should soon allow a simpler and faster confirmation of suspect isolates.

Recombinant DNA technology may even permit 2-3 day positive analysis in the future. Currently, FDA is collaborating in adapting its methodology to quantitate very low numbers of the organisms in foods.

10. Selected Outbreaks:

Outbreaks include the California episode in 1985, which was due to Mexican-style cheese and led to numerous stillbirths. As a result of this episode, FDA has been monitoring domestic and imported cheeses and has taken numerous actions to remove these products from the market when *L. monocytogenes* is found.

There have been other clustered cases, such as in Philadelphia, PA, in 1987. Specific food linkages were only made epidemiologically in this cluster.

CDC has established an epidemiological link between consumption of raw hot dogs or undercooked chicken and approximately 20% of the sporadic cases under prospective study.

For more information on recent outbreaks see the [Morbidity and Mortality Weekly Reports](#) from CDC.

11. Education:

The [FDA health alert for hispanic pregnant women](#) concerns the risk of listeriosis from soft cheeses. The CDC provides similar information [in spanish](#).

The Food Safety and Inspection Service of the U.S. Department of Agriculture has jointly produced with the FDA a [background](#) document on *Listeria* and Listeriosis. FSIS also has updated consumer information on [Listeria](#) dated February 1999.

The CDC produces an information brochure on preventing [Listeriosis](#).

12. Other Resources:

A [Loci index for genome *Listeria monocytogenes*](#) is available from GenBank.

CDC/MMWR

The CDC/MMWR link will provide a list of Morbidity and Mortality Weekly Reports at CDC relating to this organism or toxin. The date shown is the date the item was posted on the Web, not the date of the MMWR. The summary statement shown are the initial words of the overall document. The specific article of interest may be just one article or item within the overall report.

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