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Food-Borne Bacteria Causes Potentially Fatal Heart Infection

Researchers at the University of Illinois at Chicago College of Medicine have found that particular strains of a food-borne bacteria are able to invade the heart, leading to serious and difficult-to-treat heart infections.

The study is available online in the Journal of Medical Microbiology.

The bacteria *Listeria monocytogenes* is commonly found in soft cheeses and chilled ready-to-eat products. For healthy individuals, listeria infections are usually mild, but for susceptible individuals and the elderly, infection can result in serious illness, usually associated with the central nervous system, the placenta and the developing fetus.

About 10 percent of serious listeria infections involve a cardiac infection, according to Nancy Freitag, associate professor of microbiology and immunology and principle investigator on the study. These infections are difficult to treat, with more than one-third proving fatal, but have not been widely studied and are poorly understood.

Freitag and her colleagues obtained a strain of listeria that had been isolated from a patient with endocarditis, or infection of the heart.

"This looked to be an unusual strain, and the infection itself was unusual," she said. Usually with endocarditis there is bacterial growth on heart valves, but in this case the infection had invaded the cardiac muscle.

The researchers were interested in determining whether patient predisposition led to heart infection or whether something different about the strain caused it to target the heart.

They found that when they infected mice with either the cardiac isolate or a lab strain, they found 10 times as much bacteria in the hearts of mice infected with the cardiac strain. In the spleen and liver, organs that are commonly targeted by listeria, the levels of bacteria were equal in both groups of mice.

Further, the researchers found that while the lab-strain-infected group often had no heart infection at all, 90 percent of the mice infected with the cardiac strain had heart infections. The researchers obtained more strains of listeria, for a total of 10, and did the same experiment. They found that only one other strain also seemed to also target the heart.

"They infected the heart of more animals and were always infecting heart muscle and always in greater number," Freitag said. "Some strains seem to have this enhanced ability to target the heart for infection."

Freitag's team used molecular genetics and cardiac cell cultures to explore what was different about these two strains.

"These strains seem to have a better ability to invade cardiac cells," she said. The results suggest that these cardiac-associated strains display modified proteins on their surface that enable the bacteria to more easily enter cardiac cells, targeting the heart and leading to bacterial infection.

"Listeria is actually pretty common in foods," said Freitag. "And because it can grow at refrigerated temperatures, as foods are being produced with a longer and longer shelf life, listeria infection may become more common. In combination with an aging population that is more susceptible to serious infection, it's important that we learn all we can about these deadly infections."

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