

New study reveals hypervirulent Listeria strains and emerging clones

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Sophia Kathariou (right) with students Sangmi Lee (left) and Shakir Ratani (center). Credit: North Carolina State University

Listeria monocytogenes is a major cause of severe foodborne illness in the United States. But recent research at NC State indicates that not all strains of the bacteria are equally virulent.

A team led by Sophia Kathariou, professor of food science and



microbiology, found that certain Listeria strain groups, or clones, acquired unique genetic determinants associated with hypervirulence – unusually high propensity to cause disease – and one of these clones has been responsible for three listeriosis outbreaks since 2014, all traced to <u>fresh produce</u>.

"We looked in depth into especially problematic groups of Listeria, and we wanted to know if we could identify <u>strains</u> that are more prone to be found in <u>human disease</u> than others," Kathariou says. "We examined Listeria from various sources such as food and food processing environments, human disease, other animals and the natural <u>environment</u> such as soil and water."

The study will provide baseline data critical for the development of targeted strategies to reduce food safety threats associated with Listeria-contaminated produce and other ready-to-eat foods.

Kathariou describes Listeria as "really problematic" because after ingestion through contaminated food it quickly leaves the gut and enters the bloodstream, becoming an invasive organism.

In people who are at risk (pregnant women, the elderly and immunosuppressed patients) Listeria can spread to the placenta in the case of pregnancy, causing abortions and stillbirths, or to the central nervous system, causing meningitis. That's a big part of the reason why she and her team have been working to further understand the ecology and virulence of Listeria and eventually help eliminate it from food processing environments.

"Once it gets a foothold in the food processing plant or in a produce packing shed, it's really a bear of a job to get rid of it," she says. Once Listeria is established there it can transfer from the processing environment and equipment to foods, and thus can re-contaminate



products that have been already cooked.

After partitioning the Listeria population by its sources, Kathariou's team, which included collaborators from United States Department of Agriculture-Agricultural Research Service and the Food and Drug Administration, found that there was at least one major group of Listeria that was strongly underrepresented in food in comparison to how often you find it in human disease, "which means that <u>food</u> products that are contaminated with that hypervirulent strain are more likely to cause disease," she says.

Kathariou's team also found that when you look at the whole Listeria population, there are several novel clones that seem to be emerging in North America.

More information: Molecular Mechanisms for Interactions Between Listeria Monocytogenes and Produce. <u>portal.nifa.usda.gov/web/crisp ...</u> <u>nes-and-produce.html</u>

Provided by North Carolina State University

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