Researchers find way to reduce E. coli in cows, improving food safety

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A new biological treatment could help dairy cattle stave off uterine diseases and eventually may help improve food safety for humans, a University of Florida study shows.

Kwang Cheol Jeong, an assistant professor in animal sciences and UF's Emerging Pathogens Institute, examined cattle uterine illnesses because they can make cows infertile, lower milk production and because those maladies are often linked to bacteria, he said. The UF researchers did their experiments in labs and at the Dairy Unit on the Gainesville campus.

Jeong and his research team infused chitosan microparticles—an antimicrobial material derived from dissolved shrimp shells—into diseased cow uteri. When bought in stores, chitosan can be used to treat many ailments from obesity to anemia. On its own, chitosan only works at acidic pH levels, Jeong said. For cattle, Jeong's team developed chitosan microparticles, which work in acidic and neutral pH, because cattle uteri have a neutral pH.

The study's findings suggest chitosan microparticles kill bacteria in the uteri, he said. Jeong said it may someday be possible for chitosan microparticles to be used to help humans who have become ill from consuming E. coli-contaminated food, but more research is needed.

Developing a new antimicrobial agent is critical to human and animal health, said Jeong, a member of UF's Institute of Food and Agricultural

Sciences.

"Dangerous infections are diminishing the role of some antibiotics, making them less able to treat infections, as pathogens are developing resistance to the drugs," he said, adding that about 23,000 people die in the U.S. annually because of exposure to pathogens that don't respond to antibiotics.

Once bacteria become resistant, whether on farms, hospitals or in the environment, they can infect humans, through water, food or contact with contaminated feces, Jeong said.

Further, some antibiotics used to treat humans and animals kill good and bad bacteria. Scientists can use the UF study's findings to begin to develop better drugs that target bad pathogens but leave beneficial bacteria, Jeong said.

E. coli are everywhere, including the human gut, but can contaminate beef, unpasteurized milk, soft cheeses made from raw milk and raw fruits and vegetables that haven't been washed properly.

The most recent outbreak of meat-traced E. coli was in 2010, according to the Centers for Disease Control and Prevention. That year, 21 people in 16 states fell ill from the pathogen, including one in Florida, the agency reported. A foodborne "outbreak" happens when two or more people get the same illness from the same contaminated food or drink, the CDC says.

Jeong's latest study was published online March 21 by the journal *PLoS ONE*. Jeong co-wrote the paper with Soo Jin Jeon, a doctoral student in the UF animal sciences department and Klibs Galvao, an assistant professor in the large animal clinical sciences department at UF's College of Veterinary Medicine.

Provided by University of Florida