

Researchers look to 'good' stomach bacteria to help poultry fend off salmonella

March 4 2013, by Renee Elder

A team of scientists in Raleigh and Chapel Hill is working to achieve a salmonella-free line of poultry by manipulating bacteria that live in the intestines of chickens.

Researchers will try to identify microscopic elements in the bird's intestines that might fend off salmonella and then encourage those "good" bacteria to flourish, said Matthew Koci, associate professor in the Department of [Poultry Science](#) at N.C. State University.

"We will be looking to see if there are bugs in the chickens' gut that can exclude salmonella, and therefore lower the risk they will carry a food-borne disease," Koci said.

The attempt to create a salmonella-free chicken stems from research in microbiomes - or the set of bacteria, viruses and fungi that populate the [intestines](#) of animals, including humans. Microbiomes can influence a wide range of [health factors](#), from [disease resistance](#) to digestion.

Uncooked [poultry](#), meat and [raw eggs](#) are major sources of salmonella infection. There are about 42,000 cases of [salmonella infections](#) reported each year in the United States, though the actual number is probably many times that because mild cases are typically not reported. About 400 people in the United States die from salmonella infections each year.

Vaccines now available can halt development of salmonella in chickens,

but questions remain about their effectiveness, Koci said.

"From our project, we hope to learn how changing the [microbiota](#) can improve vaccination or even eliminate the need for the salmonella vaccine all together," he added.

The scientists also will explore why chickens can have [salmonella bacteria](#) in their stomach and yet not suffer any adverse affects themselves.

"Poultry don't get sick from salmonella," said Hosni Hassan, professor of microbiology at NCSU and the project's lead researcher. "But when we eat the chicken, we get sick. We want to know how the microbiome of the chickens allows salmonella to survive there happily."

The research on poultry is taking place at the Dearstyne Avian Health Center at NCSU, where about 200 day-old chickens arrived last week. Researchers at the center will collect "poop samples" from the chickens weekly and send them to the microbiologists for study, Koci said.

The bacteria analysis is being done at the Microbiome Core Facility at UNC's School of Medicine by facility director Andrea Azcarate-Peril and research associate Maria Belen Cadenas.

Their mission, Cadenas said, is to evaluate [chickens](#) that are fed regular diets, those fed diets supplemented with bacteria-enhancing substances and those who have been given the salmonella vaccine. The resulting data is expected to help identify specific bacterial species that cause an increased resistance to salmonella.

"There are many bacteria, especially in the intestinal tract, that are beneficial," Cadenas added.

The work is funded by a \$2.5 million U.S. Department of Agriculture grant that also includes a health-education component for a new food-safety curriculum for North Carolina schools.

"We are looking at the project two ways, in terms of eliminating salmonella from the poultry and educating a new generation about how to handle food," Hassan said.

The project is funded through June 2017. And while it might take longer to come up with a [salmonella](#)-free chicken, food-borne disease can be reduced in the meantime through development of a new food-safety curriculum, Koci said.

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