

Study finds healthy intestinal bacteria within chicken eggs

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The conventional wisdom among scientists has long been that birds acquire the intestinal bacteria that are a necessary for good health from their environment, but a new University of Georgia study finds that chickens are actually born with those bacteria.

Lead author Adriana Pedroso said the finding, presented at the 108th General Meeting of the American Society for Microbiology in Boston, could have important implications for the poultry industry and for food safety.

“Understanding the microbial ecology of the developing chicken is the first step toward producing healthy birds without antibiotics,” said Pedroso, a post-doctoral researcher in the UGA College of Veterinary Medicine.

Pedroso and her colleagues incubated more than 300 eggs and dipped them into a light bleach solution before extracting the embryos using sterile tools. DNA analysis revealed a diverse community of bacteria within the intestines of the developing embryos. Pedroso and her colleagues hypothesize that the bacteria penetrate the surface of the shell to the egg white, which is then ingested by the developing embryo.

Study co-author John Maurer, professor of avian medicine, said the findings could lead to better methods for promoting growth of poultry and for reducing the risk of food borne illness. He explained that as the poultry industry has moved away from the use of growth promoting

antibiotics in recent years, it increasingly relies on administering probiotics – beneficial intestinal bacteria – to newly hatched chicks. Establishing a community of healthy bacteria in the birds is thought to make it more difficult for pathogenic bacteria to establish themselves, but studies on the effectiveness of probiotics have shown mixed results. Maurer said it appears now that the timing of probiotic administration is important.

“Currently, most probiotics are administered after the chicks have hatched,” Maurer said. “But our study suggest we might need to administer probiotics in ovo (in the egg) to get better results.”

The idea that embryos are sterile in the egg and that chicks acquire their intestinal bacteria after hatching goes back to the 1960s, when early experiments using bacterial cultures – often Petri dishes with a growth medium – failed to grow any bacteria. Newer DNA techniques such as those Pedroso and her colleagues used are much more sensitive, however, and aren’t influenced by how well a bacterium grows in a dish.

“Previous assumptions were based on the use of cell cultures,” Pedroso said, “but we now know that only 1 percent of bacteria in the biosphere can be cultured.”

Source: American Society for Microbiology

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