

Newly discovered reservoir of antibiotic resistance genes

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Waters polluted by the ordure of pigs, poultry, or cattle represent a reservoir of antibiotic resistance genes, both known and potentially novel. These resistance genes can be spread among different bacterial species by bacteriophage, bacteria-infecting viruses, according to a paper in the October *Antimicrobial Agents and Chemotherapy*.

“We found great quantities of bacteriophages carrying different [antibiotic resistance genes](#) in waters with fecal pollution from pigs, cattle, and [poultry](#),” says Maite Muniesa of the University of Barcelona, Spain, an author on the study. “We demonstrated that the genes carried by the phages were able to generate resistance to a given antibiotic when introduced into other bacteria in laboratory conditions,” says Muniesa.

Although we often think of antibiotic resistance genes as evolving into existence in response to the antibiotics that doctors use to fight human disease and that agribusiness uses to fatten farm animals, microbes had undoubtedly been using both antibiotics and resistance genes to compete with each other for millions of years before antibiotics revolutionized human medicine and resistance genes threatened their efficacy to the point where the World Health Organization considers them to be one of the biggest risks to human health.

Thus, the Spanish researchers suspect, based on their study, that these resistance gene reservoirs are the product of microbial competition, rather than pressure from human use of antibiotics. They note that the pasture-fed cattle in their study are not fed antibiotics, and they suggest

that even if antibiotic feed additives were banned, new resistance genes might emerge while old ones spread from these reservoirs into bacteria that infect humans.

And if resistance genes are being mobilized from these reservoirs, it becomes important to understand how the resistance genes are transmitted from phage to new [bacterial species](#), in order to develop strategies that could hinder this transmission, limiting the emergence of new resistance genes, says Muniesa.

More information: M. Colomer-Lluch, et al., 2011. Bacteriophages carrying antibiotic resistance genes in fecal waste from cattle, pigs, and poultry. *Antim. Agents Chemother.* 55:4908-4911.

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