Genetic study of bacteria in livestock in China shows growing resistance to antibiotics

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An international team of researchers has found via genetic study of bacteria in livestock that there is a growing resistance to antibiotics used in China. In their paper published in the journal Nature Food, the group describes their whole-genome analysis of Escherichia coli samples collected from a large number of pigs, chickens, cattle and sheep raised in China between the years 1970 and 2019. They looked for genes that confer resistance to several commonly used antibiotics. They also explain why they believe their findings show China and other countries need to find new ways to battle bacterial infections in both humans and animals. Claire Heffernan, with the London International Development Centre, published a News & Views piece in the same journal issue outlining the history of antibiotics use in agriculture and the work done by the team in this new effort.

In recent years, scientists around the world have been sounding the alarm about growing resistance to the antibiotics used to treat human infections. But the problem involves animals, as well. As Heffernan notes, approximately two-thirds of the antibiotics administered each year are used in agriculture, most particularly, livestock. In this new effort, the researchers wondered what impact such use might be having on the development of resistance to the antibiotics to prevent or treat bacterial infections such as E. coli.

To find out, the researchers obtained 986 samples of the bacteria from livestock collected by entities in China over the past half-century and subjected them to whole-genome analysis, looking specifically for changes to genes that might confer resistance to antibacterial agents. They found evidence of a slowly developing resistance to antibiotics against E. coli in all of the types of livestock studied. The overall rise is steep, suggesting that soon, antibiotics will no longer be effective in protecting livestock. The researchers also tested the susceptibility of recent E. coli strains to several antibiotics and found that overall, they were far more resistant than strains from the 1970s. They also note that because the same antibiotics are used to treat the same bacteria, the steep rise in resistance applies to use in humans as well.


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