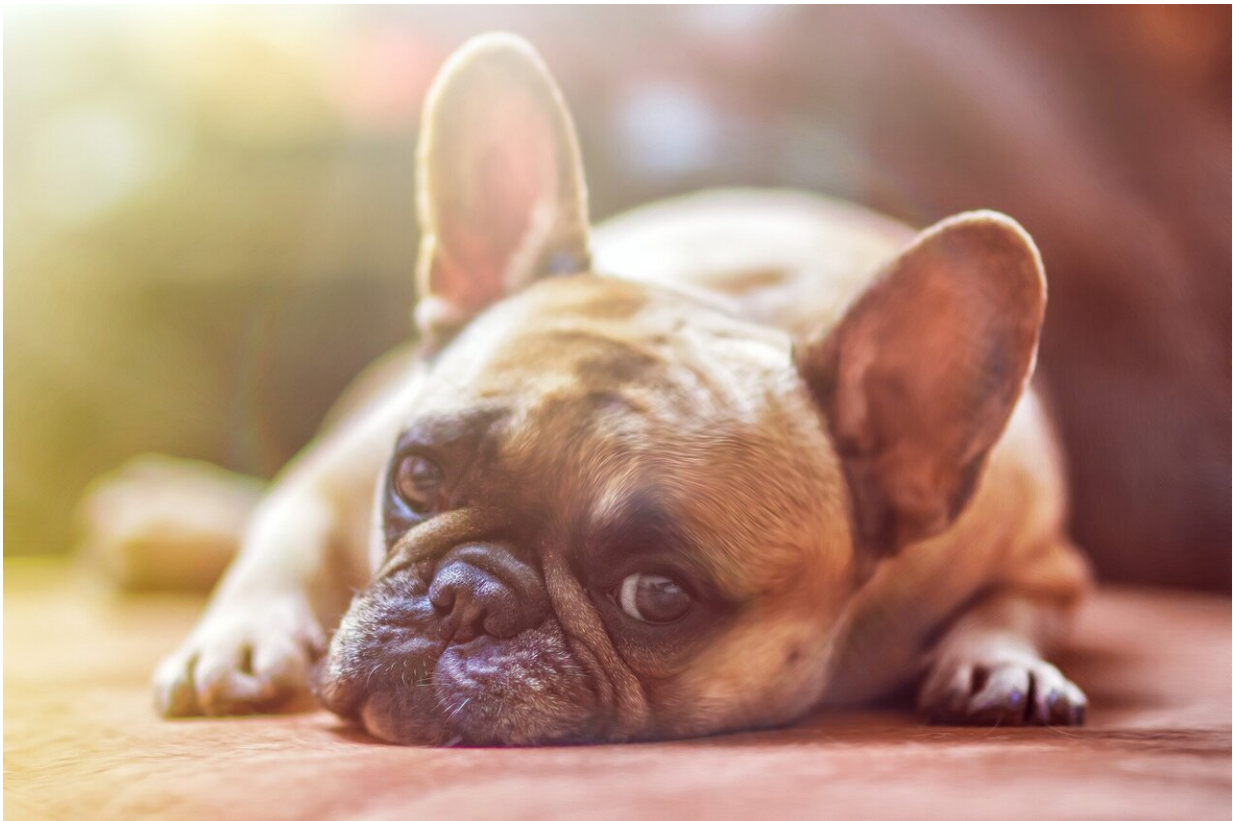


Study identifies last-line antibiotic resistance in humans and pet dog

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New research due to be presented at this year's European Congress of Clinical Microbiology and Infectious Diseases (ECCMID) has identified the dangerous *mcr-1* gene -which provides resistance to the last line

antibiotic colistin—in two healthy humans and a pet dog. The study is by Dr. Juliana Menezes and Professor Constança Pomba from the Centre of Interdisciplinary Investigation of Animal Health of the Faculty of Veterinary Medicine, University of Lisbon, Portugal, and colleagues, and is part of the Pet Risk Consortium Project funded by the Portuguese Government.

Since first being reported in China in 2015, the *mcr-1* gene has been found in various people and animals around the world. It confers resistance to colistin, which is an antibiotic of last resort used to treat infections from bacteria resistant to all other antibiotics. The nightmare scenario that could emerge is *mcr-1* combining with already drug resistant bacteria to create a truly untreatable [infection](#). Other [genes](#) in the same group (*mcr-2* to *mcr-9*) have since been identified which act in a similar manner.

In this study, the authors investigated resistance to colistin in the faecal samples of [human](#) and pets in Portugal. Between February 2018 and October 2019, faecal samples were collected from cats and [dogs](#) and their human household members. Genetic analysis was carried to establish the presence of five colistin resistance genes (*mcr-1* to *mcr-5*).

The 70 households enrolled from the Lisbon region included healthy humans (n=106) living with healthy pets (n=49) and pets with skin and soft tissue infections (SSTI) (n=19) and urinary tract infections (UTI) (n=16). Of these, 95 faecal samples (89.6%) from humans, 45 from dogs (healthy-23, SSTIs-14 and UTI-8) and 21 from cats (healthy-18 and UTI-3), were positive for *E. coli*.

Further analysis showed colistin resistance in 5 out of the 161 isolates (3%), three from healthy humans and two from dogs with skin infections. Molecular analysis revealed that three of the *E. coli* isolates carried the *mcr-1* gene, from two healthy humans and one from a dog

with skin infection, all from different households. The two remaining isolates resistant to colistin (one from a healthy human and one from a dog with a skin infection), did not test positive for the *mcr-1* to *mcr-5* genes, and will now be screened for the other *mcr-6* to *mcr-9* genetic variants.

The isolates found in the faecal samples were not causing infections in humans, hence no specific treatment was recommended for them. Only the sick dog received oral amoxicillin in combination with clavulanic acid for the treatment of the skin infection.

The authors say: "To our knowledge, this is the first report of the presence of the *mcr-1* gene from either a dog and or in healthy humans in Portugal. Further studies are needed to determine the full epidemiology of colistin resistance genes in humans and companion animals."

They add: "These humans and dogs, if in direct contact, may transmit bacteria containing the [mcr-1 gene](#) to other humans, dogs, other animals and the environment and potentially be a hazard for public health. The situation we all want to avoid at all costs is any infection totally resistant to all antibiotics, caused by bacteria already resistant to most other antibiotics also acquiring this colistin resistance gene."

Provided by European Society of Clinical Microbiology and Infectious Diseases

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