

ZOOZOSES

Emerging infectious agents in game animal viromes

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Game animal trade and consumption can provide pathways for zoonotic pathogens to reach human populations. Surveillance and early detection of emerging zoonotic infectious agents is an important strategy for preventing future epidemics and pandemics. Since the emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), little attention has been paid to game animals beyond bats and pangolins. Now, Wan-Ting He and colleagues from Nanjing Agricultural University have investigated the viromes of 18 species of game animals in China.

He and colleagues collected nearly 2,000 nasal, faecal and tissue samples from game animals commonly traded and consumed as exotic foods in China. The majority of samples were collected from game breeding and wild sites after February 2020, coinciding with the COVID-19 pandemic. Using metagenomics techniques, they identified 102 virus species from 13 different viral families — including 65 viruses that had not been previously described. Although many viruses were detected in sick animals,

healthy animals also harboured viruses with zoonotic potential.

Civets had the highest number of potentially high-risk viruses, followed by porcupines, coypus, bamboo rats, raccoon dogs and Malayan pangolins. While some viruses were geographically clustered, *Influenza A* strain H9N2 (an avian influenza virus), *Alphacoronavirus 1* and *Rotavirus A* (both causing gastroenteritis) were prevalent in geographically distal provinces and displayed similar genomic signatures across multiple libraries within the same or different species. He and colleagues classified these viruses and a further 18 viruses as high risk, indicating increased risk for zoonotic potential and/or tendency to jump species barriers — posing a threat to workers and consumers across the game animal supply chain.

Interestingly, no severe acute respiratory syndrome (SARS)-like viruses were detected in the samples. However, evidence of bat coronavirus transmission to civets (*Miniopterus* bat CoV-HKU8) and hedgehogs (*Erinaceus amurensis* hedgehog coronavirus HKU31, Ea-HedCoV HKU31) adds to evidence that game animals may present a route for viruses to move from bats to humans. Through this characterization of game animal viromes, He and colleagues provide important insights into zoonotic viruses — underlining the importance of virus surveillance alongside other food-system-scale measures for preventing future epidemics and pandemics.

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