ONE HEALTH

Coronaviruses in rat and bat meat supply chains

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COVID-19 has brought wild animals' interaction with food systems into the spotlight — wildlife trade supply chains may inadvertently facilitate the emergence, spillover and amplification of coronaviruses. In many parts of Vietnam and Cambodia, humans and animals consume wild-caught and farmed bat meat. The demand for rat meat has increased since the early 2000s due to positive public opinion, particularly amongst affluent restaurant consumers. Nguyen Quynh Huong, from the Wildlife Conservation Society, Vietnam, and colleagues have now surveyed the presence and diversity of coronaviruses from rat and bat meats in the Mekong Delta region.

From January 2013 to March 2014, Huong and colleagues selected and sampled 70 sites where live rats were traded, rat farms, bat guano farms and one natural bat roost location. They collected a total of 2,164 samples of oral swabs and internal organ tissue from slaughtered rats, oral or faecal swabs from live bats and environmental swabs from animal enclosures, then sequenced and identified coronavirus variants.

Coronaviruses were detected at 58 out of 70 test locations. Samples from all live rat trade sites tested positive for coronaviruses — restaurants represented 55% of these sites. Ninety-four per cent of bat guano farms

were coronavirus-positive; bats in a natural bat roost had more positive tests during the wet season (May–October) than the dry season (27% compared to 2%), indicating that seasonal spread is likely. To assess coronavirus diversity, Huong and colleagues constructed a phylogenetic tree of rat and bat coronaviruses, identifying 17 distinct strains. When looking at coronavirus distribution, they found star-like network topologies and a shallow geographic structure of one coronavirus (512/2005) with two sequence types shared between bats and rats, demonstrating that these strains spread across different localities and species.

The authors noted that contact between rats, bats and other farm animals was common. Farmers' and their families frequently came into contact with coronavirus-positive material like faeces and urine, increasing zoonotic risk. One Health education and virus testing for all people involved in the food supply chain is crucial for food production systems such as those described here to be sustainable and support global health.

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