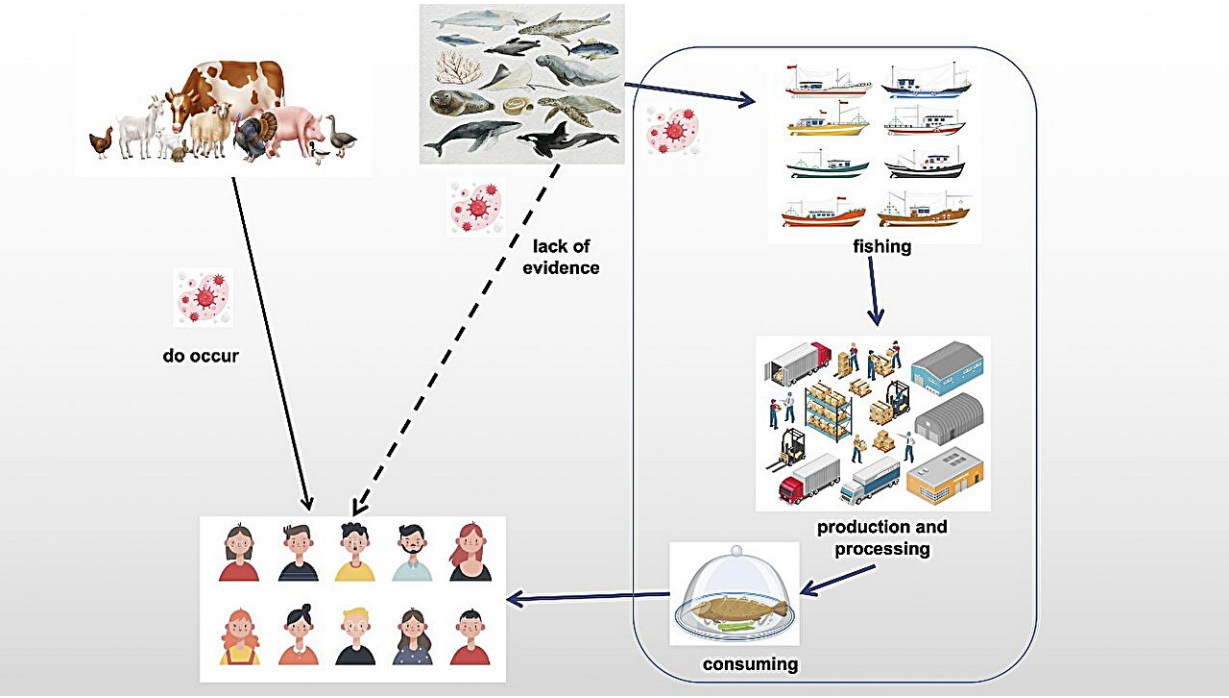
Safety of aquatic animals as human protein sources amid SARS-CoV-2 concerns

December 29 2023



Potential routes of virus transmission from aquatic animals to humans. Credit: *Reproduction and Breeding* (2023). DOI: 10.1016/j.repbre.2023.09.002

Aquatic animals have historically constituted a vital and nutritious dietary component for humans, contributing to nearly 20% of animal protein intake for approximately 3.3 billion people. Unlike terrestrial animals, there has been no evidence indicating that aquatic animals serve as reservoirs for zoonotic viruses. However, multiple cases of SARS-

CoV-2 from cold-chain aquatic food and environmental samples have evoked worldwide concerns, despite the incidence being notably lower than that associated with poultry and livestock.

In a recent study published in the journal *Reproduction and Breeding*, a team of researchers from China and Canada developed a virus-mining pipeline to evaluate the risk of infections by aquatic animals.

The initial phase involved screening publicly available databases to gather transcriptomic and genomic data from commonly consumed aquatic species. This effort resulted in the acquisition of RNA-seq libraries of 70 aquatic species and reference genomes of 55 aquatic species. Human respiratory and intestine-related virus genomic sequences, such as coronavirus and influenza virus, were downloaded and used to build a virus reference genome pool. Two strategies were adopted to map the aquatic animals' transcriptomes onto the genomes of human respiratory- and intestine-related viruses.

"Positive hints occurred in all positive control groups, which confirms the reliability of our pipeline," explains senior and co-corresponding author Jing Luo, a professor in State Key Laboratory for Conservation and Utilization of Bio-resource at Yunnan University. "Besides, both mapping strategies identified fragments of Influenza A Virus from a salmon skin sample. This fragment could result from either contamination during sampling, or an IAV infection of fish, but no similar viral fragment exists in the transcriptomes of other tissues of the same S. salar sample."

The researchers recovered and verified this human-associated viral fragment through de novo assembly and phylogenetic analysis. The results show high homology between the fragment and human IAV (H7N9).

"We believe that the fragment most likely came from sample contamination by human handling rather than viral infection," adds Luo. "Apart from this false-positive result, analyses fail to find any human-associated viruses in the other aquatic animal transcriptomes."

Multiple recent cases of SARS-CoV-2 have shown that cold-chain food and environmental contamination play a role in the spread of SARS-CoV-2, but through human contamination. In addressing that, the team concluded that aquatic animals are safe sources of protein for humans, albeit under the caveat of safe processing and storage. "Therefore, the processing of frozen aquatic animal products is critical to controlling the spread of the virus, and this should be carefully monitored," said Luo.

More information: Yuan Chen et al, Transcriptome analysis confirms aquatic animals have less risk by carrying on human respiratory viruses, *Reproduction and Breeding* (2023). DOI: 10.1016/j.repbre.2023.09.002

Provided by KeAi Communications Co.