Research reveals novel herpesvirus in South American pinnipeds

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New research in *PLOS ONE* uncovers an important discovery in the study of marine mammal health by being the first study to detect Otariid gammaherpesvirus 1 (OtGHV1) in free-ranging South American

pinnipeds, as well as a novel herpesvirus Otariid gammaherpesvirus 8 (OtGHV8) in South American sea lions (Otaria byronia) in the Southern Hemisphere.

These findings shed new light on the spread and variety of these types of viruses among pinnipeds and underscore the importance of continued research into the impact these emerging, infectious pathogens have on animal health and ecosystem dynamics in this and similar aquatic systems. Veterinarians and researchers at Brookfield Zoo Chicago, Programa Punta San Juan, Shedd Aquarium, University of Illinois Wildlife Epidemiology Lab, University of Florida, in-country partners, and others conducted the study in Punta San Juan, Peru.

Given the scarce information on pinniped populations in the South Pacific, sampling pinnipeds in Peru provided researchers an opportunity to detect and characterize the epidemiology of herpesviruses in the region. OtGHV1 is well documented in California sea lions (Zalophus californianus) in the Northern Hemisphere and is associated with high rates of urogenital (bladder, kidney, prostate, and other urinary tract) cancer.

While northern fur seals have overlapping geographic ranges in California, the virus and cancer have not been identified despite large-scale surveillance. Through swabs and quantitative PCR testing, the researchers not only detected OtGHV1, but they also identified an unexpected, novel herpesvirus OtGHV8 in wild pinniped in the Southern Hemisphere.

"This discovery marks a significant advancement in our understanding of herpesvirus diversity and distribution in marine mammals," said Dr. Matt Allender, co-author on the study, director of conservation medicine and science at Brookfield Zoo Chicago, and director of the University of Illinois Wildlife Epidemiology Laboratory. "Further, the identification

of OtGHV8 underscores the complexity of viral ecology in pinniped populations and emphasizes the need for continued research into the health of these animals."

Given the phylogenetic relationships between the different viruses, and how herpesviruses interact differently with their definitive and aberrant hosts, there is a chance that South American fur seals (Arctocephalus australis) could be the original endemic host for OtGHV1 since there is no evidence of urogenital cancer in wild populations in Peru.

In general, herpesviruses tend to cause minimal clinical disease in their host species but are more likely to result in severe disease in aberrant hosts. The complex nature of the host, environment, and evolutionary pressures on herpesviruses requires further investigation in this population.

The Punta San Juan marine protected area guards critical rookeries or breeding colonies for the two pinniped species considered endangered by the Peruvian government—both the South American sea lions and fur seals. South American pinniped populations have experienced declines related to hunting, habitat encroachment, overfishing, and pollution.

"If we can identify pathogen threats and understand how it might interact with others, differ, or crossover, then we can hopefully strengthen the response of intervention and minimize impacts of disease in this declining population of pinnipeds," said Dr. Karisa Tang, a co-author on the study and vice president of animal health at Shedd Aquarium.

"These types of health assessments for species or ecosystems can help inform future conservation action for marine life, can add justification for protection, and can help describe how a changing environment may be associated with changing patterns of disease."

Research and fieldwork advance aquatic animal care knowledge, processes and innovation. Shedd Aquarium, Brookfield Zoo Chicago, and University of Illinois provide advanced training to veterinarians who aspire to careers as specialists in zoo and aquarium clinical medicine through the Illinois Zoological and Aquatic Animal Residency (IZAAR) Program. Dr. Tang participated in the study, also the subject of her master's thesis, during her residency through the IZAAR program.

More information: Karisa N. Tang et al, Otariid gammaherpesvirus 1 in South American fur seals (Arctocephalus australis) and a novel related herpesvirus in free-ranging South American sea lions (Otaria byronia): Prevalence and effects of age, sex, and sample type, *PLOS ONE* (2024). DOI: 10.1371/journal.pone.0299404

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