

PROGRAM ACTIVITY REPORT (PAR)



Cross-Species Transmission of Parvoviruses

Parvoviruses are non-enveloped single stranded DNA viruses that infect fast replicating tissues like bone marrow or lower gastrointestinal tract tissues. These viruses are commonly described in domestic carnivores, but little is known about their biodiversity in non-domestic species. Cornell University is collaborating with the NWDP and other entities to describe the phylogenetic analysis of the VP2 gene sequences from puma, coyote, gray wolf, bobcat, raccoon, and striped skunk; results have revealed two major groups related to either feline panleukopenia virus (“feline parvovirus-like”) or canine parvovirus (“canine parvovirus-like”).

The VP2 gene encodes for the main structural VP2 protein of the parvovirus capsid. This analysis, which was published in the February edition of the *Journal of Virology*, demonstrates that cross-species transmission was commonplace. Furthermore, interspecific transmission likely occurred with multiple introductions into each host species and, with the exception of raccoons, relatively little evidence was found for onward transmission in wild species.

Early studies suggested that canine parvovirus in dogs was directly



derived from a feline parvovirus in a domestic cat. However, the diverse range of parvoviruses in other carnivore species suggests domestic cats may not have been the source of virus that emerged in dogs in the late 1970s. Additionally, phylogenetic analysis shows that the feline and canine parvovirus clades are separated by a relatively long branch, and there is no obvious ancestral virus of the canine parvoviruses. Molecular dating analysis suggests that both clades have been evolving independently for part of the last century, although their ultimate

origins, particularly the animal species from which they are derived, are unclear.

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or refer to the publication:

[Allison, A. B., D. J. Kohler, K. A. Fox, J. D. Brown, R. W. Gerhold, V. I. Shearn-Bochsler, E. J. Dubovi, C. R. Parrish, and E. C. Holmes. 2013. Frequent cross-species transmission of parvoviruses among diverse carnivore hosts. *Journal of Virology* 87:2342-2347.](#)

The original artwork on this page was created by the National Wildlife Disease Program's Erika Kampe and Sarah Goff