University of Prince Edward Island

Faculty of Veterinary Medicine
Summary of Dissertation

Submitted in Partial Fulfilment
of the Requirements for the

DEGREE OF MASTER OF VETERINARY SCIENCE

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Development of a PCR assay to detect skunk adenovirus 1 in free-ranging striped skunks (Mephitis mephitis) in Prince Edward Island, Canada

Skunk adenovirus-1 (SkAdV-1) was first discovered in a striped skunk in Ontario, Canada in 2015. It has since been documented causing disease in a wide range of free-ranging wildlife including North American porcupines, a grey fox, and captive exotic species including pygmy marmosets and African pygmy hedgehogs. Skunks infected with SkAdV-1 most often have clinical signs of weakness and lethargy or are found dead. Infected skunks typically have microscopic lesions of bronchopneumonia, tracheitis, rhinitis and hepatitis with large intranuclear viral inclusions. A specific diagnostic test to identify SkAdV-1 is not widely available, which makes it difficult to determine prevalence of the virus as well as understanding its significance as a pathogen. The objectives of this project were first, to develop a PCR assay to detect SkAdV-1 in free ranging skunks from Prince Edward Island and second, to perform targeted surveillance for SkAdV-1 in this population. An additional aim of this project was to perform a necropsy-based health survey of skunks on PEI. Primers were designed and tested against SkAdv-1, generating amplicons 100 % identical to the published SkAdv-1 genome. Necropsy was performed on 80 skunks. Of these, 1 tested positive for SkAdv-1 using the newly developed PCR. Respiratory lesions were most frequently found (n = 25). The results of this study suggest that respiratory disease is common in striped skunks, but that SkAdv-1 may have a low prevalence in PEI skunks.

Publications:

Alkie TN, Cox S, Embury-Hyatt C, Stevens B, Pople N, Pybus MJ, Xu W, Hisanaga T, Suderman M, Koziuk J, Kruczkiewicz P, Nguyen HH, Fisher M, Lung O, Erdelyan CNG, Hochman O, Ojkic D, Yason C, Bravo-Araya M, Bourque L, Bollinger TK, Soos C, Giacinti J, Provencher J, Ogilvie S, Clark A, MacPhee R, Parsons GJ, Eaglesome H, Gilbert S, Saboraki K, Davis R, Jerao A, Ginn M, Jones MEB, Berhane Y. Characterization of neurotropic HPAI H5N1 viruses with novel genome constellations and mammalian adaptive mutations in free-living mesocarnivores in Canada. Emerg Microbes Infect. 2023 Dec;12(1):2186608.do i0.1080/22221751.2023.2186608. PMID: 36880345; PMCID: PMC10026807.

Presentations

1. Pathologic findings in 11 striped skunks diagnosed with highly pathogenic avian influenza virus from Prince Edward Island, Canada October 31, 2023 Amanda Clark, Laura Bourque, Russell S. Fraser, Megan E.B. Jones Annual Meeting of the American College of Veterinary Pathologists / Society for Veterinary Clinical Pathology Chicago, Illinois, United States of America

2. Less common diseases of uncommon species Shannon Martinson, Amanda Clark October 17, 2022 AVC Zoo, Exotic and Wildlife Medicine Club lunch lecture

3. Erosive bronchopneumonia and tracheitis in a striped skunk (Mephitis mephitis) Amanda Clark, Laura Bourque, Megan E.B. Jones, Stephen Raverty October 10, 2021 American Association of Zoo Veterinarians (AAZV) 28th Annual Zoo and Wildlife Pathology Workshop (virtual)

Biographical Data

Born in Boston, Massachusetts

Awards

Dr. A. Harris Mosher Award, Veterinary Scholarship Trust of New England March 2024

Davis-Thompson Foundation’s Pathology Trainee and Scholarship Award September 2023

Atlantic Provinces Diagnostic Services Award March 2021

Oscar and Piper Honeyman Yarrow Award March 2021

American College of Veterinary Pathologists Award for Excellence in Veterinary Pathology March 2021