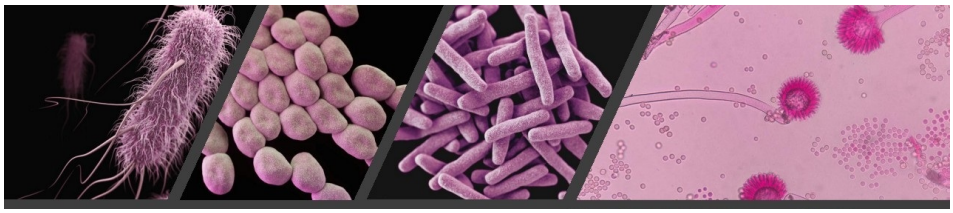

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A defective canine distemper virus strain responsible for CNS disease in a Eurasian Lynx shares key phenotypic traits with measles virus strains associated with SSPE in humans

Thursday 11 September 2025 16:30 (15 minutes)

Canine distemper virus (CDV) can cause chronic central nervous system (CNS) infections such as old dog encephalitis with parallels to subacute sclerosing panencephalitis (SSPE) in humans. However, it has not been possible to correlate such clinical manifestations to viral molecular determinants. The complete genome sequence of a CDV strain (CDV-lynx) previously identified in the brain of a Eurasian lynx was obtained by next generation sequencing. Sequence analysis showed unique amino acid (aa) changes in all viral proteins, including a premature stop codon in the matrix protein, four aa changes in the F protein and several additional changes in other proteins. A recombinant (r) CDV-lynx-EGFP was rescued, and several gene-swap constructs were generated with a closely related rCDV-Raccoon-EGFP with the resulting recombinant viruses used to study virus infection of immune cells and organotypic ferret brain slices. The CDV-lynx F protein was hyperfusogenic in cell fusion assays as fusion was observed in receptor negative Vero cells. A single aa change (P479A) could abrogate cell fusion in Vero cells. Furthermore, a significant reduction in the entry of VSV pseudotyped with CDV-lynx glycoproteins into Vero-Dog-SLAM cells was observed. Our data show an animal morbillivirus acquired a hyper-fusogenic phenotype and defective matrix protein expression following long-term CNS infection, findings that are strikingly homologous to the phenotype of SSPE strains of measles virus.

Keywords

Virus, canine distemper virus, central nervous system, lynx, matrix protein, fusion protein

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