Zoonotic Virus Seroprevalence among Bank Voles, Poland, 2002–2010

Maciej Grzybek, Tarja Sironen, Sanna Mäki, Katarzyna Tolkacz, Mohammed Alasarraf, Aneta Strachecka, Jerzy Paleolog, Beata Biernat, Klau diusz Szczepaniak, Jolanta Behnke-Borowczyk, Antti Vaheri, Heikki Henttonen, Jerzy M. Behnke,† Anna Bajer†

Author affiliations: Medical University of Gdansk, Gdansk, Poland (M. Grzybek, B. Biernat); University of Helsinki, Helsinki, Finland (T. Sironen, S. Mäki, A. Vaheri); University of Warsaw, Warsaw, Poland (K. Tolkacz, M. Alasarraf, A. Bajer); University of Life Sciences in Lublin, Lublin, Poland (A. Strachecka, J. Paleolog, K. Szczepaniak); Poznan University of Life Sciences, Poznan, Poland (J. Behnke-Borowczyk); Natural Resources Institute Finland, Helsinki (H. Henttonen); University of Nottingham, Nottingham, UK (J.M. Behnke)

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†These authors contributed equally to this article.
2010 (36.1% [95% CI 31.7%–40.7%]) than in 2002 (13.1% [7.4%–21.0%]). CPXV seroprevalence also varied markedly among voles from the 3 study sites ($\chi^2 = 46.84; p < 0.001$); seroprevalence was highest among voles from Urwitałt (38.4% [95% CI 33.9%–43.1%]) and lower among voles from Taltty (23.0% [19.3%–27.2%]) and Pilchy (10.3% [95% CI 5.7%–17.4%]). CPXV seroprevalence was also significantly affected by the sex of the host ($\chi^2 = 11.01; p = 0.001$) and was 1.5 times higher for male than female voles (Figure, panel A). Seroprevalence increased with host age ($\chi^2 = 12.73; p = 0.002$) and was lowest among voles from age class 1 (immature) (16.0% [95% CI 10.0%–24.1%]) and higher among those from age class 2 (mostly young adults) (27.2% [95% CI 23.2%–31.5%]) and age class 3 (breeding older adults) (30.1% [95% CI 25.9%–34.6%]).

The differences in seroprevalence between sites were also confounded by interaction with study year ($\chi^2 = 12.76; p = 0.012$). Seroprevalence increased significantly at all 3 study sites from 2006 to 2010 and was highest in Urwitałt (0.83-fold). The largest seroprevalence increases from 2006 to 2010 were in Taltty (2.35-fold) and Pilchy (2.9-fold) (Figure, panel B).

The pattern of age-related changes in seroprevalence also differed between study sites (site × age × presence/absence of antibodies against CPXV; $\chi^2 = 17.45; p = 0.002$) (Figure, panel C). In Urwitałt, the overall seroprevalence was highest among voles in age class 2 (44.5% [95% CI 37.5%–51.8%]), 1.57-fold lower among voles in age class 1, and 1.22-fold lower among voles in age class 3. In Taltty and Pilchy, seroprevalence was highest among voles from age class 3. In Taltty, seroprevalence was 1.8-fold higher among voles in age class 3 compared with voles in other age classes. In Pilchy, seroprevalence among voles in age class 3 was 10.8-fold higher than among voles in age class 2.

Our data show that CPXV was the dominant viral pathogen among bank voles in Poland during the study period, although PUUV and LCMV were also found. Our finding that the highest seroprevalence was among bank voles from Urwitałt complements our previous reports on other pathogens, reflects the importance of extrinsic effects on prevalence, and establishes that the sites from which host populations are sampled is the most influential factor affecting prevalence (4).

Our results provide additional information about the role of bank voles in Poland as infectious virus reservoirs. Although short-term cross-sectional studies are useful as a starting point (8), to obtain a comprehensive ecologic picture, long-term monitoring (several years and preferably a decade or longer) and a multisite approach are crucial. Identifying rodent species that can serve as reservoirs for zoonotic disease viruses and predicting regions where new outbreaks are most likely to happen are crucial steps for preventing and minimizing the extent of zoonotic disease among humans (9).

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About the Author
Dr. Grzybek is a parasitologist holding the position of assistant professor in the Department of Tropical Parasitology, Medical University of Gdansk, Poland. His research interests include epidemiology and ecology of macroparasites and microparasites in rodents, especially bank voles. He is also interested in host–parasite interactions and intrinsic and extrinsic factors that influence these relationships.
Evidence of spinal cord involvement in Powassan virus infection is largely limited to mouse models. We report a case of a polio-like illness caused by Powassan virus infection in a 62-year-old man in Canada. Magnetic resonance imaging showed T2 hyperintensities in the anterior horns of the cervical spinal cord.

Powassan virus (POWV) is a tickborne flavivirus, named after Powassan, Ontario, Canada, the location of the first documented human infection in 1958 (1). Since then, ≈150 cases of POWV infection have been reported globally, and incidence has increased over time. A total of 125 POWV cases have been identified since 2008, 33 (26%) in 2017 (2). In Canada, most reported POWV infections have been in the Great Lakes region. A small number of cases have been reported in the Maritime provinces (3).

POWV is transmitted by members of the *Ixodes* genus of ticks, including *I. cookei* and the more opportunistic and aggressive *I. scapularis*. POWV has 2 lineages; lineage 2 (deer tick virus) has emerged quickly in parts of North America, along with the expanding range of *I. scapularis* ticks.

POWV infection typically begins with prodromal symptoms including fever, nausea, headache, and myalgia. Central nervous system involvement includes an altered level of consciousness, paralysis, or ophthalmoplegia (4). POWV encephalitis has a 10% mortality rate, and ≤50% of survivors suffer residual deficits (5). Studies with mice have demonstrated that POWV can affect motor neurons in the anterior horns of the spinal cord (6). These same neurons are affected by poliovirus, West Nile virus, and enterovirus D68 (7). However, POWV infection with cord involvement in humans is not well documented; 1 human case demonstrated motor neuron pathology after POWV lineage 2 infection (8), and a second case with suspected motor neuronopathy was reported in 2018 (9).

We present the case of a 62-year-old man living in urban Ontario who experienced nausea, vomiting, and abdominal pain while vacationing in rural Newfoundland. He sought treatment at a hospital in Nova Scotia and experienced diplopia and ataxia. A computed tomography scan of the head did not show any acute intracranial event.

The patient became febrile and experienced dysarthria, weakness, and respiratory distress. Cerebrospinal fluid analysis showed pleocytosis (159 × 10^6 total nucleated cells: 42% neutrophils, 43% lymphocytes) and elevated protein levels (0.79 g/L). He was started on empiric treatment with ceftriaxone, ampicillin, acyclovir, and dexamethasone. Results of tests for *Cryptococcus*, HIV, syphilis, Lyme disease, herpes simplex viruses 1 and 2, varicella zoster virus, and acid-fast bacilli were negative. Initial arbovirus serology results were negative. The patient worsened, requiring intubation and transfer to an intensive care unit.

Polio-Like Manifestation of Powassan Virus Infection with Anterior Horn Cell Involvement, Canada

Christopher Picheca, Vignan Yogendrakumar, James I. Brooks, Carlos Torres, Elizabeth Pringle, Jocelyn Zwicker

Author affiliation: University of Ottawa, Ottawa, Ontario, Canada

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These first authors contributed equally to this article.