
Health, zoonotic pathogens and parasites

Lymphocytic choriomeningitis virus: a neglected zoonotic pathogen in Germany

Mehl, Calvin^{1,2}; Wylezich, Claudia¹; Adeyemi, Olayide Abraham¹; Möhrer, Fiona Joana¹; Kerber, Romy³; Cadar, Daniel³; Oestereich, Lisa^{2,3}; de Cock, Marieke P.⁴; Maas, Miriam⁴; Geiger, Christina⁵; Schauerte, Nicole⁵; Mätz-Rensing, Kerstin⁶; Nessler, Anne⁷; Schmidt, Katja⁸; Höper, Dirk¹; Linnenbrink, Miriam⁹; Beer, Martin¹; Heckel, Gerald¹⁰; Ulrich, Rainer G.^{1,2*}

¹ Friedrich-Loeffler-Institut (FLI), Federal Research Institute for Animal Health, Greifswald-Insel Riems, Germany

² German Center for Infection Research (DZIF), Partner Site Hamburg-Lübeck-Borstel-Riems, Germany

³ Bernhard Nocht Institute for Tropical Medicine, Hamburg, Germany

⁴ National Institute for Public Health and the Environment, Centre for Infectious Disease Control, Utrecht, the Netherlands

⁵ Zoo Frankfurt, Frankfurt am Main, Germany

⁶ German Primate Center, Leibniz Institute for Primate Research GmbH, Göttingen, Germany

⁷ Landeslabor Hessen, Gießen, Germany

⁸ German Cancer Research Center, Microbiological Diagnostics, Heidelberg, Germany

⁹ Max-Planck-Institute for Evolutionary Biology, Plön, Germany

¹⁰ University of Bern, Institute of Ecology and Evolution, Bern, Switzerland

* calvin.mehl@fli.de

DOI: 10.20315/evmc.2025.161

Lymphocytic choriomeningitis virus (LCMV) is a zoonotic arenavirus transmitted by house mice (*Mus musculus*) through contact with infectious secretions and excreta. Vertical transmission in house mice can result in death of the embryo, while surviving offspring will be persistently infected and shed the virus throughout their lives. Human infections may present with flu-like symptoms, but in severe cases meningitis and encephalitis may develop. LCMV infection poses a significant threat to organ transplant patients, because they are immunosuppressed. In pregnant women, LCMV infection may have significant teratogenic effects, often presenting with deformities of the brain and eyes of the foetus. LCMV was also identified as the etiological agent responsible for callitrichid hepatitis (CH), a lethal infection in New World primates. Despite these, LCMV is not a notifiable disease in Germany and little is known about the virus' prevalence and diversity. LCMV and reactive antibodies were detected in humans and mice from Germany in the 1960's, with the highest prevalence in North Rhine-Westphalia. This was also the same region in which the first German CH outbreak was reported in 2001. LCMV was detected in nine Emperor marmosets from another zoological garden in Germany in 2014. Continued assessment of LCMV in this zoo revealed an increasing viral prevalence in wild house mice between 2021 and 2023, as well as two further CH cases. High-throughput sequencing and phylogenetic analyses showed that two distinct lineages (I and II) of LCMV were present in the zoo, though only lineage II was detected in primates. The continued co-occurrence of these different strains (lineages I and II) resulted in coinfections and possible reassortants in wild house mice. This may have significant implications for virus evolution, the emergence of novel strains and viral epidemiology. LCMV screening was expanded to other regions of Germany and several other European countries (2005-2023). This resulted in the discovery of a novel lineage of LCMV in wood mice (*Apodemus sylvaticus*) from the south of Germany. Despite screening more than 2,100 small mammals, only a single positive house mouse was detected in the Netherlands. These findings suggest that LCMV is maintained in nature primarily through patches of high prevalence, and additional small mammal species may be hosts to yet undiscovered arenaviruses.