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Target tissues of the Puumala orthohantavirus (PUUV) in its natural host, the bank vole (Myodes glareolus)

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Keywords: Puumala orthohantavirus, tissue tropism

Background and objectives: PUUV is one of the most important hantaviruses in Europe, with the bank vole as reservoir. PUUV transmission between rodents and to humans happens mainly via inhalation of virus-containing aerosols. Affected people can show flu-like symptoms up to renal failure, whereas infected bank voles do not exhibit any clinical signs. The aim of this study is to describe the tissue tropism of PUUV in its natural reservoir.
Materials and methods: Naturally infected laboratory and wild bank voles were necropsied looking for gross pathologic findings, and subsequently tested for hantavirus-RNA by RT-PCR using lung tissue. Haematoxylin-eosin stained slides of the PUUV-RNA positive animals were screened for histological alterations and immunohistochemistry (IHC) was performed using a polyclonal pig-anti-hantavirus-nucleocapsid-protein-antibody. IHC positive tissues and additional secretory and excretory organs were tested by PUUV RT-qPCR and in situ-hybridization (ISH) detecting hantaviral mRNA.
Results: IHC demonstrated viral antigen in brain, heart, lung, tongue, stomach, parotid gland, pancreas, liver and kidney. Presence of mRNA was revealed in these organs as well as in the intestine, adrenal gland, brown fatty tissue and in the submaxillary salivary gland. Notably, IHC and ISH-positive tissues had no gross or histopathological lesions.
Conclusions: The results indicate secretory and excretory organs as main target tissues for viral shedding and transmission.