

Bank voles accrue scientific interest

by Gregory D. Larsen

SCIENTIFIC NAME

Myodes glareolus

TAXONOMY

PHYLUM: Chordata

CLASS: Mammalia

ORDER: Rodentia

FAMILY: Cricetidae

General description

The bank vole is a small rodent native to northern Europe and Asia, where it inhabits woodland and scrubland habitats at sea level and lower altitudes. This species has a stout, mouse-like appearance with a reddish-brown dorsal coat and a lighter, greyer underbelly. Adults grow to 8–12 cm in body length and 15–40 g in weight, with a hairy tail about 4–7.5 cm in length. Their faces are characteristically round with small eyes and ears. Bank voles are generally bold in temperament, being active during both day and night, roaming and foraging both above and below ground. Their diets mostly consist of plant matter, supplemented opportunistically with invertebrates and other animal food. As small rodents, bank voles are relatively easy to maintain in captivity, and there are many resources available that specifically address the care and use of voles, including the bank vole, as laboratory animals¹.



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Research résumé

The first known use of bank voles in laboratory research, published in 1954, describes them, using the outmoded moniker ‘red mice’, as a useful model of tuberculosis, given that they are susceptible to bovine and human tuberculosis, can be immunized with the BCG vaccine and “thrive very well in captivity”². This last attribute, in particular, proved to be of particular interest to researchers, and many subsequent studies explored the husbandry and reproductive nuances of this relatively unconventional rodent model^{3–5}.

Though they are no longer needed for tuberculosis research, today bank voles remain a very useful model of infection and disease. For example, as a known reservoir and vector of hantavirus, scientists have used wild and captive bank voles to study the ecology and pathology of this disease, which can cause hemorrhagic fever with renal syndrome in infected humans^{6,7}. Researchers have also noted that wild and captive bank voles can develop a condition that

resembles type 1 diabetes as it occurs in humans⁸. Studies with bank voles lead scientists to identify the Ljungan virus—a parechovirus that is associated with the diabetic condition in voles—and ongoing research is investigating the capacity of this virus to cause type 1 diabetes in humans⁹.

Beyond these applications, bank voles are currently poised to shape the future of research in the field of prion diseases. Many prion diseases, such as Creutzfeldt-Jakob disease, scrapie, chronic wasting disease or bovine spongiform encephalopathy, have potentially enormous biomedical, ecological and economic importance, but they are difficult to model in laboratory species because prion diseases are generally minimally transmissible outside their endemic

clades. Wild-type mice are therefore not susceptible to most prion diseases, and mice that express

transgenic proteins are susceptible only to that disease for which they were designed.

However, scientists have determined that bank voles are susceptible to prion diseases from several species, including humans, and transgenic mice expressing the bank vole prion protein are susceptible to prion diseases from at least eight different species¹⁰. This discovery opens doors to new models of prion diseases and to simpler comparisons between models with common transgenic

backgrounds. Furthermore, scientists hope that this promiscuous prion protein from the bank vole will allow studies to investigate those mechanisms that facilitate prion infection and thereby reveal the barriers that typically prevent transmission to new host species.

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