Bat Rabies

Susceptibility of Eptesicus Serotinus to EBLV-1 following Different Routes of Infection

Thomas Müller,[1] Conrad Freuling,[1] Ad Vos,[2] Larissa Neubert,[2] Nicholas Johnson,[3] Denise Marston,[3] Ingrid Kaipf,[4] Astrid Denzinger,[4] Anthony Fooks,[3] and Charles Rupprecht[5]
1) Friedrich-Loeffler-Institute, Wusterhausen, Germany, 2) IDT Biologika GmbH, Dessau-Rosslau, Germany, 3) Rabies and Wildlife Zoonoses Group, Veterinary Laboratories Agency – Weybridge, United Kingdom 4) Zoologisches Institut, Eberhard Karls University, Tuebingen, Germany, 5) Centres for Disease Control and Prevention, Atlanta, Georgia, USA

Thomas Müller: thomas.mueller@fli.bund.de

Insectivorous bats are the principal reservoir species for European Bat Lyssaviruses (EBLV) type 1 (gt 5) and type 2 (gt 6). Since a few years there has been an increasing interest to examine the pathogen-host relationship between this group of viruses and their natural reservoirs. In recent experiments we used E. fuscus and M. daubentonii as animal models to investigate the host response to infection with EBLVs. In the third part of the project, our objective was evaluating the susceptibility and pathology associated with an EBLV-1 infection in their assumed natural host E. serotinus. Four routes of inoculation were used: A dose of 10^3.2 MICLD50/20 µL was applied i.c. (n=5), i.m. (n=7), s.c. (n=7) and i.n. (n=6). The negative controls (n=4) were infected i.m. with a mouse brain suspension. Animals were observed for up to 140 days post infection, blood- and saliva samples collected on a monthly and weekly basis, respectively, and tissues collected post-mortem were examined for the presence of viral antigen. The results suggest that the pathogenesis of EBLV-1 in E. serotinus might differ from that in E. fuscus as obtained in a previous study. Next to the i.c. group (100%) mortality was highest in the s.c. (57%) group reflecting similar observations in M. daubentonii infected with EBLV-2. Only one animal of the i.m. group succumbed to infection, whereas all other animals survived. None of the animals developed detectable levels of VNA. This leads us to the assumption that the sub-dermal route of infection might be the most effective one in the transmission of EBLV-1 in Serotine bats.

Safety and Efficacy of a Defined-Mutation Attenuated Rabies Virus (ERA-G333) against Lethal Rabies Virus (RABV) Infection in Big Brown Bats (*Eptesicus Fuscus*)

Amy S. Turmelle,[1,2] Xianfu Wu,[1] Felix R. Jackson,[1] Richard Franka,[1] Gary F. McCracken,[2] and Charles E. Rupprecht[1]
1) Centers for Disease Control and Prevention, Atlanta, Georgia, USA 2) University of Tennessee, Knoxville, Tennessee, USA

Amy S. Turmelle: fcj6@cdc.gov

The ERA strain of rabies virus (RABV) has been used for oral vaccination of terrestrial carnivores in North America and Europe. To improve the safety of ERA virus for field use, strategies using selection of escape mutants under monoclonal antibody neutralization pressure have resulted in single or double nucleotide mutations in arginine (AGA) at residue 333 in the ERA glycoprotein gene, affecting pathogenicity and viral clearance in neurons. However, some early constructs exhibited mutation conversion after oral vaccination, causing clinical rabies in target species. Current efforts employ a reverse genetics defined-mutation strategy to alter residue 333 to glutamic acid (GAG) (ERA-g333), to minimize the likelihood of mutation conversion. We tested the safety and efficacy of ERA-g333 via intramuscular (im) and oral (po) routes in big brown bats (Eptesicus fuscus). Twenty-five bats received 5x106 MICLD50s of ERA-g333 im, 10 received 5x106 MICLD50s of ERA-g333 po, and 15 bats were unvaccinated controls. Twenty-one days after vaccination, 43 bats were infected im with 102.9 MICLD50s of E. fuscus RABV. We report immunogenicity and efficacy of ERA-g333 delivered im, but no induction of humoral immunity in bats vaccinated po. A subset of bats vaccinated im (n=5) and po (n=2) were not infected, and none developed clinical rabies from ERA-g333. Scarce reports exist on oral