

New vaccines for rabies control by oral vaccination of wildlife

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Summary: A vaccine prepared from vaccinia-rabies recombinant virus has been found to be efficacious and safe for target and non-target species. A field trial involving the oral vaccination of foxes was likewise successful. Vaccines produced by mutation or recombination of viral strains are also being studied.

KEYWORDS: Disease control - Fox - Genetic recombination - Oral vaccination - Rabies - Viral diseases - Wild animals.

1. Attempts to control rabies by vaccinating wild carnivores with attenuated rabies virus seem very promising.

Nevertheless it is still possible to improve both the safety and the stability of the vaccine used; a recombinant vaccinia virus, expressing the immunising glycoprotein of rabies virus, has therefore been developed.

The vaccine consists of a live-modified vaccinia (Copenhagen strain)-rabies glycoprotein (ERA strain) recombinant virus grown on VERO cells to a titre of 10^8 TCID₅₀/ml.

2. The potential of recombinant vaccinia virus to protect foxes (*Vulpes vulpes*), raccoons (*Procyon lotor*) and striped skunk (*Mephitis mephitis*) against rabies has been demonstrated.

Oral administration of vaccine to these target species elicits high levels of rabies virus neutralising antibodies and long-term protection against rabies, even if the virus does not multiply more than 48 hours in the tonsils.

The recombinant virus was shown to be safe for fox, raccoon, skunk, wild boar (*Sus scrofa*), badger (*Meles meles*), carrion crow (*Corvus corone*), magpie (*Pica pica*), jay (*Garrulus glandarius*), common buzzard (*Buteo buteo*), kestrel (*Falco tinnunculus*), wood mouse (*Apodemus sylvaticus*), yellow-necked mouse (*Apodemus flavicollis*), common vole (*Microtus arvalis*), field vole (*Microtus agrestis*), water vole (*Arvicola terrestris*), bank vole (*Clethrionomys glareolus*), ferret (*Mustela furo*), laboratory mouse, rabbit, cattle, cat, dog and sheep, as well as numerous other non-European wildlife species.

Furthermore, the absence of horizontal transmission was confirmed in several species including the fox.

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Taking into account the experimental data concerning the safety of this recombinant virus for target and non-target species and its efficacy in foxes, a first field trial of fox vaccination using the vaccinia-rabies recombinant virus was carried out in Belgium during October 1987. The results obtained confirmed the safety of this vaccine.

3. Other vaccines have also been developed such as an attenuated strain of rabies virus modified by a mutation at arginine 333 of the viral glycoprotein and a raccoon-pox-rabies glycoprotein. The advantages of these new candidates will be discussed.
