

## With Baited Breath



### The Very Real Problem With Rabies Baits

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At some time or another, we all worry about the threat of rabies. Most people, at some point in their lives, have seen or heard rumor of the mad neighborhood cat or skunk that had to be destroyed because of suspected rabies. We warily watch the bats, raccoons and skunks in our backyards, suspicious of their ability to carry deadly disease. We worry that our cats will catch a rabies-infected bat or our dogs will get in a scrap with an infected raccoon.

We also worry about the safety of the rabies vaccine and rightly so: it is perhaps the most lethal of them all and threatens our dogs with loss of health and even loss of life. Some of us take great care to avoid any wildlife at all while others have a more cavalier attitude and find comfort in the fact that there really aren't that many cases of rabies in dogs each year. The dog would have to find an infected animal in the first place and then the virus would have to be spread via a bite: those can be pretty long odds for most dogs. In fact, in the five years between 1997 and 2001, most states reported about one case of a rabid dog each year (Rabies in vaccinated dogs and cats in the United States, 1997–2001 JAVMA, Vol 235, No. 6, September 15, 2009). Regardless, rabies continues to be one of the most feared zoonotic diseases.

In an effort to control the spread of rabies in wildlife, the US and Canada regularly dump rabies-laced baits into rural areas. You may see the planes fly by, dropping their little fish-meal covered bait bombs in the forests and fields surrounding your home. You may even feel a little safer, knowing that the foxes, skunks and raccoons in your neighborhood might now be a little less likely to pass rabies on to your dog. You may be wrong and both you and your dog may now be in even more danger than before. Those little baits may pack a lot more punch than anyone ever suspected.

These baits are recombinant vaccinia/rabies glycoprotein, which is an oral vaccine intended to control rabies in wildlife. Recombinant means they have spliced two viruses together. In addition to the rabies virus, these baits also carry vaccinia which is the immunizing agent used in smallpox vaccines. This combination of two viruses is an example of a genetically modified vaccine. Genetically modified vaccines have some pretty nasty and unpredictable habits. The first problem is the viruses in rabies baits are live and that can cause some problems.

The live virus vaccines found in the oral rabies baits are supposedly comprised of a weakened strain of rabies. This is theoretically done by recombining it with the pox virus. If that is true and if all goes well, the body will form an immune response to the vaccine, and the animal that eats the bait will be successfully vaccinated against rabies. That's what happens when things go right.

When things go wrong, the animal is in a weakened state when he consumes the bait. When modified live vaccines are given to animals that are ill or stressed at the time of vaccination, there is a very real risk of vaccine failure or the vaccine actually producing the disease it is supposed to protect against. Alternately, any latent disease the animal may be harboring will become a full blown disease once he consumes the bait because of the resulting stress on his immune system. With humans encroaching on their territory at an alarming rate, it is likely safe to say that many members of the wildlife population are stressed and malnourished, making them susceptible to vaccine-induced illness.

Dr. Michael Fox wrote an outstanding account of the dangers of vaccines (Genetically Modified and Engineered Live Virus Vaccines: Public Health and Animal Welfare Concerns) where he notes: "Lions in Serengeti National Park, followed by

those in the Masai Mara of Kenya, died like flies in 1994 from a new strain of canine distemper (CD). This followed a period between 1992-94 when domestic dogs of agropastoralists and farmers to the west, and Maasai pastoralists' dogs to the east of the SNP boundaries, were being with experimentally vaccinated against rabies during a vaccination trial. The same new strain of CD in the rabies vaccinated domestic dogs was subsequently found in the lions and was then found to have caused the death from CD of most of a captive colony of wild dogs in Mkomzai Game Reserve in Tanzania in 2000-2001: these wild dogs had been vaccinated against CD."

"Following this, in 2007 the same new CD strain was for the first time identified in free living African wild dogs in Maasai areas to the east of SNP where mass vaccinations of local domestic dogs were being carried out against CD, CPV and rabies. The outbreak confirmed in one large wild dog pack was associated with high mortality of this highly endangered canid species."

That's not the only danger. Add to that the danger of pairing two viruses together to make one vaccine. The World Health Organization states that the widespread use of vaccinia against smallpox protection is not recommended due to potentially serious complications, yet we are bringing it back into the environment with these vaccines. In 2000, a pregnant woman found her dog eating one of these wildlife baits. When she tried to take it off the dog, she received a small puncture wound to her finger and a minor abrasion to her forearm. Eight days later, she was hospitalized with growing blisters, lesions and necrosis. Thankfully after five days of hospitalization, she recovered and her baby showed no obvious signs of trauma.

There are other dangers inherent in genetically modified vaccines that make rabies baits pretty dangerous stuff. Splicing rabies onto other viruses can carry many risks that we are just recently becoming aware of. In Arizona and other parts of the US, rabies is starting to jump species. For the first time, we are seeing rabies jump from bats to foxes to skunks with no bite required. How can a virus jump species like that? Well, it seems that we really don't know that much about genetically engineered vaccines, so nobody really has the answer to that. In fact, Philadelphia's Thomas Jefferson University, Jefferson Vaccine Center is developing a lot of these recombinant vaccines but has the following to say: "We are interested in understanding the interaction of rabies with the infected host at the molecular level.

The molecular mechanism of rabies virus pathogenesis is not well understood, and our research analyzes the different functions of the rhabdoviral proteins (e.g. rabies virus) and their interactions with host proteins and the immune system." Maybe somebody should figure that out before they go splicing that virus together with other viruses, creating one angry mutant virus.

Dr. Terje Traavik PhD (Centre of Biosafety), has written extensively about how genetically engineered viruses are creating new hybrid viruses through recombination. He cautions that the characteristics of some of these new hybrid viruses are similar to both of the parent viruses but also include traits from neither. Dr. Traavik specifically expresses concern about the stability of genetically engineered viruses. He notes that cases of rabies infected humans could be due to a return to virulence of the genetically engineered rabies virus with the pox viruses.

In addition to the danger of jumping species and return to virulence, there is another frightening way for these new viruses to spread: aerosolization. It used to be that we could feel pretty safe about rabies because the chances that our dogs would trade saliva with another animal were pretty slim. Nowadays, thanks to recombinant vaccines, there is no bite required. The Center for Disease Control acknowledges that rabies can be spread via aerosolization so you or your dog need only be in close proximity to a rabies infected animal to be in danger.

Despite these gaps of knowledge and frightening possibilities, the US alone continues to drop tens of millions of genetically modified, rabies/pox spliced vaccines into your backyard. What does this mean for you and your dog? It means the days of rabies being a simple but deadly virus with a simple mode of transmission are long gone. In their wake are questions of just easily how can these new mutant rabies strains be spread, can they just jump from one species to another and potentially jump to humans like West Nile Disease, and can the animals eating those baits actually get rabies? As we ponder these questions, the baits continue to drop by the thousands and new genetically modified vaccines are being developed at a maddening rate. At some point we need to step back and ask whether the cure is worse than the disease.

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