

CHeRI Medgene Labs Vaccine Report

Prepared by Drs. Samantha Wisely and Juan Campos

Highlights

- **Vaccinated animals had a 100% survival rate to EHDV, while unvaccinated animals had an 82% survival rate to EHDV.**
- **Titers for antibodies to EHDV-2 remained high, one year after vaccination.**
- **We could not determine if antibody levels increased after vaccination due to inconclusive results.**

Background and Goals

The UF/IFAS Cervidae Health Research Initiative is committed to help bring vaccines that protect deer from EHDV to Florida deer farmers. The Medgene experimental EHDV Vaccine is a bivalent vaccine for EHDV-2 and -6 currently available nationwide to deer farmers, under special permission from the USDA. CHeRI partnered with a Florida deer farm to conduct a field trial of this vaccine in September and October of 2020.

This vaccine is targeted against two EHDV serotypes (EHDV-2 and EHDV-6) for generation of sero-specific antibodies after vaccination. Antibodies are measured by titer, and a titer level >10 is considered protective against EHDV.

We had three goals in this vaccine field trial:

Goal 1) conduct a case-control experiment to determine if vaccinated deer had greater antibody titers than unvaccinated deer,

Goal 2) compare mortality rates of case and control groups to determine if vaccinated animals died of EHDV less frequently than unvaccinated animals,

Goal 3) assess titer levels of animals that had been vaccinated one year previously with the Medgene vaccine.

Methods

For goal 1, we started the titer evaluation with 51 deer. By the end of the study, we had 29 deer for which we had collected a complete dataset. Animals were removed from the study when they died, received only one dose of the vaccine or were otherwise excluded from the trial (sold, released to a preserve, could not capture, etc). Animals in the treatment group received 2 doses of the vaccine; animals in the control group did not receive any vaccine but were handled in a squeeze chute in a manner similar to the

treatment group. At the end of the study, only 3 control animals remained enrolled and none of them were fawns; 26 deer were in the treatment group.

We drew blood on all animals and administered vaccine to case animals on September 1, and September 23. On October 7th, we drew blood from every animal still enrolled in the study. Titer levels were determined by Medgene Labs.

For goal 2 we were able to evaluate survival rates in a group of 28 treatment animals, and 17 control animals. Treatment animals received 2 doses of the vaccine while control animals received one or no dose of vaccine.

For goal 3, we were able to evaluate EHDV -2 titers in 7 animals one year after that had received the Medgene EHDV-2 vaccine in September 2019.

Results

Goal 1. We did not have sufficient data to compare case and control animals because there were too few control animals that were naïve to the virus (i.e. did not already have pre-existing titers to the virus). In addition, we did not see a change in titer levels in vaccinated animals before or after the vaccine (Table 1).

Table 1. Titer levels (average \pm standard deviation) for deer in the vaccination (case) group at day 0 prior to vaccination and at day 37, which was 2 weeks after receiving the second dose of the vaccine. Because most animals were exposed to naturally circulating EHDV-2 and -6 at the farm, they had high titers at Day 0. There was also substantial variation in titer level which led to high standard deviations. These two factors made the comparison inconclusive.

	Day 0	Day 37
EHDV-2	45 \pm 48	166 \pm 164
EHDV-6	260 \pm 111	217 \pm 142

Most vaccinated animals were also exposed to the virus prior to the experiment and therefore had titers to the virus prior to the experiment. At the end of the study, 23 of 26 animals had titer levels that were considered protective against either EHDV-2 or EHDV-6. However, 3 animals (11%) in the vaccinated group ended the experiment with titers for EHDV-2 that were below the protective level (<10). All 26 animals had protective levels of titers to EHDV -6. Ultimately, we conclude that Goal 1, determining if the vaccine produces homologous antibodies, was inconclusive due to the vagaries of field trials which made comparisons difficult.

Goal 2. During the field trial, EHDV-2, EHDV-6 and BTV were actively circulating in the herd. We were able to assess survival rates for two groups: 28 vaccinated animals and 17 unvaccinated animals. Eleven of the 35 animals were virus positive during the trial. These animals were asymptomatic of infection and remained healthy through December 2020. This virus outbreak allowed for a natural challenge of the vaccine. No animals that were vaccinated died of the virus, although 9 circulated the virus at some point in the study suggesting that the vaccine boosted their immune response to the virus. Three of 17 unvaccinated animals died of either EHDV-2 or EHDV -6. One animal had received the first dose of vaccine at the time of death. In summary unvaccinated animals had a mortality rate due to EHDV of (3 of 17) 18% while vaccinated animals had a mortality rate of 0% (0 of 28 animals).

Goal 3. In addition to the animals enrolled in the vaccine study, 7 animals that had been initially vaccinated in September/October of 2019 had their titers checked in September of 2020. All 7 animals had titer levels >320. Given the level of exposure all animals on the farm had to EHDV, its hard to say if the vaccine was responsible for the maintenance of antibodies or it was due to EHDV exposure.

Conclusion

Animals that received the vaccine had a lower mortality risk from EHDV- 2 and -6 than animals that received no vaccine. Vaccinated animals maintained titer levels at protective levels for up to one year. This result suggests that animals vaccinated in April and May will continue to have protective levels of antibodies during EHDV season of that year.

Recommendations

- Vaccination of adults in April reduces the risk of vaccinating deer that are sick with EHDV. Vaccinating sick deer increases the risk of mortality. We have observed on multiple occasions deer that were sick prior to one dose of vaccine that succumbed to EHDV.
- Vaccinating fawns during weaning is better than not vaccinating fawns. Cases of EHDV occurred into December of 2020 in Florida. Thus, while fawns may have a window of unprotected vulnerability (maternal antibodies have waned, but vaccine antibodies have yet to fully develop), fawns do develop antibodies before the end of EHDV season in Florida.
- For animals that have never received the vaccine, one dose is likely not sufficient to produce a protective level of antibody.