mRNA Vaccines in Livestock

Key Takeaways

- mRNA vaccines use messenger RNA, which occurs naturally in all cells, to teach cells how to make a protein which will trigger an immune response.
- Research into the use of mRNA vaccines in livestock medicine has been ongoing for more than a decade.
- Currently, none of the commonly used vaccines licensed by USDA for cattle utilize mRNA technology. SEQUIVITY, developed by Merck Animal Health in 2018, utilizes mRNA technology and is licensed for use for swine.
- Proposals to ban mRNA vaccines or designate meat from animals treated with mRNA vaccines on labels have been brought forth around the country in recent months.

Questions

1. **How much concern, if any, do you and/or people in your county have about the use of mRNA vaccine technology in livestock?**
2. **As more mRNA vaccines are approved for use by the USDA, how inclined are you to use them for your operation?**
3. **Are you and farmers in your community ready to defend this technology to lawmakers and the public?**

Background

The use of vaccinations to prevent disease is commonplace in animal agriculture. As new technologies emerge and new diseases present threats to animal health and human food security, research into new methods of improving animal health continues to develop. One new technology being thoroughly studied is the use of messenger RNA (mRNA) vaccines in livestock.

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mRNA vaccines use messenger RNA, which occurs naturally in all cells, to teach cells how to make a protein which will trigger an immune response. mRNA vaccines differ from commonly known conventional vaccines in a few ways:

- Conventional vaccines use an antigen, or a small piece of weakened or killed virus, to induce an immune response. mRNA vaccines contain genetic material, the messenger RNA, which tells the body

how to make a protein. Once the vaccine is injected, the cells in the muscle pick up the mRNA, make the protein, and display it on the cell's surface. The immune system sees the protein and develops an immune response against it.

- Viruses used to develop conventional vaccines are grown in cell cultures which, after growing and harvesting, can be lengthy. The process to develop the messenger code used for mRNA vaccines is made from a DNA template in a lab and is much quicker. This provides useful time-saving techniques when looking for vaccines for emerging or mutating diseases needing a rapid response time.
- While conventional vaccines contain additional adjuvants and components to preserve the vaccine, mRNA vaccines do not.

Research into the use of mRNA vaccines in livestock medicine has been ongoing for more than a decade. They require significant review and approval from USDA before being licensed for use in livestock. This licensing process is regulated by the USDA Center for Veterinary Biologics (CVB). Any vaccine licensed to be administered to animals undergoes thorough testing and study of the safety, effectiveness, and quality of the product. In addition, once a vaccine is approved to be on the market, USDA continually collects data regarding the success of the vaccine. Currently, none of the commonly used vaccines licensed by USDA for cattle utilize mRNA technology. SEQUIVITY, introduced by Merck Animal Health in 2018, utilizes mRNA technology and is licensed for use for swine. SEQUIVITY harnesses RNA particle technology to create customized prescription vaccines against strains of influenza A virus in swine, porcine circovirus (PCV), rotavirus, sapovirus, and others.

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Since the development of the Moderna and Pfizer COVID-19 vaccines, both mRNA vaccines, were rapidly developed and approved for human use during the COVID-19 pandemic, public concern about the use of mRNA vaccines in livestock has been heightened. Those who challenge the use of this technology express concern of the presence of remnants of the vaccine being found in the meat of animals administered with it.

Proponents of the continued research and development of mRNA vaccine technology cite the added benefit of another tool to combat impending disease threats such as Foot and Mouth Disease (FMD), African Swine Fever (ASF), Porcine Reproductive and Respiratory Syndrome (PRRS), and Highly Pathogenic Avian Influenza (HPAI), along with others. As is true with vaccines currently licensed for use in livestock, components of the vaccine are broken down by immune cells after being administered,

ensuring no trace of the vaccine persists in animal tissues. Also, when mRNA vaccines are approved for use in livestock, withdrawal periods before animals can be slaughtered following the administering of the vaccine would be required, similarly to all other vaccines currently used to treat livestock.

In 2023, Tennessee lawmakers brought forth proposals to ban mRNA vaccines or designate meat from animals treated with mRNA vaccines on labels. A couple concerning labeling of mRNA vaccines even made their way to the Tennessee General Assembly this year. One aimed to introduce a statewide label designating "mRNA-free" meat and meat products and would prohibit the state veterinarian's office from requiring vaccination – authority the position holds but has never used. The other attempted to prohibit the manufacture, sale, delivery, holding, or offering for sale of any food containing a vaccine or vaccine material unless the food is labeled with notification of such vaccine or vaccine material.

Opponents of these efforts, including Farm Bureau, expressed concerns regarding state-by-state labeling of food products due to implications on interstate commerce. They also reasoned "mRNA-free" meat or meat products would be misleading considering mRNA vaccines for livestock are currently only available for swine. After consulting with TFBF and other industry groups, both efforts were taken off notice with the goal to further review this issue during the summer.

Policy

Tennessee Farm Bureau
Food Safety (Partial)

Integrity in food labeling is a vital element in maintaining food safety. Food labeling requirements should remain a function of the federal government. We oppose separate state level labeling requirements of foods sold through interstate commerce. We support consumer friendly, science-based labeling of agricultural products providing consumers with useful information concerning the ingredients, nutritional value, and country of origin. Agricultural products produced using approved biotechnology such as GMO, GE, etc. should not be required to designate individual inputs or specific technologies on the product label. We oppose misleading labeling statements such as "bST Free Milk" implying food produced using certain production practices is superior and safer than food using other approved production practices.

Agricultural Public Relations (Partial)

Farmers and their organizations must explain to the public the positive effects of farm science and technology. Everyone gains from good public agricultural policy.

Biotechnology (Partial)

Advancements in biotechnology are having tremendous positive impacts on agriculture. These developments are beneficial to all sectors of our society, not just agriculture. Therefore, Farm Bureau should strive to inform the public on the beneficial effects implementation of these new production practices will have on the environment and well-being of the community.

We urge state and national political leaders to develop a positive national strategy for biotechnology research and development. Part of this strategy should include an open and frank dialogue with all

interested parties. Only the continued support and encouragement of technological advancements will assure our viability in world markets. We encourage the USDA to take a lead in coordinating efforts to evaluate and move approved products and technologies to the marketplace quickly. The approval of new products should be based on safety and efficacy criteria, and not on socioeconomic criteria.

American Farm Bureau

302 / Animal Health Emergency Management Preparedness (Partial)

3. We recommend that the USDA continue to work to develop an accurate rapid testing program for Johne's disease. Additional research is needed for developing diagnostics and vaccines, understanding the biology of organisms and determining why diseases emerge. We and the international community must give priority to other emerging infectious diseases such as African Swine Fever, foot-and-mouth disease (FMD), Exotic Newcastle Disease, West Nile Virus, vesicular stomatitis, bovine spongiform encephalopathy (BSE), classic swine fever, porcine epidemic diarrhea virus, pseudorabies, tuberculosis, salmonella, E. coli, scrapies, avian influenza and contagious equine metritis.

5. We support:

> 5.7. Changing the focus of USDA's FMD emergency response plan from eradicating infected animals to implementing a widely available vaccination control program;
>
> 5.9. The development and production of foot-and-mouth disease vaccine on U.S. soil and/or by a U.S.-controlled company;
>
> 5.14. USDA planning for a critical supply of animal use vaccines, antibiotics, antiparasitics, and other essential animal health products to be produced domestically;

337 / Biotechnology (Partial)

2. We urge state and federal political leaders to develop a positive national strategy for biotechnology research, development and consumer education. Part of this strategy should include an open and frank dialogue with all interested parties. We believe that our competitive advantage in world markets will be maintained only by the continued support and encouragement of technological advancements.

3. The approval of new products should be based on safety and efficacy criteria. Consideration of socioeconomic criteria should not be required.

7. We support:

> 7.1. Increased efforts through biotechnology and animal stem cell research to more rapidly develop traits with recognized consumer benefits, to increase the marketability of our products, to solve environmental concerns, to increase net farm income by decreasing input costs and to improve product quality and quantity to feed our ever-growing population.

8. We oppose:

> 8.3. Individual states establishing separate policies on agricultural biotechnology labeling, identification, use and availability;

8.5. The imposition by foreign countries of any import restrictions, labeling or segregation requirements of any agricultural product enhanced through biotechnology, once such commodity has been certified by the scientific community as safe and not significantly different from other varieties of that commodity.