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For more information contact: Wendie Powell
Livestock Production Agent, Wildcat Extension District
wendiepowell@ksu.edu, (620) 784-5337

Keeping Livestock Healthy

Raising healthy livestock is the goal of every livestock producer. Not only are healthy animals more profitable, but they are also more enjoyable to work with. However, keeping critters healthy requires a good herd health management plan. All animals have various defense mechanisms to deal with infections, influenced by age, nutrition, and management. Stress can impact how the immune system reacts to a pathogen attack. Vaccination is one tool to prevent disease; it's risk mitigation for producers to protect their livelihood from disease.

When an organism gets sick from a specific pathogen for the first time, the immune system can be slow to develop antibodies, sometimes 7 to 14 days. Recovery allows the immune system to remember and recognize the pathogen in the future. So, the next exposure triggers the production of specific antibodies by specialized cells, which will work to destroy the pathogen again, often within 48 hours. Vaccines induce this same protection by priming the system for a response. Most vaccines do not prevent *infection*; instead, they aid in the prevention of *sickness*.

There are several types of vaccines; the majority of licensed veterinary vaccines in use are killed vaccines and modified live vaccines. They have different strategies to reduce the risk of illness and induce a beneficial immune response.

Modified live vaccines are non-disease-causing versions of a virus or bacteria. The live virus or bacteria replicate similar to the actual disease but does not cause the disease itself. The replication of the vaccine organism allows the immune system to develop a full response and create protective immunity with only one dose of the vaccine.

Killed vaccines do not contain a live virus or bacteria. These contain a dead organism or a specific piece of an organism that is critical to the function of the disease-causing pathogen. The crucial difference between killed and modified live vaccines is the lack of replication with a killed product, meaning the immune system does not develop the protective memory with just one dose and requires a booster.

There has been a recent buzz concerning Messenger RNA (mRNA) vaccines. Dr. Kevin Folta, a molecular biologist and professor at the University of Florida explains that this type of vaccine is an intermediate between the gene itself and the products that the gene encodes. Consider a blueprint and a house; the mRNA is the construction worker. It takes the blueprint and builds the

house. In the cell, the mRNA takes the DNA blueprint and builds part of the final structure. The mRNA is the go-between, it does not change the genes or the DNA itself.

The Food and Drug Administration sets withdrawal times for all veterinary drugs. The withdrawal period is the time between the last dose and when the animal or animal product can be safely used for food. Rephrased, this is the time that the animal and its products must be withdrawn from trade. This time allows the drug to be reduced to a safe tolerance level; the withdrawal time depends on the drug; but typically ranges from 0 to 60 days.

To learn more about keeping livestock healthy, please contact Wendie Powell, Livestock Production Agent, (620) 784-5337, wendiepowell@ksu.edu.

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