



Effects of Respiratory Problems on Cholera Immunity in Turkeys

Viruses can interfere with the development of immunity to fowl cholera in two ways:

1. Viral disease, along with ammonia or dust, may cause enough inflammation and damage in the trachea and lungs where the live fowl cholera vaccine multiplies so that the vaccine will not be able to establish itself and multiply so the bird can develop immunity to fowl cholera.
2. Some viruses may work directly on the immune system itself. In other words, the virus may damage the parts of the bird that actually produce the antibodies and cells which make the bird immune to fowl cholera. This kind of damage should result in poor immunity from either live cholera vaccines, or bacterins. In other words, the live vaccine can multiply within the bird, or the killed vaccine can be injected, but nothing is there to respond to it with the cells and antibodies needed to make the bird immune to cholera.

Let's examine these areas a little more thoroughly: Let's say that we have a virus which invades the trachea and lungs, causing a respiratory disease. The bird will begin to try and overcome the virus by

producing more mucous in the lungs and trachea, and by moving cells to the trachea and lungs that begin producing many different chemicals. These cells and chemicals have many different functions and work in many different ways. However, the chemicals they produce and the actions that they take have one goal in mind: to make the trachea and lungs an inhospitable place for any foreign invader such as the virus.

If the infection is severe enough and enough mucous is produced, the birds will begin to cough, sneeze and rattle. This is the way that a bird will protect itself against almost any respiratory disease in its early stages, and is a good example of a nonspecific disease response. This means the bird's body will respond like this to almost any respiratory disease, be it due to a bacteria, a virus, or even high dust or ammonia levels. Because it is a nonspecific response, once it occurs it works against any foreign bacteria or virus, whether that bacteria is a live cholera vaccine, or a Newcastle virus.

In summary, if there is an inflammatory response caused by a virus, bacteria, dust or ammonia in the bird's respiratory system, the live cholera vaccine will not be invasive enough to establish itself and

multiply long enough to produce an immune response. However, it may multiply just enough to make the bird's respiratory reaction even worse, although it won't be enough multiplication to produce good immunity. If you cannot delay cholera vaccination in a flock suffering from respiratory disease, be prepared to treat the birds with sulfas or tetracyclines if a reaction to the live vaccine occurs.

The second way in which a virus can interfere with immunity to fowl cholera is by keeping the bird from developing antibodies to fowl cholera and immune cells that work only against fowl cholera. This is known as interfering with the **specific** immune response. This is called the specific immune response because it involves the development of antibodies and cells which work only against a particular disease, in our case, fowl cholera. They will have little or no effect on Newcastle, erysipelas, etc. To make these specific cells and antibodies, the tissues that produce them must be in normal, disease-free condition. These tissues include the bursa of Fabricius, thymus, and other smaller patches of tissue scattered around the bird's body. If a virus has an effect on these tissues, it can decrease the specific immune response to a vaccine.

Almost no turkey research has been done in this area with the exception of some very recent work on immunosuppression at North Carolina, Georgia and Iowa. Experience in the field suggests that there may be a virus in turkeys similar to Gumboro in chickens and a bacteria (*Alcaligenes faecalis*) that may damage the thymus.

Birds that have experienced severe outbreaks of Newcastle disease, avian influenza, and hemorrhagic enteritis in the field have all been reported as fowl cholera problem flocks, or flocks with continuous problems with colibacillosis if fowl cholera was not present in the area. It may be that the reason for many of these problem flocks is immunosuppression due to a virus, bacteria, or possibly mycotoxins. We should know a lot more about this in the years ahead. Until then, try to maintain flocks in as disease-free an environment as possible. Use good traffic control and cleanup programs. Vaccinate for those diseases known to be a hazard in your area. Keep reading and asking questions — a lot more information will become available in the next several years.

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