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Pathogen inoculation: Where are we now?

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Exposure of pigs to pathogens has been used commonly in practice for a long time. Pathogen exposure has been a standard procedure of gilt acclimatization protocols, where the intention has been to expose the incoming gilts to the sow farm pathogens and allow them time to develop immunity in a separate facility.

These acclimatization procedures have included such things as feeding the gilts with manure from the sow farm, feeding them aborted fetuses and placentas (feedback), or exposing them to cull or sick animals, be it sows or weaned pigs. Although not commonly thought as such, these procedures truly constitute exposing animals to pathogens in a relatively uncontrolled fashion.

In older, continuous flow systems, pathogen inoculation of the growing pigs was not practiced usually, essentially because the high level of microbism ensured that early exposure to pathogens would take place.

However, as we have moved to high health, multiple site production, this pathogen exposure has become less reliable, leaving many growing groups of pigs susceptible to diseases which may actually be carried in by a few members of the group. Because of this, there has been renewed interest in pathogen exposure, especially using more controlled methods than those achieved by traditional acclimatization protocols.

There are different strategies for this exposure, depending on the epidemiology of the pathogen under consideration. I will cover 3 different strategies which are being used today: PRRSV, *H. parasuis* and *E. coli*.

PRRSV

Exposure of gilts to PRRSV is an absolute must in order to achieve stabilization of sow farms and as a preliminary step to PRRSV eradication based on farm closure. Practically everybody agrees that naïve gilts must be exposed to PRRSV and allowed to recover prior to entering a positive sow herd. Failure to do this results in gilts getting infected in the gestation barn, recirculating the virus and resulting in new outbreaks. The problem is: How do we achieve consistent and safe exposure to all these gilts? This can be done by:

- Exposing gilts to cull sows or affected weaned pigs: This is usually done, but success is unpredictable, since it is difficult to ensure that all gilts get evenly exposed
- Growing the gilts in the sow farm. Again, exposure is not consistent and the 3-site protocol is broken
- Vaccination ensures even exposure, but the introduction of a new viral strain into the system must be considered carefully
- Exposure to serum from infected pigs. This works very well and is used extensively in other countries, although the virus is injected and there are some safety concerns regarding other pathogens which may be present
- Injection with cultured homologous virus. This would appear to be the most sensible alternative, but has regulatory problems, especially regarding dose, cell culture safety and others.

H. parasuis

Exposure of suckling piglets to the farm's virulent strain of *H. parasuis* and *S. suis* has been shown to significantly decreased prevalence of sick pigs in that group. The underlying idea is to get all piglets exposed to the nursery virulent strain at a very early age (usually 5 days) when they are still protected from systemic invasion through maternal immunity.

The procedure requires first identifying and characterizing which is the strain that is prevalent in cases of systemic disease in that farm and then using it as a homologous challenge in a very dilute presentation through the oropharyngeal route. There are some concerns regarding the safety of the procedure, especially if PRRS virus is actively circulating in the farrowing units. There are some minor concerns also with the low zoonotic potential of *S. suis*

E. coli

Exposure of weaned pigs to *E. coli* in the drinking water is commonly used to reduce the risk of post weaning scours and/ or Edema disease. The *E. coli* strains used are

commonly K88 + toxin negative (for scours), or F18 + toxin negative (for Edema disease). This procedure is being used as a practical approach to disease control, but few if any scientific data about it's efficacy or mechanisms involved is available. Presumably, the process functions either by competitive inhibition, by stimulating specific immunity or by both these mechanisms

In summary, pathogen exposure of naïve pigs is widely used across our industry. This exposure can be by traditional uncontrolled methods (exposure to feces or sick pigs, for example) or in a more controlled and specific manner, using live autogenous cultures. There is an urgent need for scientific documentation of these procedures, as well as of characterization of the legal ramifications that they may have.

