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ONE SHOT VACCINES

Most swine vets and farmers strive to know and understand as much as they possibly can about their animals and the ways in which their health and welfare can be maximised. But, sometimes, too much knowledge can cloud rather than clarify our vision, and may even make us blinkered to new ideas.

Vaccination is a case in point. All swine vets and most serious producers will be familiar with the way in which vaccines work. The first dose is used to 'prime' the system; subsequent doses trigger a significant immune response which protects against the target infection. The duration of immunity depends upon how strong the immune response is and how long it takes for it to fall back to less protective levels. Some vaccines provide long-term protection – others need regular boosters.

The immune response is determined in part by the antigen which the vaccine contains, which may be a complete (but weakened or killed) pathogen or just part of its structure.

In fact, immunisation using vaccines mimics what happens in nature. The first time any animal is exposed to a new pathogen, such as a virus or bacterium, it reacts by producing new antibodies that can recognise that specific pathogen. Usually, the production of these molecules is too slow to prevent this initial infection, but a low level of immunity in the form of memory cells remains and acts as a form of immune memory.

If the same pathogen is encountered again, it is quickly recognised by the immune system and an immune response mounted to prevent it from gaining a significant foothold and setting up a full-blown infection.

We are all familiar with the use of multi-dose vaccines: they have been used for many years to protect both animals (livestock, wild and companion) and humans against common infections – and they work well. So when a single-dose, killed vaccine was made available for the immunisation of

piglets for life-long protection against *Mycoplasma hyopneumoniae*, many were sceptical. How could a single dose provide sufficient immunity, when the majority of vaccines need at least two doses?

The answer lies in the speed and strength of the immune response that the vaccine elicits. Vaccines vary in their ability to generate and maintain an immune response, partly due to their ability to 'educate' the immune system about the specified pathogen. Not only does this depend upon the antigen but also on the 'carrier' or adjuvant that is also present in the vaccine.

It is the adjuvant that can enhance the presentation of the antigen to the immune system, and thus generate a more powerful response. Getting the adjuvant right in a vaccine is every bit as important as getting the antigen correct.

In the case of single-dose vaccines, researchers have tried to develop antigen/adjuvant combinations that produce an immune response that is so fast and powerful that a second dose is not required. For example, with the *M. hyopneumoniae* vaccine, Stellamune One, immunity begins to develop within 2 weeks and then lasts for at least 25 weeks. Studies have confirmed that the immune response is equivalent to that seen with standard 2-dose Stellamune vaccine. This is recognised as a huge advance for the swine industry.

In practice, the one-dose option means that piglets can be protected from an earlier age, before weaning, and with less use of labour.

Despite these obvious benefits, single-dose vaccines do not fit with the 'conventional' way of thinking, and this 'knowledge' can act as a hurdle to their use. Knowledge and understanding are key attributes for any successful swine business, but they are most useful when they are combined with a mind that is flexible and open.

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STRESS COSTS

Sky News recently carried a story about a Vietnamese swine farmer who has increased productivity among his 3,000 pigs by playing music by Beethoven, Mozart and Schubert while they eat. The experiment started six years ago for the benefit of his workers, but he noticed that it also had a soothing effect on the pigs and increased the amount they were eating.

The fact that chilled out, happier pigs produce a better quality product and bigger profits is not new. Scientists have recognised for some time that stress is associated with greater risk of disease, bigger variations in growth rates and poorer quality meat. They have even identified the gene responsible for porcine stress syndrome (PSS), the inherited myopathy that leads to pale, soft and exudative (PSE) pork.

Stress can be considered broadly in two groups: physical and psychological. Physical stressors include environmental conditions such as poor air quality, excessive heat, pain, handling or lack of water. Psychological stressors include bullying by other animals, new or unexpected situations, loud noises and competition for food or water. In many cases, there is a mixture of both physical and psychological factors.

Good stockmen do all they can to reduce stress on their animals. Housing is designed to provide a calming environment with easy access to food and water, and stock levels chosen to reduce overcrowding. Handlers are encouraged to mingle with animals on a regular basis, so they become familiar with the presence of people.

Handling pigs is not only stressful and costly for the animals, it is of course also stressful for the stockmen.

Pigs are intelligent animals and quickly learn the warning signs of an impending procedure – for example trying to give them an antibiotic inject on a daily basis can become increasingly difficult. There is always a risk of needles breaking off.

The fact that skilled labour is an increasingly rare and expensive commodity on swine farms was one of the reasons why Pfizer Animal Health decided several years ago to research and develop more treatments that could provide a whole course of treatment in just one injection. The aim was to make life easier and less stressful for both the pigs and the farmer.

This research is now starting to bear fruit. The last few years has seen the launch of two one-dose antibiotic treatments: Draxxin (tulathromycin) and Naxcel (ceftiofur crystalline free acid). Both products are not only extremely efficacious in the treatment of target infections, but they also have the potential to cut the amount of labour and stress significantly compared to multi-dose courses of injectable antibiotics.

As the swine industry continues to become more competitive and more global, investment in systems that produce returns in the form of reduced labour, increased convenience and peace of mind for the producer, improved animal welfare, and enhanced productivity is essential. Even seemingly small changes to production, like the adoption of single-dose treatments in place of traditional multi-dose courses, will help to deliver these kinds of return and give successful businesses the edge they are looking for. Who knows, even a few classical CDs might prove to be a wise investment.

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SHAPING THE FUTURE

The whole of European farming is currently going through a period of rapid and significant change – and the swine industry is no exception. But where will this transition lead us? What will the swine industry look like in ten years' time?

Some of the organisations that are best placed to answer such a question are the animal health companies. They not only have to adapt to any trends in the industry but are also responsible for driving some of the changes. It can take ten years or more, and millions of Euros, to get a new swine product to market. Therefore, an accurate vision of the future is a real asset.

So what does Europe's largest animal health supplier think the future holds for European swine vets and farmers.

"The next ten years will see an increasingly integrated and competitive industry," says Marco Leone, Head of European Swine Marketing for Pfizer Animal Health. "The number of farms will continue to fall and the average herd sizes will increase. Value creation via pork quality and cost-effective production on a large scale is where the future lies."

According to Marco, the continuing move towards globalisation of food markets will put even more pressure on European farmers to produce good quality pork as efficiently as possible.

"The shortage of skilled labour, and the need to cut labour costs, will mean that farmers will have to adopt new ways of working with less man hours available per pig produced. This obviously has implications for animal health, because less time with animals means less chance of catching disease early – and that potentially means more veterinary costs."

Pfizer Animal Health has already responded to the need to make health care and veterinary intervention more efficient by developing single-shot treatments such as Draxxin and Naxcel. This vision extends beyond the swine

industry; the company has also developed one-shot products for use in the dairy industry and companion animal practice.

"These products recognise the fact that time is money and that successful farmers in the future will want products that are not only highly effective but which reduce labour input and minimise stress to the animal."

"Veterinarians will also shift the emphasis of healthcare towards preventive medicine in the future, but in a targeted way as part of an overall health plan. I think in the future, successful farmers will have to know much more about the disease patterns within their own herd and understand the most cost-effective ways of protecting them. In this context, the role of veterinarian will become far less reactive and far more pro-active – vets will be seen far more as 'business' consultants than they are now."

European consumers are taking an increasing interest in the way their food is produced, and this trend looks likely to continue in the next 10 years. Traceability within the food chain is an important issue, both for consumers and legislators.

"More people want to know where their food comes from, how it is produced and that it is safe," says Marco. "This is one area where the European industry can protect itself and gain an advantage over cheaper imports from outside the EU."

"The use of quality inputs and the use of meat quality standards to reassure the consumer will become much more widespread over the next few years as consumers become more choosy about the produce they buy."

So, is the future bright?

"I think we have a very strong swine industry in Europe and as long as we can adapt to the changing market and develop our industry accordingly, I think we have a very bright future ahead of us."

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