International Pig Topics

Pighealth BYTES

Your own reference source on pig health

ESPHM 12th EUROPEAN SYMPOSIUM OF PORCINE HEALTH MANAGEMENT

Number: 182

Vaccinology XVIII

The future of vaccines

There has never been a period in which the need for vaccines was more clear. With Covid-19 and ASF viruses causing major disruptions in society, and enormous economic damage, everyone is now aware about the need for vaccines.

What is necessary to develop vaccines against these two viruses and other new diseases? Basically the same knowledge that is needed for the old disease vaccines. You need to understand how the immunity to control the pathogen is functioning and you need to know which part of the virus is responsible for provoking a reaction in the body that leads to protective immunity.

For learning how protective immunity is induced and is working, both pathogen and patients need to be studied. When we cannot isolate, determine and cultivate the disease-causing pathogen, we can not develop systems to test our findings. When we can not study the damage caused by the new disease in patients we have no leads to guide our research.

The immune system is both well-organised and very complex. Interpretation of what is seen is not easy. For example, antibodies can be measured but when they have no function in protection, they only lead to confusing information. The different parts of the immune system communicate with each other through messenger molecules (also called cytokines). These cytokines activate certain specific cells in the system or just depress their activity. An overproduction of cytokines can be induced by the invading pathogen leading to an over reacting immune system. But how much is too much? The term 'cytokine storm' was used when the high path PRRS virus hit the industry and is, for example, connected with Spanish Flu in the years after the First World War. Cytokine profiles, a nowadays widely studied subject, can be rather complex and may lead to misinterpretation and confusion. In Covid-19 treatment schemes preventing an over-reacting immune system, induced by the corona virus, is now common practice.

The new generation of vaccines are dealing with more complex immune reactions and are high-tech biological products. R&D efforts to design and develop such products is enormous. The description of the mode of action of these innovative products reads like a science fiction story. It is essential that the knowledge, the experience and the laboratories equipped with hardware to study these new techniques, are preserved for current and future activities.

This is a financial investment and burden that must be provided by society. Such investment was not made available in the past decades for developing an ASF vaccine. ASF was regarded as a 'poor man's' disease and therefore commercial interest was lacking. This has changed, but in the meantime many years were lost.

The future for vaccines is good. New diseases are emerging. Prevention is better than cure. Cure (read antibiotics) is under pressure. However vaccines can only be used in an optimal manner when the veterinarians (and/or farm manager) understand both the epidemiology of the pathogen in the region and the biological field in which the pathogen and vaccine operate.

To develop vaccines requires expertise and so does using them!