International Pig Topics

Pig Focus Asia 2020

ESPHM 12th EUROPEAN SYMPOSIUM OF PORCINE HEALTH MANAGEMENT

Pighealth BYTES

Your own reference source on pig health

Number: 165

Vaccinology

Boehringer Ingelheim

ECO

EVONIK POWER TO CREATE

innovad

miXscience Innovate for Life

HUVEPHARMA we add performance to your business

Alltech

MSD Animal Health

Arm & Hammer

Biorigin

Lallemand

LUBING

Norel

Novus

Perstorp

Silvateam

Wisium/Neovia

This series of Pighealth Bytes will deal with vaccinology. Aspects related to strain selection and development of a vaccine, proper handling of vaccines, vaccination techniques and vaccination schemes will be covered – both from users and a pig health viewpoint. When deciding to vaccinate, suggestions will be given on how to select a vaccine and how to evaluate the return on investment in terms of efficacy.

Strain selection

Making a vaccine and using it in an efficient and efficacious manner, is an art. At best it is comparable with biological warfare. In vaccinology, biology sets the rules in relation to controlling or winning the fight against the 'enemy'. When applying vaccination, a manipulated bacterial or viral strain of a certain species is used to induce immunity against as many possible different field strains of that same species. This is fine when the immunological relationship between the strain used to develop the vaccine and the strains in the field is great, like it is with porcine Parvo virus. It is a nightmare however when this immunological relationship is an issue, which is what we see with, for example, PRRS virus field strains. The consequence of this immunological relationship, which forms the basis for protection, is that users are very satisfied with Parvo vaccines, irrespective of the field strain, and with PRRS vaccines only when the field strain that infects the vaccinated pigs is covered by the vaccine strain, which is more or less a lucky event.

Heterologous protection in the case of PRRS vaccines can still be present but in general is poor. Why is that happening? Bacteria and viruses are living organisms and with all living organisms, the fittest will survive. Being regarded as the fittest also depends on the environment in which they live. For example when antibiotic products are used there is antimicrobial pressure on survival. Those bacteria that have the appropriate resistance genes are then the fittest and they will flourish because competing, and not resistant, bacteria are killed by the antibiotic compound. But the same thing happens when immunity induced by a vaccine strains is putting selective pressure on the population. This means that among all the different field strains a certain field strain might not, or only partly, be controlled by the immunity that is induced by the vaccine strain. These field strains that are not covered by the induced immunity will then become the dominant population on the farm and will be the cause of problems despite vaccination.

Another mechanism to escape immunity induced by the vaccine strain is by mutation. During the multiplication process of a bacteria or virus, mistakes can be made in the genetic constitution of the living creature. The resulting change might deliver a new strain with increased disease-causing capabilities. These new field strains are called escape mutants.

Conclusion

Selecting a vaccine strain is a difficult process that should take the specific features of that species into account. When using a vaccine regular checks should be done to ensure that the vaccine strain provides protection against the prevailing field strains. The longer the vaccine is used, the more information will be gathered to assess the possible appearance of new strains.

© Positive Action Publications Ltd