



## Understanding *Streptococcus suis* Key insights into Prevention and Eradication

Illness in pigs, caused by *Streptococcus suis*, is characterized by septicemia, meningitis, polyarthritis, polyserositis, and valvular endocarditis. In addition to an increased mortality rate, production parameters such as growth and feed conversion remain behind, and animals are more susceptible to other pathogens.

Disease, caused by *S. suis*, also leads to increased antibiotic use. Although the introduction of Phenoxyphen<sup>®</sup> has made a more targeted approach possible, prevention is still better than the need for curative treatment.

### Natural habitat

The natural habitat of *S. suis* is the upper respiratory tract, particularly the tonsils and nasal cavities, as well as the genital and possibly alimentary tracts of pigs.<sup>1</sup> It is easily detected in almost all pigs of any age. Not all serotypes or all strains within a serotype have the potential to cause disease and, next to that, virulent strains can also be carried subclinically by healthy pigs.<sup>2</sup> *S. suis* has uncommonly been confirmed in other animals, like cattle, lambs, wild rabbits, and dogs, suggesting that these could serve as unlikely sources for pigs. Additional mammals and birds might also carry *S. suis*.<sup>1</sup>

### Factors that influence prevention

Mixing piglets from different litters should be avoided as much as possible, since not every piglet is colonized by *S. suis* at birth. This implies the importance of keeping piglets within their own litter as much as possible.<sup>3</sup> Vangroenweghe *et al.* (2009) also state that moving piglets to, for example, a foster sow should be kept to a minimum.<sup>4</sup>

Another critical moment is weaning. Housing weaned litters separately, thereby reducing piglet contact, also prevents the spread of *S. suis*. Additionally, the stress of weaning and the loss of lactogenic immunity create a so-called immunity gap. Management practices such as all-in/all-out pig flow can help reduce the incidence of the disease. Dividing large buildings into smaller rooms can help spread out the age distribution among pigs. Cleaning each room between groups of pigs reduces the buildup of microorganisms.<sup>4</sup> Co-infections, for example with PRRSv and influenza virus, significantly increase susceptibility to *S. suis* disease.

### Prevention through vaccination

Vaccination against *S. suis* is possible but variable in scope and efficacy, primarily due to the bacterium's high genetic diversity across serotypes. The commercial bacterin vaccines available are mainly for serotype 2, the most common pathogenic type. But this does not cover all other strains effectively.

Another option would be a subunit vaccine. Subunit vaccines can induce strong and specific immune responses against *S. suis*. The core of these vaccines lies in utilizing highly immunogenic antigens derived from *S. suis*, produced through the single expression in systems such as *E. coli* or other engineered bacterial strains or viral expression systems. Ongoing research is exploring the potential of subunit vaccines, which use adjuvants or vectors to provide broader protection, but these vaccines are not yet commercially available.<sup>5</sup>

For now, options focus on targeted approaches like autogenous vaccines. These farm-specific vaccines made from isolates recovered from diseased pigs on the same farm can be produced for multiple serotypes and/or combination of serotypes. Accurate diagnostics are crucial to the success of an autogenous vaccine. Numerous identifications and serotypings, conducted by our laboratory, RIPAC-LABOR GmbH, have shown that many different serotypes can cause clinical symptoms. This also applies to different types within a single farm.

The produced autogenous vaccine is used to vaccinate sows, and/or piglets, to reduce clinical signs and mortality in piglets. Variable results regarding efficacy of *S. suis* autogenous vaccines have been reported in published literature. This can be explained by the nature of these vaccines, where farm-specific bacterial strains are used for the production of each farm-specific vaccine. Additionally, the quality of sample collection and the quality of the diagnostic and production laboratory is essential. However, recent studies demonstrate that protective passive maternal immunity against *S. suis* can be achieved.<sup>6,7</sup>

## The possibilities of eradication

The question is whether the complete eradication of *S. suis* on pig farms is feasible with current methods, given that the bacterium colonizes healthy carriers (for example, in the tonsils) and spreads easily. Early weaning medicating piglets is ineffective since *S. suis* is a very early colonizer. Cesarean section can be used to derive pigs free of *S. suis* from infected dams. Only depopulation and restocking with “clean” pigs will ensure eradication of the infection. In most herds, this cannot be justified economically. Furthermore, the question arises as to whether a farm can subsequently be declared free of the disease, given the zoonotic nature and widespread occurrence of the pathogen.

## References

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