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Streptococcus suis: A danger among our swines and… among us!

Resume:

Streptococcus suis is a major swine pathogen responsible for septicemia, meningitis, arthritis, and endocarditis, causing significant economic losses in the global swine industry. It also poses a recognized zoonotic risk. The capsular polysaccharide (CPS) is the main virulence determinant of S. suis. It also serves as the basis for serotype classification and represents a key target for the development of glycoconjugate vaccines. However, most studies focus on serotype 2, which is considered the most virulent and the main zoonotic serotype.

Yet, among the many described serotypes, serotype 3 (SS3) is frequently isolated in several regions of the world, notably in Europe, Asia, and North America. Indeed, the most recent review analyzing the distribution of S. suis serotypes in diseased pigs reported that serotype 3 was the third most prevalent serotype globally. We have demonstrated that, structurally, the serotype 3 CPS is closely related to hyaluronic acid and differs significantly, in both composition and structure, from serotype 2 (the most studied and characterized serotype to date). Given the unique structural features of the serotype 3 CPS, we hypothesize that it plays a role in host-pathogen interactions distinct from that of serotype 2.

To test this hypothesis, a non-encapsulated SS3 mutant is being used to investigate the role of its CPS. This will enable an analysis of the CPS's influence on host-pathogen interactions. These factors include the ability of the mutant and the parent strain to adhere to and invade respiratory epithelial cells (the first protective barrier), their survival in the blood versus their destruction by phagocytic cells, as well as the development of antibodies against CPS3 and B-cell activation.

In this way, the project will deepen our understanding of serotype 3. The results will provide an essential foundation for developing glycoconjugate vaccines targeting serotypes other than serotype 2, thereby fostering the emergence of more effective prophylactic strategies. Ultimately, these advances will help reduce antibiotic use in swine production and limit antimicrobial resistance.