



CONFERENCE/WORKSHOP ORGANISER'S REPORT

“4th International Workshop on Streptococcus suis”

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Brief Description of what the conference/workshop was about

Streptococcus suis (*S. suis*) is considered the most important bacterial swine pathogen leading to important economic losses to the porcine industry worldwide. Control is based on an alarming antibiotic misuse that lead to a dramatic increase of the risk related to antibiotic resistance. It is also an agent of disease in humans and considered in most OECD countries as an occupational disease (swine industry workers). In Asia, this pathogen affects the general population and represents a significant public health concern. After a deadly 2005 Chinese human outbreak, research teams worldwide turned their attention to *S. suis* with an explosion of published articles.

The objectives of the “4th International Workshop on *Streptococcus suis*” that was held in Montreal, Canada were:

- a. Reuniting researchers, knowledge-users and partners in working together to identify research questions or emerging issues in the *S. suis* field.
- b. Exchanging on the current situation on vaccine development and strategies to reduce the use of antibiotics in animal production in the fight against antimicrobial resistance.
- c. Discussing alternatives to the use of antibiotics (such as vaccines)
- d. Building an opportunity for knowledge exchange involving stakeholders (veterinarians and swine producers) on the risk posed by *S. suis* infection, diagnostics, and preventive measures.

Participation – details of total number of participants, countries they came from, backgrounds (academia, industry, etc.)

a. Total number of participants and backgrounds:

- Academia: 58
- Industry: 34
- Government: 18
- Students/post-docs: 80

Total = 190 (to be noticed that 68 participants were from outside the province of Quebec)

b. Represented countries:

- Canada; USA; Brazil; Australia; China; Thailand; Taiwan; Spain; Italy; Germany; France; UK; Japan; Netherlands; Sweden



Major highlights from the presentations

- Data on how *S. suis* persists within tonsils: the niche of the pathogen
- Explaining how influenza virus and *S. suis* work together to cause disease
- Exploring the link between genome and virulence: identification of virulence factors
- New human organoids to study the pathogenesis of the *S. suis* infection
- Epidemiology of the *S. suis* infection in humans and pigs in Asia
- Epidemiology and virulence factors among swine strains in Italy
- Epidemiology and virulence factors among swine strains in Spain
- Epidemiology and virulence factors among swine strains in USA and Canada
- Identification of mobile genetic elements that disseminate antimicrobial resistance
- Autogenous vaccines: there is a need of standardization...and no scientific data yet to confirm they protect in the field
- New policies for autogenous vaccine production from 2021: Recommendations for the manufacture, control and use of inactivated autogenous vaccines within the EEA
- Virulence of *S. suis*: there is a need of international agreement on how evaluate virulence and virulence factors

Major outcomes/conclusions in terms of policy relevance

- New policies about the manufacture, control and use of inactivated autogenous vaccines within the EEA: similar policies must be applied in North America. New definition of “farm” where the strain has been isolated: strain will be considered the same when the farms are epidemiologically linked.
- There is also a need to harmonize the steps for the manufacturing of autogenous vaccines by different companies.
- Identification of protective antigens to be used in vaccines (sub-unit vaccine): candidates must be confirmed by independent laboratories.

Relevance to CRP theme(s)

Our workshop was specifically related to Theme 2: “**Managing risk in a connected world**”

Within this theme, our Workshop addressed three topics:

a. Food safety: *S. suis* infections in humans in Asia occur mainly through the oral route. Consumption of undercooked animal products is a well-established risk factor for acquiring many infectious diseases, including *S. suis*. In Vietnam, Thailand and Laos, raw blood of pigs is consumed in a dish known as “tiet canh”. The



main ingredients of porcine “tiet canh” include coagulated, fresh, uncooked blood mixed with chopped cooked pork tissues. This is one of the main (but not the only one) source of human infection by *S. suis*.

b. Emerging diseases: *S. suis* is considered a re-emerging disease in animals (due to the reduction of antimicrobials in European countries) and an emerging disease in humans: with higher number of swine cases, more cases of human infections are reported.

c. Antimicrobial resistance: *S. suis* is mainly localized in the tonsils and most pigs are carrier animals, harbouring mostly low virulent strains. In the presence of virulent strains, some carrier piglets will develop septicaemia, meningitis and/or arthritis due to dissemination of *S. suis*. The incidence of the disease may be as high as 20%, although it is usually kept lower than 5% in the field, due to the extensive and routine prophylactic and metaphylactic use of antimicrobials. **Data from antimicrobial resistance of *S. suis* worldwide are alarming and restriction of antimicrobials as a preventive measure must be a primary concern.** In addition, the most effective drugs against *S. suis* are those in categories 1 and 2 (Critically or Highly Important). The industry is trying to reduce the use of these drugs, given their importance in human medicine. Indeed, *S. suis* is considered a niche for antibiotic resistance and represents a high risk of transmission of resistance to other pathogens. This arises from mobile genetic elements in *S. suis* carrying resistance genes that are transferable at high frequency within and between bacterial species.

Website for further details – please also indicate if the presentations are/will be available on the website

Presentations were available in the website until mid-October (website no longer active). Program is still available in the research centre website: https://docs.wixstatic.com/ugd/c91739_70763c6db3334a2cb64748e985906b2c.pdf

List of keynote speakers: https://docs.wixstatic.com/ugd/c91739_664e2b43b4634cc1a3304226b0f4c964.pdf

A review is presently under preparation with all keynote speakers as co-authors. Individual proceedings will be published together with the review. The review will be submitted to the journal “Pathogens” before mid-December to be published in a special issue: "Update on *Streptococcus suis* Research and Prevention in the Era of Antibiotic Restriction - 4th International Workshop on *Streptococcus suis*" (https://www.mdpi.com/journal/pathogens/special_issues/Workshop_Streptococcus_suis)