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31 *Streptococcus dysgalactiae* a potential source of zoonotic infection in the kitchen

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Background: *Streptococcus dysgalactiae* is comprised of two subspecies; *S. dysgalactiae* subspecies *equisimilis* (SDSE) and *S. dysgalactiae* subspecies *dysgalactiae* (SDSD). Traditionally *S. dysgalactiae* have been separated into β -haemolytic SDSE which infect humans and α -haemolytic SDSD that are animal pathogens. Interestingly, a suspected zoonotic fish-associated SDSD infection was first described in Singapore in 2008. We have since isolated a few more suspected zoonotic *S. dysgalactiae* from humans and from fish meat being sold at a market. Here, we performed a comparative genomics analysis of five local *S. dysgalactiae* (recovered from four human and one fish meat samples) and 15 publically available *S. dysgalactiae* genomes (2 SDSD and 13 SDSE).

Materials/methods: Five samples were collected from patients and fish meat from 2005 to 2017. Samples were cultured on blood agar plate and identified by MALDI-TOF. The isolates were sequenced using PacBio® RSII or Illumina Hiseq4000 system. Whole-genome sequencing data was used to determine the subspecies identification. Sequence type (ST), antiphagocytic M protein, antimicrobial resistance and virulence genes were characterized. Population structure was inferred using phylogenetic analysis of publically available selected genes.

Results: The five isolates are identified as SDSD except for one clinical sample which was SDSE. The SDSD isolates belonged to three different STs; ST341, ST246 and ST450, while the SDSE isolate belonged to ST342 clone. The virulence gene profiles of SDSD isolates are distinct from the publically available human isolates and clustered most closely with fish isolates in the phylogenetic analysis. The SDSE isolate clustered with human isolates.

Conclusions: It appears that zoonotic infections of SDSD may be acquired as a result of handling meat. SDSD infection is likely to be rare given that the opportunity to acquire zoonotic infection with this species is uncommon. It may also be under-recognized because the variability of haemolysis on blood agar may result in failure to distinguish SDSD from SDSE in the routine laboratory. The possibility of zoonotic SDSD should be suspected in patient with bacteraemia and ascending cellulitis of the upper limb with a history of handling meat. Hence, confirmation of the identity of SDSD can only be made with a multi-gene approach.