

# Uncovering emerging *Streptococcus canis* as a zoonotic agent of public health concern

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## Editorial

Several bacterial agents have emerged in the past decades that cause high morbidity and mortality in humans and animals throughout the world.<sup>1,2</sup> Among these pathogens, *Streptococcus canis* belonging to the genus *Streptococcus*, family *Streptococcaceae*, is one of causative agents of streptococcosis. The other species of *Streptococcus*, such as *S. pyogenese*, *S. suis*, *S. pneumoniae*, *S. dysgalactiae* sub sp. *S. dysgalactiae*, *S. iniae*, *S. halichoeti*, *S. equi* subsp. *zooepidemicus*, *S. mitis*, *S. porcinus*, *S. agalactiae*, *S. marimammalium*, and *S. phocae* are also implicated in the etiology of streptococcosis, an important bacterial disease of global public health and economic significance.<sup>3-6</sup>

*Streptococcus canis* is an emerging multi-host pathogen of One Health concern that causes various clinical disorders in animals and humans, and is reported from several nations of the world.<sup>7-10</sup> It is a Gram-positive, non-motile, non-spore forming, cocci shaped bacterium that can produce life-threatening infections in humans.<sup>6,10</sup> The organism is sensitive to 70% ethanol, 1% sodium hypochlorite, 2% peracetic acid, formaldehyde, hydrogen peroxide, and quaternary ammonium compounds.<sup>5</sup>

*Streptococcus canis* has been isolated from many species of animals, such as badgers, cats, cattle, dogs, foxes, horse, kinkajous, minks, otters, rabbits, rats, sea lions, and seals.<sup>5,6,11</sup> Cross-infection between cats and cows has been described by Tikofsky and Zadoks.<sup>12</sup> It is important to mention that toxic shock-like syndrome that can develop into a serious illness within hours carries high mortality rate in both dogs and cats.<sup>5</sup> The infection in humans occurs in sporadic form<sup>13</sup> where as in cattle outbreaks of mastitis are reported.<sup>14</sup> In humans, *S. suis* can cause variety of clinical syndromes like cellulitis, arthritis, purulent skin infection, endocarditis, and septicemia.<sup>15</sup> Trauma is considered as a significant risk factor, and maximum cases have been recorded in elderly patients above the age of 60 years.<sup>16,17</sup>

The zoonotic significance of *S. canis* has been delineated in a woman who developed septicemia two weeks following bite from a dog, and the pathogen was isolated from the oral cavity of dog. Further thorough examination of human and canine strains revealed that both shared the similar PFGE pattern, thus supporting zoonotic transmission of *S. canis* from canine-to-human.<sup>11,15</sup>

The direct demonstration of Gram positive cocci in chains or pairs in stained smears from clinical specimens helps in presumptive diagnosis of *S. canis* infection. However, the isolation of pathogen from the clinical specimens on blood agar confirms the diagnosis.<sup>5</sup> Recently, PCR technique has been developed for the diagnosis of *S. canis*.<sup>5</sup>

A number of antibiotics, such as amoxicillin, ampicillin, vancomycin, and clavulanic acid are recommended for the treatment of *S. canis* infections in human beings. In animals, penicillin, amoxicillin and clavulanic acid are used.<sup>10,12,15</sup>

*Streptococcus canis* acts as a primary pathogen of dog, and occurs as a commensal on the skin and mucosal surfaces of healthy dogs.<sup>10</sup> In this context, Pagnossin and co-workers<sup>10</sup> described that bites and scratches by dogs may be considered as a significant driver of human infections. It is advised that pet owners, para-veterinary staff, pet handlers, and veterinarians should use gloves to prevent the bites/scratches while dealing with dogs and cats.

The infection caused by *S. canis* are underestimated and hence, the true magnitude of the disease burden is not well understood. Therefore, comprehensive and systematic studies should be conducted to know the morbidity and mortality from this emerging canine pathogen. It is emphasized that further research on the virulence, pathogenesis, and epidemiology will be rewarding. The role of animals in the transmission of *S. canis* to humans needs to be elucidated. As zoonotic potential of this bacterium poses a public health risk for humans, One Health approach having experts from veterinary, medical and environmental science seems pertinent.

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## Conflicts of interest

The author declares that there are no conflicts of interest.

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