Lactococcus garvieae: emergent pathogen usually misidentified as enterococcal species

Abstract
Due to its many phenotypic similarities to enterococci, Lactococcus garvieae is frequently misidentified as Enterococcus spp. Initially recognized as a low virulence organism, the species has increasingly been isolated from both animal and human clinical specimens. Its clinical relevance has also increased due to the identification of important antimicrobial resistance profiles, including plasmid encoded resistance.

Keywords: lactococcus garvieae, enterococcus spp, infections, foodborne disease, antimicrobial resistance

Introduction

Lactococcus garvieae is a Gram-positive, non-motile, non-pigmented, facultatively anaerobic, catalase-negative, pyrroliodinyarylamidase (PYR) positive coccus. It grows at 10°C, at pH 9.6 and may grow at 45°C and on 6.5% NaCl. It can hydrolyze esculin in the presence of bile and produce alpha hemolysis on blood agar. It ferments glucose, mannitol, maltose and fructose but does not ferment arabinose, raffinose and sorbitol, what is a significant differentiation to enterococci.\(^1\)\(^2\) Normal growth at 45°C, on 6.5% NaCl and at pH 9.6 caused L. garvieae to be misidentified as a new species called Enterococcus seriolicida.\(^3\) These atypical phenotypic characteristics combined to genotypic heterogeneity led to the identification of two subspecies: L. garvieae subsp. garvieae and L. garvieae subsp. bovis.\(^4\) The reliable and conclusive identification of L. garvieae can be performed using matrix-assisted laser desorption ionization-time of flight mass spectrometry (Maldi-TOF-MS), which is extremely quick and simple.\(^5\)\(^6\)

Lactococcus garvieae is frequently isolated from fish and marine animals, but has also been isolated from humans, cows, buffalos, pigs, birds, cats, dogs and horses. It has also been isolated from environmental samples from water bodies and sewage.\(^7\)\(^8\) It can also be found as a contaminant in many types of foods such as beef, pork, poultry and turkey meat and meat products, milk and dairy products, brocoli, celery, salads, vegetables, cereals, wheat flour.\(^9\)

Lactococcus garvieae has been considered an emerging bacterial pathogen with increasing relevance for both human and veterinary medicine. Classically, it is described as a pathogen of fish and seafood and as the causative agent of multisystemic lactococcosis in aquaculture rainbow trout, eel, yellowtail and prawn. It can be the causative agent of subclinical mastitis in brazilian water buffalos raised for milk production and pneumonia in pigs. It has also been identified as the etiologic agent of human diseases such as infectious endocarditis, liver abscess, infective spondylodiscitis, osteomyelitis, peritonitis, diverticulitis and gastroenteritis associated to the consumption of raw seafood.\(^10\)\(^11\)\(^12\)

Comparisons of Lactococcus garvieae strains genomes isolated from cases of human infections and from a variety of food products (fish, seafood, meat, milk and dairy products) indicated a close genetic relationship, suggesting that human infections by L. garvieae are foodborne-related.\(^4\) Some authors have already confirmed the presence of antimicrobial resistant strains of L. garvieae in fish for human consumption\(^13\)\(^14\) and multidrug resistance plasmids were identified in human clinical isolates of L. garvieae.\(^15\) There is a recent report of urinary tract infection caused by a strain of Lactococcus garvieae resistant to gentamycin, clindamycin and bacitracin, suggesting a development of an important antimicrobial resistance profile in human infections.\(^16\) Often, this a result of a selective pressure due to the extensive use of antimicrobial drugs, which increases both the complexity of the infection treatment and the risk of antimicrobial resistance transmission.

Conclusion

The importance of Lactococcus garvieae as human pathogen has been growing as strains previously reported as Enterococcus spp. were reidentified as Lactococcus garvieae with multidrug resistance in some cases. The dissemination of the knowledge about the species and the identification of possible sources of Lactococcus garvieae infections can aid in the prevention of many diseases in humans and animals.

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Conflict of interest
Author declares no conflict of interest.

References
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