

Please read this section first

The HPCSA and the Med Tech Society have confirmed that this clinical case study, plus your routine review of your EQA reports from Thistle QA, should be documented as a "Journal Club" activity. This means that you must record those attending for CEU purposes. Thistle will **not** issue a certificate to cover these activities, nor send out "correct" answers to the CEU questions at the end of this case study.

The Thistle QA CEU No is: **MT00025**.

Each attendee should claim **THREE** CEU points for completing this Quality Control Journal Club exercise, and retain a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

MICROBIOLOGY LEGEND

CYCLE 28 - ORGANISM 1

ENTEROCOCCUS

Enterococcus is a genus of lactic acid bacteria of the phylum Firmicutes. Enterococci are Gram-positive cocci that often occur in pairs (diplococci) or short chains and are difficult to distinguish from Streptococci on physical characteristics alone. Enterococcus species are hardy, facultative anaerobic organisms that can survive and grow in many environments: extreme temperature (10-45°C), pH (4.5-10.0) and high sodium chloride concentrations. In the laboratory, Enterococci are distinguished by their morphologic appearance on Gram stain and culture (gram-positive cocci that grow in chains) and their ability to (1) hydrolyze esculin in the presence of bile, (2) grow in 6.5% sodium chloride, (3) demonstrate pyrrolidonyl arylamidase and leucine aminopeptidase, and (4) react with group D antiserum. Members of the genus Enterococcus were classified as Group D Streptococcus until 1984 when genomic DNA analysis indicated that a separate genus classification would be appropriate.

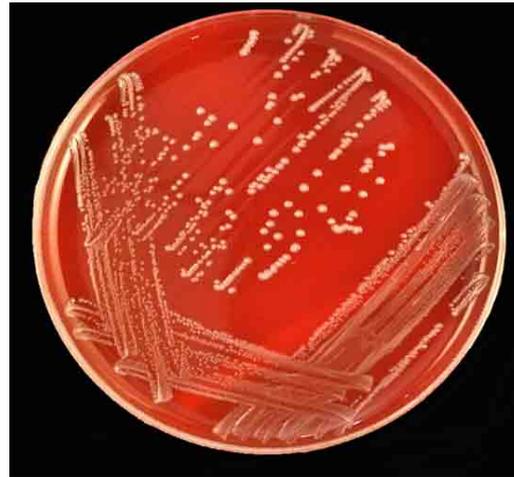
Enterococcus faecalis and Enterococcus faecium are the most prevalent species cultured from humans, accounting for more than 90% of clinical isolates. E faecium represents most vancomycin-resistant Enterococci (VRE). E. faecalis is a non-motile microorganism. Other Enterococcal species known to cause human infection include Enterococcus avium, Enterococcus gallinarum, **Enterococcus casseliflavus**, Enterococcus durans, Enterococcus raffinosus and Enterococcus mundtii.

Enterococcus casseliflavus, first considered as a subspecies of E. faecium, is a motile Enterococcus that produces a yellow pigment in agar and often has a VanC phenotype determining an intrinsic low level resistance to vancomycin. It has been implicated in a wide variety of infections in humans, especially immunocompromised hosts.

Isolation of Enterococci resistant to multiple antibiotics has become increasingly common in the hospital setting. Sensitive strains of these bacteria can be treated with ampicillin and vancomycin. From a medical standpoint, the most important feature of this genus is the high level of endemic antibiotic resistance. Some Enterococci are intrinsically resistant to β -lactam-based antibiotics (some penicillins and virtually all cephalosporins) as well as many aminoglycosides. In the last two decades, particularly virulent strains of Enterococcus that are resistant to vancomycin (Vancomycin-resistant Enterococcus, or VRE) have emerged in nosocomial infections of hospitalized patients.



E. casseliflavus



E. faecalis

Pathophysiology

Infections commonly caused by Enterococci include urinary tract infections, endocarditis, bacteraemia, catheter-related infections, wound infections, and intra-abdominal and pelvic infections. Many infecting strains originate from the patient's intestinal flora. From here, they can spread and cause urinary tract infection, intra-abdominal infection, and surgical wound infection. Meningitis, pleural space infections, and skin and soft-tissue infections have also been reported.

Mortality/Morbidity

In general, the virulence of Enterococci is lower than that of organisms such as *S. aureus*. However, Enterococcal infections often occur in debilitated patients and as part of polymicrobial infections. These factors limit the ability of investigators to determine the independent contribution of Enterococcal infections to mortality and morbidity. Vancomycin-resistant bacteraemia increases the length of hospital stay by an average of 2 weeks, and studies calculate an attributable mortality rate of up to 37% from these infections. Mortality rates associated with Enterococcal infections may exceed 50% in critically ill patients, those with solid tumours, and some transplant patients. Bacteraemia caused by VRE strains carries higher mortality rates than does bacteraemia due to vancomycin-susceptible strains. Despite the availability of antimicrobial agents with greater potency against VRE, one study of 113 patients with VRE bacteraemia reported that such agents did not significantly change clinical outcomes.

Sex

In general, Enterococcal infections are distributed equally between the sexes. Although urinary tract infections are more common in healthy women than in healthy men, Enterococci are an uncommon cause of uncomplicated cystitis in this setting. In published series of Enterococcal endocarditis, men often outnumber women.

Age

Enterococcal infections are more common in elderly patients because of various associated factors that are more common in these patients. For example, urinary tract catheterization is more common in elderly populations. Abdominal surgery for diverticulitis or biliary tract disease is also performed more commonly in elderly persons. In a recent series, most cases of Enterococcal endocarditis occurred in elderly individuals. In neonates, Enterococci occasionally cause bacteraemia and meningitis.

References

1. <http://en.wikipedia.org/wiki/enterococcus>
2. www.biomedcentral.com
3. [www.wikipedia.org/enterococcus faecalis](http://www.wikipedia.org/enterococcus/faecalis)

Questions

1. Discuss how you would distinguish between *E. faecalis* and *E. casseliflavus* in your lab.
 2. What are the morphological characteristics of the genus *Enterococcus*?
 3. Discuss the pathophysiology of *Enterococci*.
-