

Enterobacter
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general

- Enterobacter spp. are motile Gram-negative bacilli that produce ornithine decarboxylase and are urease negative.
- These features distinguish them from Klebsiella spp.
- Enterobacter spp. are ubiquitous organisms found in human and animal faeces and in the environment, including water, plants and plant materials.

infections & colonisation

- Of the 14 species, Enterobacter aerogenes and Enterobacter cloacae are the most commonly isolated and are particularly important nosocomial pathogens in the ICU.
- They cause a variety of infections including bacteraemia, pneumonia, urinary tract and surgical wound infections.
- The most frequently cited risk factor for Enterobacter infection is prior exposure to antibiotics. It appears that the combination of severe debility and the effect of antibiotics on normal flora provide a selective environment favouring colonisation and subsequent infection with Enterobacter spp
- The majority of infections are likely to be endogenous in origin from chronically colonised patients, which implies that infection control practices are unlikely to have a major effect on the overall incidence of Enterobacter infection.

resistance

- All species of Enterobacter possess an inducible, chromosomally encoded beta-lactamase known as AmpC. This enzyme confers resistance to broad-spectrum penicillins, second and third generation cephalosporins and aztreonam, and is not affected by beta-lactamase inhibitors like clavulanate.
- Treatment with broad-spectrum penicillins and cephalosporins, while able to eliminate 'wild-type' strains with inducible AmpC beta-lactamase, preferentially selects out these so-called stably derepressed mutants; this results in treatment failure.
- Resistance to aminoglycosides and other antibiotics is often encoded on the plasmids carrying extended-spectrum beta-lactamases, and it is postulated that this may be one of the selective forces behind acquisition of extended-spectrum beta-lactamases in Enterobacter
- Resistance to carbapenems can occur when high level AmpC expression coincides with loss of outer membrane porin proteins; fortunately, this is rare
- The only agents that maintain activity against the mutants are the carbapenems and newer fourth generation cephalosporins like cefepime.

therapy

- While AmpC beta-lactamase production is the main mechanism of antibiotic resistance in Enterobacter spp., plasmid-borne extended-spectrum beta-lactamases are also encountered.