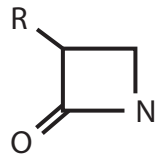


JULY 2007
QUESTION 5

Compare and contrast the spectrum of activity and mechanisms of microbial resistance for; Benzyl Penicillin, Flucloxacillin, Ampicillin



All three drugs are beta lactams

Mechanism of action

Beta-lactams contain a beta lactam ring and inhibit cell wall synthesis by binding penicillin-binding proteins (PBPs)

Resistance mechanisms

Target site may be altered

MRSA synthesizes an additional PBP which enables it to continue cell wall synthesis

Access to the target site may be altered (permeability or pumping)

Beta-lactams must diffuse through porins (which can alter) in gram negative outer membranes

Enzymes may destroy the antibacterial agent produced

Beta-lactamases

Benzyl Penicillin

Flucloxacillin

Ampicillin

Narrow-Spectrum
Natural Penicillin

Narrow spectrum +
Semi synthetic

Moderate spectrum
Semisynthetic

Highly bactericidal, only
gram positives/anaerobes,
susceptible to beta-lactamases

Less bactericidal but stable
to staph beta-lactamases

Can penetrate some gram
negative outer membranes,
but susceptible to beta-lactamases. Often given with
clavulanic acid

Targets

Streptococci
Meningococcus
Clostridia
Listeria
Treponema

Targets

Streptococci
Staphylococcal

Targets

Strep
Listeria
Enterococcus
Haemophilis

Resistance

MRSA
Many Staph
-Beta-lactamase prod
Gram Negatives

Resistance

MRSA
Gram negatives

Resistance

MRSA
Many Staph
-Beta-lactamase prod