

PHOENIX FLYER

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What can you find on Phoenix Lab's web site?

- Interactive online learning in Cytology, Hematology, Parasitology, & Urinalysis
- Printable materials, such as brochures & test request forms
- Archived technical bulletins, flyers, and other articles

www.pclv.net



Brand New Year, Same Ol' Great Service

All of us at Phoenix Laboratory thank you for your continued business and support. Your backing has allowed us to build a foundation strong enough to not be just any laboratory, but to be *your* laboratory. We are determined to continue improving upon all of our services. Therefore, your input is invaluable and your suggestions are welcomed no matter how big or small. Call the marketing department or write an anonymous comment on our webpage at www.pclv.net.



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New FIV Testing!

We are now performing FIV testing using ELISA methodology. Reaction wells are read using a microtiter plate reader. We hope this will eliminate the "equivocal" result which can be so frustrating. Confirmation testing should be by Western Blot. This change will not affect the price or turnaround time of the FIV test.

Guide to Minimum Inhibitory Concentration (MIC) Final Article **Part III**

In part II of our MIC article (from November's Flyer) we went over treatments and some of the recommended antibiotics. In our last segment (part III) we discuss the remainder of suggested antibiotics.

Penicillins

Uses/Susceptible organisms:

- (1) **Penicillin G** – Highly active against most gram positive bacteria, however they are readily hydrolyzed by penicillinase produced by *Staph aureus*.
- (2) **Penicillinase-resistant penicillins** (methicillin, oxacillin, cloxacillin, dicloxacillin) – Generally less potent against gram positive bacteria than Penicillin G, but more effective against *Staph aureus* and *Staph epidermidis*.
- (3) **Ampicillin, amoxicillin** – Gram positive bacteria as well as gram negative bacteria such as *E.coli*, *Proteus mirabilis*. However, these drugs and the following ones are readily hydrolyzed by broad-spectrum β -lactamases that are increasingly found in gram negative bacteria.
- (4) **Carbenicillin, ticarcillin** – Gram positive bacteria, gram negative bacteria as in (3) and

Pseudomonas, *Enterobacter*, *Proteus* (not *Klebsiella*). These agents are inferior to ampicillin against gram positive cocci and *Listeria monocytogenes*.

(5) **Mezlocillin, piperacillin** – *Pseudomonas*, *Klebsiella* and certain other gram negative organisms. Piperacillin retains excellent activity against gram positive cocci and *Listeria*.

Pharmacokinetics: In general, the penicillins are formulated into the preparation for administration in which they are best absorbed. Therefore, oral penicillins are rapidly absorbed and readily excreted, mostly through the kidney. They penetrate well into all soft tissues in the body.

Cephalosporins

Uses/Susceptible organisms:

- (1) **First generation** (cephalothin, cefazolin, cephalixin, cefadroxil) - Active against gram positive and gram negative bacteria. The antibacterial spectrum of cefazolin is similar to cephalothin, although cefazolin is more active against *E. coli*, *Klebsiella*, but more sensitive to staphylococcal β -lactamase than cephalothin.
- (2) **Second generation** (cefotixin, cefaclor) –

More active than first generation cephalosporins against certain gram-negative bacteria. Broader spectrum than first generation agents and are active against *Enterobacter* and some *Proteus spp.* and *Klebsiella*.

(3) **Third generation** (cefotaxime, ceftiofur) – Highly resistant to many of the bacterial β -lactamases and have good activity against many gram positive and gram negative bacteria.

Pharmacokinetics: In general, the cephalosporins are formulated into the preparation for administration in which they are best absorbed. They are primarily excreted by the kidney and have good penetration throughout the body, including the placenta and synovial and pericardial fluid. Concentrations in the bile are usually high. Some cephalosporins achieve good penetration into the CSF.

Carbapenems (Imipenem-cilastatin sodium)

Uses: Urinary tract infections, lower respiratory infections, intraabdominal infections, testes, prostate, skin, soft-tissue, bone and joints.

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The latest WetLab schedule is out!

Urinalysis with Dr. Plier
March 4, 2006 1:00-4:00pm

Hematology with Dr. Henson
March 5, 2006, 1:00-4:00pm

3 CE Credits

**Spaces Fill Up Quickly...call the marketing dept
1.800.347.0043 or email lindsayh@pclv.net to
reserve your space!**

These WetLabs are held at Phoenix Central Laboratory
in Everett, WA

...Guide to Minimum Inhibitory Concentration (MIC) Final Article

(Continued from page 1)

Susceptible organisms: Wide variety of aerobic and anaerobic organisms – *streptococci*, *staphylococci*, *Listeria*, enterococci, and Enterobacteriaceae (such as *E.coli*) and *Pseudomonas*.

Pharmacokinetics: Only available as injectable and \$\$\$\$. Antagonism may occur when used in combination with penicillins or cephalosporins. Renal excretion with about 70% in active form.

Aminoglycosides

Uses: Urinary tract infections, bacteremia/sepsis, infected burns, osteomyelitis, pneumonia, peritonitis, otitis.

Susceptible organisms: Bactericidal for aerobic gram negative bacteria by interfering with protein synthesis. These antibiotics have little activity against anaerobic bacteria or facultative bacteria under anaerobic conditions.

Pharmacokinetics: Highest concentrations of drug found in renal cortex and inner ear (causes nephrotoxicity and ototoxicity). About 30% of plasma concentration in bile. Concentrates in pleural and synovial fluid slowly, but increases with repeat administration and with inflammation. Does not penetrate the CNS, the eye or respiratory secretions. A postantibiotic effect (residual bactericidal activity) occurs even after the serum concentration has fallen below the MIC.

Tetracyclines

Uses: Rickettsial infections, *Mycoplasma pneumoniae*, urinary tract infections, Actinomycosis.

Susceptible organisms: In general, tetracyclines are more active against gram positive than gram negative bacteria. Streptococci are usually resistant, the Enterobacteriaceae are relatively resistant – 1,005 *Pseudomonas aeruginosa* strains are resistant. Most strains of *Brucella* are susceptible. Highly effective against Rickettsiae and many spirochetes (*Borrelia* – Lyme disease), *Chlamydia*, and *Mycoplasma*.

Pharmacokinetics: Most absorption takes place in the stomach and upper small intestine and is greatest in the fasting state.

Dairy products and aluminum hydroxide gels impair absorption. Most excretion is by the kidney, except for doxycycline which is GI excreted. All are also concentrated in the liver and excreted by way of the bile into the intestines where enterohepatic circulation occurs.

Chloramphenicol

Uses: Anaerobic infections and rickettsial diseases in which the patient is sensitized to tetracyclines.

Susceptible organisms: Primarily bacteriostatic – wide spectrum of antimicrobial therapy including gram negative bacteria and most anaerobic bacteria including gram positive cocci and *Clostridia*.

Pharmacokinetics: Can cause serious and potentially fatal blood dyscrasias – consider sending gloves with owners for administration. Rapidly absorbed from the GI tract and well distributed in body fluids including CSF. May accumulate in brain tissue and is present in bile, milk and probably crosses the placenta.

Macrolides

Uses: Useful in treatment of some pneumonias, joint infections, some causes of conjunctivitis in topical form. Azithromycin has been used to clear *Bartonella* infections.

Susceptible organisms: Usually bacteriostatic, but can be bactericidal at higher dosages – *Mycoplasma pneumoniae*, *Chlamydia* infections, *Cryptosporidium* diarrhea, *streptococci*, *staphylococci*, *Campylobacter*, *Helicobacter pylori*, *Mycobacterium avium* (clarithromycin or azithromycin). Erythromycin is most effective against aerobic gram positive cocci and bacilli, but no activity against most aerobic enteric gram negative bacilli. Clarithromycin is slightly more potent against gram positive cocci than erythromycin and has good activity against *Chlamydia* and *Mycoplasma*. Azithromycin is generally less active than erythromycin against gram positive organisms and is slightly more active than either erythromycin or clarithromycin against *Campylobacter*. Azithromycin is very active against *Chlamydia*, *Bartonella* and *Mycoplasma* (not effective in treatment of cats with *Mycoplasma haemofelis*).

Pharmacokinetics: Erythromycin is incompletely but adequately absorbed from the upper small intestine. It is inactivated by gastric acids and therefore must be administered as enteric-coated tablets. Food in the stomach may delay absorption. Clarithromycin and azithromycin are rapidly absorbed and achieve high intracellular concentrations. Clarithromycin bioavailability is reduced by 50-55% because of rapid first-pass metabolism. Azithromycin is rapidly and widely distributed throughout the body except CSF.

Clindamycin

Uses: Useful for lung and pleural space abscesses caused by anaerobes. Does not penetrate well into CSF, but useful in treating *Toxoplasma gondii* infection causing acute encephalitis. Also useful for anaerobic infections in bone and other tissues.

Susceptible organisms: Anaerobes such as *B. fragilis*, *Actinomyces*, *Clostridium perfringens* and most other clostridia species, and *Nocardia*.

Pharmacokinetics: Fairly rapidly absorbed from the GI tract and widely distributed in many fluids and tissues including bone. Significant concentrations are not attained in CSF, even with inflammation, however the concentration is sufficient to treat cerebral toxoplasmosis.

Metronidazole

Uses: Active against a wide variety of protozoal parasites and anaerobic bacteria.

Susceptible organisms: Trophozoites of *Giardia*, all anaerobic cocci and both anaerobic gram negative bacilli (such as *Bacterioides sp.*) and anaerobic spore-forming gram positive bacilli (such as *Clostridium*).

Pharmacokinetics: Rapid and complete GI absorption. Liver metabolized and eliminated in urine, largely as metabolites. May cause neurologic toxicity at higher dosages or occasionally with chronic therapy. May cause reddish-brown urine. ✕