

## **Amoxicillin/Clavulanate (Augmentin®, Clavamox®)\***

### **Class: $\beta$ -lactam/ $\beta$ -lactamase inhibitor combination**

#### Overview

Amoxicillin is a type of aminopenicillin, a semisynthetic group of  $\beta$ -lactams that was developed for effectiveness against both gram-negative and gram-positive organisms. Aminopenicillins were created by joining penicillin to an amino group or side chain. Addition of the side chain significantly changed the activity of the drug against some bacteria. Initially these antimicrobials were effective against *Proteus mirabilis*, *E. coli*, *Shigella*, *Salmonella*, *Hemophilus* and *Neisseria* species. However due to changes in susceptibility, aminopenicillins are no longer the drug of choice in treating several of these organisms.

Clavulanate was added to amoxicillin to give the combination drug greater activity against those organisms that produce non-group 1 (class A)  $\beta$ -lactamases. The mechanisms of action of amoxicillin/clavulanate are interference with cell wall synthesis by attachment to penicillin-binding proteins (PBPs), inhibition of cell wall peptidoglycan synthesis and inactivation of inhibitors to autolytic enzymes. Amoxicillin and its clavulanate combination can be administered orally.

#### Resistance

As with other  $\beta$ -lactams the mechanisms of resistance against amoxicillin and amoxicillin combinations are production of  $\beta$ -lactamases, alteration of penicillin binding proteins and decreased permeability through the bacterial cell wall.

#### Effectiveness

Amoxicillin/clavulanate is commonly used to treat acute otitis media in humans. Short course high dose treatment regimens of amoxicillin/clavulanate may improve tolerability and adherence of the drug and prevent increases in resistance and improve efficacy. The combination drug is considered one of the most efficacious antibiotics for acute bacterial rhinosinusitis in humans. In fact short course high dose therapy with amoxicillin/clavulanate and fluoroquinolones are the antimicrobial agents of choice in cases of acute rhinosinusitis when other drugs, including amoxicillin alone, have failed.

See the penicillin section for an explanation of uptake in body fluids and CSF.

**\*References available by request. Call the Infectious Disease Epidemiology Section, Office of Public Health, Louisiana Department of Health and Hospitals (504-219-4563)**