

## **Ticarcillin/Clavulanate (*Timentin*®)\***

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

#### Overview

Ticarcillin is one of the carboxypenicillins, a semisynthetic group of  $\beta$ -lactams. These carboxypenicillins, like ureidopenicillins, were developed for effectiveness against enterobacteriaceae (*Klebsiella* species, *Proteus* species, *Enterobacter* species and *Pseudomonas aeruginosa*). Carbenicillin was developed by adding a carboxyl group to the penicillin molecule. Ticarcillin was developed by adding additional substitutions to the carbenicillin carboxyl group. Ticarcillin exhibits greater antipseudomonal activity than carbenicillin. Clavulanate is added to ticarcillin to combat non-group 1  $\beta$ -lactamases produced by some resistant bacteria. The ticarcillin/clavulanate combination is administered parenterally.

#### Resistance

Primary mechanisms of resistance against ticarcillin and other  $\beta$ -lactams are production of  $\beta$ -lactamases and alteration of penicillin binding proteins. Decreased permeability through the bacterial cell wall is another mechanism of resistance. This resistance to ticarcillin by decreased permeability is not affected by clavulanate.

#### Effectiveness

Ticarcillin is combined with clavulanate to increase the spectrum of effectiveness against  $\beta$ -lactamase-producing bacteria, such as *H influenzae*, *M catarrhalis*, *Staphylococcus* species, *Neisseria gonorrhoeae*, *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus* species, *Bacteroides fragilis* group, *Fusobacterium* species, *Prevotella* species and *Porphyromonas* species. In human medicine, ticarcillin/clavulanate combinations are used in the treatment of infected animal bite wounds and aspiration pneumonia. The ticarcillin/clavulanate combination is also used in infections caused by *Pseudomonas aeruginosa*, including osteomyelitis, abdominal infections and mixed gynecologic infections.

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)**