

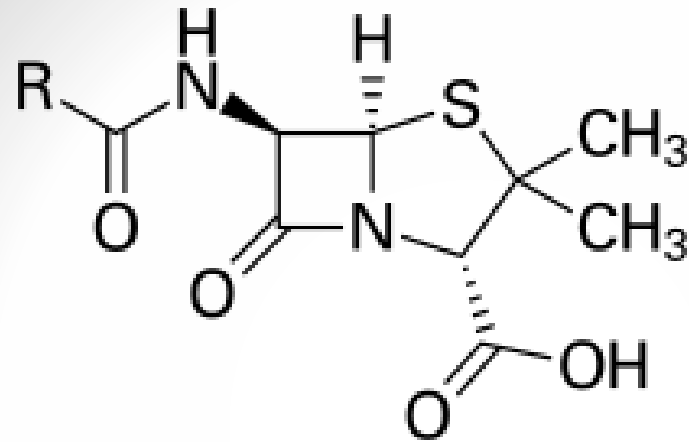
BETA LACTAM ANTIBIOTICS

PENICILLINS

PHARMACEUTICAL CHEMISTRY II
PHA386

PENICILLINS

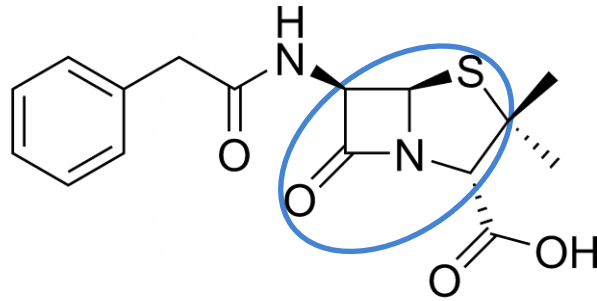
➤ Penicillin was discovered in **1928** by Scottish scientist **Alexander Fleming**, who noticed that one of his experimental cultures of **staphylococcus** was contaminated with mold (**fortuitous accident**), which caused the bacteria to lyse. Since mold belonged to the family Penicillium (*Penicillium notatum*), he named the antibacterial substance **Penicillin**.



Penicillin core structure

CHEMICAL STRUCTURE

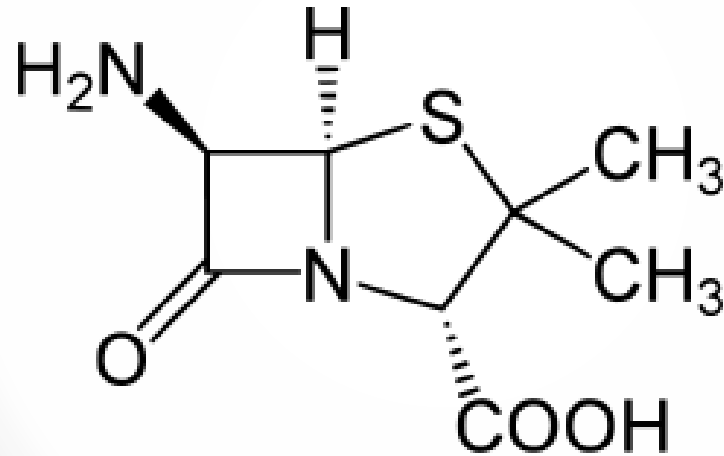
PENAM RING



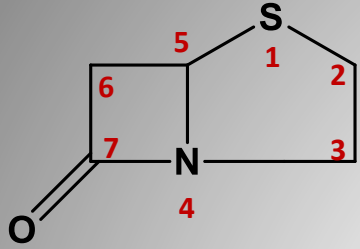
PENICILLIN G

6-APA

- **6-APA** is the chemical compound (+)-6-aminopenicillanic acid.
- It is the **core of penicillin**.

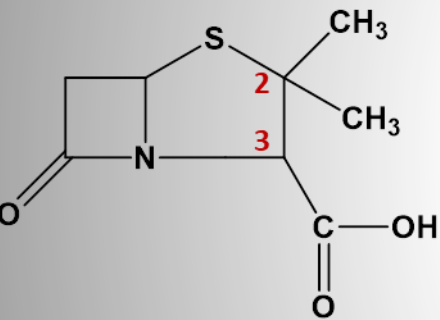


PENAM RING



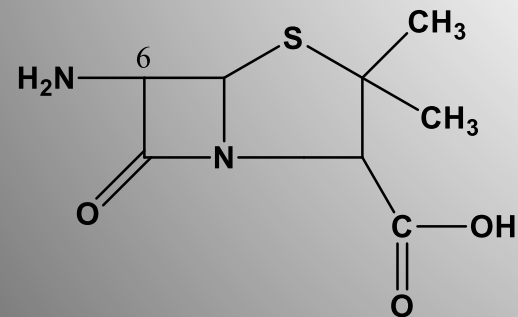
- **7-oxo-1-thia-4-azabicyclo [3,2,0] heptane**

PENICILLANIC ACID



- **2,2-dimethyl penam -3- carboxylic acid**
- **2,2-dimethyl-7-oxo-1-thia-4-azabicyclo [3,2,0]heptane -3-carboxylic acid**

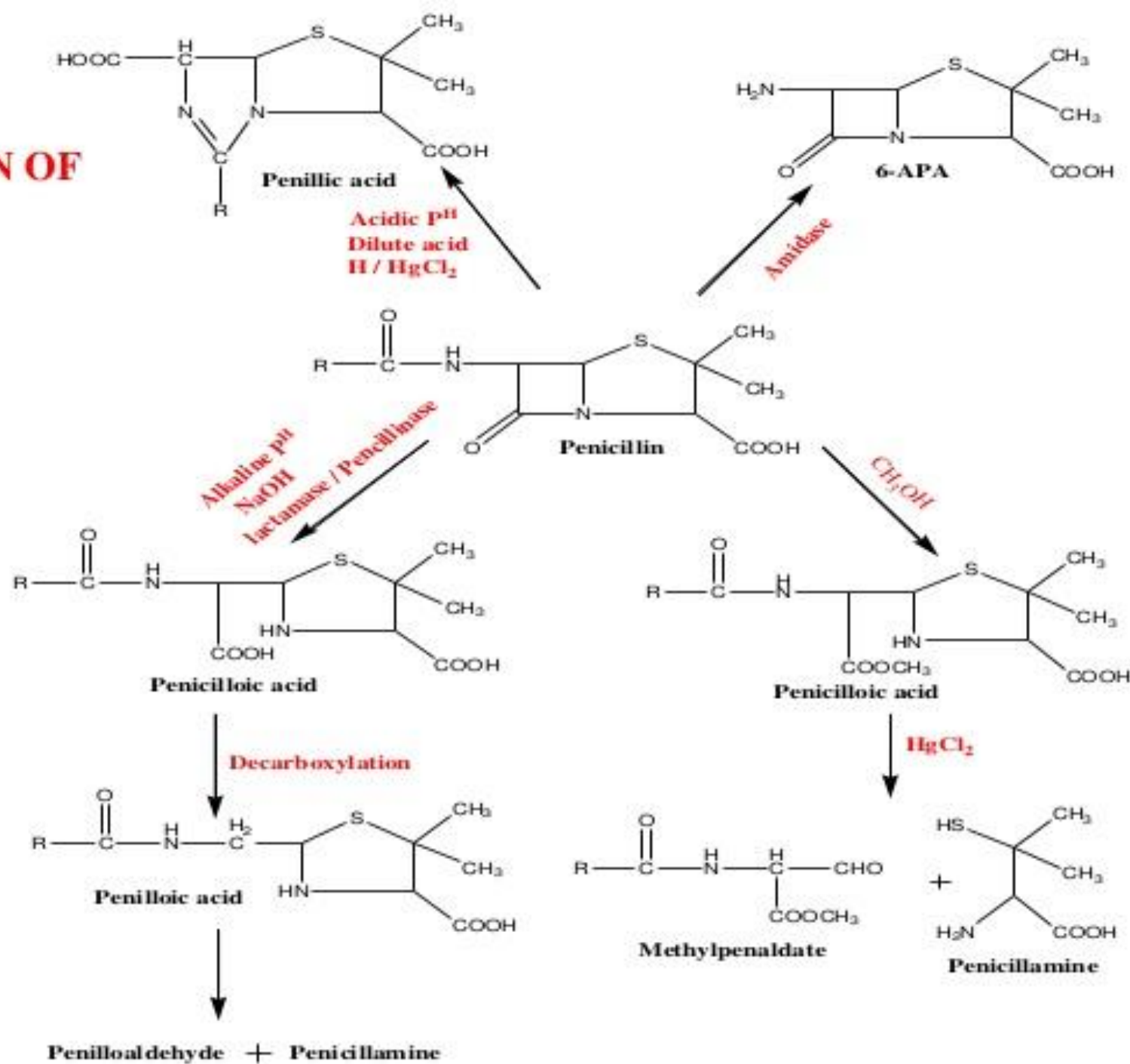
6-AMINO PENICILLANIC ACID (6-APA)



- **6-amino-2,2-dimethyl penam -3- carboxylic acid**
- **6-amino-2,2-dimethyl-7-oxo-1-thia-4-azabicyclo [3,2,0] heptane-3-carboxylic acid**

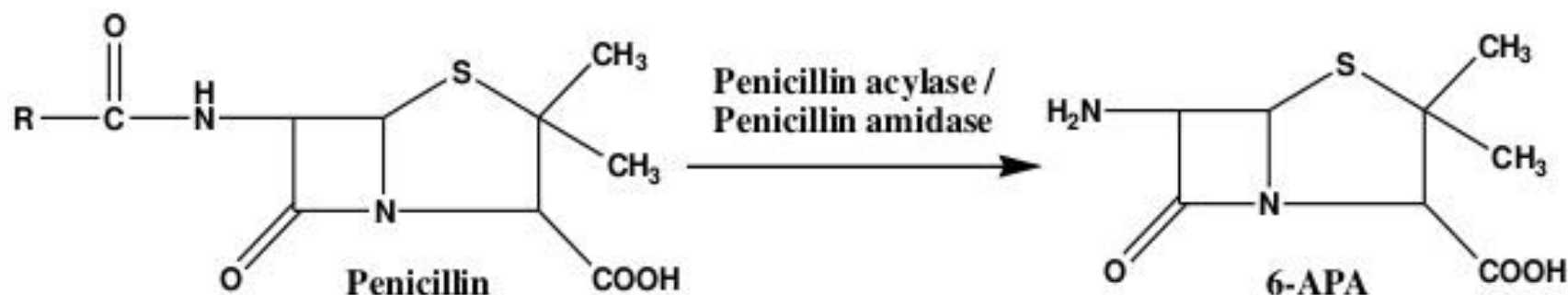


CHEMICAL DEGRADATION OF PENICILLINS

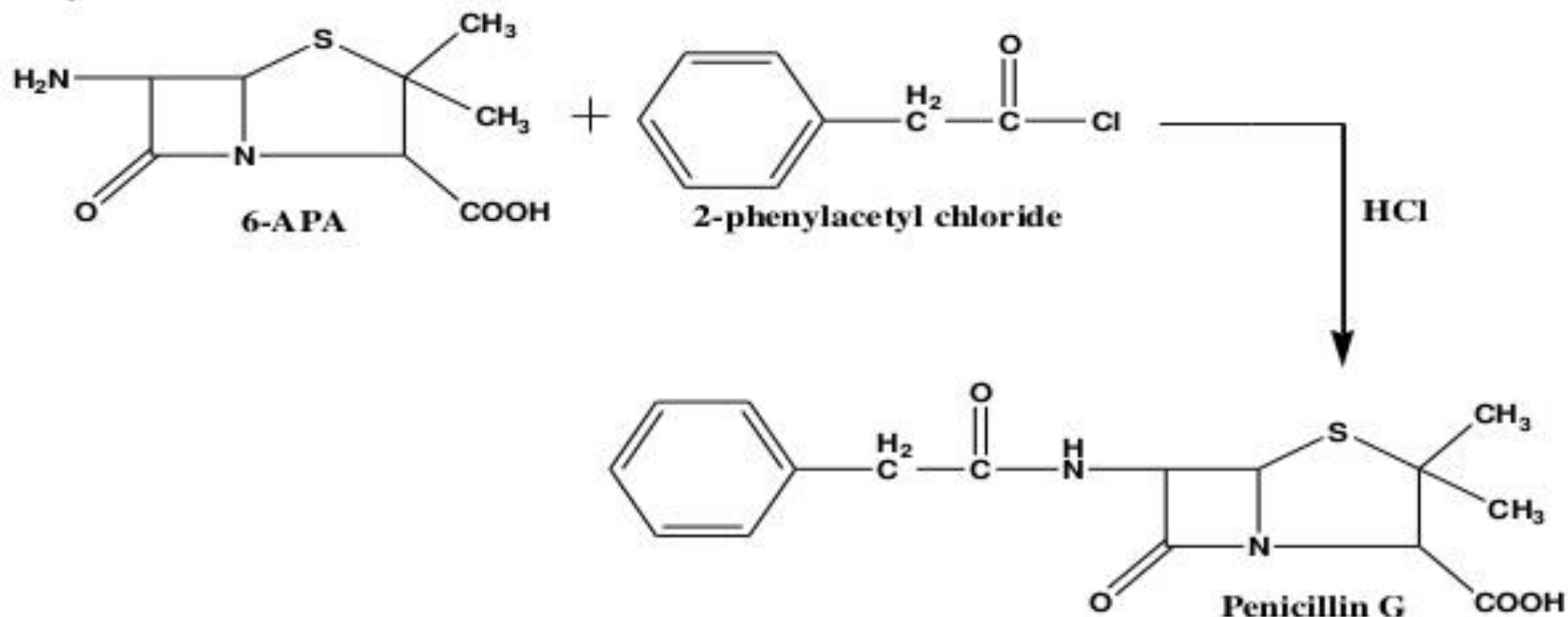


General method of synthesis of Penicillins from 6-APA:

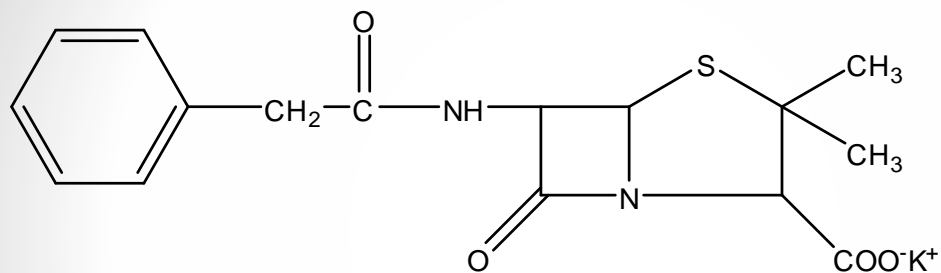
Production of 6-APA:



Synthesis of Penicillin G from 6-APA:

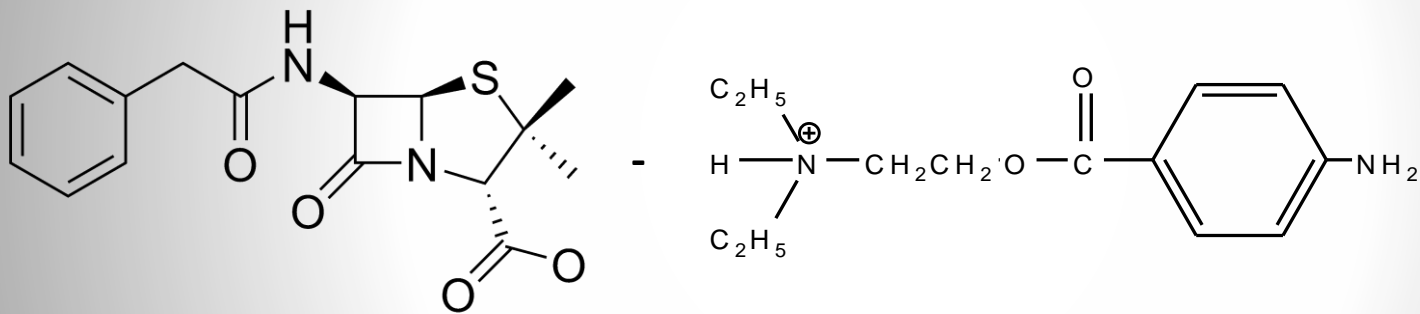


PENISILLIN G (BENZYL PENICILLIN)

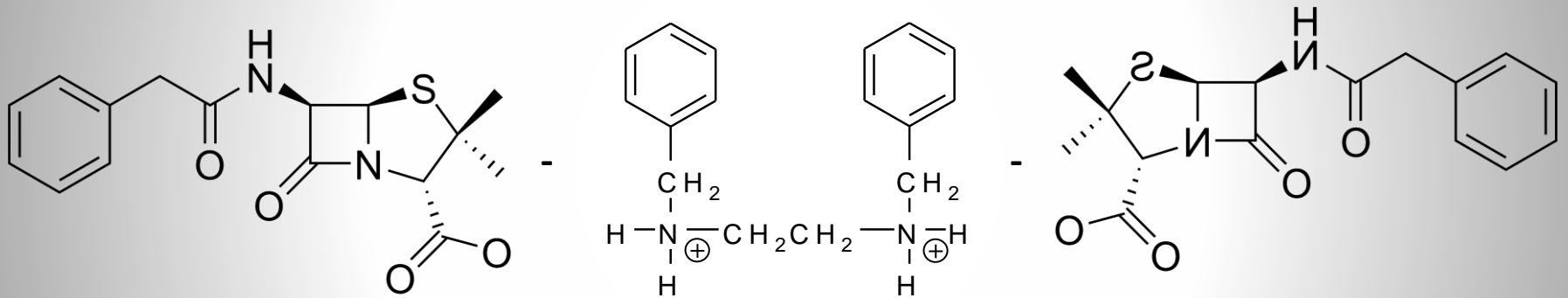


6-(2-Phenylacetamino) penicillanic acid potassium salt

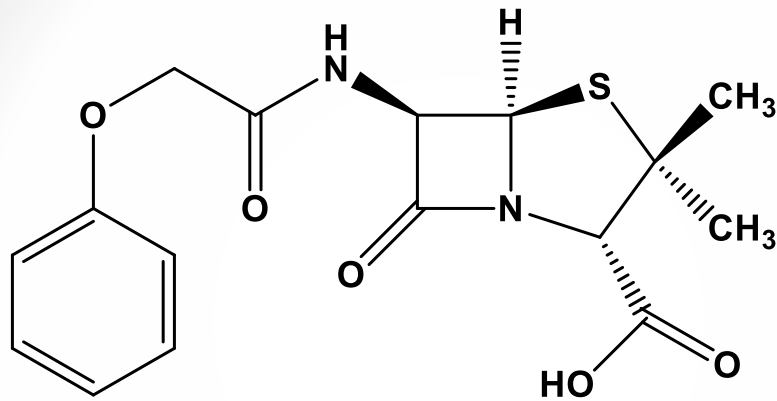
PENICILLIN G PROCAINE



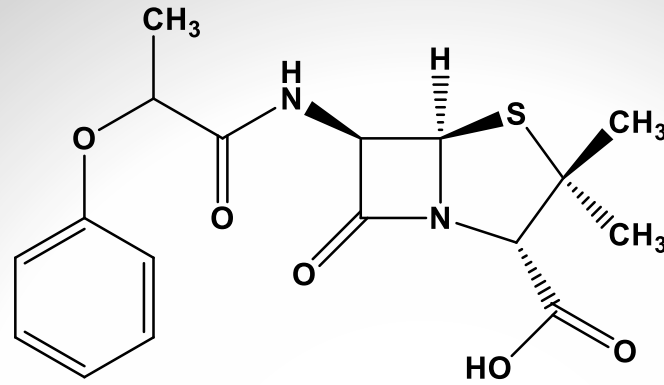
PENICILLIN G BENZATHINE



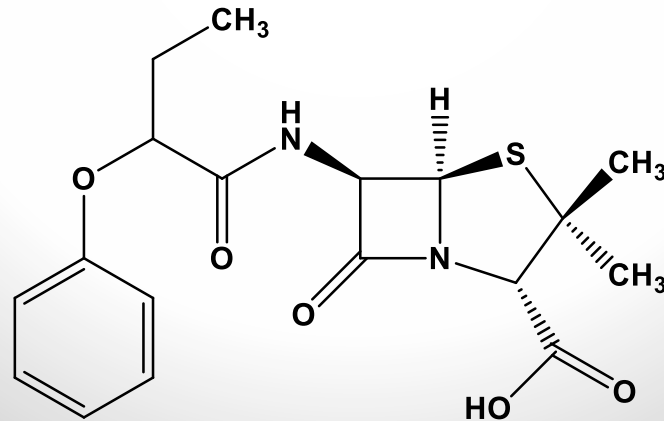
PENICILLIN V (PHENOXYMETHYL PENICILLIN)



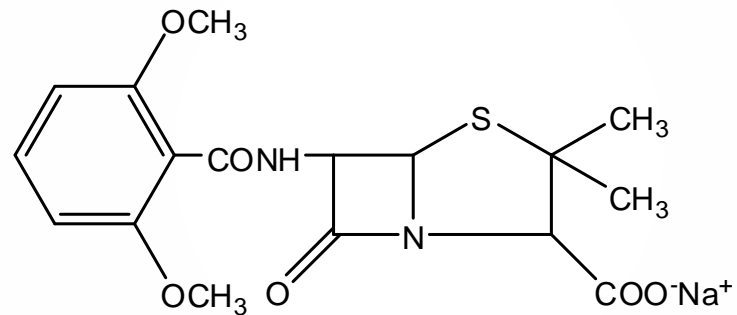
PHENETHICILLIN



PROPACILLIN

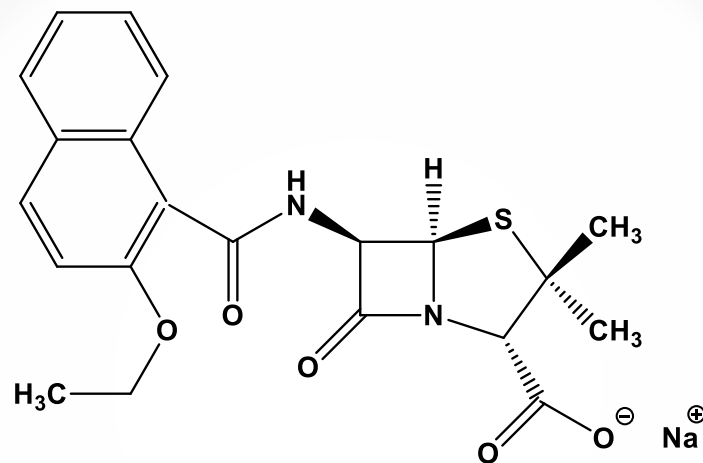


METHICILLIN SODIUM



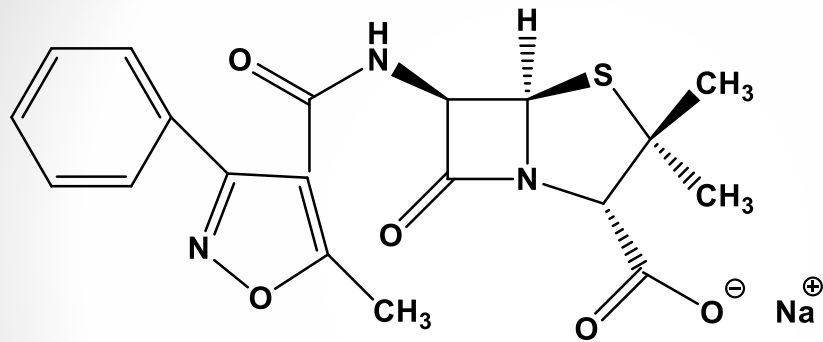
6-[(2,6-dimethoxybenzoyl)amino] penicillanic acid sodium salt

NAFCILLIN SODIUM



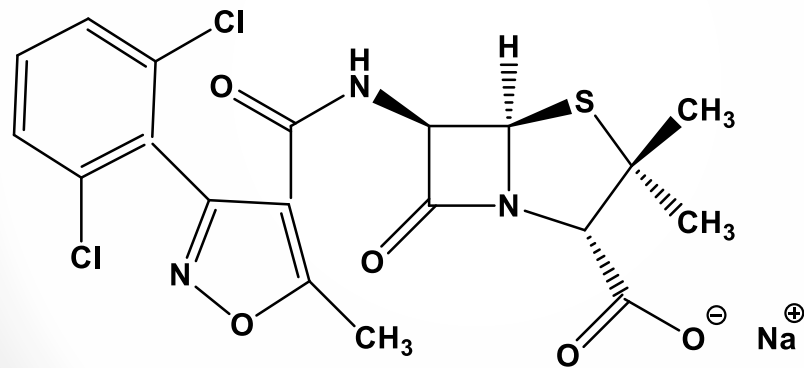
6-(2-ethoxy-1-naphthylcarbonylamino) penicillanic acid sodium salt

OXACILLIN SODIUM



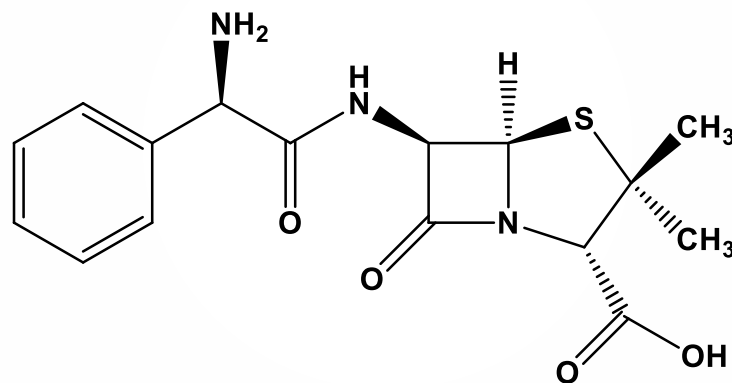
6-[(5-methyl-3-phenylisoxazole-4-yl)-carbonylamino] sodium penicillanate

DICLOXACILLIN SODIUM



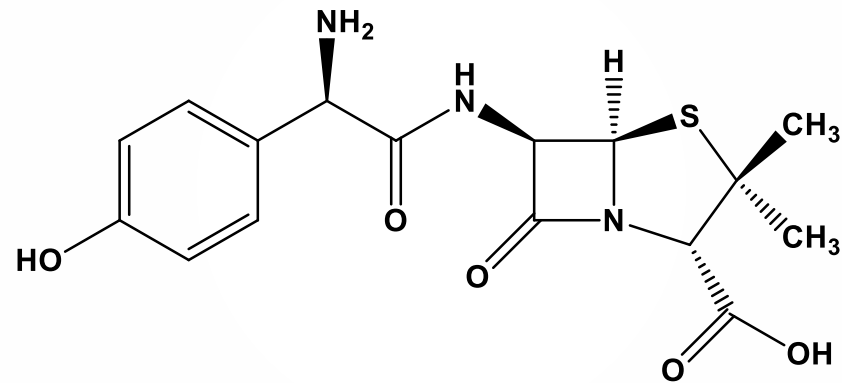
AMPICILLIN

(α - Amino benzyl penicilin)



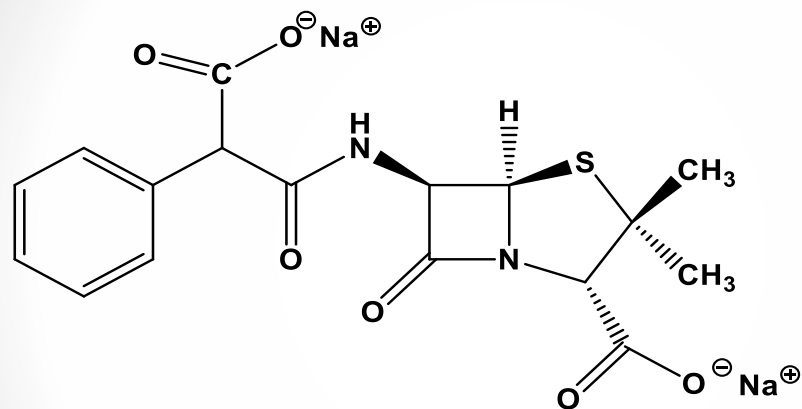
6-(D-2-amino- 2-phenylacetamino) penicillanic acid

AMOXICILLIN



6-[D-2-amino- 2-(p-hydroxyphenyl)acetamino] penicillanic acid

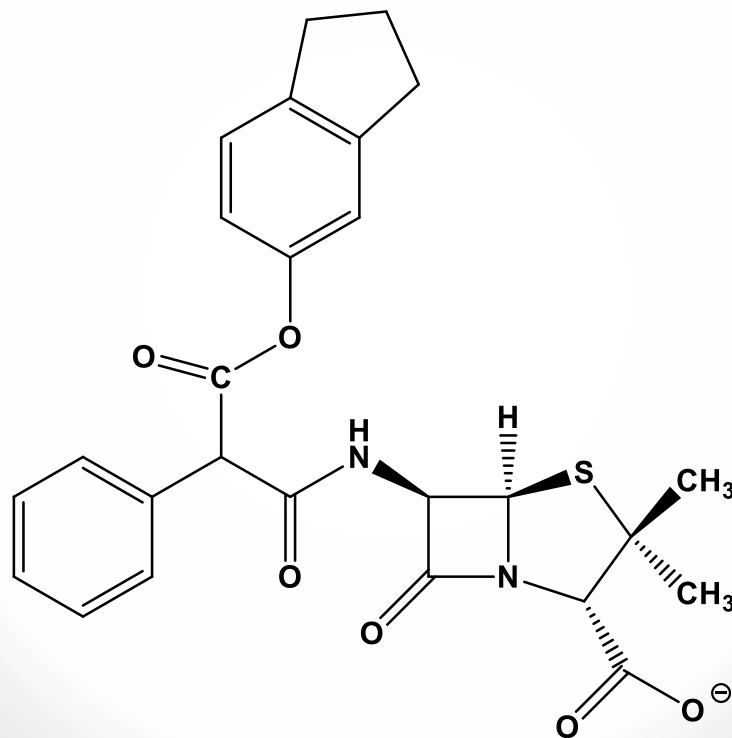
CARBENICILLIN DISODIUM



6-[2-carboxy-2-phenylacetamino] penicillanic acid disodium salt

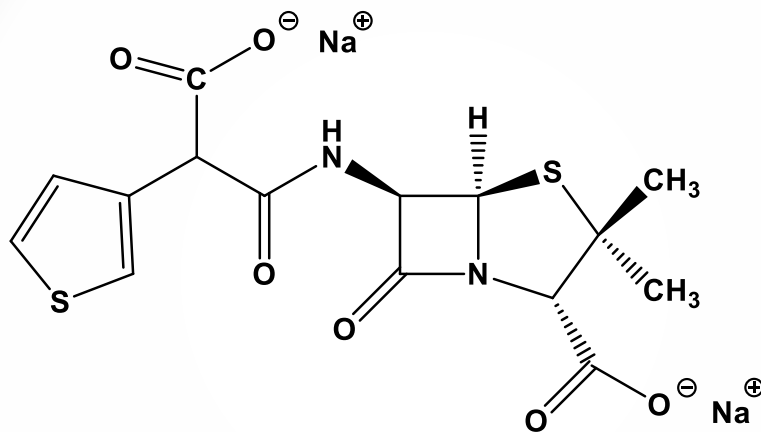
CARBENICILLIN INDANYL SODIUM

CARINDACILLIN



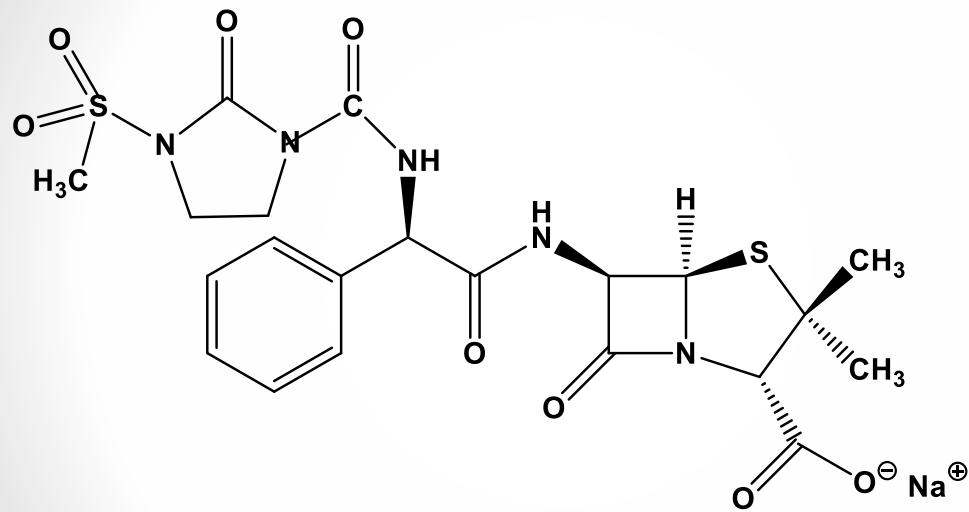
6-[2-phenyl -2-(5-indanyloxycarbonyl) acetamino] penicillanic acid sodium salt

TICARCILLIN DISODIUM

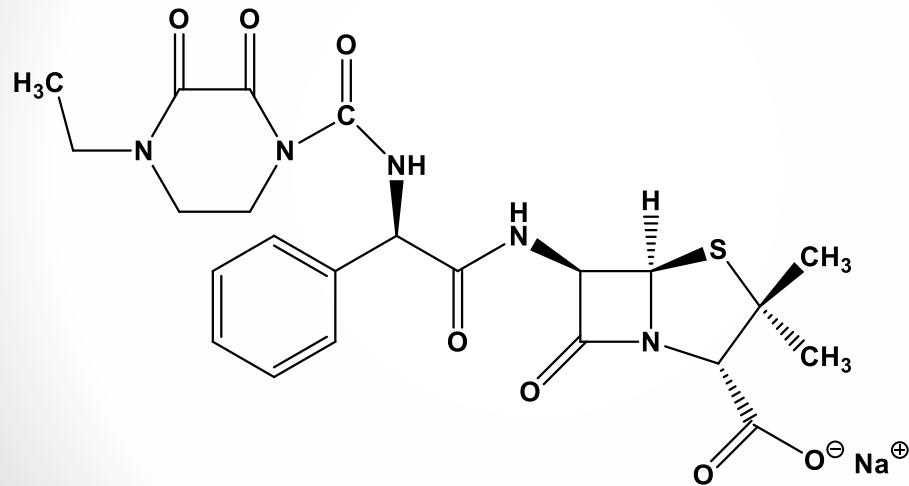


6-[2-carboxy-2-(3-thienyl)acetamino] penicillanic acid disodium salt

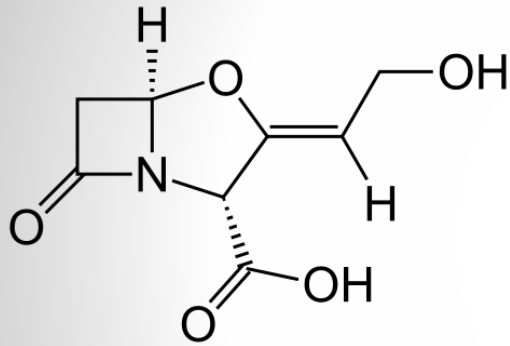
MEZLOCILLIN SODIUM



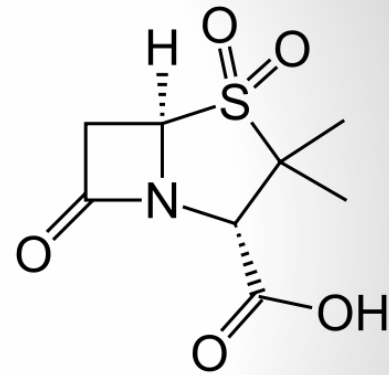
PIPERACILLIN SODIUM



β LACTAMASE ENZYME INHIBITORS

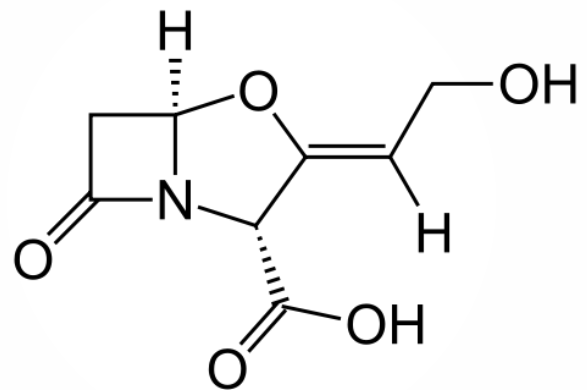


CLAVULANIC ACID

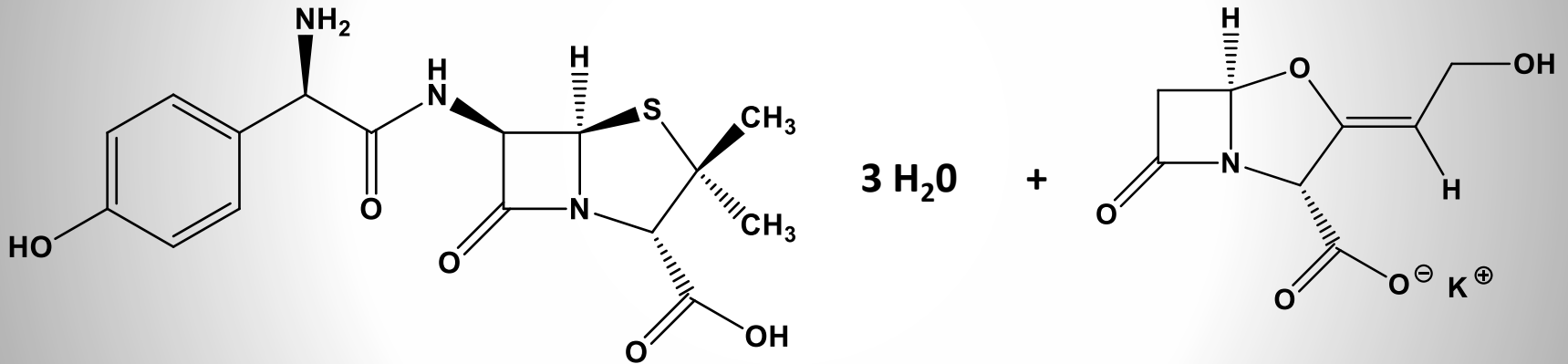


SULBACTAM

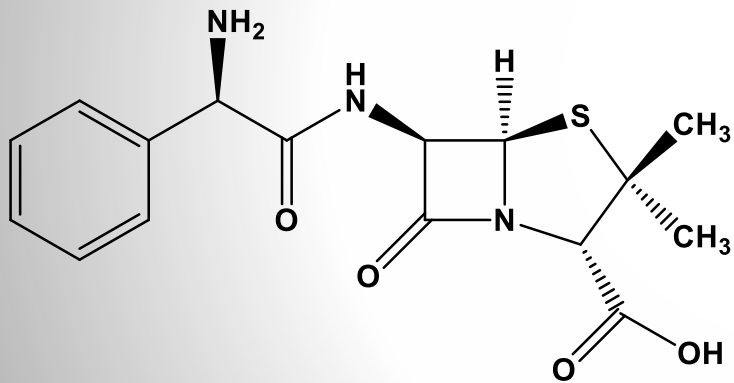
CLAVULANIC ACID



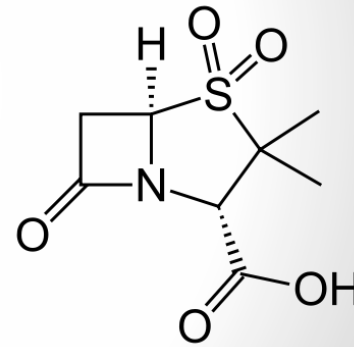
AMOXICILLIN CLAVULANATE COMBINATION



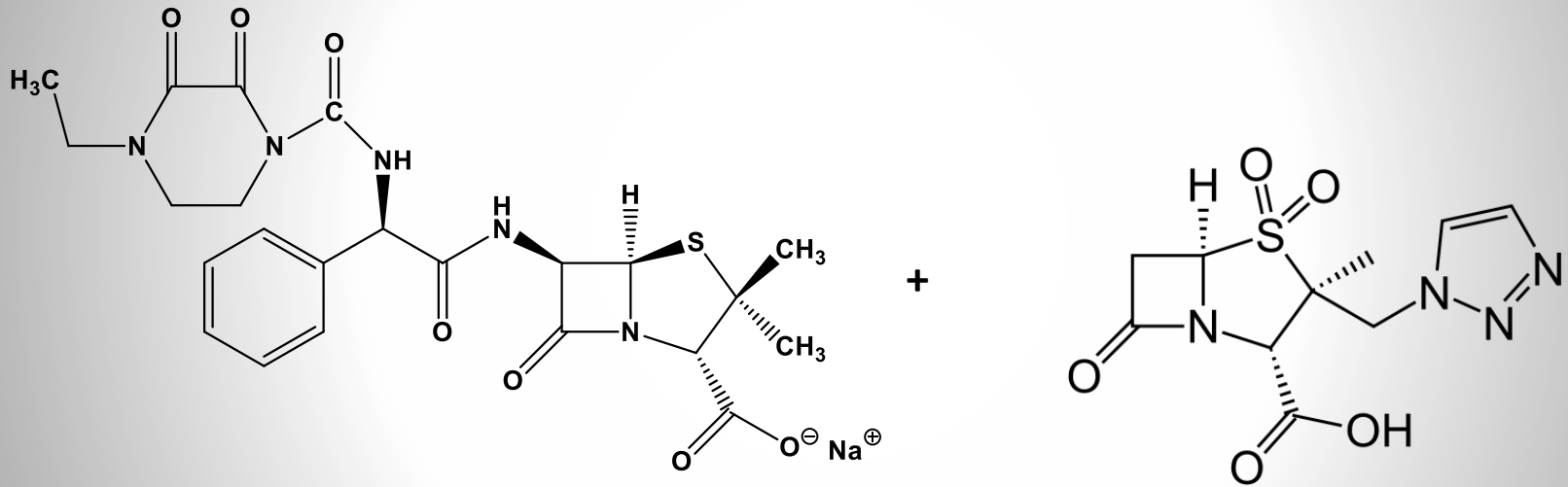
AMPICILLIN SULBACTAM COMBINATION



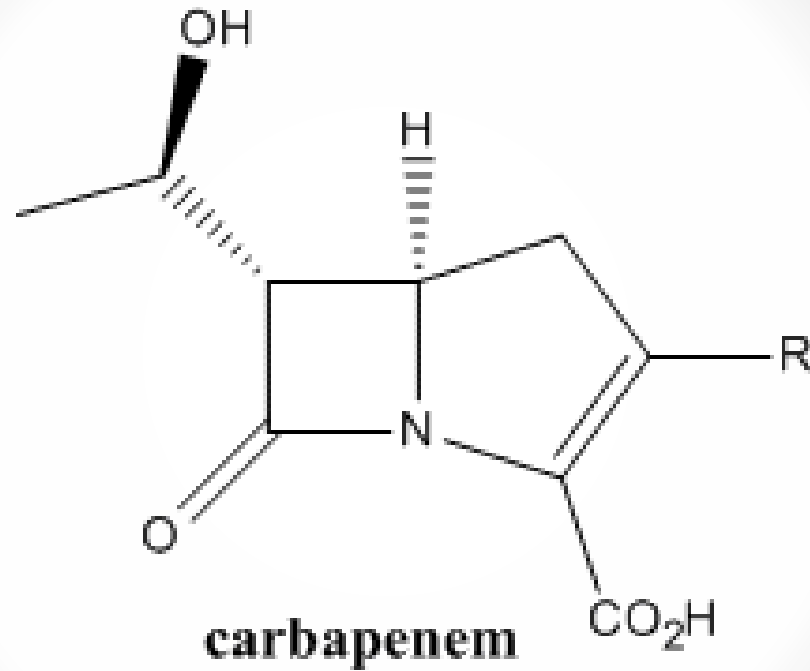
+



PIPERACILLIN TAZOBACTAM COMBINATION

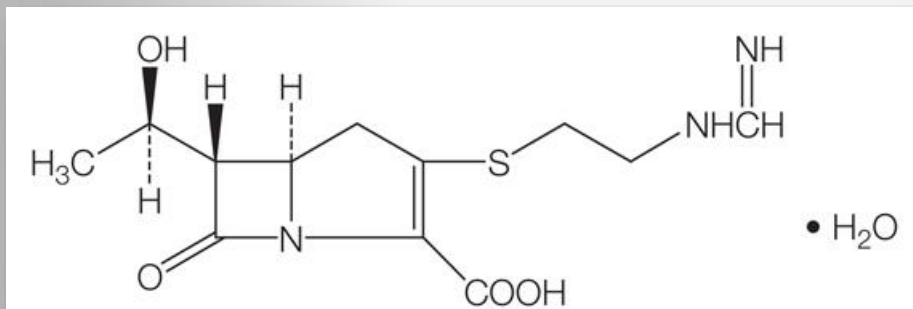


CARBAPENEMS



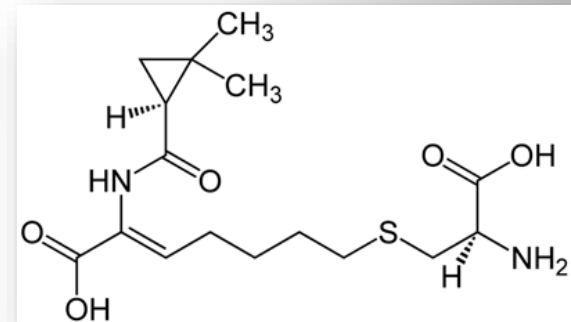
IMIPENEM

(CARBAPENEMS)



Imipenem

+



Cilastatin

AZTREONAM

(MONOBACTAMS)

