

Amoxicillin

AVAILABLE IN
ORAL SUSPENSION,
250 mg, 500 mg CAPSULES &
40 mg, 50 mg, 100 mg, 125mg, 150 mg,
200 mg, 250 mg, 400 mg, 500 mg, 875 mg
TABLETS

HISTORY AND BACKGROUND

Thanks to work by Alexander Fleming (1881-1955), Howard Florey (1898-1968) and Ernst Chain (1906-1979), penicillin was first produced on a large scale for human use in 1943. At this time, the development of a pill that could reliably kill bacteria was a remarkable development and many lives were saved during World War II because this medication was available.

But quickly, it became obvious that this new "wonder drug" could bear improvement. For example::

- Penicillin is not well absorbed from the intestinal tract meaning that at least 70% of an oral dose is wasted.
- Penicillin is also a short-acting medication, with half of the amount circulating being removed from the body every half hour.
- Not all bacteria have the type of cell wall which is susceptible to destruction by penicillin. (Bacteria are classified as Gram negative or Gram positive, depending on the cell wall characteristics. Penicillin is able to punch holes through the Gram positive cell wall but is not very effective against the Gram negative cell wall.)
- **Staphylococci** (an important group of bacteria) have developed an enzyme to break the penicillin molecule apart and are thus rarely susceptible to penicillin.

Amoxicillin represents a synthetic improvement upon the original Penicillin molecule. Amoxicillin is better able to resist damage from stomach acid so less of an oral dose is wasted. While it is still susceptible to destruction by Staphylococcal enzymes, it does have a much broader spectrum against the Gram negative cell wall and is able to last a bit longer.

USES OF THIS MEDICATION

Amoxicillin is regarded as having a fairly broad spectrum against many bacteria thus it is used both on organisms known to be sensitive to it plus it is a good selection when the sensitivity of bacteria is unknown. It is especially helpful in anaerobic infections (those which grow without the benefit of oxygen). Typical uses might include:

- Infected bite wounds
- Upper respiratory infections
- Infected teeth
- Bladder infections

It should be noted that staphylococcal infections are NOT sensitive to this medication with two exceptions:

- OVER -

- Staph infections in the bladder are frequently sensitive to amoxicillin simply because the kidney concentrates such a large amount of amoxicillin in the urine. The Staph protective enzymes are overwhelmed by the huge concentration of antibiotic and the Staph organism is killed. A few words regarding Methicillin-Resistant Staphylococci as these are in the news periodically: These bacteria have mutated, have less predictable sensitivity, and do not follow the above rules for Staph sensitivity. In event of a Methicillin-Resistant Staph infection, a culture is needed to determine the sensitivity of the organism even if the infection is in the bladder where high levels of amoxicillin are present as described.
- Staph infections are sensitive to amoxicillin if clavulanic acid is given concurrently to protect amoxicillin from the Staph enzymes. (Amoxicillin/Clavulanic acid combinations are marketed under the names Clavamox and Augmentin.

INTERACTIONS WITH OTHER DRUGS

When the organism in a serious infection cannot be isolated, a common strategy is to attempt to "cover" for all possible bacteria. Amoxicillin is frequently used in combination with other antibiotics for this purpose.

Clavulanic acid may be added to amoxicillin to increase amoxicillin's spectrum against staphylococcal bacteria.

Amoxicillin is believed to synergize with members of the fluorquinolone class of antibiotics (enrofloxacin, orbifloxacin etc.)

Concurrent use of amoxicillin with methotrexate (an agent of cancer chemotherapy) can increase the toxicity of the methotrexate.

SIDE EFFECTS

Some individuals experience nausea, diarrhea or appetite loss with this medication. This is generally mild and giving the medication with food should reduce this effect. Serious side effects are unusual but the following has been reported: fever, rashes, and bone marrow suppression.

SPECIAL CAUTIONS

The oral suspension should be refrigerated, though if it is mistakenly left out of the refrigerator this is not a problem. The oral suspension should be discarded after 2 weeks.

If a dose is accidentally skipped, give the next dose when it is remembered and time the subsequent dose accordingly.

Amoxicillin may be given with or without food.

Amoxicillin will cross the placenta in a pregnant patient but is felt to be safe for use during pregnancy.

The use of amoxicillin may cause some brands of urine dipsticks to falsely test positive for glucose.

Amoxicillin is what is called a "time dependent" antibiotic which means it must be doses on at specific intervals to maintain a therapeutic level in the body. Amoxicillin is given 2-3 times daily depending on the type of infection.

