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Upcoming Events

- Dates are confirmed for the next Austere Medic Course
- Class size is limited to 10 students, so SIGN UP EARLY!!

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Tip: Print and store hard copies of Disaster Medical Preparedness News in case there is a long term power outage. Having the info available on your computer won't help!!

Antibiotics

One of the most amazing and life-saving discoveries/inventions in the history of mankind has been the introduction of antibiotics. Though history tells us that Chinese and ancient Egyptian medicine used plants and molds which had an antibacterial effect, the commercial manufacture of antibiotics did not commence until the 1930s. Since then, there has been an explosion in the types of antibiotics available.

Here is where some confusion occurs. On more than one occasion, a well-meaning person, looking to prepare for his or her family in a medical sense, will ask "What's the best antibiotic to store for emergencies?" This is akin to asking "What's the best tool for fixing my car?" Different antibiotics work in different

ways, and the choice of which antibiotic to use is dependent -for the greater part- on which bacteria you are trying to kill.

"What's the best antibiotic to store for emergencies?" This is akin to asking "What's the best tool for fixing my car?"

There are several classes of antibiotics, and a load of derivatives of each of these classes. One of the most common that is familiar to most is Penicillin.

Penicillins include Amoxicil-

lin, Dicloxicillin, Ampicillin and many more. Notice that in the generic name (the names listed here) it's pretty clear what family these antibiotics are in. The "Cillins."

Cephalosporins include Cefazolin (Brand name: Ancef), Cefalexin (Keflex), Cefaclor (Ceclor), Cefdinir (Omnicef), Ceftriaxone (Rocephin). Again, notice that in the generic form, you can tell that these are all in the "Cef" family of cephalosporins.

Macrolides include Erythromycin, Azithromycin (Zithromax) and Clarithromycin (Biaxin).

Tetracyclines include Tetracycline (of course!) as well as Doxycycline and Oxytetracycline (Terramycin).

Q & A with MDM

The Readers Question:

My doctor gave me a prescription of antibiotics to fill in case I got worse after he saw me. I filled the prescription, but I never used any. Can I keep these for an emergency?

MDM Answer:

First, you need to be sure that the antibiotic you have on hand is the correct one for the particular infection you may have.

As to the storage life, if the drug was kept in the proverbial "cool, dark and dry" place, most antibiotics in pill form are good well beyond their expiration dates. Most retain at least 90% of their potency after 5 years.

You will frequently see cautions regarding "old" tetracyclines. In the early 1960s, there was a case of kidney failure traced to a degraded tetracycline (GW Frimpter et al, JAMA 1963;

184:111). Shortly after that unfortunate incident, tetracycline tablets were reformulated, and are unlikely to have similar dangers, but as with everything, it is better to err on the side of caution!

Liquid medications are another matter: It is safest to use them before the expiration date or very soon thereafter.

Antibiotics Cont.

Quinolones include Ciprofloxacin (Cipro), Levofloxacin (Levaquin) and Gatifloxacin (Tequin).

Then there are combinations of medications, such as Amoxicillin with Clavulanic acid (Augmentin).

Of course, many other antibiotics in several different families exist, though the medications listed above seem to be the most common.

Why are there so many different varieties? Because there are so many different bacteria. Each bacteria has different strengths and weaknesses. One type of bacteria may laugh at penicillin, yet Cipro may have the same type of bacteria on the mat in a couple days.

Your doctor -by dint of many long hours put into medical school, and even more hours in residency, and many more in practice- knows that almost always, if cat bite gets infected (which they do, about 50% of the time) the major infecting microbe is a bacteria called "Pasteurella Multocida." The doc knows that Pasteurella multocida is killed quite nicely by a penicillin-family drug.

That's the trick to knowing which medicine to use: What is the usual causative organism? What antibiotic works best against that organism?

Fortunately, there are a number of sources which will tell you the answers to those two essential questions. One of the most handy and least expensive is called the Sanford Guide. The Sanford Guide contains -among a great many other things- a listing of common illnesses/injuries such as pneumonia, animal bite, cellulitis, etc. and which antibiotic is currently recommended,

along with how much, how often and how long to give it. A word of warning, however: The Sanford Guide has small type, so don't forget your bifocals. Since the Sanford Guide is printed once a year, there are many, many older editions available in used bookstores and online. Get the most recent edition you can, but a five year old edition is likely not terribly different from a current edition in all practical aspects.

So, what if your doctor isn't sure of the causative organism? Odds are s/he'll take their best guess as to what the organism is, and prescribe a "broad spectrum" antibiotic. "Broad spectrum" means that the antibiotic works on many different types of bacteria that are the usual culprits. It may not work that well on them, but it at least works to some extent. Cipro,

Augmentin, and Ceftriaxone are considered broad spectrum antibiotics. Broad spectrum is not the be-all, end-all. There are lots of bugs that even broad spectrum antibiotics don't touch, especially if your "best guess" at the causative organism was wrong in the first place.

What to do? This is where the modern medical lab comes into play. Most of the time, if the doc is the least part unsure, s/he will take a culture. A sterile swab (Q-tip) is rubbed on the wound (or in the sputum the patient coughs up, or....) then rubbed on some growth media in a Petri dish. The Petri dish is placed in an incubator, and the bacteria are encouraged to grow. When a nice big party of bacteria is underway, the lab tech will drop in little pieces of paper that have been soaked in the different antibiotics. Then they see which piece of paper had killed the most bacteria. The lab tech lets the doc know.

That's a vast oversimplified version, but essentially that is how a "culture and sensitivity" is done. In other cases, the lab tech will simply report which organism grew from the sample. The lab tech finds this out through various lab practices such as Gram staining, etc. If the doc knows the name of the causative organism, s/he can simply look that up in the Sanford Guide as well, and see which antibiotic works best.

After the appropriate antibiotic has been started, it can be 48-72 hours before the patient feels some relief. Many antibiotics do not kill bacteria outright, they instead act as birth control for the bacteria, preventing them from reproducing. Since individual bacteria have a limited life span, it can take time for them to die. As well, most symptoms that humans get with a bacterial infection -swelling, fever, etc.- are caused by the bodies' immune response and to toxins released by bacteria. It takes some time for the immune response to return to normal, and for the body to remove the bacterial toxins.

There are other factors that come into play when deciding which antibiotics will best serve the patient. Is the patient allergic to the best antibiotic for the causative organism? Most guides have first, second and third line medications. Second line antibiotics -though not as effective- may be a medication the patient can tolerate. Another factor is the age of the patient. Another is if a female patient is pregnant as some antibiotics can harm the fetus. Yet another consideration is that of side effects. Still another is cost.

As you can now perhaps appreciate, there are a great many considerations that make up the process of choosing an antibiotic medication. With careful study, guidance and experience it becomes easier.

"That's the trick to knowing which medicine to use."