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Microbiology Term Paper

'To Take or Not to Take...That *is* The Question'

Antibiotics: according to the medical dictionary is defined as the subgroup of anti-infectives that are derived from bacterial or fungal sources and are used to treat bacterial infections. Penicillins are the oldest class of antibiotics, generally are bacteriocidal as they kill bacteria rather than inhibiting growth. Why is it that something that is seemingly as beneficial and important as antibiotic be so controversial today. Some individuals will easily take the medicine and swear as to its benefits, while others will not touch the stuff; fearing developing drug resistant diseases. It is liken to being in a bad relationship: we cannot live without it [in some cases]nor can we live with it too much of it. This paradox exist, as antibiotic has inadvertently become the seeming magic bullet a 'cure all pill' There has been *overuse*, [abuse], *misuse* [antibiotic for viruses] and *underuse* [not taken as prescribed]. It is possible to find a middle ground.

The improper use of *any* substance, even those that are beneficial *can* become problematic.

Before we look at how did we get here, we will consider the why. We are now in the 21st century, mankind have made significant strides, [more like leaps and bounds] in the scientific arenas. Even recently life expectancy was around 40's now its 80's+. Thanks to Louis Pasture [1822-1895] a french biologist, microbiologist and chemist. Discoveries of microbes, their

functions and the role that they play in infectious diseases. significantly decreases mortality rate caused from a simple fever; prevention [immunization] by the administration of vaccines. All of this was accomplished through careful and meticulous research. On the other hand the discovery of antibiotics ie. penicillin in September 3, 1928, was pretty much accidental. Alexander Fleming after returning from vacation, was sorting through some petri dishes contains various bacterial colonies, observed a clear zone around a mould later identified as a rare strain *Penicillium notatum*. He concluded that the bacteria, in a bid for survival, secreted 'mold juices' that eliminated the competition [ie. other bacterias], such as streptococcus, meningococcus and the diphtheria bacillus.

Although of humble beginnings, penicillin gained notoriety, [with the advent of WWII 1939-1945] by saving thousands of soldiers' lives who would have otherwise died from simple wounds and infections. Due to penicillin's fastidious nature and the bacterium proved difficult to cultivate, however with the collaboration of chemical scientists and engineers who persevered by working on a pilot production. On March 1, 1944, Pfizer opened and started larger scale production of penicillin in Brooklyn.

Commercialism and medication is a *conflicted* mix: one has a bottom line; one saves life. The two usually never sees eye to eye. Driving this, was pressured by the intense demand of this 'new miracle drugs.' Penicillin was initially stockpiled for treatment of soldiers at war time. Later regular civilians caught wind of its benefit and pressured doctors [and government] to give them the drug; thus production has to keep up with the demand.

With the misconception of being 'deemed' the magic cure all pill has led to the *over use* of antibiotics. Thanks to doctors, who wantonly will write a prescription for any old ailment [eg. causes of opioid epidemic] even a 'toe' ache. Broad spectrum antibiotic eg. cephalosporin

[Pseudomembranous colitis has been reported with cephalosporins and renal toxicity], drugs kills off the 'good the bad and the ugly' bacteria. Diarrhea caused by antibiotics that destroys or inhibits, normal microbiota flora; by changing the the pH value, creating an environment conducive to infection and or increase from pathogens. Pregnant and lactating mothers are advised to abstain from taking antibiotics while breast feeding as it may alter the infants intestinal flora. Another side effect is vulvovaginal candidiasis or yeast infection in women. Keep in mind each time you take antibiotics, some resistant strain *can be* left behind, that will and grow and multiply, and spread to other people causing infection that certain antibiotics cannot cure. An example of this is Methicillin-resistant Staphylococcus aureus (**MRSA**). *To help prevent antibiotic resistance: don't pressure your doctor to give you an antibiotic.*

Misuse of antibiotic: Antibiotic resistance can be induced by horizontal acquisition of resistance genes (plasmids or transposons), by recombination of foreign DNA into the chromosome, or by mutations in different chromosomal antibiotic. Also antibiotics **only** work on bacteria not virus. Antibiotics do not fight infections caused by viruses, such as colds, flu most coughs and bronchitis. Sore throats, unless caused by strep. If a virus is making you sick, taking antibiotics may do more harm than good. Misuse is an especially dangerous as it could encourages mutations. Micro organism are very clever and adaptable and will use all/ever means for survival even at our expense. They may undergo **lytic** or **lysogenic conversion** where a bacterium introduced may acquire anew trait from *its/a* bacteriophage or vice versa which often times is a dangerous toxin[gains immunity]. Antimicrobial (Drug) Resistance and allergic reactions could occur. *Don't use antibiotics for viruses like colds or flu. Antibiotics don't work on viruses.*

This leads us to Underuse each time you take antibiotics, and **don't finish** the recommended dosage. Often patients discontinue treatment when they begin to feel better; strain

can be left behind that may mutate becoming antibiotic resistance to future treatment will grow and multiply and possibly infect others. Drug-resistant. An example of this is Drug-resistant Tuberculosis [**DR TB**] [especially in Africa; exacerbated by the AIDS pandemic] can occur when the drugs used to treat TB are misused or mismanaged. Examples of misuse or mismanagement include People do not complete a full course of TB treatment. Health care providers prescribe the wrong treatment (the wrong dose or length of time) Drugs for proper treatment are not available or drugs are of poor quality Drug-resistant TB is more common in people who do not take their TB drugs regularly or not take all of their TB drugs could develop TB disease again, after being treated for TB disease in the past. Poor people who can't afford treatment, and have a nomadic lifestyle, tend to become victims of **DR TB**. When you take antibiotics, follow the directions carefully. Finish your medicine even if you feel better. *If you stop treatment too soon, some bacteria may survive and re-infect you. Don't save antibiotics for later or use someone else's prescription.*

"Antibiotic resistance is an inevitable consequence of [antibiotic] use, the more you use them the more resistance you will get." Says Associate Professor Collignon.

broad spectrum antibiotic an antibiotic, e.g. ampicillin, amoxicillin, co-amoxiclav,

Augmentin, effective against both Gram-negative and Gram-positive organisms. Identifying Gram -/+ is important so your administering of antibiotics, are more specific [eg, penicillin useful against gram positive bacteria]. Good alternative to antibiotics: is Phage Therapy using specific lytic bacteriophages to kill its bacterial host.

In conclusion with the taking of any medication there are always the pros and the cons; the individual must decide, that is their civil liberty. However if within reasonable limits, and recommended by qualified physicians; follow instructions carefully and thoroughly. Notify Dr of

current medication[no overmedication]. This will help the spread of drug resistant disease. Don't use antibiotics for viruses like colds or flu. Antibiotics don't work on viruses. Even if you are feeling better: stopping treatment too soon, some bacteria may survive and re-infect you. And lastly don't save antibiotics for later or use someone else's prescription. Also don't pressure your doctor to give you an antibiotic.

All of the afore mentioned suggestion will help prevent antibiotic resistance protecting yourself and family...

-REFERENCES:

[antibiotics 1928-2000](#) [superbugs](#)

[surviving infection](#) [what can we do?](#)

[antibiotics use in agriculture](#) [faq](#) [links](#)

CDC

<http://medical-dictionary.thefreedictionary.com/Antibiotics> American Chemical Society

International Historic Chemical Landmarks. Discovery and Development of Penicillin. <http://www.acs.org/content/acs/en/education/whatischemistry/landmarks/flemingpenicillin.html>

(accessed Month Day, Year).

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Mutation Frequencies and Antibiotic Resistance