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# Antibiotics and Side Effect of Theirs

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**Abstract**

Antibiotics are important medicines to overcome the microbial infection, but a condition that we got a choose a proper antibiotic to destroy living of pathogen bacteria, fungus. Except all these antibiotic has damage side as to have useful, for example, to intake more much antibiotics medicine than the needed amount or long time could cause destroying normal micro flora of our guts, also can cause losing mineral elements as Mg, K and etc.

**Keywords**: Antibiotics, Salvadora Persica, Amphotericin B and side effects.

## Introduction

To making new antibiotics medicines random the end of 19th century. The first time Paul Ehrlich has declared that some kind of chemically matter is able to cure syphilis. First time Alexandr Fleming have made penicillin in 1928 and penicillin was used to cure infection disease on 1941. Latest antibiotic class invented in the 1987 year. To use penicillin on Second World War kept so many people in life. It is an important condition to use proper antibiotics for a correct infection. Also, doctors keep a thing in their mind that antibiotics have more much side effect from anaphylactic reactions to death. A lot of natural products have some antibiotics effect like Caffeine, Salvadora Persica etc.

## Antibiotics

Choosing correct antibiotics for proper bacteria is an important factor. Penetrating of antibiotics to organs is different, for example, antibiotics penetrated hardly to these organs like brain, prostate and bone marrow. Antibiotics of amino glycosides, clindamycin, erythromycins penetrated to the brain hardly are known. Activities of amino glycosides in the alkali environment are stronger than an acid environment. During taking chloramphenicol can deliver aplasion in bone marrow, taking tetracycline can cause the destruction of teeth children under eight-year, intake quinolones cause of degradation of cartilage tissues. Some antibiotic group can be useable together with another kind antibiotic. For example, betalaktam + aminoglycosides, sulphametaksazol + trimetoprim, beta laktam+ inhibitors of beta-lactamase [1]. In fact, we should take also the genetic analysis of our patients of determination of antibiotics. For example, deficiency of glucose-6-phosphate dehydrogenase if patient intake nitrofurantoin and sulfanilamide, it can cause hemolysis of erythrocyte. The doctors must be careful while

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determining antibiotic for the pregnant woman. Especially is strictly forbidden for pregnant amikacin, tobramycin, tetracycline, streptomycin, quinolones, lincomycin, kindamisin, chloramphenicol, griseofulvin. But these kinds of antibiotics can be used partly for pregnants penicillins, b lactam inhibitors, cephalosporin, , erythromycin, azithromycin, metronidazole, amphotericin b, didanosine [2]. Patients which suffer from kidney deficiency the doctors should determine antibiotics which incur the biotransformation process in the liver as aminoglycoside, cephalosporin, penicillin, quinolones, aztreonam, carbapenem, vancomycin, tetracycline, trimethoprim. Taking antibiotics to the organism could be through several ways like parenteral, intravenous, and oral. We can take antibiotics through oral way during the pharengit infection process, leather infections, urinary system infections, mycoplasma while delivering pneumonia. Also, it needed to be careful about the duration time of consumption of the antibiotics in the infection process, for example, treatment period of meningitis which delivers by pneumococcus haven't been over 10-14 days, but treatment period of meningitis which delivers by meningococcus haven't be over than 7-10 days, this period in Haemophilus influenza can be 10-14 days, but in brucellosis 21-42 days treatment period [3].

All antibiotics could be classified into three groups

1. Antibiotics which influence to bacteria wall (penicillin, cephalosporin, carbapenems, monolactam, vancomycin), 2. Antibiotics which destroy of nucleic acids synthesis, folic acid (inhibitors of folic synthesis are sulfonamide, trimethoprim, rifampin is an inhibitor of RNT polymerase), 3. Antibiotics which are inhibitors of protein synthesis (macrolides, clindamycin, linezolid, chloramphenicol, streptomycin adhere 50S part of the ribosome and inhibit protein synthesis, tetracycline, and amino glycoside but adhere 30S part of the ribosome and inhibit protein synthesis). The entering of antibiotics from the cell wall is energy depended process [4].

B lactam antibiotics are useable to kill gram negative bacterias. These kinds of antibiotics decrease pores in bacteria membrane to keep control of bacteria from its damages. If we are using the same kind of antibiotics in a long period, in this period it can cause the modification of target object in bacteria. In this period, the mutation in bacteria DNT can cause big backward influence of antibiotic to target. There is three kinds of enzymes in bacteria which are able to decrease toxic influences of antibiotics to bacteria organism. They are B-lactamases, amino glycoside-modifying enzyme and chloramphenicol asetiltranspherases. A type of B-lactamases locates in Enterobacteriaceae, C type of B-lactamases locates in Klebsiella, Salmonella, but D types of B-lactamase can become in Enterobacteriaceae, P.aeruginose. Aminoglycoside-modifying enzyme protects S.aureous, E.faecalis, S.pneumania from the influences aminoglycoside antibiotics, also chloramphenicol-acetyl-transferases have activity in some gram plus and most gram-negative bacteria's [5].

The penicillins (another name of these class antibiotics is B-lactam antibiotics) could be classified in 5 groups 1. Aminpenicillin 2. Antipseudomonal penicillin 3. B-lactamase inhibitors 4. Natural penicillin 5. Resistance penicillin to penicillinase. Penicillin can affect only gram-positive bacteria because its influence object is the peptidoglycan. But in the all of the gram-negative bacteria, the peptidoglycan is covered by cell membrane from both sides that is why penicillin isn't able to influence to peptidoglycan. Sometimes after long time using of penicillin bacteria could get resistance for penicillin. It can proceed to several different ways 1. The

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transferred gen from other bacteria manages synthesis of enzyme which is broken penicillin 2. The bacterias also able to modify the peptidoglycan, in conclusion, the penicillin doesn't recognize peptidoglycan layer 3. The bacteria can be modified of the penicillin-binding protein [6].

The tetracycline, these kinds of antibiotics are usable to treat acne, urinary system infections, intestinal tract infections, ocular infections, sexually transmitted infections, and other bacterial infection processes.

Cephalosporins are classified in 5 groups. The influence object is the gram negative bacteria's. Cephalosporines are useful for treating an ear infection, the urinary system infections, the skin infections, and the meningitis disease.

If others kind of antibiotics is unaffected for treatment, quinolones are useful to cure urinary tract infection which is difficult to treat.

Lincomycins are versus to gram-positive (aerobic and anaerobic) antibiotic group. Lincomycin is usable to treat pelvic inflammatory disease, intraabdominal infections, below respiratory tract infections, bone, and articular infections.

Macrolides are usable to treat pneumonia, skin infections. Sulphanilamide is a very affected antibiotic group for diseases (pneumonia, ear infection) which deliver by gram-positive and most gram-negative. Glycopeptide antibiotics are useable to treat the infectious disease which delivered by Staphylococcus aureus, skin infections, diarrhea which deliver by Clostridium difficile, endocarditis which delivered infection which is resistance to b-lactam and others antibiotics. Aminoglycoside, in taking with intravenous way, aminoglycosides adhere to 30S part of ribosome bacterias and kill them very rapidly. Carbapenems are usable to treat stomach infection, pneumonia, kidney infection and for interior hospital infection [7].

**Salvadora persica and its antibacterial effects**

Salvadora Persica other name is Miswak. The 1400 year ago the Muslim Prophet Muhammed (s.w.s) said several hadiths about Salvadora Persica. One of them is *'Make a regular practice of Miswak, for verily it is the purification for the mouth and means of the pleasure of the Lord'*. After 1400 years, it means now have founded that miswak really useful thing for human health [8]. Salvadora persica has some chemically matters which are strong inhibitors effected for microorganisms of the oral cavity, especially Pseudomonas Aeruginose, Actinobacter Baumann and Enterobacter Cloacae. For using Miswak is taking its roots. There are several chemical components in Miswak, they are sterol, phenol, palmitin acid, carvacrol, eugenol, olein acid [9]. The methanol extracts of Miswak have an antibiotic effect for gram-negative bacteria. The Miswak can raise the antibacterial effect to this kind of microorganisms as Staphylococcus pyogenes, Staphylococcus aureus, Lactobacteria acidophilus, Pseudomonas aeroginose, Actinomycetes, Haemophilus influenza, Candida albicans [10].

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**Caffeine's antibacterial effects**

Caffeine is a stimulator for the human organism. During having caffeine, it stimulates come out of Ca from end plasmatic reticulum in muscle cells, in conclusion, being cause the motor activity. Also, caffeine has immunologic and anti-HIV effects. Caffeine can make lysosomes stronger. Caffeine can increase the inhibitory effect of penicillin-G and tetracycline in Pseudomonas aeruginosa. Seeds and fruits are usable of caffeine. Antibacterial role of caffeine is too inhibiting of protein synthesis and inhibiting joining each other of adenine and timin in bacteria organisms [11].

**Amphotericin B and its side effects**

Amphotericin B (AmB) is an antifungal antibiotic, taking intravenous way. The first stages of antibiotic treatment must be taking a little dose, because of to learn reaction of the body to AmB. AmB has so many side effects ad fever, shaking, chills, flushing, decreasing of appetite, dizziness, nausea, vomiting, headache, shortness of breath, muscle/joint pain, unusual tiredness, weakness, muscle cramping, hearing changes, dark urine, stomach/abdominal pain, yellowing eyes/skin, blue lips, mental/mood changes, seizure, black stools, allergic reaction, rash, trouble of breathing [12].

Am B using to cure a disease which delivering by Histoplasmosis, Cryptococcus, Histoplasma capsulatum, Aspergillus fumigates, Coccidiomycosis, two kinds of Leishmania, infection disease which depended on HIV, esophageal candidiasis. These infections are able to create pathological processes in the oral cavity, trachea, esophagus, brain, blood, lungs and liver. Histoplasmosis is the infectious disease of lungs which delivering by Histoplasma. The symptoms of this disease are the pain in the chest, dry cough. Histoplasma can spread within HIV disease to the brain and gastrointestinal tract. Cryptococcosis is delivering by Cryptococcus neoformans/Gotti. At first, this disease shows clinical symptoms in the lungs, gradually spread to other organs. Coccidioidomycosis is delivering by Coccidioides immitis/posadasii. The first clinical symptom is being in the lungs, in the next steps of disease spreads to the skin, brain, bone marrow and heart [13]

Amphotericin B produces by Streptomyces nodosus bacteria. AmB is the lipophilic antibiotic. The damaging procedure of AmB is different. AmB increases ion channel in membrane especially K+ channel, in conclusion, it will deliver K+ deficiency in fungus after the end it will cause the death of fungus. Except this AmB can localize on the cell membrane and increase their activity. AmB adhere with ergosterol because of to creating a pore in the cell membrane, also ergosterol connects to cholesterol molecule in the host cell membrane. AmB located inner side of pores, the diameter of the pores is 0.8nm, the long of pores is 1.5-2 nm. To creating of a pore is due to 4-12 AmB monomers. AmB can't penetrate to central nervous system because of polyene antibiotic. AmB can cause muscular paralyze if participates together with amino glycoside and neuromuscular blocator. Am B absorption from gastrointestinal tract too slow, that is why it must use by the intravenous way. Liposomal Am B has a lower toxic effect than Am B (could deliver nephrocalcinosis and diffuse interstitial tumor). Peak activity of Am B is being PH-6.0-7.5.

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Am B fastly adheres to lipoprotein after dropping to vena but in tissues join to cholesterol. It could deliver thrombophlebitis, normocytic hypochromic anemia, leucopenia, thrombocytopenia, hypokalemia, hypomagnesemia. After taking the 1-3 hour of Am-B could show side effect. Am-B has several groups as Am-B cholesteryl sulfate, Am-B lipid, Am-B liposomal. Am-B can cause hypomagnesemia more than hypokalemia. After a long time using, it is able to deliver calcification around the basal membrane, proximal tubules, glomerular capillary of nephron [14]. Am-B was given to dogs in high dose (2-5 mg/kg) after several days has seen in ECG bradycardia, then tachycardia, elevation of T wave, prolongation of PR, shortening QR and in the end fibrillation of the heart [15].

Mg and Ca participating activity creates the binding polyene-sterol connection, the joining of Mg and Ca to this process cause Mg and Ca depended on enzyme deficiency which 300 kinds (for example, Na/K-ATP-case, hexokinase, creatine kinase, protein kinase, cyclase) enzyme can participate in reaction when Mg is needed [16]. Mg is the fourth important mineral in the human body (Ca Na K Mg). The percentage of Mg is 53% in bones, 27% in muscles, 19% in soft tissues, 1% in blood serum. A normal amount of Mg in blood serum is 75-95mmol/L. The biologic half-life of Mg molecule in the human organism is 10000 hours (42 days). Mg participates in an important process in a human body as protein synthesis (3571 kinds), muscle contraction, nerve function, blood glucose control, hormone receptor binding, blood pressure regulation, cardiac excitability, transmembrane ion influx, gating of Ca channels, glycolysis, ATP metabolism, oxidative phosphorylation processes. Absorption of Mg isn't able in the gastrointestinal tract when to have vitamin D deficiency in the body. Also, Am B, smoking, and aging deliver Mg deficiency in the body. During Mg deficiency in the body can cause neuromuscular weakness, arrhythmia, changing of EKG, psychic, depression, agitation. During Mg deficiency could happen bronchospasm, at that time using of 2gr. $MgSO_4$ can annihilate this problem [17].

## Conclusion

The antibiotics therapy of infectious diseases is the alone way to treat them. We definitely should be careful choosing of antibiotics for the proper infection. But all antibiotics have so much side effects than their benefits. There is some natural product in nature which has so much antibiotic effect. For example, Salvadorian persica (Miswak) and Caffeine. Miswak has inhibitor effect for oral cavity microorganisms. It is very useful using of miswak for clear oral cavity before eating, after eating, before sleeping, after wake up. Also, caffeine has some inhibitor effects for microorganisms. It inhibits protein synthesis and binding of adenine and timin in renewing DNT molecule. The excess amount of AmB can cause side effects, especially as hypomagnesemia. Mg includes to cofactor part of 300 enzymes. Deficiency of Mg creates so many problems in the human organism, for example, arthmia, diabetes mellitus, depression, agitation, dysphagia, muscle weakness, tremor and etc.

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