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Classification and mechanism of action of antibiotics: A review

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Abstract
The relationship between humans and microorganisms has been around for a long time. Some bacteria help to achieve symbiotic balance by providing protective and stabilizing effect on the human body. Recent microbial and pathogenic bacteria invade Humans tissues, causing harm to the human body and endangering his Life. Human's discovered cure for it many bacteria were discovered due to there adverse shape.The use of antibiotics was found to have determinant effect on the normal and useful microorganisms of human body. Many types of antibiotics are used not only for therapeutic purposes but also in other industries such as agriculture and animals husbandry. Adequate understanding of the mechanism of action of antibiotics and hence the importance of protecting the human health care delivery system. Recent molecular biological approaches have greatly helped to understand the mechanism of action in this paper by emphasizing the classification of antibiotics and molecular senses and Reiterates optimal use of antibiotics.

Keywords: antibiotic, resistance, penicillin, bacteria, inhibition

Introduction
Antibiotics are also cytotoxic or cytostatic to the microorganisms accepts the body's natural shielding, like immune system to prohibiting the synthesis of proteins, deoxyribonucleic acid (DNA), ribonucleic acid (RNA), by a membrane unorganised the agent or other particular measures. Antibiotics can also through oneself into the cell wall of the bacteria by irrevocable to them, utilising the energy supported by convey procedure in ribosomal sites, which later accelerate the blockage of protein synthesis. The battle of human beings against the infectious diseases is widely known.There is no doubt that antibiotics are a benedication to the mankind that has rescued people and the discovery of antibiotics shows hopeagainst infectious diseases that are even now the major cause of death in developing nations, This is because of a continuously arrival of new diseases. At that period, there was an optimistic belief that infectious disease was almost slow down. The origin of modern 'antibiotic era' was related with two names Alexander Flamming and Paul Ehrlich, antibiotics were contemplate a resolution that particularly selected microbes that were responsible for disease causation. but simultaneously would not affect the host.Flamming was first who alerted regarding the possible resistance to penicillin if used too Smaller for a little while of treatment.The period from 1950's to 1970,s was thought as golden era for the finding of novel antibiotics claases.There are millions of new antibiotics classes have been found in previous 60 years from its initiation.because of increasing demand of antibiotics over numerous regions has permitted for the cheap and unapproved usage of drugs. Resistance to antibiotics is huge matter of concern and now nearly all the antibiotics are obtainable without any prescription which is very prime factor of causing the resistance. So there is only way to educate the patient and public about resistance to the antibiotics for restraining it [1, 2, 4].

History of antibiotics [3].
The service of antibiotics manufacturing microbes to prevent disease got up to with old poullies of mouldy.Sulfonamide were the first accurately efficacious broad spectrum antimicrobial in clinical use and are even now in service, But they were most replaceable by the finding or penicillin seen it is a impure.Antibiotics between microbes was illustrate well previous the discovery of penicillin together by Louis Pasteur that one proposed microbes could secret material to cause the death of the bacteria.There are three phase to explain the history of antibiotics such as

1. Empirical period
2. Ehrichs phase

Basic Anatomy of Bacterial Cell.
Cell wall responsible for characteristic and shape of the cell. Inside the cell wall (rigid peptidoglyco layer) is the plasma membrane. The spece between outer membrane and cytoplasmic membrane is referred as periplasm. The outer membrane has an additional protective layer in gram - negetive bacteria and it prevents many substances

from entering into the bacterium.this member contains channels called porina which allow the entry of various molecules such as drugs [2].

Antibiotics
Anti: Oppose/ against
Biotics: Microorganisms

Antibiotics are those Chemical Substances which are obtained from various species of microorganisms that kill or inhibit the growth of other microorganisms in low Concentration.

Classification of Antibiotics [2, 6].
- According to their spectrum.
- According to their Source / Origin.
- According to their Mechanism of Action.
- According to their structure.

1. According to their spectrum.

1. Narrow Spectrum Antibiotics.
2. Extent Spectrum Antibiotics.
3. Broad Spectrum Antibiotics.

1. Narrow Spectrum Antibiotics

1. Agents acting only on single or limited group of micro-organisms.

E.G.:- Penicillin, Erythromycin & Streptomycin.

2. Extent Spectrum Antibiotics

Antibiotics that are effective against gram +ve & Also against significant number of Gram -ve bacteria.
Eg:- Ampicillin.

3. Broad Spectrum Antibiotics

Drug effective to spread wide variety of species.
Eg:- Tetracyclines & Chloramphenicol.

- **According To Their Origin/ Source**

1. Natural

These are those antibiotics which are from natural origin.
Eg:- Tetracyclines & Streptomycin.

- **Semisynthetic**

These are Combination antibiotics that are Derived from Natural as well as Chemical Source.
Eg:- Penicillin-G.

- **Synthetic**

These are antibiotics that are purely Synthetic.
Eg:- Chlorophenicol.

2. According To Their Mechanism of Action

- Bactericidal:-Kill Bacteria.

Eg:- Penicillin & Aminoglycosides.

- **Bacteriostatic**

Inhibit Growth of Bacteria.
Eg:- Tetracyclines & Chloramphenicol.

1. Drugs that interfere with biosynthesis of bacterial Cell Wall.

Eg:- Penicillin & Cephalosporins.

2. Drugs that interfere with the Functioning of Cytoplasmic Membrane:-

Eg:- Amphotercin B.

3. Drugs that interfere with Protein Synthesis

Eg:- Chloramphenicol & Tetracyclines.

4. Drugs that interfere with Nucleic Acid Biosynthesis

Eg:- Actinomycin & Rifampin etc.

Inhibition of protein synthesis [6].

The amount and types of protein composed and continuously produced by living organism including bacteria. Proteins are used for structural composition, metabolic process also response to adverse condition. the set of genetic codes information called codons. In proteins translation of mRNA occurs three sequential phases (initiation, elongation and termination) the drugs are used to blocking the protein synthesis called antibiotics.it is divided into 2 subclasses-1) 50s inhibitors

A. Antibiotics are used to block 50s ribosomes. Inhibition of 50s ribosomes by blocking either the initiation phase or elongation phase of protein synthesis.

The antibiotics class macrolids such as lincosamide and sterptogramin inhibit the protein synthesis by blocking elongation phase of mRNA translation. In ribosome inhibitors to aminoglycoside subclass the naturally derived is bactericidal and Macrolids, tetracyclines etc.are bacteriostatic.

Inhibition of Nucleic acid synthesis [2]

The formation of Nucleic acid is important in the metabolic pathways.the nucleic acid synthesis process is disrupted.then it is very harm to survival and next generation of bacterial cells.the Antibiotics are disrupt the process of Nucleic acid synthesis by blocking transcription. DNA replication involves loosen the normal double helix structure.the helicase enzyme help in this process. The unwinding DNA is the work of helicase enzyme is disturbed by antibiotics such as quinolones.the antibiotic action of quinolones basically cut the process of DNA replication and adjusted by susceptible bacteria (Chen *et al*., 1996) The antibiotics inhibit the synthesis of Nucleic acid and also target on topoisomerase-2 and topoisomerase-4 of bacteria. Disturbing the action of enzymes in bacteria it adverse effects on RNA synthesis polymerase which in turn blocking RNA synthesis. Quinolones blocking bacterial nucleic acid synthesis.is this path do not mix with mammalian RNA polymerase, formation them especially antagonistic to Gram + ve and some Gram -ve bacteria.

Antibiotic modification or degradation [5]

Antibiotic modification is a commonly used plan of action for renderings an antibiotic inefficient, extremely in the case of aminoglycoside antibiotics example: (streptomycin kanamycin gentamicin neomycin) chloramphenicol (APH), and o-adenyltransferases (ANT) that acetylate phosohorylate or adenylylate the aminoglycoside antibiotic corresponding are known. However these enzymes were 1st identified in the producer streptomyces species in the rarely 1970s and they perform identical biochemical reaction from reliable source in antibiotic resistant clinical strains (walker and walker1970; Benveniste and Davies 1973) direct inter connection between synthesis of amino glycosides and the presence of moderation enzymes in producer streptomyes.

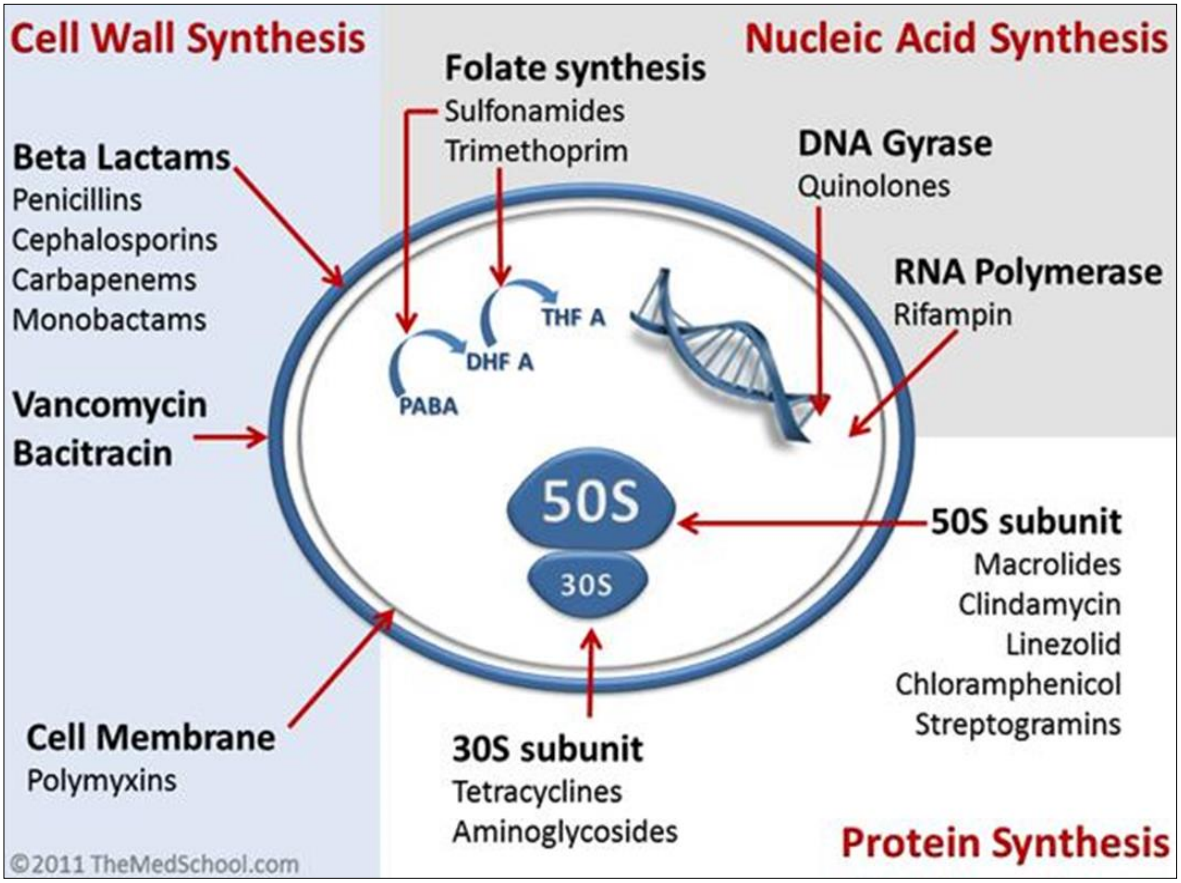

Fig 1: Mechanism of action.

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Conclusion
We have obtain most important and useful knowledge about We have obtain most important and useful knowledge about (Classfication And mechanism of action A Review) Multi-drug resistance pattern in gram positive and negativr bacteria are difficult to treat and may even be untreatable with conventional antibiotics. Therefore more should be done in classification,history and synthesis of antiniotic.

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