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AREVIEW: "A REVIEW ON ANTIBIOTICS RESISTANCE"

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ABSTRACT:-

Infections caused by antibiotic-resistance germs are difficult and Sometimes impossible to treat. Antibiotic resistance does not mean the body Is becoming resistant to the antibiotic; it is that bacteria have become Resistant to the antibioticdesignedtokill them.Penicillin first commercialized antibiotic was discovered in 1928,by Sir Alexander fleming.Ever since,there hasbeen discovery and acknowledge of Resistance along side the discovery of new antibiotics.In thisarticle are also include the need novel tools which helps to reduce Or prevent the antibiotic.Antibiotic resistance happens when germs like bacteria and fungi develop the ability to defeat the dug designed to kill them.That means the germs are not killed and continue to grow.

Keywords -Antibiotics, Antibiotic Resistance, Antimicrobial Resistance

DEFINITION:

Antibiotics are chemical agents that prevent bacterial growth by stopping the bacterial cell from dividing(bacteriostatic) or by killing them (bactericidal).The terms antibiotic and antimicrobial are often used interchangeably but are not synonymous .Antibiotics are substances of microbial origin(suchaspenicillin) while"antimicrobial"refers to any substance including synthetic compounds which destroys microbes. Mechanism of action of antibiotics In order to appreciatethe mechanisms of resistance ,it is important to understand how antimicrobial agents act. One ofthe most common mechanisms of action is targeting the cell wall,which is present in bacteria(prokaryotic cells)but absentin humans(eukaryoticcells)

AntibioticResistance

Antibiotic resistance is the ability of a bacterium or other Micro organisms to survive and reproduce in the presence of antibiotic doses That were previously thought effective against them. The origin of antibiotic resistance genes are unclear; however ,studies using clinical isolates collected before the introduction of antibiotics demonstrated susceptibility,although
,conjugative plasmids were present. The main fourty pes of resistance to antibiotics develops
1.Natural(Intrinsic)resistance
2.Acquired resistance
3.Cross-resistance
4.Multi-drug resistance and pan-resistance

1.Natural (Intrinsic, Structural) resistance:

This kind of resistance is caused by the structural characteristics of bacteria and it is not associated with the use of antibiotics. It has no here ditary property.

2.Acquired resistance:

As result of the changes in the genetic characteristics of bacteria ,an acquired resistance occurs due to its not being affected from the antibiotics it has been responsive before.

3.Crossresistance:

Some micro organisms which are resistant to a certain drug,that acts with thesame or similar mechanism and also resistant to other drugs.This condition is usually observed in antibiotics whose structures are similar: such as resistance between erythromycin ,neomycin-kanamycin or resistance between

cephalospor in and penicillin.

4.Multi-drug resistance and pan-resistance:

Multidrug-resistant or ganisms are usually bacteria that have become resistant to the antibiotics used to treat them.This means that a particular drug is no longer able to kill or control the bacteria.Contact with its target.

Multiple antibiotic resistances:

R-plasmids possess regions with the resistance genes and resistance to
a number of different antibiotics that can be mediated by the same R-factorandis known as multi pleantibiotic resistances.

MECHANISMS OF RESISTANCE BY ANTIBIOTICS GROUP

Resistance to Beta-lactam antibiotics:
Beta-lactam antibiotics are a broad class of antibiotics;include penicillin's, cephalos porin's(namely,first-generation,second-generation,third generation,fourth-generations and fifth generations),mono bactams and the carb a penems. A1.Beta-lactamases As a result of studies molecular level 4 classes (A,B,C,D)of beta-Lactamase enzymes described. A, C and D beta-lactamases which functions Enzymes cool-estermediated B-class zinc ioninne edmetalloenzyme.

a.ClassAbeta-lactamases:

Gram positive and Gram negative bacteria are often plasmid or Transposon. Usually capable ofinducible Gram-negative bacteria TEM,ESBL (the number is 50)are included in this group.

b.ClassB beta-lactamases:

Stenotrophomonasmaltophilia, Bacteroidesfragilis, Aeromonasand Legionella detectablespecies, enzymes which hydroly zecarbapenems as well
As penicillin and cephalos porin.

c.ClassCbeta-lactamases:

Mainly parts cephalosporin(cephalosporins). Usually found on Gram-Negative bacteria and localizedtochromosome.

d.ClassDbeta-lactamases:

Oxacillin degrading enzymes(Oxacillins).Gram-positive cocciof S. aureus type that induced by beta-lactamases.Plasmids and transposons are usually movableand can be transferred by conjugation of staphylococcus.
A2.The development of resistance in Penicillin-binding proteins (PBP) into change:
Target of beta-lactam antibiotics, peptidogly can synthesis in the cell membrane which is responsible for penicillin-binding proteins(PBP).PBPs sarboxy peptidase and trans peptidase enzymes.
A3.Change in membrane proteins: Porinchannels 'change induced by gram-negative bacteria resistance. For example ,P. aeruginosa with a dedicated channel protein in Opr D registration may develop resistance to carbapenems. B .Aminogly coside group antibiotics resistance
B1.Enzymes that changing thestructureof aminogly coside:
In aerobic gram-negative bacteria the most important mechanism inthe development of resistance to a minogly cosidesis enzym aticinactivation.It plays a role in resistance to aminogly cosides modifying enzymes.
B2.Preventing the pass age of the drug to cytoplasm: Anaerobic bacteria,them a in mechanism responsible for resistance to aminogly coside.
B3.Changes in the ribosomal target: Especially important to streptomycin resistance. Caused by mutations in ribosomal protein S12 30S sub-unit is not connected to the target streptomycin.
C. Tetracycline Resistance
C1.Prevention of drug up take into the cells and the active pump systems:
Reduction in membrane permeabilityas result of the spontaneous chromo so malmutation sin bacteria as are sultofthe up take of the drug in preventing the development of resistance.
C2.Ribosomal Protection: The second important mechanism that leads to resistance to tetracycline The segenes found on bacteria suchas Campylobacter,Mycoplasma,Urea plasmaand Bacteroides genus. They are plasmid and chromosomal origin.
D.Macrolide,Lincosamide,Streptogramin (MLS) groups Macrolide, Lincosamide,Streptogramin (MLS) group's antibiotics resistance Because Gram - negative bacteriais impermeable to these antibiotics which have hydrophobic outer membranes, Gram-negative bacteria are naturally resistant to MLS group antibiotics.

NEED OF NOVELTOOLS :Back in1998 when Alexander Flamming discovered penicillin, it comes out wonder drug.This drug was widely used for various infections.In1940,it was observed by the two members, who were apart of penicillin discovery, that the reexistsan enzyme called penicillinase ,from a same strain of bacteria from which penicillin was observed.

LIMITATIONS OF EXISTING APPROACHES:

The only existing approaches are that of antibiotics.The modernera of
Antibiotics begin with the discovery of penicillin in 1928.Since then,Antibiotics have been backbone of treating several infections and saving Millions of lives.
Table1.List of effective and ineffective antibiotics against Disease causing bacteria.

UPCOMINGTRENDS:

Several scientist have developed many novel theories That would help to kill microbes with out the use of antibiotic. This will Preclude antibiotic and antimicrobial agent many novel theory describe in this Review have been tested in vitro and the iranti bacterial properties have been confirmed.

Nanotechnology:

Theunantic ipated threat of antibiotic resistance demands the development of novel drugs and strategies for battling antibiotic resistance. New developments in nanotechnology to produce engineered nanoparticles with coveted physicchemical properties have been utilize das the new out look of defence against MDR microbes.

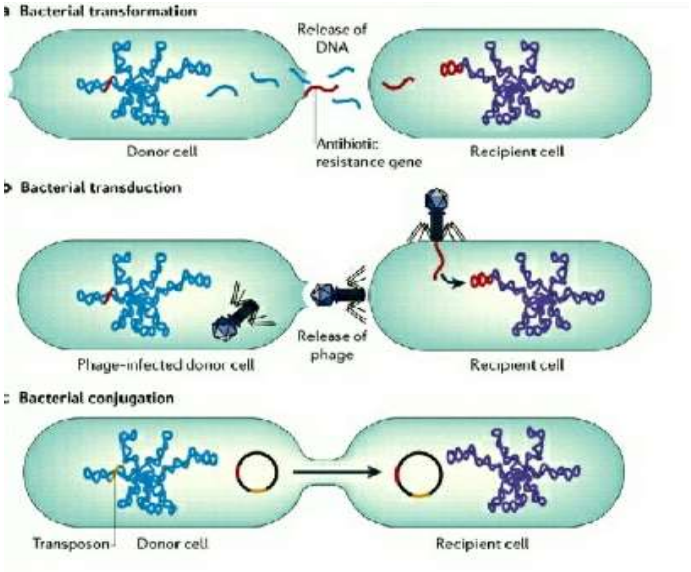

Fig. 1.Horizontal gene transfer. Resistance gene being transferred from one bacterium to another bacterium, antibiotic inactivation.

Gold nano particles also exhibit antibacterial activity by two ways: It inhibits ATP synthase activities and decreases the ATP level which leads to decrease in metabolis mandhence change in membrane potential. B.ENZYMES Researchers have discovered bacteria killing enzymes that could successfully supersede the traditional antibiotics. These enzymes are obtained from bacterio phages which infect the bacteria and kill them.One such enzyme available in market is Staphefekt .

TM.C.HERBAL ALTERNATIVES:

Medicinal plants have many traditional uses.These plants are composite sources for active ingredients which can act as an anti-infectious agent.The microbial infections are the primary cause of death in the developed and developing country.

D.PROBIOTICS APPROACH: Food and Agriculture Organization of United Nation (FAO) and World Health Organization (WHO) define probioticsas“live organisms which when administered in adequate amounts confer health benefits on the host". Probiotics may function in these three ways:

1. They reduce the chances of antibiotic triggered super infections in the urinary tract and gut.
2. Form anantibacterial substance which disrupts biofilms formed by bacteria,making it easier for antibiotics to kill.

CONCLUSION:

Antibiotic are extensively use both on human and animal health

Practice in developed and developing countries. There are many antibioticsThey get resist by the bacteria because of insufficient amount or Concentration of antibiotic.

Antibiotic resistance is major problem in the clinical practice today in

The emergence of multiple drug resistance to several types of antimicrobial agent.It develops by different ways such antibiotic in activation modificationof target site efflux or transport of antibiotic and soon.

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