*I production of drug inactivation enzymes*

*Drug resistance is the reduction in effectiveness of a medication such as an antimicrobial or an antineoplastic in treating a disease or condition.[1] The term is used in the context of resistance that pathogens or cancers have "acquired", that is, resistance has evolved. Antimicrobial resistance and antineoplastic resistance challenge clinical care and drive research. When an organism is resistant to more than one drug, it is said to be multidrug-resistant.*

*Ii. Modification of the antimicrobial target.*

*Some resistant bacteria evade antimicrobials by reprogramming or camouflaging critical target sites to avoid recognition. Therefore, in spite of the presence of an intact and active antimicrobial compound, no subsequent binding or inhibition will take place. Modification of the antimicrobial target.*

*Iii Eliminating antimicrobial agents from the cell with expulsion via efflux pumps.*

*To be effective, antimicrobial agents must also be present at a sufficiently high concentration within the bacterial cell. Some bacteria possess membrane proteins that act as an export or efflux pump for certain antimicrobials, extruding the antibiotic out of the cell as fast as it can enter. This results in low intracellular concentrations that are insufficient to elicit an effect. Some efflux pumps selectively extrude specific antibiotics such as macrolides, lincosamides, streptogramins and tetracyclines whereas others (referred to as multiple drug resistance pumps) expel a variety of structurally diverse anti-infectives with different modes of action.*

*Iv. Inactivation of antimicrobial agents via modification or degradation.*

*Another means by which bacteria preserve themselves is by destroying the active component of the antimicrobial agent. A classic example is the hydrolytic deactivation of the beta-lactam ring in penicillins and cephalosporins by the bacterial enzyme called beta lactamase. The inactivated penicilloic acid will then be ineffective in binding to PBPs (penicllin binding proteins), thereby protecting the process of cell wall synthesis.*