Thioretical studies on the structure of cephalosporin drug

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Antibiotic have been defined by Wakesman(1) as a chemical substances produced by microorganisms that is capable in low concentration of inhibiting and even killing. Other microorganisms , literally, antibiotics means (anti) life (biotic) .However ,there definition by Wokesman described only. Those antibiotics derived from living organism , in constant to chemotherapeutic agent which are purely synthetic. Now a days the term antibiotics is applied to substance that is produced wholly ”synthetic” or partially ”semisynthetic” by chemical synthesis and in low concentration inhibits the growth or kill microorganismsHistory of antibioticsMany ancient cultures, including ancient Egypt, ancient Greeks and ancient Chines had already used mould and plants to treat infections, In 1929 Alexander Fleming(2) discovered that penicillium notatum produced a substance which inhibited the growth of certain bacteria .later he suggested that the culture filtrate containing this active substam once could be used for the treatment of septic wounds .Three years later , Clutterbuck , Lovell and Raiastric(3) noted that an ethereal extract of the antibiotics was sensitive to oxidant and was readily inactivated by evaporation in acid and alkaline solutions but moderately stable at PH 5-6, Therefore, a substance is classified as an antibiotic if the following conditions are met:1- It is a product of metabolism (although it may be duplicated or even have been anticipated by chemical synthesis).2- It is a synthetics product as a structural analogue of a naturally occurring antibiotic.3- It antagonizes the growth or survival of one or more species of microorganisms.4- It is effective in low concentrations.Spectrum of activityThe ability of some antibiotics to antagonize the growth of numerous pathogens has resulted in their being designated ”broad spectrum” antibiotics. Designations of spectrum of activity are based on clinical effectiveness of the antibiotics (against) specific microorganisms. Many of broad spectrum antibiotics are active only in relatively high concentrations against some of the species of microorganisms often including the ”spectrum ”.Basic Mechanisms of antibioticsa- Inhibitions of cell wall synthesisThis is considered as the most common mechanism. The antibiotics functions by binding to the bacterial cell wall synthesis enzyme. This enzymes catalyze the cross linking reactions of peptidoglycans, a major structural component of the bacteria cell wall rendering it into a three dimensional rigid ,network which allows the bacteria to survive in a harsh environment ,deprived of these essential enzymes, bacteria can not sustain the rigidity of their cell walls and are ruptured by osmotic forces.b- Inhibition of

protein synthesis (Translation)The antibiotic action is directed towards the ribosome .It inhibits protein synthesis by binding to subunit of the bacterial ribosome. Consequently, it causes bacterial death. Antibiotics following this mechanism represented the second classc- Alterations of cell membranesThe antibiotic inhibits cell wall productions by blocking the step in the process (recycling of the membrane lipid carrier) which is needed to add on new cell subunits.d- Inhibition of nucleic acid synthesisNucleic acid synthesis can be inhibited via three routes. Some antibiotics can inhibit the formation of the nucleic acid precursors, adenine, guanine and thiamine. Some can block the DNA synthesis by inhibiting one of the enzymes (DNA Gyrase) required for the enzymes (DNA-department RNA polymerase) needed to more proteinse- Anti metabolite activityIn this case, the antibiotic block cell metabolism by inhibiting enzymes which are needed in the biosynthesis of folic acid which is necessary for cell compound.Classification of antibioticsAt the highest level antibiotics can be classified as either bacteriostatic or bactericidal. Ba/cteriostatic mean prevent bacteria from dividing, i.e. inhibit its growth .wherever, bactericidal mean kill bacteria .However these classification are based on laboratory behavior and more specific classification needed. According to their chemical structurei- The macrolide antibioticsThey are a group of antibiotics whose activity stems from the presence of macrolide ring, large lactone ring to which one or more deoxy sugars are attached . The lactone ring can be either 14,15 or16-memberd e.g. erythromycin (I), in 1952, reported by McGuire et al.(4), had achieved rapid early acceptance as well- tolerated antibiotics of value for the treatment of a variety of upper respiratory and soft tissue infections caused by gram positive bacteria .-1Spectrum of activity The erythromycin is active against bacteria strains that are resistant to the penicillin, especially gram- positive bacteria.ii- Tetracycline antibioticsThey are a group of a broad –spectrum antibiotics, they are named for their from ”tetra” hydrocarbon rings ”cycle” derivative ”ine”. e.g. , tetracycline(II)..The structure was discovered by Conover(5) in 1955 by conversation 7- chlortetracycline to tetracycline. Later tetracycline was obtained from fermentation of streptomycin species.-2Mechanism of action:Tetracyclines are specific inhibitors of bacterial protein synthesis. They bind to the subunit of the bacterial ribosome. Consequently it causes bacterial cell death.Spectrum of activity:The tetracyclines have the broadest spectrum of any known antibacterial agents. They are active against a wide range of gram-positive and gram- negative bacteriaiii- Antifungal antibiotics:These include griseofulvin was first reported in 1939 by Oxford et al. (6) as an antibiotics obtained from the mold penicilliumThe structure of griseofulvin (3) was determined by Grove et al. (7) to by 7-chloro 2, 4, 6 trimethoxy-6, β-methyl spiro-{benzofuran-2(3H)-l-(2) cyclohexen} 3,4 dione.-3Mechanism of action:The Mechanism of action of is demonstrated by it’s ability to arrest call division in metaphase in vitro ,by binding with the tobulin dimmer required for microtubule assembly(8).Spectrum activity:Grisofulvin is recommended of the systemic treatment of retactory ringworm infections of the boy, nails, hair and feat (tinea corporus, tinea unguium, tinea captious and tinea pads) caused by various species of dermatophytic fungi.iv- The amino glycosides antibioticsThis antibiotics contains amino sugar units that are linked together via glycosidic linkage, streptomycine (4) was the first antibiotic to be discovered in this

class.