

How antibiotic resistance occurs and prevention of resistance

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How Antibiotic Resistance occurs and Prevention of Resistance How Antibiotic Resistance occurs and Prevention of Resistance Antibiotics have been one of the best medical innovations of the twentieth century which have changed the face of medical practice. Bacterial agents are one of the most common pathological agents and the knowledge of bacterial diseases was identified towards the last few decades of the nineteenth century. This led to the search for medicines to treat these diseases and hence to the creation of antibiotics. Antibiotics are considered to be “wonder drugs” owing to the large number of people who were able to survive owing to these drugs. But the effectiveness of these drugs has been threatened by the formation of strains of bacteria that are resistant to the effects of this wonder pill. The situation is so serious that some medical experts have suggested the fact that the medical field might again fall into the dark period where there were no antibiotics (Davies & Davies 2010). Antibiotic resistance is a serious medical issue that is led to by many reasons and many drug resistance strains have of bacteria have resulted for example the strains of *Neisseria gonorrhoea*.

Antibiotic resistance has evolved owing to many underlying causes. Human activities have been a major cause. These include the utilization of antibiotics regularly for agricultural purposes and the disposing of wastes containing a high quantity of the antibiotics. Treatment plants for wastewater are also seen to have high quantities of genes and resistant bacteria. The incorrect use of antibiotics is another reason for the formation of drug resistant strains of bacteria. Genetic changes are the most common reason for the creation of resistance strains. The most common mutations are noted

in the genes that code for the β -lactamase enzymes. Intrinsic resistance is another process which results in resistant bacterial strains. This results as the genetic code of certain bacteria already possesses the capability of forming new resistant strains. Certain bacteria already possess the ability of preventing the functioning of antibiotics and hence this is also a cause of antibiotic resistance (Davies & Davies 2010).

Neisseria gonorrhoea is a common bacterial agent which has had many genetic changes that have resulted in making many antibiotics ineffective in its treatment. Sulfonamides were considered to be the best treatment for gonorrhoea but after a short period of their usage resistant strains of this bacteria came forward. *Gonococcus* bacteria have the capability to adapt to changes in their surrounding and undergo changes which is the reason for the resistant strains. There are two processes which result in the resistant strains of these bacteria. These include either chromosomal mutations or the attainment of R plasmids. Plasmid associated resistance of gonorrhoea has made the treatment of this disease resistant to penicillin since the year 1976 and to tetracycline since 1985. Penicillin has also been rendered ineffective owing to chromosomal mutations in the bacteria. Spectinomycin resistant strains were also produced but these strains did not prevent the action of other antibiotics (Lind 1997).

Neisseria gonorrhoea was considered to be a treatable bacterial infection but resistant strains have made its treatment extremely difficult. The bacteria have “ evolutionary adaptability” and it eventually becomes resistant to the therapy that is given for its treatment for a long time. This is explained by the resistance to ceftriaxone in France as well as Japan recently. Resistant

strains to even the most effective treatment therapy that is cephalosporin are already being seen. This is leading to a difficult situation as there are no further antibiotics that can be used as an alternative therapy. For overcoming this problem and improving the prognosis of this disease, it is effective if dual therapy with more than one antibiotic is started. It is also important that authorities at the local and state level should intervene and initiate antimicrobial resistance (AMR) surveillance strategies on an international level (Whiley et al 2012).

References

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