Does Secondhand Smoke Induce Superbugs?

Jeyaseelan, Anugrah

Secondhand cigarette smoke (SHS) exposure is the third leading cause of preventable death. More than 7,000 chemicals in tobacco smoke and 70 of which are known to cause devastating lung diseases. In children, SHS can increase severe lung diseases (bronchitis and pneumonia). Drug resistance is a dangerous problem that can induce superbugs, bacteria that are resistant to multiple pharmaceutical antibiotics. Antibiotic Resistance can develop in a population of bacteria in several ways, and one case would be mutations. Mutations in the DNA genome can be an advantage or disadvantage, but when SHS smoke is involved it can cause great harm. The bacterium with such mutations has a selective advantage when antibiotics are present. Mutant bacteria multiply and take over the population and thus top the antibiotics' curing abilities and also many resistant genes are now present in plasmids called Resistant (R)-Plasmids, which can pass easily between any bacteria by transformation. R-Plasmids can carry resistant genes to many antibiotics, by this way they give the bacterium multiple resistance to antibiotics. SHS causes point mutations, which are a type of mutation that changes the nucleotides in a DNA strand. My hypothesis was that the natural antibiotics would kill the mutated bacteria by SHS most effectively. We used both Gram +ve and Gram -ve pathogenic pulmonary pathogens and used disk diffusion method to assess antibiotic resistance. The results show that some natural antibiotics are as effective as pharmaceutical antibiotics with regard to inhibiting the growth of bacteria. Garlic was the most effective natural antibiotic against bacteria. The ultimate goal is to treat infections caused by mutated bacteria by natural antibiotics because they are cheap and readily available.

Awards Won: