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A new approach to fight against the superbugs

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In this emerging era of antibiotics, multidrug-resistant bacteria have been proven to be a great threat to the public health sector. Over the past few decades, the overuse or indiscriminate use of antibiotics has led to the development of resistance to antibiotics. As a result, superbugs such as methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant Enterococcus (VRE) and multidrug-resistant Pseudomonas aeruginosa have evolved as antibiotic-resistant pathogenic organisms. The constant genetic mutations in the strains of these bacteria have allowed them to develop resistance against almost all the available antibiotics. And this has led to a crisis because there are a very limited number of known antibiotics left to be used for medical purposes. To fight this exigency, the major concern should be in developing new antibiotics that can inhibit the growth of these multidrug-resistant strains by identifying their genetic code and recognising the enzymes that cause such resistance. Additionally, this knowledge can be used to produce specific secondary metabolites from plants which will be effective against these multidrug-resistant organisms by providing new targets within the bacterial cell. In the future, constant and regular susceptibility testing on all these types of bacteria can reveal their properties or methods that cause resistance to the antibiotics. Along with this, the proper protocol for using or taking antibiotics that can prevent the development of resistance to these drugs in the future can be determined. To take the study one step forward, alternative directions or avenues have to also be evaluated. Instead of fighting against a disease, a proactive defence mechanism will be handier for humankind. Natural medicines with immune-stimulating properties can help the body to develop natural immunity to superbugs. The mechanism of action of natural medicines includes disruption of cell membrane followed by leakage of the cell contents that eventually lead to cell death. Natural medicines will have more specific targets with a narrow range of effects, hence the healthy living cells will remain safe. Some recent studies demonstrated that antioxidants can help increase the effectiveness of some antibiotics by influencing the bacteria's natural resistance. These studies further prove that existing antibiotics can become more effective to combat antimicrobial resistance if they are combined with essential oils like tea tree oil, oil of oregano, Valencia orange oil, etc. Plant bioactive compounds also have properties that can give resistance to the pathogenic activities of bacteria. Medicinal herbs will be more effective to treat superbugs than synthetic drugs. Nowadays, homoeopathic medicines from Pulsatilla nigricans and Atropa belladonna are being used to treat MRSA, especially in women and children. Therefore, the solution to the problem of superbugs relies on nature at best.

Keywords: Antibiotics, MRSA, Pseudomonas aeruginosa, Superbugs, Multidrug-resistant bacteria, Secondary metabolite, Natural medicines

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