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Non-antibiotic treatments for bacterial diseases in an era of progressive antibiotic resistance.

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Abstract

The development of Multi Drug Resistant (MDR) microbial infections poses a threat to the fundamental principles of traditional antibacterial chemotherapy. To treat invasive bacterial infections, non-antibiotic approaches must be taken into account. There are significant clinical issues that will be difficult to resolve as we move away from antibiotics and toward alternative therapies. Some infections (such as group a streptococci and Treponema palladium) will still be successfully treated with antibiotics in the future, but many bacterial infections will likely require adjuvant medicines or need to be replaced.

Keywords: Antibacterial, Chemotherapy, Bacterial infections

Introduction

The final line of defence against multidrug resistant bacteria has already been broken, according to recent findings of plasmid-transferable genes that mediate resistance to carbapenems and colistin. When battling antibiotic-resistant bacterial infections, we now have to cope with the unsettling truth that the post-antibiotic age has come [1]. Extracorporeal pathogen removal filters that can bind to and remove a variety of blood stream pathogens are currently being developed. The usage of mannose-binding lectins or bound heparin are two of the more intriguing device filters now under study out of many others. Theoretically, despite widespread antimicrobial agent resistance, hemofilters' reduction of the bacterial load would enable the host's innate and adaptive immune systems to eradicate any remaining pathogens [2].

Many bacteria use intercellular communication to alert one another. Despite various difficulties, the use of bacteriophages (viruses that lyse certain bacteria) as an alternative to antimicrobial medicines against MDR infections remains an appealing approach. By adhering to surface receptors on bacteria, phage enters the bacterial host, proliferate intracellularly, and destroy it by breaking down the peptidoglycan cell wall. Phages are common in nature and are used in our food by millions of people each day in a harmless manner. It is not a novel concept to use immunotherapy to treat infectious diseases, but recent advances in the ability to produce high affinity human polyclonal or monoclonal antibodies against a variety of molecular targets have made this strategy more appealing. Both monoclonal and polyclonal antibodies are being developed as passive treatments for bacterial diseases as well as active vaccinations with adjuvanted, multi-eptitope bacterial vaccines [3].

A number of cell membrane lytic toxins made by bacteria have been captured by liposome-based cyto-toxin inhibitors. These liposomes act as fake cell membranes that absorb cyto-toxins, shielding human cells from harm. In experimental settings, this non-antibiotic defensive mechanism is effective and might be used in conjunction with anti-microbial drugs to treat bacterial infections that produce exotoxins [4].

A number of adjuvants are being scrutinized, including interleukin-7, granulocyte macrophage-province animating element, modified cell demise ligand-1 immune response, among different systems. Such invulnerable adjuvants could help patients with sepsis-actuated resistant concealment [5].

Conclusion

We must revaluate our treatment options for some bacterial diseases due to the spread of antibiotic resistance genes. Infections caused by germs will probably be harder to treat in the future. We must safeguard the existing antibiotics, create new ones, and intensify our efforts to create novel treatments for bacterial diseases.

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