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Bioweapons- Future of Warfare

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Mini Review

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ABSTRACT

Biological weapons are destining to propagate disease among living organisms via the inauguration of microorganisms including viruses and bacteria. In recent era of development, bioweapons were limited to be used in wars or in civilian attacks. But as technologies grows faster including the computational power, genetic engineering proved a vital role in manufacture of bioweapons. Genetic experts are seeking several techniques such as binary biological, designer diseases techniques etc. to accelerate the effectiveness of pathogens in war zones.

INTRODUCTION

Biological weapons are destine to propagate disease among living organisms via the inauguration of microorganisms including viruses and bacteria. The means of preparation, durability and route of infection determines the manner it is deployed and attackers circulate these agents via food products, aerosols or water supplies [1]. In recent era of development, bioweapons were limited to be used in wars or in civilian attacks. But as technologies grows faster including the computational power, genetic engineering proved a vital role in manufacture of bioweapons [2,3]. Genetic engineering plays a key role in designing bioweapons with new virulence

physiognomies that enhances an organism's abilities such as survivability, pathogenicity, resistance etc. Although the constructive communal applications of biotechnology is visible, but the destructive implication of biotechnology (black biology) is still threating us [4].

Confinements of Former Bioweapons

Bioweapons were exclusively considered as natural pathogens that must be first verified to have some certain requirements to fulfill to be used as effective military bioweapons. So for most of the pathogens are natural, they are not suitable to be used for such purpose. Firstly, bioweapons must be manufactured in numerous quantity enough to allow their purification and testing of their properties [5]. For this purpose either they can be obtained from natural environment or can be produced in microbiology lab or bank. For the process of replication of microorganisms, living cells are required. This larger quantity growth of both microorganisms and living cells is somehow limited by the availability of suitable equipment, space and risk of hazards associated with health while handling of hazardous germs [6].

Novel Advancements

From DNA sequencing to its synthesis it became tremendously easy for researchers to form any virus [7].This was first accomplished when recreation of poliovirus and influenza virus was done. Recombinant DNA technology allows the modification of unique pathogens that could be easier and safer to handle, capable of ethnic specificity and may cause higher mortality rate [8]. The developing capacity of DNA synthesis proficiencies, use of computational tools (electronic technology) and informatics means that more and more people are able to design effective bioweapons. Experts have been successful in renovating the four bases of DNA namely adenine, cytosine, guanine, and thymine into the binary code of 1s and 0s. This revolution indeed involves a purely electronic manipulation of genetic engineering, which in turn reduces cost of technology [9,10].

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Enhancing Effectiveness of Bioweapons

Genetic experts are seeking numerous ways to accelerate the effectiveness of pathogens in war zones.

1. Binary Biological technique: it encompasses the implanting of DNA segments from one living organism to another to enhance virulent properties within the host bacteria [11].

2. Gene Therapy technique: it involves the implanting of DNA segments from one living organism to another permanently, completely altering the genetic composition of host organism. This is well known technique for creation of bioweapons by inserting the toxic genes into host organism [12].

3. Designer Diseases technique: It involves the occurrence of abnormal cellular multiplication of cells causing diseases different from regular one by injecting toxic agents in host organism body just like in cancer [13].

4. Stealth Viruses Technique: It is a viral infection that enter into the cells and may be stimulated externally by agents to cause diseases. They stay dominant for long enough periods and can be triggered while they are dominantly active. This technique can spread virus among large population and activation could either be delayed or used as a threat for blackmail [14].

Defensive Bioweapons

The constructive usage of biotechnology still emerges as means of defense against the bioweapons. Some important techniques involved are as follows:

1. Human Genome Literacy: As genetic engineering is growing it continues to explore those particular genomes can be effective in controlling human disease with production of such vaccines and drugs to fight specific microbes based on their unique molecular effect on humans [15].

2. Enhancement of Immune System: Human genomics gives a clear understanding of the immune system in living organisms. Thus under the immune system enhancement technique ,genetic engineering is beneficial in enhancing immunity against toxics pathogens for example cellular research in quest to find solution against the bioweapon anthrax [16].

3. New Antibiotics and Antiviral Drugs: Currently antibiotics aimed at protein, DNA and cell wall amalgamation methods in bacterial cells. With a comprehensive knowledge of microbial genes and other proteins that are crucial for bacterial viability, researchers focus on formulating novel antibiotics. Ultimately, broad spectrum, instead of protein specific antimicrobial drugs, can be developed [17].

CONCLUSION

With the advancement in technology, genetic engineering plays a vital role in manufacture of bioweapons with enhanced survivability, infectivity, virulence and resistance. Although constructive usage of biotechnology still emerges as means of defense against the bioweapons.

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