World War III- Man vs Microbes

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Abstract

Life on earth is a debatable story, where the mystery has not yet been solved about the beginning of life. Beneath our superficial differences, we all are just the magnified version of our ancestors, the microbes especially the bacteria. About 3.5 billion years ago, due to abiotic processes the first cell appeared in earth. Then obeying “survival of the fittest” theory, bacteria were the first fittest living microorganisms. Microbes, initially were beneficial to all the life forms, later became a harmful weapon by mutations and transformations. With the discovery of antimicrobials, the battle between man and microbe has raged. Even though the threats posed by the dangerous exotic microbes are of great concern, the major iceberg phenomenon is seen in common pathogenic microorganisms. Much importance was given on understanding the mechanisms of major shift and drift of influenza virus, but the antibiotic resistance, which is considered the potential threat to mankind, received less attention and importance. The sad fact is the antibiotic resistance is evolved to the extent involving common pathogens like *Staphylococcus aureus* (MRSA), *Escherichia coli* (ESBL) and many more. We have to realize the fact that microbes are our opponents in our day to day battle life. Hence it is time to interrogate ourselves whether we are losing. The ongoing cold war i.e. World War III, is being dominated by microbes and it’s in our hands whether to surrender or offend. Let us put our hands together and stay united to win the battle.

Key words: Antibiotic Resistance, Bacteria, Earth, Human.

Introduction

Since the very beginning of human life – that was a very long time age until comparatively recent times, the disease and demons are inextricably linked together on human’s mind. The recent development in bioarcheology had a focus and impact investigation on the ancient DNA and ancestral microbes. These archaeologies, historical documentation and ethnological literatures abound the relations of sprits to illness.

Life on earth is a debatable story, where the mystery has not yet been solved about the beginning of life. Beneath our superficial differences, we all are just the magnified version of our ancestors, the microbes
especially the bacteria. Scientists have discovered that bacteria is not only the building blocks of life, it also plays a key role in maintaining the living beings on Earth. Without microbes, the Earth would have become one among the other lifeless planets. With the beginning of Paleolithic era, the Homo sapiens arose and got civilized. The wandering hunters became nomads. The human population dramatically started increasing resulted in geographical separation. Communism, slave society, feudalism, capitalism, and socialism mounted changes and revolution all around the world. Thus paved a way for World War I and World War II, the great wars in the history yet.

**Ancestors of earth**
About 3.5 billion years ago, due to abiotic processes the first cell appeared in earth. Then obeying “survival of the fittest” theory, bacteria were the first fittest living microorganisms. The ocean floor is a home to $2.9 \times 10^{29}$ single-celled organisms — that's 10 million trillion microbes for every human on the planet. In the dynamics of evolution, the adapting kings, the bacterial population survived the crises by routinely transferring their genes between themselves.

The pride and uniqueness of human intelligent consciousness made the traditional thought saying “Man, the highest animal”. The world speaks only about humans forgetting how interdependent life on earth really is. Without microbes, we would sink in a world full of sewage, dust and dirt. The balanced evolution occurred only because of metabolic processes of bacteria before 2000 million years ago. The perfect knowledge of evolutionary history will act as a spark for humans to stop domination, so that we can avert the premature end to our species.

**World War III – Battle cry**
Microbes, initially were beneficial to all the life forms, later became a harmful weapon by mutations and transformations. The harmful conversion is attributed by various factors including environmental changes, emergence of new life forms in the world, and rapid communicability of diseases among the living beings, thereby lead to the discovery of “Antibiotics – the bacterial killers”. With the discovery of antimicrobials, the battle between man and microbe has raged.

In 1960, the first MRSA isolate was identified and reported. The bacterial battalion has defended the attack and got adapted to the new environment, thus caused an alarming threat to the humans by the word “Resistance”. Thus the World War III between man and microbes has already started.

Albert Einstein said “I know not with what weapons World War III will be fought, but World War IV will be fought with sticks and stones.” To his query, now there is a crystal clear answer that the weapons are resistance genes and their manufacturer, our opponent are the Microbes.

Microorganisms are stubborn, hard and they can survive in every conceivable environment we can think of – hot springs, ocean trenches and deep down the sea. Bacteria are dangerous and they are extremely resilient adversaries. They always continue to ‘find a way’. Yes! They always ‘find a way’ by mutation, transformation, adaptation and by acquiring more virulence. When we discovered penicillin and cephalosporin to attack the cell wall of microbes, they defended it by producing Penicillin binding Proteins (PBP2a) by MecA genes [1]. Thus the war of Methicillin Resistant *Staphylococcus aureus* (MRSA) is still a troublesome attack in all hospital acquired infections. To attack the MRSA, the six sense human designed the powerful armored vehicle – Glycopeptide antibiotics. Immediately after introducing an antibiotic, the clock begins to tick and the bacteria finds a way. It finally ended up in Vancomycin Resistant *Staphylococcus aureus* (VRSA) strains. The war extended through a wide range of bacteria and it leads to Vancomycin Resistant *Enterococci* (VRE). When bacteria are killed by beta lactam antibiotics, they produced beta lactamases and subsequently landed up in Extended Spectrum Beta Lactamases (ESBL) producing strain [2, 4].
These are the pioneers of attackers in Gram negative bacilli. Then Metallo Beta Lactamases (MBL), *Klebsiella pneumoniae* Carbapenamase (KPC), emerged and becomes an ongoing threat to all the community and health care settings. On the other hand, the newly emerging or re-emerging pathogens have started destructing a part of the world by its power to instill widespread pandemic. Even though incredible processes are being taken in prevention and cure of infectious diseases worldwide, the recent pandemic Influenza and the deadliest attack of Ebola are still like Hiroshima Nagasaki attacks, where there is drastic increase in the mortality rate within a short interval.

**Are we losing?**

Doctor’s trial was one of most ashamed and unforgotten evil happened in the medical history to genocide war shoulders on world war II by using bio weapons and deadly microbes. In 2001, letters containing anthrax spores were mailed to several news media offices and two Democratic U.S. Senators, killing five people and infecting 17 others [4]. Humans used Microbes as a biological weapon to kill their own species. But we forget the fact that there is huge threat in the underworld that microbes are forming a terrific army against us.

In 1970, the Surgeon-General of the United States of America announced that it was “time to close the book on infectious diseases, declare the war against pestilence won, and shift national resources to such chronic problems as cancer and heart disease”. But the morbidity and mortality for the past two decades made his opinion a debate and opposing. The magnitude of problems related to infectious diseases are increasing due to new and re-emerging communicable diseases like Influenza and Ebola viruses causing pandemic and epidemic warranting an effective intervention to control them. Even though the threats posed by the dangerous exotic microbes are of great concern, the major iceberg phenomenon is seen in common pathogenic microorganisms.

Much importance was given on understanding the mechanisms of major shift and drift of influenza virus, but the antibiotic resistance, which is considered the potential threat to mankind, received less attention and importance. The sad fact is the antibiotic resistance is evolved to the extent involving common pathogens like *Staphylococcus aureus* (MRSA), *Escherichia coli* (ESBL) and many more. We have to realize the fact that microbes are our opponents in our day to day battle life. Hence it is time to interrogate ourselves whether we are losing.

**A better way for future**

Every medical article put the spotlight on problems connected to antibiotic overuse. Some people consider those problems to be real and serious, and others think that the discussed topics are nothing more than new “fashionable” subjects to talk about. Meanwhile, antibiotic overuse continues as a common practice among medical professionals for the last 50 years. The practice of antibiotic overuse has put patient’s health at risk, contributed to antibiotic resistance and increased bacterial mutation to a new, stronger level; as well as it hitting the economy with new costly expenses in health care. Formulating a strict antibiotic policy, infection control practices and strict follow up of the protocol in all the centers is a must to make the enemies calm down. Let us understand the nature of bacteria and make them our beneficial companion.

To overcome the emerging infectious diseases (EID), a more efficient strategy to address future is to combine rigorous analyses of the fine-scale ecological and demographic changes within hotspot regions with state-of-the-art molecular approaches to viral discovery [5]. This will give us a more accurate predictive model for future disease emergence, and better definition of the size and diversity of the zoonotic pool. With the help of molecular techniques doing the virus-hunting in the future is, of course, still somewhat crude. It is impossible to determine the future ability of a novel virus to jump to the hosts. However, by focusing first on viral...
groups known to be pathogenic, and by targeting viral discovery within these clades, significant progress can be made toward dealing with the EID threat.

**Conclusion**

Brand says “If you don’t like bacteria, you are on the wrong planet”. The supreme art of war is to subdue the enemy without fighting. We, the *Homo sapiens* should make our life worth by being good to all living being in our universe. The ongoing cold war i.e. World War III, is being dominated by microbes and it’s in our hands whether to surrender or offend. Let us put our hands together and stay united to win the battle.

**References**


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