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Review Article

Biochemical and Molecular Role of Microorganisms in Disease Progression and Current Impact on Health Conditions

Syed Abrar Hussain[1], Roha Saeed[2], Rimal Ayesha[1], Muhammard Jawad Bashir[1], Aqdas Hameed[3], Saba Nasir[1*], Urooj Afzal Chughtai[4]

[1]Institute of Microbiology, University of Agriculture Faisalabad, Pakistan
[2]Department of Microbiology, Government College University Faisalabad, Pakistan
[3]Departments of Biotechnology, Forman Christian College University, Lahore, Pakistan
[4]Department of Zoology, University of the Punjab, Lahore, Pakistan

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***Corresponding author:** Saba Nasir

Abstract

Autoimmunity simply stated is one's immune system responding to self. The occurrence of infectious disease is affected by interaction between microorganisms. The link between certain bacterial infections and autoimmunity is particularly compelling, and molecular mimicry is often implicated in autoimmune disease pathogenesis. The role of microorganisms in the spreading of diseases has undergone significant modification in the past few decades with new observations from clinical, epidemiologic, and basic science research. Primary bacterial colonizers are *Staphylococcus epidermidis* and other *coagulase-negative Staphylococci*. Other microorganisms that are generally regarded as skin colonizers are species of *Corynebacterium*, *Propionibacterium* and *Brevibacterium.* Adenovirus, herpesvirus, and poxvirus are all examples of large DNA viruses that infect humans. Adenoviruses, of which there are many types, cause gastroenteritis and respiratory disease in humans. Notable human diseases caused by RNA viruses include the common cold, influenza, SARS, MERS, COVID-19, Dengue Virus, hepatitis C, hepatitis E, West Nile fever, Ebola virus disease, rabies, polio, mumps, and measles. Parasitic diseases that can be blood borne include African trypanosomiasis, babesiosis, Chagas disease, leishmaniasis, malaria, and toxoplasmosis. Vaccinations are generally the cheapest and most effective trusted Source way to prevent viruses. Some vaccines have succeeded in eliminating diseases, such as smallpox.

Keywords: Bacterial Pathogens, Microbes, Autoimmunity, Covid-19, Food Poisoning.

INTRODUCTION

Animal body has different systems like immune system, blood circulatory system and digestive system [1, 2]. One of the systems that fight against the different types of bacteria and virus is the immune system. This system has large network of cells such as natural killer cells and white blood. These cells present in the blood and kills the invader when enter into the body. Cells of immune system umlaut detect the bacteria and other harmful microorganisms. Then they work against them by releasing the different kinds of immune response proteins [3, 4, 5].

There are different diseases caused by viruses as well as bacteria. Some bacteria are beneficial and hence used in industries for the manufacturing of compounds such as yeast and yogurt [6,7,8]. While on the other hand, some bacteria are harmful and cause different diseases and hence affect the global population all around the world. While viruses replicate faster and kills the cells of immune system. While some viruses are DNA and some is RNA based demigod upon the particular profiteer present on the specific cell [9].

Viruses are the group organisms that have genetic material in the form of DNA as well as RNA that if potentially acting body [10]. Viruses are the replicate faster as compared to their organism and have severity of disease is more than bacterial disease. It is important to control them at early stage once it replicate and difficult tp control them in particular ways. It counter to their cells of immune system and destroy the cells of natural killer cells by attacking their main roots [11].

Viruses can survive in the particular host for a long periods of time and then damage the skin, brain, mouth and liver upon the particular certain infections of

viruses [12]. There are different methods to damages them like PCR as well as ELISA. These diagnostic parameters help to detect them at the cellular and molecular level. PCR as the most advance form of real PCR is used of all around the world. ELSIA is not much reliable as other tests [13, 14].

When antigen as the foreign substances enter into the body, then immune system of the body product that work savages them to fight and kills them. Antibodies are the natural proteins produced by immune system in order to kills the foreign invader. Different types of antibodies artificially defangs by scientists be modifications in their barrier [15].

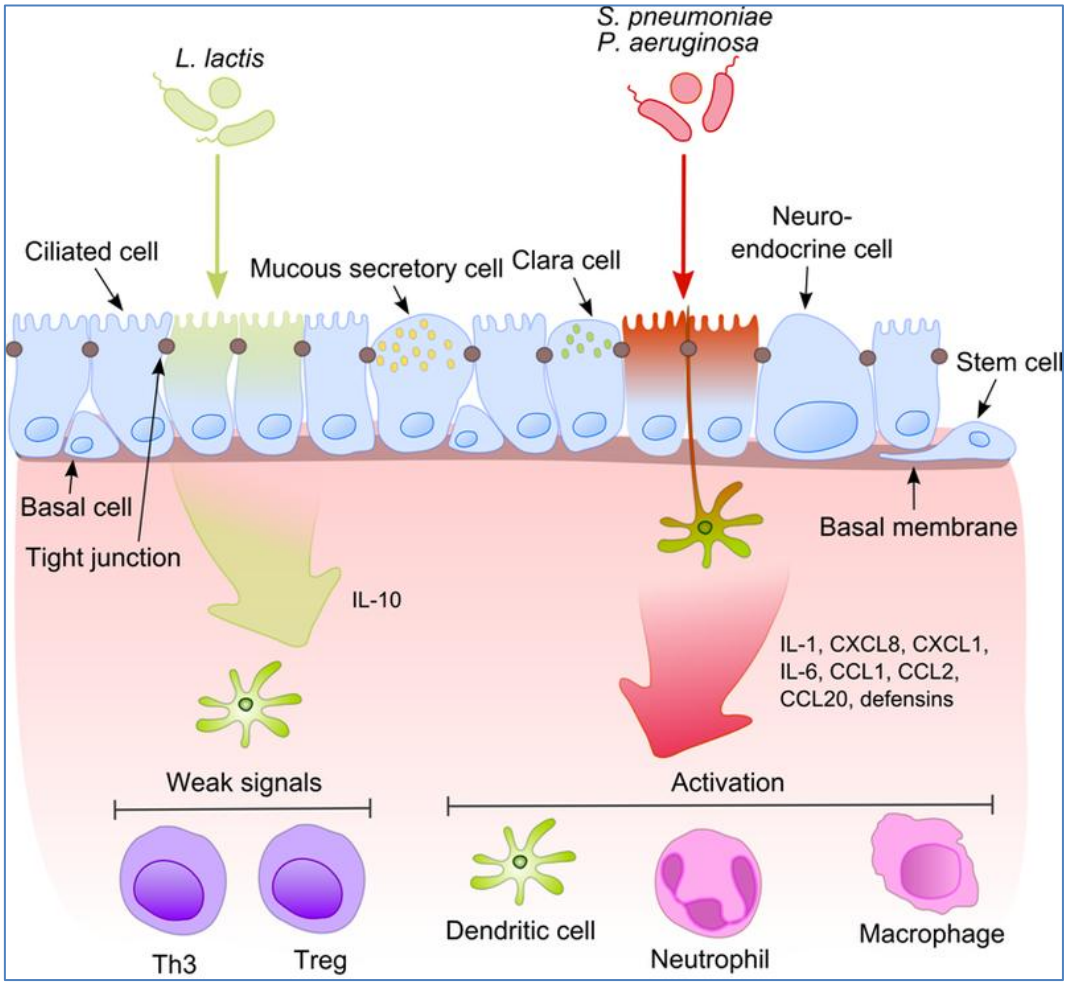

Fig-1: Shows the pattern of attacking of pathogens and action of immune cells

Ebola virus is the deadly virus that attack on the cells of the immune system. It is the most harmful viruses task compared to other viruses because it directly replicate faster and causing starts bleeding of the infected area once enter into the body[16]. This virus also attack on cells of immune of blood. This virus mainly transmitted into the body of human in contact to the infected person with already diagnosed with Ebola virus and other toxic fluids. These viruses also damages to the mucus membrane once enter to the body and lead to lethal once active and stay for long periods of time. Different drugs are variable to treat the Ebola virus but the important causation is the safety [17].

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus [18, 19]. The most common symptoms including in this diseases are fever as well as throat. It also causes the tiredness that leads to shortening of breaths. Those people who have lung cancer or also problems of breathing have greater chances of attacking of viruses of that disease. This viruses particularly attack on the lungs. Different types of laboratory tests are available for diagnosis of this disease such as RT-PCR. The samples are taken form the saliva or noise and send to the well-organized laboratories for testing [20].

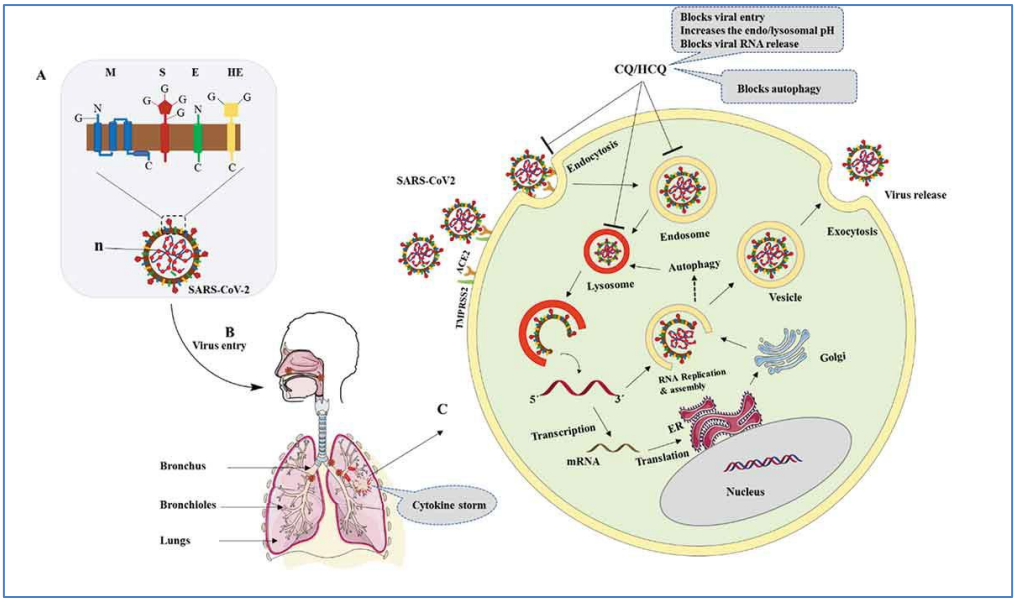

Fig-2: Shows the mechanism of SARS-CoV-2 and its action at molecular level

Shigella flexneri as one of the harmful pathogens causes serious infections in human that is transmitted through different types of polluted water. It also affected the largest population all around the globe [21-23]. Salmonella enterica that also causes infectious disease caused through spoilage and plotted food and thus leads to food poisoning. This type of pathogens mainly transmitted through food poison and has become resistant pathogens in human for period of decades. Pseudomonas aeruginosa that is mainly transmitted though the various infections in human and plants. It leads to severity of infections if exceed at the normal level [24-28].

There are other different types of bacteria that cause the disease in foods like Escherichia coli that particularly damage the large variety of foods all around the world. There is need to design strategy to control them in better way. While on the other hand, Helicobacter pylori may leads to problems for digestive system and causes the different types of cancers ulcers. These bacteria particularly grown on the intestine and if survive for long periods of time then takes its serious form [29].

Neisseria gonorrhoeae also causes problems related to nervous system by damage the layer of mening in the nervous system [30]. This bacteria directly attacks on the cells of nervous system and damage the myelin sheath of the brain cells. Staphylococcus aureus also causes the different disease of skin like the cellulitis that is the bacterial infection leads to severe danger to skin. This type of bacteria takes some days for survival in the skin and causes the skin infections. Streptococcal affected the large population of the human by damage the brain cells as well as the throat [31, 32].

Some viruses attacks in liver and causes severe inflammation that leads to hepatitis. It may due to excess concentrations s of viruses that enter and stay in liver for prolonged time [33]. There are different types of hepatitis unending upon on the particular virus. Hepatitis is mainly spread through polluted foods and water that caused leads to the accumulation of viruses responsible for hepatitis A. Hepatitis A is not harmful as compared to their viruses as it treatable. Hepatitis B is another type of virus that spread through mother to child, contact through blood and seculars activity. This type of hepatitis is harmful as it attack on the specific live cells and kills them that leads to abnormalities in liver fictions [34, 35].

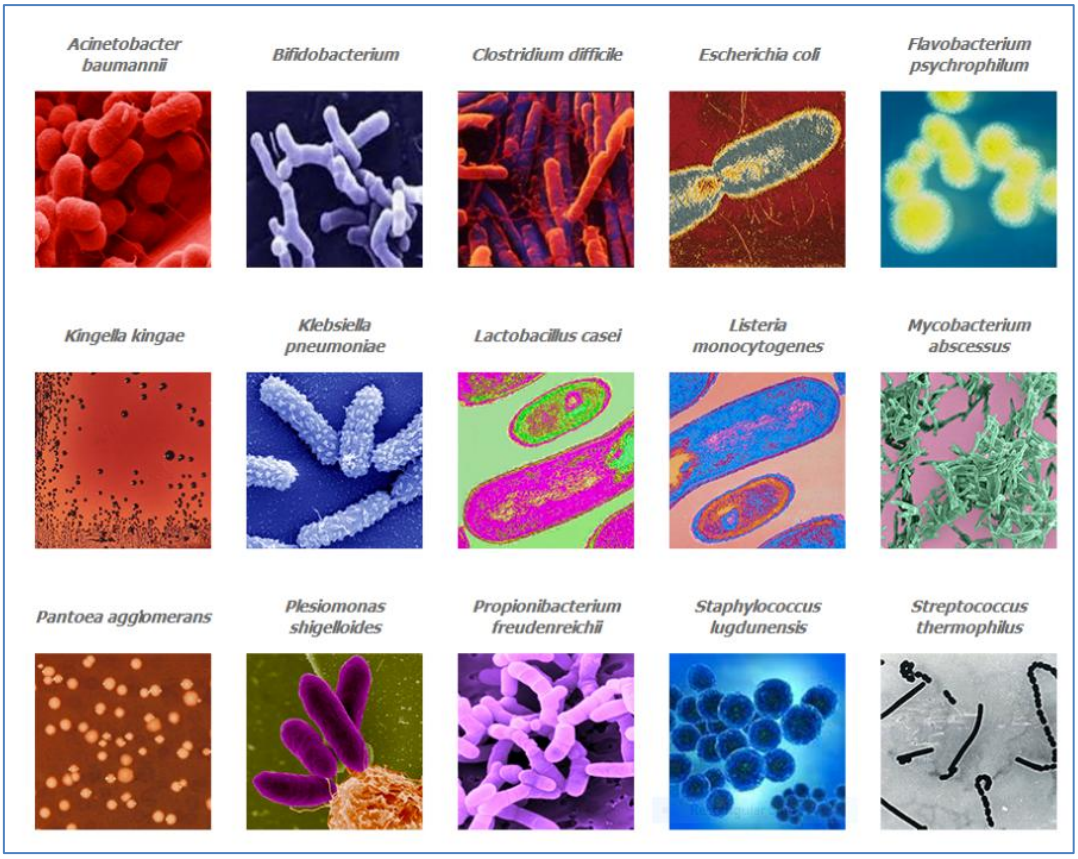

Fig-3: Shows the different types of bacterial pathogens

Hepatitis C is the most common hepatitis all around the world that affected the world populations. This type of viruses transmitted infected needles. Syringes, sexual activity and blood contacts [36, 37]. This virus leads dead's to liver cirrhosis when it takes to most active form. Liver has certain cells that perform its functions normally, when this virus enters and kills them, liver unable to perform its functions at the normal level. Certain drugs are available for the treatment of hepatitis. It is important that viruses can be detected at early stage and should be treated in order to avoid them their replication and attacking mode to normal cells [38].

Examples include bacteria, viruses, toxins, cancer cells, and blood and tissue from outside the body. These substances contain antigens [39, 40]. The immune system produces antibodies against these antigens that enable it to destroy these harmful substances. The occurrence of infectious disease is affected by interaction between microorganisms in three ways. The indigenous flora (commensal microorganisms) of some mucous surfaces provide one of the main protective mechanisms against infection by pathogens (disease-producing microbes). The commensal populations interfere with the establishment of pathogens on mucous membranes by evoking anaerobic conditions, by competing for space and nutrients and by producing inhibitors [40, 41, 42].

Infectious diseases are caused by infectious organisms. Typically, these are bacteria, viruses, fungi, or helminthes [43-45]. Under normal circumstances, when the immune system of the host is fully functional, disease symptoms may not develop. If the host immune system is compromised, or the infectious agent overwhelms the immune system, an infectious disease ensues. Most infections are caused by bacteria, viruses, protozoa, helminthes, rickettsia, and fungi [46-48].

Some pathogens have Streptococcus and Staphylococcus is part of the normal skin microbiota and typically resides on healthy skin or in the nasopharyngeal region [49-52]. Yet these species can potentially initiate skin infections. They are also able to cause sepsis, pneumonia or meningitis. These infections can become quite serious creating a systemic inflammatory response resulting in massive vasodilation, shock, and death [53]. Others produce toxins or inflammatory substances that trigger negative responses from the body. This variation means that some infections are mild and barely noticeable, while others can be severe and life threatening. Some pathogens are resistant to treatment [54].

CONCLUSION

Disease-causing microorganisms, however, are another matter entirely. Sometimes, different types of microorganism when enters into the body, attacks on

the normal cells of body. The body not performs its functions due to its immunity and itself kills its cells and parts of immune system. It also deeds to death of many cells. There different autoimmune disease that increasing day by day due to more resistance caused by different types of viruses and pathogens as well.

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