

VIRUSES ARE CUTE NOT RUDE

Cute Viruses

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ABSTRACT

Bad information spreading is one of the biggest problems that the world faces. For example, at this time, lousy information is spreading about covid-19 vaccines, but it is the key to end pandemic; it is the analogy that All of the people think that all viruses are harmful and if they heard word virus they become too scary, but this something is false. So this paper aims to analyze this problem by showing the harmful viruses that infecting us and it is the mechanism in addition to the good viruses that do not infect us but help us to live, and it is the mechanism, discuss specific topics that support the idea to make them get the conclusion before they read it. (Abstract)

KEY WORDS: Viruses, Cute Viruses, Bad Viruses

I. INTRODUCTION

Viruses are this small thing that is not alive until it enters a living organism. It uses it to reproduce, eat, and everything viruses have a mechanism by which they enter the host cell and use it. Most people think that this condemns viruses, and they become afraid of them. It cannot be Langerhansed that this is a scary thing like HIV or covid-19 there images are present in figures 1 and two, respectively, but these viruses are too small compared to the total amount of viruses the rest of these viruses, people cannot live without it. These viruses enter the inhale of air while eating, live in our bodies, and some sea creatures cannot live without their presence. So why are people afraid of these microorganisms? In the next section, viruses' mechanisms will discuss, but now, there are some infections caused due to bacteria. However, the thing that is not known is that there is a type of virus that kills this bacteria, and we may use it to make medicines. This type is called "bacteriophage," as shown in figure (3), so not all viruses are harmful as you think, and as has written in the title, viruses are cute, not rude.

Figure(1) "covid-19" figure (2) "HIV" figure(3) bacteriophage



II. MECHANISMS OF VIRUSES

Viruses vary in function, so it varies in mechanisms; in this paper, three types of mechanisms with three examples will discuss because people must know how viruses are work before they were afraid of them or do not be afraid.

Mechanisms of good viruses will be the beginning of our discussion, but before this somethings in virus structure must be known like:

1- Glycoproteins "envelope proteins" on the surface of the coated viruses -coated viruses are viruses that are coated by plasma membrane- that is bind to receptor proteins on the host membrane to facilitate its entry. As shown in figure(4)

2- Viral genome is something where all DNA of the viruses are present -some viruses contain RNA instead of DNA-. as shown in figure(4))

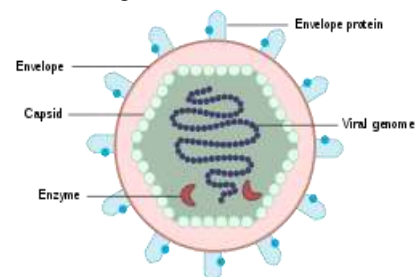


Figure (4) virus structure

Bacteriophages have differed in structure and shape, as shown in figure(5) that it contains some different things like the fiber tails used to enter the host cell by injecting int's DNA through it.

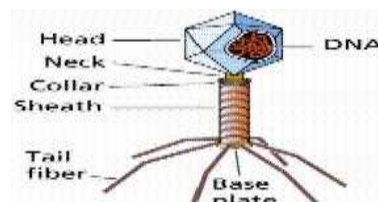


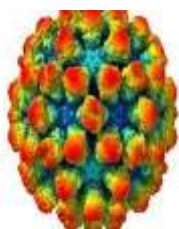
Figure (5) "bacteriophage

Now the principles of viruses mechanisms will be discussed:

1. Virus particles are too large to diffuse across the plasma membrane, and thus entry must be an active process.

2. Virus particles bind to receptors on their host cells to initiate entry.
3. The cell receptor may determine the host range and tissue tropism of the virus.
4. Viruses may bind multiple distinct receptors, and individual cellular proteins may be receptors for multiple viruses.
5. Enveloped virus particles bind via their transmembrane glycoproteins; nonenveloped virus particles bind via the capsid surface or projections from the capsid.
6. Attachment proteins may not lead to internalization and viral reproduction but may still be necessary for dissemination in the host.
7. Some viruses uncoat at the plasma membrane, while others do so from intracellular vesicles.
8. Many viruses enter host cells by the same cellular pathways used to take up macromolecules.
9. The entry mechanism used by a particular virus may differ depending on the nature of the target cell.
10. Viral particles and subviral particles depend on the cytoskeleton to move within an infected cell.
11. Binding of virions to cell receptors may activate signaling pathways that facilitate virus entry and movement or produce cellular responses that enhance virus propagation and affect pathogenesis.
12. For viruses that undergo replication in the nucleus, import can occur either through use of the nuclear pore complex or during cell division, when the nuclear membrane breaks down.

These are the entry principles of any viruses by arranged steps, but they can be modified under each circumstance. Now, what differentiates the excellent virus from the harmful virus? The difference is why these viruses are present in the host? Or what they do in the host cell? For example, the human body may get infected by the late herbs virus; this virus does not harm humans, but it helps natural killer cells- a specific type of white blood cells- to identify cancer cells. Another example is that norovirus in mice gut that protects it as when mice get antibiotic the protective bacteria were killed leading to make the mice oversensitive to gut infection but by the presence of this virus it protects its host from getting an infection. Norovirus and late herbs are shown in two figures 6 and 7, respectively.



Norovirus Image Figure(6)



Herbs Virus Image Figure (7)

Us as they act as a protective phage as they are found in the mucus membranes lining the digestive system, respiratory tract, and reproductive tract; they found there to destroy and kill bacteria to protect us, so they called protective phage. These phages have been used to treat many essential diseases caused by bacteria like dysentery and sepsis caused by *Staphylococcus aureus*, *salmonella* infections, and skin infections.

This phage is too vital for people as recently a teenager had reported close to death due to a kind of bacteria that resists antibiotic when phages used to treat it, he successful get well.

However, there is a harmful type of these viruses like the human immune deficiency virus -HIV- that attacks human immune system cells. By the time it leads to AIDS, a disease where the human become without an immune system. of course, it is too dangerous because that when human become without an immune system, he will be subjected to many diseases such as tuberculosis-TB-. also he becomes easy to get ill with any infection. The something that makes this virus is too dangerous is that until this moment, there is not any treatment or vaccine have clearly but for it.

In general, the something that made these viruses dangerous is that viruses are always in mutation and this made it hard to treat as the idea of treating any virus is that we make a vaccine made our receptor does not bind to viruses, but when we discover this receptor and make the vaccine it becomes mutated and binds to a new receptor.

Another example of these harmful viruses is the recently spread virus covid-19 from the coronavirus family; this virus enters our body and causes many problems to our respiratory system. It may lead to death as it increases our body temperature, which is the most dangerous symptom. As if the temperature does not decrease, it will cause a protein unfolding leading to death. It does not make only this but also decreases oxygen present in the blood where if it is not fast treated, it will also lead to death and many other flu symptoms.

There is a hazardous virus, but they are few comparing with the good viruses that live with human bodies and animals, and they cannot live without it.

III. VIRUSES THAT LIVING ORGANISMS CAN'T LIVE WITHOUT IT

Not only people that are not aware of good viruses but most scientists works on pathogen viruses. Recently a few scientists have worked on the good viruses that, without them, are present in the human body, plants, animals, and universe; the world maybe have an unbalanced ecosystem which may lead to the end of the universe. As it has been estimated that 380 trillion viruses are inhabiting the human body, these viruses do not harm humans, but they help them survive still, help the immune system kill the pathogen, help their intestine kill microbes, and kill microbes many other ways were they help humans. Viruses are not suitable for humans only as Researchers studying insect pests also have found that viruses are essential for species population control. If a particular species becomes overpopulated, a virus will come through and through them out.

Also, some types of viruses help cows and other animals to help digest cellulose as their intestine cannot digest them as they turned cellulose that enters through the grass into sugar, then in its body, it turns to milk and food.

In another case study, scientists have found that certain viruses are found in jalapeno seeds. They pass through the seed leading to prevent their insect attract which in order help to keep the plant healthy, and in general, insects attract to plants that are without viruses.

Also, there is a virus called a good boy virus -GB virus- you can see it in figure(8) it is a lymphotropic human virus it is infection does not cause any disease, but it has many benefits as it helps the immune system against HIV as they always alert T-cells against the virus -HIV-. Moreover, help the body fight against this virus; in some searches, people with this virus did not die when they become infected with HIV.

Moreover, as mentioned previously, the importance of phages in protecting our body and right now, many researchers are developing many treatments using these phages and laten herbs that play a central role in our body. Which have previously discussed also

The Norovirus in mice intestine, which has a significant role all of this virus living organisms cannot live without it.



Figure(8) good boy virus

IV. VIRUSES THAT SEE CREATURES CAN'T LIVE WITHOUT IT

It has been estimated that there are 1030 bacteriophage particles in the world's water; all of them help marine creatures to survive against bacteria. They also control the number of bacteria in the ocean, which leads to control of the ecosystem. Also, phages are considered the primary regulator of bacteria in the ocean. If viruses or phages disappeared, some bacteria species might be exploded, and others may be stopped growing, ultimately. About 90% of ocean living materials by weight are microbial. Those microbes produce about half oxygen on the planet. These phages kill about 20% of ocean microorganisms and about 50% of ocean bacteria. Also, there are certain viruses that whales cannot live without it. So not only the earth organisms that need viruses to live. However, marine creatures need it to survive also Viruses play essential roles in biogeochemical nutrient cycles and act as genomic reservoirs in marine and freshwater environments also Five to 25% of the carbon is fixed by primary producers is estimated to

enter into the microbial loop via virus-induced lysis at different trophic levels in aquatic environments.

V. VIRUSES THAT INFECT LIVING ORGANISMS

Because not all things are good and there is not a perfect thing in this life, some terrible viruses harm the living organism, but before I begin to discuss them, here is something that must be known there is viruses more than the stars in the universe. If you begin to count how many are wrong, you will discover that they are too small compared to the total amount of viruses. The rest -the greater- are the good viruses.

Now let us begin to discuss the most famous dangerous viruses; a virus that makes people without immune system human immune deficiency -HIV- this virus target immune cells, especially CD4 blood cells, which contain t-helper cells, macrophages, and dendritic cells. They named so because it contains CD4 receptor protein it binds to this receptor by a glycoprotein found on its envelope called gp120 also needs another receptor on the host, but this is a coreceptor protein it needs one or two of it which are cxcr4 and ccr5. Some humans have a genetic mutation called heterozygous resistance to this virus as they do not contain coreceptor proteins. It begins to infect immune cells in the lymph nodes it mainly infects dendritic cells in it then it begins to transfer to all cells in the lymph nodes the virus resume it is spreading, and while doing this, it kills T-helper cells on his way it still doing this, and the percentage of T-cells decrease In the blood until it reaches a certain percentage which is 200-500 T-cell/mm3 at this percentage it causes many symptoms as:

- 1- Swollen lymph nodes.
- 2- hairy leukoplakia.
- 3- Oral infection.

In figure 9, 10, and 11 will show the appearance of this symptoms



**Figure(9)
Swollen
lymphnodes**

**Figure(10)
Hairy
leukoplakia**

After the percentage of T-cells decreases under 200 T-cell/mm3 of blood, now the person have AIDS which cause many symptoms as:

- 1- Recurrent bacterial pneumonia.
- 2- Fungal infection in the esophagus as seen in figure
- 3- Kaposi sarcoma as seen in figure

After some time, the person infected with this virus will die because he does not have an immune system in addition to all of these diseases. If anyone sneezed beside him, he would get ill.

Many other viruses are harmed us like this, so humans must take highly protective precautions to protect their life and save their health from any pathogen that may harm them.



CONCLUSION

Far from viruses, there is a concept that people must use in their life “not all things are the same” each thing has its exception; for example, we saw a person who stole a wallet from a woman does all persons are thieves? Of course, no, it is an analogy that we saw a person who kills a teenage girl does all persons are murders? Of course not also when a whale eat a human does all whales do that, of course, no, but there is the exception now when the talk turns to viruses scale the world contain viruses that they are more than the stars of the universe the human body contain about

Three hundred eighty trillion viruses live in it without harming its health, only a few viruses that harm the human body, so; people must not be afraid of viruses. If they listened to it, they get feared this is a lousy awareness the good, accurate, and trusted awareness is that most viruses are good, cute, and we cannot live without them, but some terrible species may harm us, and people must take the highly protective precautions to protect their life and save their health from any pathogen that may harm them. There is something that must be known that if there are no viruses on the earth, there would not be life as there is an ecosystem balance, and viruses have a central role in it because it is an excellent job in helping us survive.

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