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CELL-LEVER VIRAL INFECTIONS

Annotation: Currently, the coronavirus is spreading all over the world. Therefore, this article provides information on the detection of viruses, the types and structure of viruses, their survival, the order in which they reproduce, and how to overcome COVID-19.

Keywords: Viruses, COVID-19, capsid, infection, DNA adenovirus, RNA, cell, pandemic.

COVID-19, which is now a huge and global problem facing the world community, encourages everyone to think and explore. So, first of all, let's talk about viruses.

We all know that the Russian scientist Dmitry Iosifovich Ivanovsky (1864-1920), who discovered the world of viruses in the XIX and XX centuries, is the founder of the science of virology. While still a student, during his vacation, he began to study tobacco mosaic disease, which caused great economic damage to the tobacco industry. When he passes the juice from infected tobacco leaves through a bactericidal Chamberlan filter, the disease is caused by very small microorganisms that pass through the filter, and when it is artificially transmitted, found that microorganisms have the ability to cause disease.

Viruses are very small cell-free biological objects that differ from other organisms in that they are constantly parasitic in the genetic machinery of living cells (plants, bacteria, insects, animals). There is only one type of nucleic acid in the genome of viruses. Viruses can infect all forms of life, from plants to humans. The ability of the host to transmit new information to the host cell's genetic machinery is essential for the biological evolution of all living organisms and an important factor in the variability. Scientists have also linked viruses to cancer, atherosclerosis, diabetes, mental and neurological disorders, and other infectious diseases.

Viruses are very small, ranging from 20 nm to 300 (350) nm. They can be spherical, polygonal, rod-shaped, axial, filamentous, pin-shaped. There are simple (without shell) and complex (shell) viruses. At the center of both is a nucleic acid molecule (DNA or RNA) surrounded by a protein shell, the capsid. Such a structure is called a **nucleocapsid.**

Normal viruses are made up of a nucleic acid and a capsid that bind to an internal protein, the nucleocapsid.

In complex viruses, the nucleocapsid is the nucleus of the virion, supercapsid at the top - wrapped in an outer shell. The two lipid layers of the membrane contain a virus-specific protein called glycoproteins, and the tumors are visible. These include glycoproteins - hemagglutinins, neuraminidase, protein, etc., which are responsible for the binding of virions to cell receptors and their entry into the cell. They have antigenic properties (protective antigens). Many complex viruses attach a matrix protein layer (M-layer) to the supercapsid from the inside, and some viruses have other additional structures.

The pathogenicity of viruses is commonly referred to as “contagious” or “contagious”. It occurs when a virus adsorbs and enters cell receptors, releases the virus genome, and transmits its genetic information through one or more reproductive stages. It uses cell biosynthetic systems and energy resources. The resulting virion offspring also infect neighboring cells, forming a primary source of virus replication (usually at the site of entry) and spreading throughout the body. The result is a localized viral infection and general pathological processes develop. Infectious viruses can survive when released into the environment and re-infect other organisms. Viruses carry their infection in susceptible cells.

Only in permissive cells do all stages of virus reproduction continue in full, and new virion populations emerge.

Factors that cause viral infections:

- There is a system of non-permissive or semi-permissive cells that accept the virus but do not have the factors that ensure the reproduction of the link. In these cases, the virus does not reproduce or a very small number of daughter cells are formed, which means that an abortion infection occurs.
- Abortion infection can also develop in permissive cells infected with defective viruses with defective genomes. This requires a virus with a complete genome to help the virus reproduce. As a result of abortion or limited infection, the viral genome can be stored in the cell for a long time.
"For some reason, even in permissive cells, the virus cannot reproduce or be limited." These include fever, changes in RNA at the site of inflammation, the effects of antimetabolites, and more.
- In the absence of inflammation and necrosis, the replication of viruses in the primary site is limited and apoptosis of the infected cell (their genetically programmed death) occurs. In doing so, the cell "sacrifices itself" to prevent the reproductive cycle from being completed and a new virion to form. It should be noted that some viruses cause cell apoptosis
have the ability to block (e.g. poxiviruses).
- Influence of non-specific factors of antiviral immunity - interferon, normal killers, phagocytes - both virus replication or destroy cells infected with viruses.
Cell-level viral infections can be autonomous or integrative.

Autonomous is a productive (as well as abortive) viral infection. In this case, the viral and cellular genomes are located in the same cell and interact with each other, but both remain unchanged. In contrast, in integrative infection, the viral genome merges with the cell genome and becomes part of it. Typically, integrative infection is caused by DNA - protective viruses, such as herpes viruses, adenoviruses, hepatitis B virus, papilloma viruses, and belongs to others. Their DNA genome is in the form of a double-stranded ring, which is located on the chromosome of the cell and becomes a provirus. During cell division, the provirus replicates in the chromosome and enters the resulting daughter cell, so that the cell can remain in the cell system for a long time without disrupting its vital functions. The provirus can become active, become autonomous, and cause a productive infection. Chronic of some viral infections, this is due to the fact that the periods without remission are alternated with relapses. The persistence of viruses in the cell can also be observed in the autonomous state of the genome - in the form of several circular DNA molecules (plasma). Provirus integration into the cell chromosome can lead to disruption of protein synthesis and, consequently, to uncontrolled cell proliferation - transformation and the development of tumors. The oncogenic property is most pronounced in RNA-genomic retroviruses. They contain a reverse transcriptase enzyme that helps form a DNA provirus that is integrated into the cell's chromosome. (RNA-linked DNA polymerase). The DNA provirus stage is absolutely necessary for retrovirus reproduction to take place. Herpes viruses, some adenoviruses, and hepatitis B virus are also oncogenic feature.

A brief theory of the coronavirus. When the coronavirus was encountered in its natural state, it would not reach pandemic levels. Because coronavirus is not a disease that is spreading for the first time. Previously, the spread of coronavirus covered the same area, but this time COVID-19 knows no boundaries. This is because the modern coronavirus is synthetic and was designed to spread around the world. The reason for this was that if it were natural, it would have to die in extreme heat or cold. But that is not happening. He is adapting to all the environments he has reached. Sudden mutation? Why didn't the previous coronaviruses reach the pandemic level from the same area? These questions simply remain open.

In short, viruses cannot live without cells. As a result, the coronavirus, which is also a global problem, cannot survive long in the environment. In order to defeat the virus and the coronavirus itself, we must first create antibodies that can block it when it enters the body, that is, create artificial immunity. Only then can we defeat the coronavirus, a type of virus.

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