

## **The good and bad influence of viruses**

The biom projects and knowledge about bacteria reveal that bacteria inside us and in our external environment have important and decisive role, besides in most cases this impact is positive. Also academic establishments have started to reconsider previous beliefs that almost always accused our little friends of causing diseases. Now is the time for viruses to take on the stage: the shift of beliefs about them is in the very beginning, but it can occur.

Let's start with looking at the viruses and trying to find out the definition of these nano-sized creatures. They are so tiny that they cannot be seen by means of the optical microscope. Since they are only 20 - 30 nanometers in size, the viral interaction with living cells can be seen only in specially constructed Royal Raymond Rife and Gaston Naessens microscopes. In the conventional research the viruses can be seen in the electron microscope, nevertheless they are already processed and killed viruses, isolated from their habitat. A virus is actually a package of genomes including DNA or RNA as well as small quantities of proteins and enzymes. The virus is enclosed in a coat consisting of sugar-related glucoproteins, some of them serving as receptors, namely they have an ability to attach to other living organisms — all kinds of cells — in a special way. The quantities of protein in a virus are too low for it to ensure a wholesome life — to grow, develop metabolism and replicate.

The quantities of proteins coded in a genome are too low to achieve something more than to create a new virus or to reprogramme the infected cell so that it becomes an incubator for creation of new viruses. They are also capable of transforming the very information of a cell in order to do other actions.

Therefore viruses are not classified as living organisms, because they cannot survive independently. They are in an intermediary position and are similar to organelles — cell components fulfilling a special task.

## **Role of the viruses in the nature should be reconsidered**

According to the previous definition, also phages and plasmids — information-containing living organisms — can be included in the group of viruses.

Who knows, perhaps the crucial role of viruses is to provide interaction in our cells by transferring essential information to other cells in order to coordinate the cell activity in a changing environment. As far as it concerns the bacterial plasmids, it becomes more obvious that it is so. Plasmids help bacteria to develop new properties. It is due to Pasteur the viruses so far have been considered to be an evil (word "virus" is derived from Latin "poison") as he initially attributed the same qualities also to bacteria. This belief justified itself in the end of the 19th century, when people were looking for the answers as to what causes diseases, but not nowadays. By using more and more reliable research methods, it has been established that one cubic centimetre (1 ml) of marine water contains one million to even billion of viruses. The recent calculations make us assume that the number of viruses is billions of times greater. It is

hard to believe that the only role of viruses is to cause illnesses. It looks like the role of viruses in the context of life is much more significant.

### **Viral replication**

In order to survive and be able of proliferation, a virus is forced to find a living cell. As already mentioned, viruses are very specific organisms. Protein receptors located outside the viral capsule contain several amino acids that form an epitope or the recognizability code, which makes sure that the virus, by using the “key and lock” mechanism, could attach only to a cell with a matching epitope. Thus the virus is very specific both in terms of selection of species and cells. For example, in case of HIV virus, our body has only two cells capable of attracting HIV — macrophages and T4. Besides, there is very small number of animals infected with HIV. Immune cells can be infected also in sheep, horse and chimpanzee. Other cells lack the proper epitope that could connect to HIV. It is not that dangerous to drink one millilitre of marine water containing billions of viruses as the viruses residing there can connect only to algae cells and other marine organisms.

### **Viral behaviour**

When arriving in a cell the virus can demonstrate two extreme behaviours or any of their variation. At first it delivers its DNA / RNA to the new host cell, which thus obtains new properties, at the same time proliferating and emitting its replicas.

### **The virus has a special selection criteria for cells to which it can attach**

It happens without causing significant harm to the host cell. It mainly pertains to HIV that has a special effect on the activity of macrophages. They begin to discharge much more TNF-alpha than before thus causing a severe inflammation. Other extreme — the virus uses the new host cell as incubator in order to replicate. The virus kills the metabolic processes of the host cell and uses the cell's plasma content to produce new viral mass, new capsules and other proteins necessary for the virus.

When the process is complete and the host cell's content has been depleted, it tears apart and dies, releasing hundreds and thousands of copies of the virus ready to infect new host cells.

### **Oncolytic virus in Riga**

Previously described property of the virus is used as a weapon in struggle against the cancer. Imagine what would happen if a special virus was found that identified exactly those cells that are located inside the tumour and metastases and could be capable of destroying them. We would then find an oncolytic virus. Riga has done that. Aina Muceniece (1924-2010) has done that, to be more precise. She devoted her entire life to study oncolytic viruses after she found, already in 1960, that some viruses, taken from the intestinal flora of healthy children, demonstrate exactly such properties and impact on tumour's cells. Within the framework of the project where the USA and the Soviet Union collaborated in the development of polio vaccine, Aina Muceniece managed to isolate, identify and research approximately seventy viruses taken from the intestinal flora of healthy humans. Imagine our intestines hiding

the first aid in the form of viruses that neutralise undesirable bacteria and fungi that we take on with food! These viruses were named ECHO viruses. Aforesaid is supported by studies evidencing that three fourths of humans carry ECHO viruses, and only up to one fourth of cancer patients have them.

### **Question to Nadja Markova**

Answers to a question regarding which tumour cells can be destroyed by Rigvir. What are being neutralised — human cells genetically modified by the tumour or microbes, bacteria and fungi? Pēteris Alberts replies that the process is not followed through in a microscope, but there is an opinion that we can talk about the tumour cells that are recognised in the conventional medicine.

We asked the same question to Nadja Markova from Bulgaria, who is one of the world's leading experts in pleomorphic microorganisms of chronically ill patients. Her reply: "Your argument that viral therapy and its cell-destroying impact could win the pathological forms (L-forms of bacteria and fungi origin) of the microflora, is a logical one.

I have often seen lysed areas in the cultures with isolated L-forms, grown from human blood. Perhaps they have been created after the phages (oncoviruses) have lived there. I believe that the phenomenon of viral impact and oncolytic qualities of ECHO 7 is somehow related."

### **Viral development in the course of evolution**

Scientists do not have a clear understanding of creation of viruses in the course of evolution. They practically cannot be found on fossils therefore only logical explanations can be offered. Since the viruses are not able to live without cells having a wholesome metabolism they might have appeared later. Nevertheless the viruses contain information — a genome that deciphers the viable proteins. Therefore the answer to this question is the same as in chicken or the egg problem. Who was the first — chicken or the cell? It represents life, while egg or the virus was created later including the information about the ancestry. It is important to understand them when discovering new viruses related to illnesses. How did they appear in the course of the evolution?

### **What are being neutralised — human cells genetically modified by the tumour or microbes, bacteria and fungi?**

**The virus has attached to the host cell and is taken in it. Soon the virus begins to replicate.**

**In order to survive and be capable of proliferation, a virus is forced to find a living cell.**

**The replication is complete and the host cells break down.**

Regarding HIV the researchers who dwelt into that problem indicate that the virus was initially a hybrid of such components of a genome, obtained from small number of animal viruses turning into hybrids in the human substrate cells in later stages. Such conditions in nature occur very rarely. Therefore these conditions were created in a lab.

There are several types of tumours related to the viruses. We know that presence of SV-40 is relatively clear pre-requisite to cause or at least facilitate development of the brain tumour. Papilloma virus considerably increases the risk of cervical cancer development and recently Nauc ler-S derberg Karolinska research group has proved that in majority cases of cancer a cytomegalovirus (CMV) is very common. Besides a respective antiviral therapy promotes development of cancer. What is the origin of these viruses? Perhaps the microfungi forming a great part of the main tumour send parts of their genome with a certain epitope and key to penetrate human cells and modify them genetically? It is, no doubt, a very daring assumption, but, if we take into consideration previously stated arguments, it is not illogical.

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