
Smart viruses and stupid ones



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Why do viruses exist in the world? It is certain that their main purpose for living is not to kill people. We think that the viruses use a human body for a short period to leave their own descendants. Once a human body is infected with a virus, however, the body acquires immunity against it and does not allow reinfection and multiplication of the virus for a certain period. Therefore, the virus always has to look for a person without immunity to continue multiplying. This provides a severe survival condition for the virus. Once a person is infected with the measles virus, for example, that person acquires strong immunity to the virus for life.

Therefore, the measles virus has to find a newborn baby without immunity in order to live on in this world.

A scientist once selected several solitary islands with different numbers of inhabitants and investigated what population is needed for cases of measles to be reported every month for five years, in other words, for the measles virus to remain alive for 5 years. As a result, it was found that a population of at least 500,000 was necessary.

In other words, if there is no additional inflow of the measles virus from outside an island with a population of less than 500,000, the measles virus dies out on the island because the number of newborns is small. Also, even if

there is a population of more than 500,000, the disease caused by the virus will not prevail on the island when more than 60% of the inhabitants there have acquired immunity. A virus that uses man alone has to live in this severe environment.

As a result, a kind of contest of which is smarter began between men and viruses, with viruses working out tactics. As a result, smart viruses and stupid ones have come into existence. The smart virus has become tough for mankind to fight.

[I] Stubborn, stupid viruses

1. First, there is a virus that causes Japanese A encephalitis (winter type). In the old days, there were two types of Japanese encephalitis in Japan: Japanese A encephalitis (winter type), which prevailed in winter and B (summer type), which prevailed in summer. Japanese B encephalitis (summer type) is still rampant in Southeast Asia. On the other hand, the virus causing Japanese A encephalitis was screened naturally and disappeared suddenly from Japan, while the nature of this virus is still unknown to us. It may be said that this virus lacked the intelligence to survive.
2. Secondly, there is the virus that causes smallpox. Smallpox is described in the Old Testament, and traces of its infection are found in Egyptian mummies. Therefore, the smallpox virus is extremely old in its relation to a disease affecting human beings. In some countries, millions of people were infected with smallpox every year, and many died of this disease until recently. This virus infected human beings through the respiratory organs, and it was typical of terrible virus-caused diseases because almost all infected persons became ill.

This virus liked human beings and obstinately kept its character of only infecting people.

The human beings skillfully used this character of the smallpox virus, inoculated everybody with the smallpox vaccine that Jenner had discovered, and immunized all the entire population of the earth. The last incidence of smallpox occurred on October 25, 1979, and this disease became extinct from the earth due to the actions of human beings.

3. Thirdly, there is polio (poliomyelitis). Polio, also called infantile paralysis, is a disease caused by a virus. This virus invades the human body from the mouth, multiplies in the bowels, and attacks the nerves. The polio virus attacks human beings alone in the same way as the smallpox virus did and never infects other animals. This virus enters the human body from the mouth together with food and drink, and multiplies in the bowel cells. Then, the virus is mostly excreted with feces from the body, but some of the virus flows with blood through the body. Finally, it arrives at the nerve cells it likes most, and kills those cells.

Virologists have carried out many studies on this virus. As a result, they have succeeded in creating a virus of a peculiar character that multiplies well in the cells of the intestinal tract, but cannot enter the blood. This virus has now become the seed of an attenuated vaccine used widely around the world.

As water supply and drainage facilities have been installed, and sanitary conditions have been improved in most countries, opportunities have decreased for many people to take the polio virus excreted with feces into their bodies. In addition, because excellent attenuated vaccines have been developed, it is expected that polio will become extinct from the earth soon.

Although these viruses use only the human body in their obstinate manner, human intelligence has defeated them. However, the viruses described below may be superior to the human brain.

[II] Strong, smart viruses

These viruses can be divided into three classes in order of smartness: grand champion, champion, and junior champion in "sumo" terms.

1. There are human immunodeficiency virus (HIV), which is the causative virus of AIDS, and human T-lymphotropic virus (HTLV), which causes human T-cell leukaemia, as grand champions, as well as hepatitis B virus and hepatitis C virus. Why are these viruses in the class of grand champions?

First, we would like to discuss the AIDS virus as an example. The AIDS virus only infects humans alone. It is weak in its resistance, but the mode

of infection is very clever. In other words, this virus invades the human body, taking advantage of human weaknesses.

There is sexual contact between men and women, so that human beings leave descendants. The mother gives birth to a child and gives mother's milk to the child. When people get sick, blood transfusion, organ transplantation, insulin, hormone, etc., may be necessary depending on their diseases. These actions are inevitably done via blood, semen, mother's milk, organs, etc. Therefore, if the virus creeps into any of these media, it is freely transmitted from person to person.

Next, the lymphocytes that protect our body from infection by a pathogenic microbe are sites of viral multiplication. First, the virus attacks and destroys the lymphocytes that increase immunity. The virus repeats its mutation very easily in the body of an infected person, so that reinfection by the virus cannot be prevented.

In addition, most hepatitis viruses are transmitted from person to person by medical practices, sexual contact, or delivery. However, the most troublesome thing is that, because the mechanism by which the hepatitis virus multiplies is very clever, we still cannot breed the virus outside the human body. Since we cannot breed the viruses in vitro, studies on the virus will take more time, and this will make it difficult for us to understand the full mechanism of the virus, as well as its character.

2. Influenza virus, herpes virus, and measles virus come under the group of champions. The smartness of these three kinds of viruses differ somewhat from one another. First, when an influenza virus infects a person via the respiratory organs, the virus multiplies in the cells of the upper respiratory tract and develops symptoms immediately. This virus is very strong in terms of infection and propagation. In addition, it changes form (antigen) and mutates almost every year and repeats infection. The viruses migrate among many kinds of animal, such as pig, cock, and horse, in addition to human beings, and it seems that they exchange genetic information while migrating among species.

Next, there is herpesvirus. Taking chickenpox as an example, a child inhales the virus via the respiratory organ and develops symptoms, but the disease is cured naturally. The virus, however, is not completely expelled

from the body of the child and hides permanently in the nerve cells.

When the child grows up to become an adult, the virus that lay dormant in the nerve cells wakes up suddenly various factors including fatigue, neglect of health, and physiological phenomena. Thus, it starts to multiply rapidly and comes out on the surface of the body along the nerve fibers. This causes a belt-shaped varicellae (medically, herpes zoster) on the body surface governed by the nerves. It is a character common to all herpesviruses that they hide behind nerve cells, and they are activated suddenly one day. It also has yet to be elucidated how the herpesvirus hides behind nerve cells and how the latent virus can be expelled.

Lastly, there is the measles virus. Because a very strong vaccine has been developed to prevent measles, it is unlikely that the present state of almost everybody suffering from measles in his or her childhood will continue. At present, however, children who get measles suffer from subacute sclerosing panencephalitis (SSPE) at a ratio of around 1 per 200,000. SSPE is a more serious disease than measles, and a child who gets SSPE becomes human vegetable and dies of the disease. SSPE develops symptoms about six years after the onset of measles and attacks the brain to make the patient a human vegetable, with no prospects of recovery. This is because the measles virus invades the brain and mutagenizes itself to have an odd character. It is still a mystery why the measles virus enters the brain and mutagenizes.

3. There are many viruses belonging to the group of junior champion. For example, these include dengue fever virus, yellow fever virus, Ebola virus disease, and rabies virus. It is a characteristic common to these viruses that may be transmitted to people via insects such as mosquitoes, and that there are animals other than man whose blood is sucked by such insects. Therefore, the ecological system of these viruses in nature is complicated, and it is difficult to destroy these viruses. For example, it is a practically impossible to control the viruses in animals, whether wild animals inhabiting forest areas (such as bats or wolves) or domestic animals such as cows and pets such as dogs.

Japan is an exceptional country in that there is no rabies in principle, while America, Russia, and European countries are still troubled by fear of rabies.

[III] Can human beings defeat viruses?

It will be difficult for the AIDS virus to be expelled from the world, if a specific medicine for curing AIDS is not found. One measure might be to prevent parents from delivering children with the AIDS virus. Even though complete contraception is the only means to prevent the delivery of children with the AIDS virus, this means that human beings would cease to exist. The AIDS virus replicates in the lymphocytes that protect our body from infection by microbes, and destroys the lymphocytes. When a man is infected with the AIDS virus, it takes several years for symptoms to develop. Because the AIDS virus exists in blood, particularly in lymphocytes, for a latent period, the virus is transmitted from person to person through sexual contact or mother's milk, thus the infection spreads.

Finally, the AIDS virus invades the brain to cause dementia. The virus infects human beings through human actions including reproduction, childbirth, and medical activity. The virus also changes its character, so that people cannot easily expel it, and thus it magnifies its power. Will human brains finally defeat this virus? At present, there are no bright prospects, to say the least. It seems to us that we cannot win the battle against the AIDS virus with our present knowledge. However, if all human beings make efforts to eradicate AIDS by combining their wisdom, we will defeat the virus, no matter how smart it is. We need "wisdom and practice".

In modern society, human beings seem to look for ways to live with greater comfort; in the same manner, viruses may also conceive of measures to leave descendants more easily, in order that they will not be easily eradicated by man. This is our thinking about these viruses at present.

