

13-07-2022

Biomolecular Changes After EBV Infection

Why in Newspapers?

Recently scientists have found that the cancer-causing virus Epstein Barr virus (EBV) can infect neuronal cells and cause various changes in biomolecules.

Quick Issue?

- A researcher used Raman micro spectroscopy techniques under the Fund for Improvement of S&T Infrastructure (FIST) scheme to explore the potential effects of a cancer-causing virus on brain cells.
- A biomolecule is an organic molecule consisting of carbohydrates, proteins, lipids and nucleic acids.

Historical Background?

- Raman spectroscopy is a light scattering technique by which a molecule scatters incident light from a high intensity laser light source.
- Most of the scattered light is at the same wavelength (or color) as the laser source and does not provide useful information. This is called Rayleigh scatter. Although a small amount of light (usually 0.000001%) is scattered at different wavelengths (or colours), depending on the chemical composition of the analyse, this is called Raman scatter.
- Raman micro spectroscopy is a vibrational spectroscopy technique used to examine the fingerprints of a wide range of liquid or solid samples.
- The technique can be efficiently used to understand virus-mediated cellular changes and can provide valuable insights into specific bimolecular changes.
- Epstein Barr Virus: EBV is a virus of the herpes virus family that can infect humans.
- The EBV virus has been found to be widely present in the human population. It usually doesn't cause any harm, but in some unusual situations, such as immunological stress or immunodeficiency, the virus can reactivate inside the body.

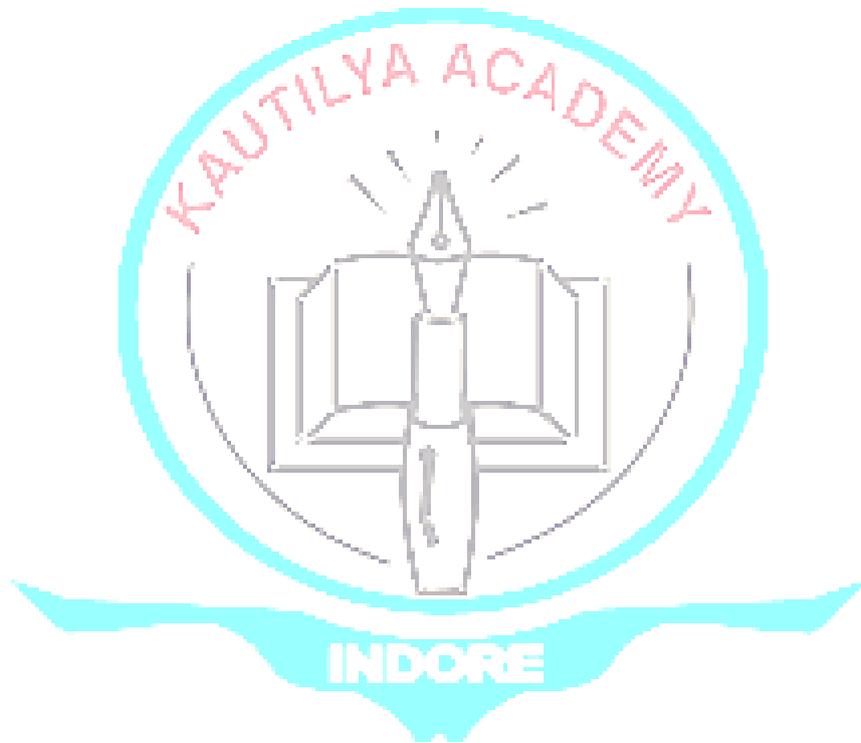
Other Key Facts?

FIST Scheme

- The "Fund for Improvement of S&T Infrastructure (FIST)" of the Department of Science and Technology (DST) aims to promote R&D activities in new and emerging areas and attract new talent to universities and other educational institutions. Providing infrastructure and enabling facilities.
- It is considered as a complimentary support to enable the Departments/Centres/Schools/Colleges to pursue research activities more effectively and efficiently.
- The current thrust on the highly successful FIST program can be oriented towards the goal of self-reliant India by providing access to basic facilities for research and development activities not only for research activities in academic organizations but also for use by Start-ups/ Manufacturing Industries/ MSMEs .



- This can further lead to various complications such as a type of blood cancer called Burkitt's lymphoma, similarly colon cancer, multiple sclerosis.
- It can alter biomolecules such as fatty acids, carbohydrate and protein components, and causing diseases of the central nervous system as well as brain cancer.
- Earlier studies reported the involvement of EBV in various neurodegenerative diseases. However, how this virus can affect and manipulate brain cells is not yet known.
- Additionally these changes were distinct from those observed in other supporting brain cells (ie, astrocyte and microglia).
- Lipid, cholesterol, proline and glucose molecules increase in cells under viral influence.





Marburg Virus Disease

Why in Newspapers?

Recently, according to the World Health Organization (WHO), two suspected cases of Marburg virus disease were reported in Ghana. Marburg virus disease is similar to Ebola.

Quick Issue?

- In the initial analysis, samples were taken from two patients from the southern region of Ghana. Both the patients died as they were positive.
- Samples have now been sent to the Research Center in Senegal to confirm the presence of this virus.
- No new case has come to light after the death of these two.

Historical Background?

- Marburg virus disease is a highly virulent disease that causes haemorrhagic fever, is transmitted by bats and has a mortality rate of over 88%.
- This virus also belongs to the Ebola virus family.
- In the year 1967, two major outbreaks of the virus were observed simultaneously in Marburg and Frankfurt (Germany) and Belgrade (Serbia).
- These outbreaks were linked to laboratory work using African green monkeys (*Cercopithecus aethiops*) imported from Uganda.
- This was followed by outbreaks in Angola, the Democratic Republic of the Congo, Kenya, South Africa and Uganda.
- There have been a total of 12 outbreaks of Marburg virus since 1967, most of them in southern and eastern Africa.
- ^ Human infection with 'Marburg virus' disease was initially the result of prolonged exposure to mines or caves that contained 'Roussetus bat colonies'.
- Roussetus is a genus of Old World fruit bat or megabats. These are known as dog-faced fruit bats or 'flying foxes'.
- Once a person has been infected with this virus, Marburg may transmit the blood, secretions, organs or other bodily fluids and surfaces of infected people by direct contact (skin or mucous membranes) through human-to-human transmission and Can spread with materials (such as bedding and clothing, etc.).
- Headache, vomiting blood, muscle pain and bleeding from various pores.

Other Key Facts?

Ebola virus disease (EVD)

- Ebola virus disease (EVD), formerly known as Ebola hemorrhagic fever, is a serious, fatal disease in humans.
- The virus is transmitted from wild animals to people and human-to-human transmission in human populations.
- The Ebola virus was first discovered in 1976 in a village near the Ebola River in what is now the Democratic Republic of the Congo.
- **Transmission:** The fruit bat belongs to the Pteropodidae family which are the natural hosts of the virus.



- Symptoms can range from severe to severe and can cause jaundice, inflammation of the pancreas, rapid weight loss, liver failure, massive bleeding, and multi-organ disease.
- Since many of the symptoms of the disease are similar to those of malaria and typhoid fever, it is difficult to diagnose. However, polymerase chain reaction (PCR) and enzyme-linked immunosorbent assay (ELISA) tests can be used to confirm the case. Is.
- There is no specific treatment or approved vaccine for Marburg haemorrhagic fever. In this, hospital supported medical system should be used.
- Hospital-supported therapy includes balancing the patient's fluids and electrolytes, maintaining oxygen status and blood pressure, replacing blood loss and blood clotting factors, and treating any complicated infections.

Likely Question Asked In Preliminary Exam

Que. Which of the following diseases is caused by a virus?

- (a) Ebola (b) AIDS
(c) SARS (d) All of the above

Answer: (d) All of the above

Que. Name the virus which spreads to humans through the bites of infected animals, birds and insects.

- (a) Rabies virus (b) Ebola virus
(c) Flavivirus (d) All of the above

Answer: (d) All of the above

Que. On the basis of host category, viruses are classified as:

- (a) Bacteriophage (b) Insect virus
(c) Stem virus (d) Both A and B

Answer: (d) Both A and B

Que. Which of the following statement is correct about virus?

- (a) Virus does not have ribosomes
(b) Viruses can make proteins.
(c) Viruses can be classified according to their size.
(d) Both A and C are correct

Answer: (d) Both A and C are correct

Que. A virus can spread through:

- (a) Contaminated food or water (b) touch
(c) Cough (d) all of the above

Answer: (d) All of the above