

VIRUS: A REVIEW OF VIRUSES, TYPES OF VIRUSES AND INFLUENZA VIRUS [H3N2]

Sayyad Ajhar Yunus*, Shinde Tushar Nandkishor

At. Wadala Mahadeo Tal. Shrirampur Dist Ahamadnagar – 413739

E-mail- ajharsayyad1192001@gmail.com

ABSTRACT:

Virus is the complex that include amino acid or nucleic acid and protein which enclose the capsid they are complicated structure, and replicates most effective. The properties of virus are they are not have cellular organism, they are both DNA and RNA viruses. H3N2 virus are commonly causes of disease in humans, particularly in children. the rhinovirus infection is responsible for common cold syndrome. the cultivation of viruses from material taken from lesions is an essential step with inside the analysis of many viral diseases. In a day's studies on viral replication employed the bacteria phages as model there are observe some equality, in the pattern of multiplication of bacterial, animal and human viruses. The antiviral drugs are used to the treatment of viral infection, but they are not similar form antibiotics. antiviral drugs for flu only work to treat flu. the influenza A, influenza B, influenza C and influenza D are the type of influenza virus influenza virus are continuously changing with new trace acting regularly.

KEYWORDS:

Lesions, Brick, Marburg, Vulnerable and influenza virus (H3N2).

INTRODUCTION

Virus:

Virus is the complex that contain small nucleoprotein, Virus is a small nucleoprotein complicated and infection agent replicates most effective Internal the living cell of different organisms which include Animal and plant.

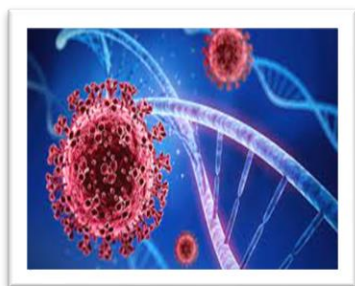


Fig.1.1 virus

PROPERTIES OF VIRUSES:

- 1) They can't have cellular organism.
- 2) They comprise most effective one type of nucleic acid. Both DNA and RNA.
- 3) They absence enzyme for protein synthesis.
- 4) They multiply through complex method however not through binary fission.
- 5) They are unaffected by antibacterials.

CHARACTERISTIC OF VIRUS:

- 1) Bacteria phage is virus that parasite on bacteria.
- 2) Mostly animal virus is spherical.

IMPORTANT POINT:

Virion: true viral parasite (including both capsid Protein and nucleic acid)

Prion: it includes off in balance infection protein molecule

Vixoids: it consists of naked, cyclical, small RNA without a capsid.

COMPOSITION OF VIRUS:

- 1) viral capsid
- 2) Peplomer:
- 3) Nucleic acid

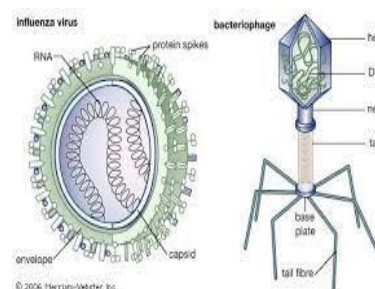


Fig.1.2 composition of virus

1) Viral capsid: virus including the nucleic acid surrounded by protein coat is called capsid .

Protein: -

- i. **Structural protein :-** structural protein work as protection e.g capsid and peplomer
- ii.

iii. **Enzymatic protein** :- Enzymatic protein are important for initiation of viral replicating cycle e.g. RNA polymerase

***Function of viral capsid: -**

- It protects virus and acting as binding site
- It acting as vehicle for spreading of virus .
- Provide structural symmetry.

• **Peplomer:-** Peplomer are the glycoprotein and appear as projecting spikes

• **Nucleic acid :-** It include single type either DNA or RNA absent nucleus , Cytoplasm and cell member.

Shape of virus :-

Pox virus – Brick Shaped .

I. Rabies virus – Elongated bullet shaped.

II. Tobacco virus – Cylindrical rod shaped.

Virus is show in the electron microscope . the electron microscope was developed in 1932 by M.knoll and Ruska in Germany .

There two types: -

1. Transmission electron microscope.
2. Scanning electron microscope

HUMAN VIRUSES :-

Viruses are commonly causes of disease in humans, particularly in children. The rhinovirus infection responsible for the common cold syndrome.

Human virus will cause disease in other animals. most are capable of infecting only few closely related primate species ,others will infect of wide range of mammals under the condition of natural infection ,viruses generally exhibit a considerable degree of tissue of specificity .[The influenza virus ,for example, replicates only in the cell lining the upper respiratory tract]

CULTIVATION OF HUMAN VIRUSES: -

The cultivation of viruses from material taken from lesions is an essential step with inside the analysis of many viral diseases. Studies of the fundamental biology and multiplication approaches of human viruses additionally require that they are growing the laboratory under experimental conditions. Human pathogenic viruses can be propagated in three types of cell system.

MULTIPLICATION OF HUMAN VIRUS :-

Virus depends on the synthetic making machinery of a host cell for replication , because it lacks biosynthetic enzyme . In a day study on viral

replication employed the bacteriophage as a model there are observe some equality in the pattern of multiplication of bacterial and animal or human viruses . The step of virus infection and replication can be divided into six sequential phases .

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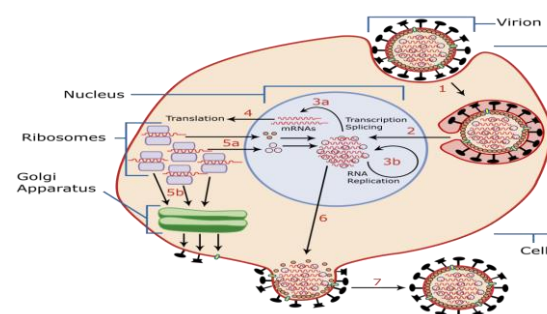


Fig .1.3 Viral multiplication in Human / a Animal cell

Adsorption:

The virus is adsorbed at a particular site on the host cell which is called receptor , virus comes in contact with cells by random collision but attachment is specific and is mediated by the binding of virion to receptors on cell surface .

Penetration:

There are four possible mechanism which the viruses use to enter in non-enveloped viruses enter the cells by endocytosis .

Uncoating:

It is a process by which virus loses its outer layer and capsid .in cases uncoating is effected by the lysosomal enzyme of the host cell.

Biosynthesis of viral components

There is a synthesis of viral nucleic acid , capsid protein ,a regular protein which of the normal cellular metabolism and enzymes necessary in the various stage of viral synthesis , assembly and release

Biosynthesis consists essentially of the following step:

Transcription of m-RNA from viral nucleic acid.
Translation of m- RNA into early protein.
Replication of viral nucleic acid. Synthesis of late protein which are the component of daughter virion capsids.

GROUP	VIRUS	CHARACTARSTICS	CLINICLE IMPORTANCE
DNA viruses Poxviruses	Variola Vaccinia	Large particles 200-250 nm Complex symmetry	Variola is the small pox virus ,it produces a systemic infection with the characterstic resicular rash affecting the face .
Adenoviruses	Adenovirus	Icosahedral Particles 80 nm in diameter .	Commonly cause upper respiratory tract infection with a characteristics vesicular rash affecting the face.
Herpesviruses	Herpes Simplex virus (HSV2)	Enveloped icosahedral particles,150nm in diameter	HSV1 infects oral membranes in children >80% are infected by adolescence. Some are the Primary Infection the individual primary infection the individual retains the HSV1 in the trigeminal ganglion for life and has a 50% chance of developing cold sores HSV2 responsible for recurrent genital herpes.
Hepatitis viruses	Hepatitis B virus (HBV)	Spherical enveloped particle 42nm in diameter enclosing an inner icosahedral 27nm nucleocapsid .	In areas such as south east asia and Africa most children are infected by Perinatal transmission .
Papova viruses	Papilloma virus	Naked icosahedra 50nm in diameter	Multiple only in epithelial cell of skin and mucous membrane causing warts .
RNA viruses myxoviruses	Influnza virus	Enveloped particles 100nm in diameter with helically symmetric ,	These viruses are capable of extensive antigenic variation producing new types against which the human population does not have effective immunity .

Table .1.1 Important Human Viruses and their Properties

BALTIMARE CLASSIFICATION

Group	Characteristics	Mode of mRNA production	Example
I.	Double stranded DNA	mRNA is transcribed directly from the DNA template	Herpes , simplex (herpes virus)
II.	Single stranded DNA	DNA is converted to double stranded form before RNA is transcribed .	Caine parvovirus (parvovirus)

III.	Double stranded RNA	mRNA is transcribed from the RNA genome .	Childhood gastro enteritis (rotavirus)
IV.	. Single stranded RNA(+)	Genome functions as mRNA	Common cold, rhinovirus .
V.	Single standard DNA (-)	mRNA is transcribed from the RNA genome	Rabies (rhabdovirus)

Anti – viral drugs:

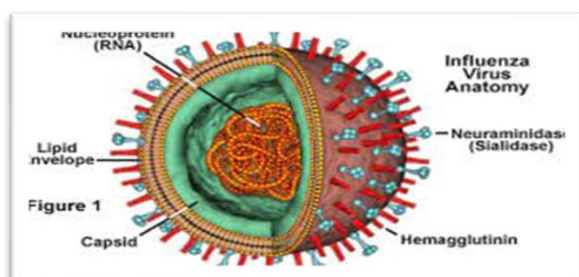
Anti viral drugs are different or not similar from antibiotic .which fight against bacterial infection . Antiviral drugs for flue only work to treat flu . flue antiviral drugs are different than antiviral drugs used to treat other infection tissue diseases such as COVID -19 are not approved or authorized to treat flue .

Benefits of antiviral drugs:

When treatment is started within two days of becoming sick with flue symptoms , antiviral drugs can lessen fever and flu symptoms and shorten the time you are stick by about one day . They also may reduce the risk of complication such as ear infections in children , respiratory complication requiring antibiotic and hospitalization in adults , for people at higher risk of serious flue complication early treatment with antiviral.

Influenza virus:

Influenza, higher called the flu and sometimes known as the grippe , is a common childhood illness , however isn't as common amongst adults . it isn't restricted to humans, maximum mammals and lots of birds also can capture influenza . it is because of numerous different viruses (see: RNA virus) , that once the call influenza comes from Italian influenza , meaning influence.



Types of influenza virus:

There are four genera of influenza virus, every containing most effective a single species , or type . Influenza A&C infect a variety of species (such as humans) . at the same time as influenza B nearly completely infect humans, and influenza D infect form animal and pigs .

Classifications

In a phylogenetic-based taxonomy, the category RNA virus consists of the subcategory negative-sense ssRNA virus, which incorporates the order Articulavirale, and the family Orthomyxoviridae. The genera-related species and serotypes of Orthomyxoviridae are proven within side the following table. a phylogenetic-based taxonomy, the category RNA virus consists of the subcategory negative-sense ssRNA virus, which incorporates the order Articulavirale, and the family Orthomyxoviridae.

Influenza A

The kind A influenza viruses are the maximum virulent human pathogens some of the three influenza kinds and reason the maximum extreme disease. It is concept that every one influenza A viruses inflicting outbreaks or pandemics originate from wild aquatic birds. All influenza A virus pandemics because the 1900's have been because of Avian influenza, through Reassortment with human influenza strains (seasonal flu) or through edition in a blending vessel (see 2009 swine flu pandemic). The serotypes which have been showed in humans, ordered through the quantity of showed human deaths, are:

H1N1 caused "Spanish flu" in 1918 and "Swine flu" in 2009.

H2N2 caused "Asian Flu".

H3N2 caused "Hong Kong Flu".

H5N1, "avian" or "bird flu".

H7N7 has uncommon zoonotic potential.

H1N2 infects pigs and humans.

H9N2, H7N2, H7N3, H10N7

Influenza B

Influenza B virus Host variety of influenza viruses Influenza B virus is nearly completely a human pathogen, and is much less common than influenza A. The most effective different animal recognized to be at risk of influenza B contamination is the seal. This kind of influenza mutates at a rate 2–3 instances decrease than kind A[47] and therefore is much less genetically diverse, with most effective one influenza B serotype. As a end result of this loss of antigenic diversity, a degree of immunity to influenza B is typically obtained at an early age. However, influenza B mutates sufficient that lasting immunity isn't possible. This decreased rate of antigenic change, blended with its restricted host variety (inhibiting pass species antigenic shift), guarantees that pandemics of influenza B do now no longer occur.

Influenza C

Influenza C virus the influenza C virus infects human beings and pigs, and may reason extreme contamination and nearby epidemics. However, influenza C is much less common than the opposite kinds and normally reasons moderate disorder in children.

Influenza D

Influenza D virus this is a genus that became classified in 2016, the participants of which have been first isolated in 2011. This genus seems to be maximum intently associated with Influenza C, from which it diverged numerous hundred years ago. There are as minimum extant lines of this genus. The most important hosts look like cattle; however the virus has been regarded to contaminate pigs as well.

Influenza virus nucleoprotein

Influenza virus nucleoprotein (NP) is a structural protein which encapsidates the poor strand viral RNA. NP is one of the essential determinants of species specificity. The query of ways some distance the NP gene can move the species barrier through reassortment and come to be tailored through mutation to the brand-new host has been discussed.

When to see a doctor

Most individuals who get the flu can treat themselves at domestic and frequently do not want to see a fitness care issuer.

If you have flu symptoms and are susceptible to complications, see your fitness care issuer proper away. Taking antiviral medicine may also shorten

the duration of your infection and help save you more-serious problems.

If you have emergency symptoms of the flu, get hospital treatment proper away. For adults, emergency symptoms can include:

Difficulty respiration or shortness of breath Chest pain Ongoing dizziness Seizures Worsening of present clinical conditions Severe weakness or muscle pain Emergency symptoms in kids can include: Difficulty respiration Pale, gray or blue-coloured skin, lips or nail beds — depending on skin color Chest pain Dehydration Severe muscle pain Seizures Worsening of present clinical conditions

Causes

Influenza viruses travel via the air in droplets while a person with the contamination coughs, sneezes or talks. You can inhale the droplets directly. Or you could choose up the germs from an object — including a telephone or pc keyboard — after which switch them in your eyes, nostril or mouth.

People with the virus are probably contagious from approximately a day earlier than symptoms seem till approximately four days after they start. Children and those with weakened immune structures can be contagious for a barely longer time.

Influenza viruses are continuously changing, with new traces acting regularly. If you have had influenza with inside the beyond, your body has already made antibodies to fight that particular pressure of the virus. If future influenza viruses are much like the ones you have encountered earlier than, both through having the disorder or through getting vaccinated, those antibodies may also prevent contamination or reduce its severity. But antibody stages may also decline over time.

Also, antibodies towards influenza viruses you have encountered with inside the beyond won't guard you from new influenza traces. New traces may be very extraordinary viruses from what you had earlier than.

Risk factors:

Age: Seasonal influenza has a tendency to have worse effects in kids below age 2, and adults older than age 65.

Living or working conditions: People who stay or work in centers with many different residents, which includes nursing houses or military barracks, are much more likely to increase the flu. People who are staying with inside the medical institution are also at better risk.

Weakened immune system: Cancer treatments, anti-rejection medications, long-time period use of steroids, organ transplant, blood most cancers or HIV/AIDS can weaken the immune system. This could make it less difficult to seize the flu and can growth the hazard of growing complications.

Chronic illnesses:- Chronic situations may also growth the hazard of influenza complications. Examples consist of bronchial allergies and different lung diseases, diabetes, coronary heart disease, nervous system diseases, metabolic disorders, issues with an airway, and kidney, liver or blood disease.

Race: American Indians or Alaska Natives humans may also have an elevated hazard of influenza complications.

Aspirin use below age 19: People who are younger than 19 years of age and receiving long-time period aspirin remedy are at risk of growing Reye's syndrome if infected with influenza.

Pregnancy: Pregnant humans are much more likely to increase influenza complications, specifically within side the second and third trimesters. This hazard maintains up to two weeks after the child is born.

Obesity: People with a body mass index (BMI) of 40 or better have a hazard of flu complication.

Conclusion

H3N2 flu is a serious viral infection that can cause significant morbidity and mortality, particularly in vulnerable populations like the elderly and young children. Since there is no vaccination for H3N2, the best way to prevent the flu and its complications is to use preventative measures, like frequent hand washing and avoiding contact with infected individuals.

You can test yourself to see if you are infected with the H3N2 virus. Metropolis Lab's Flu-Xpert Viral Panel uses the real-time Multiplex PCR method to detect 5 strains of flu including Influenza A, Influenza B, H1N1, H3N2 and RSV (Respiratory syncytial virus). It requires only a one-time sample collection and results will be made available within 12 hours.

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