Viral disease in human and animals

Important human viral disease :

A viral infection can produce symptoms by a number of different routes . viruses may damage or kill cells by causing the release of hydrolytic enzymes from lysosomes , some viruses cause infected cells to produce "toxins" that lead to disease symptoms . symptoms may be caused by direct viral harm to cells or by the body's immune response . vaccines stimulate the immune system to defend the against specific viruses .

Vaccine is a harmless variant or derivative of a pathogen that stimulates the immune system to mount defense against the harmful pathogen .

The important human viral diseases :

1- Small pox :

A viral disease that was at one time a devastating scourge in many parts of the world , was eradicated by vaccination program carried out by the " world health organization " WHO.

The very narrow host range of the small pox virus it infects only humans . the last recorded case of this disease was in 1977 . a worldwide vaccination camping wide out the disease completely variola virus (pathogen) ds DNA .

1. **Polio :**

A cute viral infection of the human body. This disease is often fatal . prior to the development of salk's vaccine in 1954, 60.000 people a year contracted

the disease in USA alone . interovirus pathogen , single stranded RNA (ss RNA) .

2. **Measles :**

Usually contracted in childhood , when it is not serious , more dangerous to adults . vaccine available , pathogen is paramyxo virus , single stranded RNA (ss RNA).

3. **Hepatitis B :**

Highly infections through contact with infected body fluids, approximately 1% of USA population infected, vaccine available, no cure, can be fatal, hepadnavirus pathogen double – stranded DNA genome (ds DNA).

4. **Chicken pox :**

Spread through contact with infected individuals, no cure, rarely fatal, vaccine approved in USA in early 1995, varicella pathogen (varicella zoster) double – stranded DNA genome (ds DNA) .

5. **Herpes :**

Fever blisters, spread primarily through contact with infected saliva, very prevalent worldwide , no cure, exhibits latency-the disease can be dormant for several years . herpes simplex virus pathogen , double stranded DNA genome (ds DNA).

6. **Mononucleosis :**

Spread through contact with infected saliva , may last several weeks , common in young adults , no cure, rarely fatal, Epstein-barr virus pathogen , double stranded DNA genome (ds DNA).

7. **AIDS :**

Destroy immune defenses , resulting in death by infection or cancer , over 42 million cases worldwide by 2002, HIV pathogen (human immune-deficiency virus). Single stranded RNA genome (ss RNA).

8. **Yellow fever :**

Spread from individual to individual by mosquito bites, a notable cause of death during the construction of panama canal . if untreated this disease has a peak mortality rate of 60% .

Flavivirus pathogen single stranded RNA genome (ss RNA) .

9. **Ebola :**

A cute hemorrhagic fever , virus attacks connective tissue leading to massive hemorrhaging and death . peak mortality is 50-90% if untreated out breaks confined to local regions of central Africa, filoviruses pathogen , single stranded RNA genome (ss RNA) .

10. **Influenza :**

Historically a major killer (22) million died in 18 months in 918-1919, wild Asian ducks, chickens , and pigs are reservoirs , leading to new flu strains , influenza viruses pathogen , single stranded RNA genome (ss RNA).

11. SARS :

Sever acute respiratory infection or syndrome an emerging disease, can be fatal, especially in the elderly, coronavirus pathogen. single stranded RNA genome (ss RNA).

12.Pneumonia :

Acute infection of the lungs , often fatal without treatment, influenza virus pathogen, single stranded RNA genome (ss RNA).

13.Rabies :

An acute viral encephalomyelitis transmitted by the bite of an infected animal , fatal if untreated .

Rhabdo virus pathogen, single stranded RNA genome (ss RNA).

11-Viral disease in plants :

More than, 2000 types of viral disease of plants are known, and together they account for an estimated annual loss of 15 $ billion worldwide to their destruction of agricultural and horticultural crops .

The comment signs of plant viral infection include :

1- Bleached or brown spots on leaves and fruits .
2- Stunted growth .
3- Damage flowers or roots .
4- Diminish the yied and quality of crops .

5- Plant viruses have the same basic structure and made of reproduction as animal viruses .
6- Viral disease of plants spread by two major routes :
   A- In the first rout called " horizontal transmission". A plant is infected from an external source of viruses. Insects, farmers, gardeners, and tools transmitting viruses from plant to plant .
   B- In the second rout called " vertical transmission" infection seeds in sexual reproduction and cutting in a sexual reproduction .

Scientists protects plant by breeding resistance varieties of crop plants .

TMD : tobacco mosaic disease caused by (TMV), have an RNA genome , helical capsid with the overall envelope shape of rigid rod .

Bacteriophages : are viruses that infected bacteria .

Viroid and Prions :

Viroid are the simplest infectious agents . viroid as small and simple as viruses , they are dwarf to another class or family pathogens .

***** viroid characteristics :**

1- They have a circular RNA molecules .
2- They have only a few hundred nucleotides .
3- Infect plants .
4- Nucleic acid (RNA) is nacked (without capsid).
5- Single-stranded genome (molecule) RNA (ss RNA) .
6- One viroid disease called " cadang-cadang " has killed more than 10 million coconut palms .

Prions :

They are proteins infectious agents , which to cause a number of degenerative brain disease in human and in various animals species . these disease include :

1- Scarpie in sheep disease .
2- Madcow disease .
3- Creutzfeldt-Jacob disease in human which has caused the death of some (150) people in great Britain .
4- Kuru another human disease caused by prions , was identified in the early 1900s among the south of new guinea .

Prions characteristics :

1. Prions are most likely transmitted in food , as may occur when people eat prion-laden beef from cattle with mad cow disease .
2. Prions act very slowly with an incubation period of at least ten (10) years before symptoms develop .
3. They are not destroyed or deactivated by heating to normal cooking temperatures .

Q1: How prions propagate :

Prions are miss folded versions of normal brains proteins , when a prion contacts a normally folded version of the same protein it may induce the normal protein to assume the abnormal shape .

The resulting chain reaction may continue until high levels of prion aggregation cause cellular malfunction and eventual degeneration of the brain .

Q2: how and why do such viruses burst on the human :

There are three processes contribute to the emergency of viral diseases .

1. **The first process :**

Perhaps the most important is the mutation of existing viruses , most mutations change existing viruses into new genetic varieties (strains) . that can cause disease. for instance, general outbreak of " flu " or " flu epidemic", are caused by new strains of influenza-viruses genetically different enough from earlier strains that people have little immunity to them.

2. **The second process :**

Is the dissemination of viral disease from small , isolated human population. For instance, AIDS went named unnoticed for decades before it began to spread around the world in this case , technological social factors including :

1- Sexual promiscuity .
2- Blood transfusion .
3- International travel .
4- Abuse of inter venous drug .

3. **The third process :**

Source of new viral diseases in human is spread of existing viruses from other animals . for instance SARs .

Q3: what is the virus of H_1N_1 ?

What means H_1N_1 virus ?

Different strains of influenza are given standardized names , for example , the strain that caused the 1918 "flu" is called H_1N_1 . the name identifies which forms of two viral surface proteins are present , hem-agglutinin (H) and neuraminidase (N). they are 16 different types of hem agglutinin, a proteins that helps the " flu" virus attach to the host cells, and 9 types of neuraminidase, an enzyme that helps release new virus particles from infected cells . water birds have been found that carry viruses with all possible combination of H and N. in 1997 at last 18 people in Hong Kong were infected with an H_5N_1 virus , six of these people died. The same strain seen only in wild birds, had killed several thousand chickens earlies that year.

Q4 : how do classify the viruses ?

Classification the viruses according the following :

1. **Structural characteristics :**
   - A- DNA and RNA.
   - B- single stranded and double stranded.
   - C- Enveloped and non-enveloped .
   - D- Have accessory structures and have not accessory structures.

2. **Type of hosts :**
   - A- Human .
   - B- Animal .
   - C- Plant.
   - D- Bacteria .
   - E- Other organisms .
3. **Viral activity :**
   - A- Virulent .
   - B- Temperate .
4. **Systemic infected :**
   - A- Respiratory viruses .
   - B- Intestinal viruses .
   - C- Skin or dermal viruses .
   - D- Urinary viruses .
   - E- Nervous system .

Human viral diseases :

Category	Diseases
Sexually transmitted diseases.	AIDS (HIV),genital herps.
Childhood diseases .	Measles, mumps, chicken pox .
Respiratory diseases.	Common cold , influenza .
Skin diseases.	Warts , shingle .
Digestive tract diseases.	Gastroenteritis .
Nervous system diseases .	Polio viral meningitis .
Other diseases .	Small pox , hepatitis .

Characteristic of some viral diseases :

Disease	Symptom	Incubation
Measles	Rash , fever	9-11 days
Shingles	Pain, itching on skin	Years
Warts	Bumpy areas on skin	Months
Influenza	Body aches , runny nose	1-4 days
HIV (AIDS)	Fatigue,weight loss, fever.	2-5 year

The End