NATURE OF VIRUSES → The nature of viruses has been a matter of dispute. Some scientist try to group them with non-living object where as other treat them as living objects. The characters of living bodies exhibited by viruses stablished there grouping with living object. They exhibit growth and reproduction which are the characteristic feature of living bodies. They are composed of protein and nucleic acid and hence called as nucleo-proteins. They also show sensi-vity to physical and chemical agents. They can be killed by heating, drying or poisoning. Thus virus can be termed to be living objects. They live and reproduce in host tissue and hence they can not be cultured in artificial media.

But the virus lack respiration and metabolism. Hence they are regarded as dead objects.

The modern virologist regard viruses as primitive form of living matters. which represent

a transitory stage between the living and non-living. The structure of virus particle can now be studied with the help of electron microscope.

TRANSMISSION OF PLANT VIRUSES → The virus are non-motile. They are carried passively from one place to other. The following mode help in transmission of plant viruses.

① Transmission by contact → Several viruses even as TMV are transmitted by contact. The plants grow very close and make contact with other plants. They frequently rub against each other to cause abrasions. The cell saps come in contact and viruses are transmitted to healthy plants.

Sometimes the sap of diseased plants comes in contact of healthy plants through implements. Again grafting is other important method of contact transmission.

② Transmission through Seeds and organs of Vegetative propagation → Seed produced by diseased plants carry virus particles in their seed coats, endosperm or embryos. Such seeds give rise to infected plants. The organs of vegetative ~~repro~~ propagation even as tubers, bulbs, rhizomes, stem cuttings

etc. derived from diseased plants also give rise to infected plants.

③ Transmission through Nematodes → The nematodes are important carriers of viruses. Some nematodes transmitting viruses include Longidorus, Xiphinema and Trichodorus. There are reports that about 12 dreaded viruses are transmitted by these nematodes.

④ Transmission through Fungi → Some fungi like Chytrids also act as vectors of viruses. These includes Olpidium, Synchytrium etc. The viruses contained in plant debris also reach long distances through water.

⑤ Transmission through Aphids → Aphids are most important among all insect vector that carry viruses to long distances. These viruses may be non persistent or persistant. It depends upon the shorter or longer duration of their spread through the aphids. The non persistant virus lie in the epidermal cell of host plant and get attached to the mouth parts of the aphids which carry them to large numbers of plants. The circulative viruses multiply inside the body of the aphids and pervade the whole body.

⑥ Transmission by Leaf hoppers → The leaf hoppers show greater biological

relationship with the viruses than the aphids. The viruses transmitted by leaf hoppers are not transmitted by other vectors. This is called vector specificity

REPLICATION OF VIRUSES → They are two modes of replication of viruses.
1. LYTIC CYCLE
2. LYSOGENIC CYCLE

1. LYTIC CYCLE → This has been reported in T-series of bacteriophages which use the bacterium E. coli as their host. The replication cycle consist of the following steps.

Ⓐ Adsorption → The virus makes a contact with the bacterial cell wall by its tail fibres. It gets attached to the bacterial cell wall. This step is called Adsorption.

Ⓑ Dessolution of bacterial cell → Tail fibre secrets Lysozaime that drills the bacterial cell wall to form a bore.

Ⓒ Injection of Viral DNA into Bacterial cell → The tail sheath starts functioning a primitive muscle, it contracts and expands to form a specific motion inside the viral head. It result in transfering of viral DNA into the bacterial cell.

Ⓓ Control of Bacterial cell metabolism

The viral DNA stablishes a control over the total metabolism of Bacterial cell. The bacterial DNA is disintegrated and the virus starts using protein synthesis machinery for its own protein synthesis.

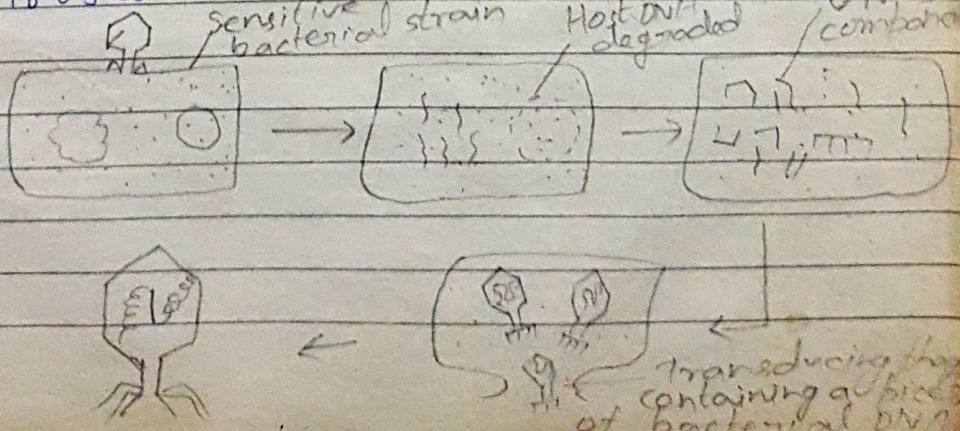
(E) Synthesis of early protein → This is followed by synthesis of early proteins which include m-RNA and other enzymes

(F) Synthesis of Late protein → Virus forms proteins for the formation of its coat. It is called late protein.

(G) Replication of viral DNA → The viral DNA replicates inside the bacterial cell to form about 100 viral DNA.

(H) Assembly → This is called the maturation stage in which viral DNA gets surrounded by the protein covering. There is formation of tail, tail sheath and tail fibres. It is ~~held~~ heard that about 21 genes are involved in the maturation of virus.

(I) Release → The bacterial body wall brust open to release the fully formed viruses.



2. Lysogenic Cycle → This cycle repeats to occur in α- phages which also attack E. coli.

In this process the virus makes a contact with the bacterial cell wall by its tail fibers. There is formation of a pore in bacterial cell wall with the help of enzyme Lyso-zyme. The viral DNA is injected into the bacterial cell through the muscular activities of tail sheath. The viral DNA combined with the bacterial DNA to form a hybrid DNA called as prophages. It replicates to form about 100 prophages. There is formation of protein coat around each prophages. Tail, tail sheath, tail plate and tail fiber are also formed. Finally the bacterial cell wall opens to set free the new phages.