Lecture title: **introduction to genetic virology**

Lecturer Affiliation: Department Microbiology, College of Veterinary Medicine, University of Mosul, Mosul, Iraq. **Fanar1976@uomsul.edu.iq**

Mutation: - spontaneous and random errors in the copying of viral N.A. which can occur during the replication of viruses, leading to change in nucleic acid sequence to produce mutant when differ somewhat than original organism

Some times virus mutation may lead to loss of virulence but still immunogenic which called attenuated viruses like vaccinia which is mutant of variola, then it can be used as vaccine against small pox in human.

There are some viruses properties may change through mutation

1-Loss of virulence.

2-Increase rate of reproduction.

3-Extension of natural host range.

4-Altered haemagglutination activity and changes of antigenic structure, plaque size, morphology or resistance to heat.

Viral recombination:-

the transfer of genetic material between closely related viruses infecting the same cell, e.g. Sheep pox and Goat pox virus, then new recombinant virus will produced with genome contain new genetic information.

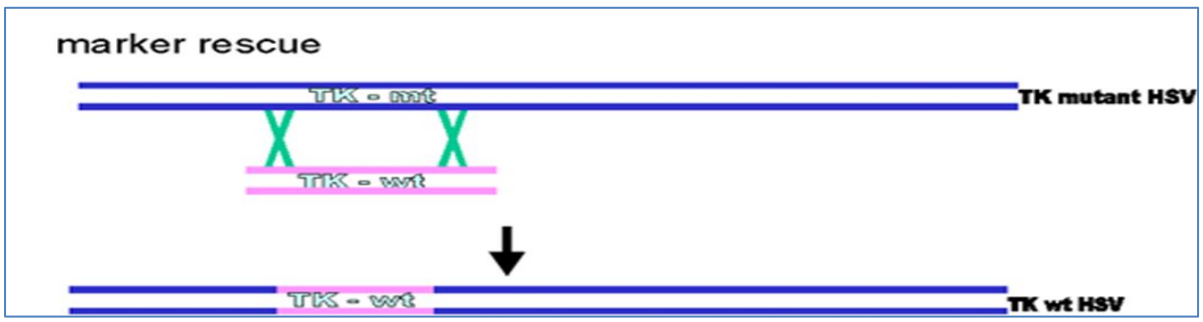
Types of viral recombination

1-Intramolecular recombination: usually occurs in DNA viruses and involved dissociation and re-establishment of covalent bonds within the nucleic acid .

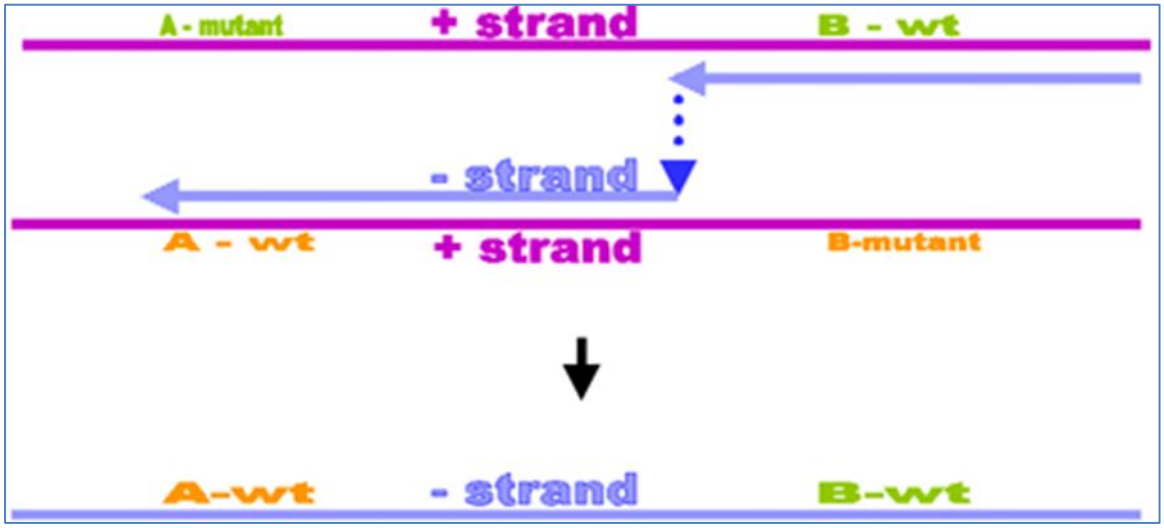
2-Copy-choice recombination: usually occurs between positive sense single-stranded RNA viruses. e.g. Picorna , Corona, and Toga viruses .

3-Reassortment: occurs randomly in RNA viruses with segmented genome e.g. Orthomyxo viruses (influenza), Reo viruses and Bunya viruses.

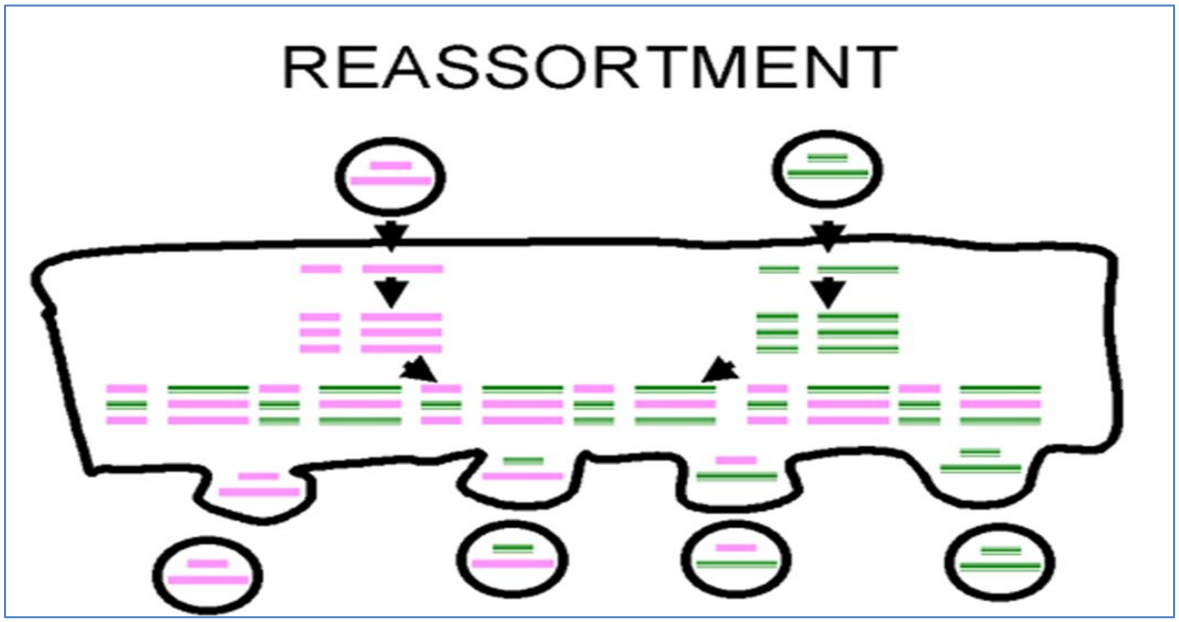
Intramolecular Recombination



Copy choice recombination (EXCHANGE OF GENETIC MATERIAL)



Reassortment



Viral interaction:

When an intact of infectious virus particles makes contacts with a susceptible host cell may develop a number of reactions at the cell surface lead to release of the genetic material at the virus within the cell. This is immediately followed by a series of biosynthetic processes lead to formation of new virus like e.g.

1-Defective virus:- viruses that have lost ability to perform any one of the essential steps required for successful replication.

2-Incomplete virus:- abnormal viruses produced due to inoculation of high titer virus solution in limited number of host susceptible cells like inoculums containing a high rating of infective units to cells this called Von Magnus phenomena.That the produced viruses without nucleic acid e.g. influenza virus.