

Course Title – Virology

Course Code – L.Sc. – 307

Marks: 75

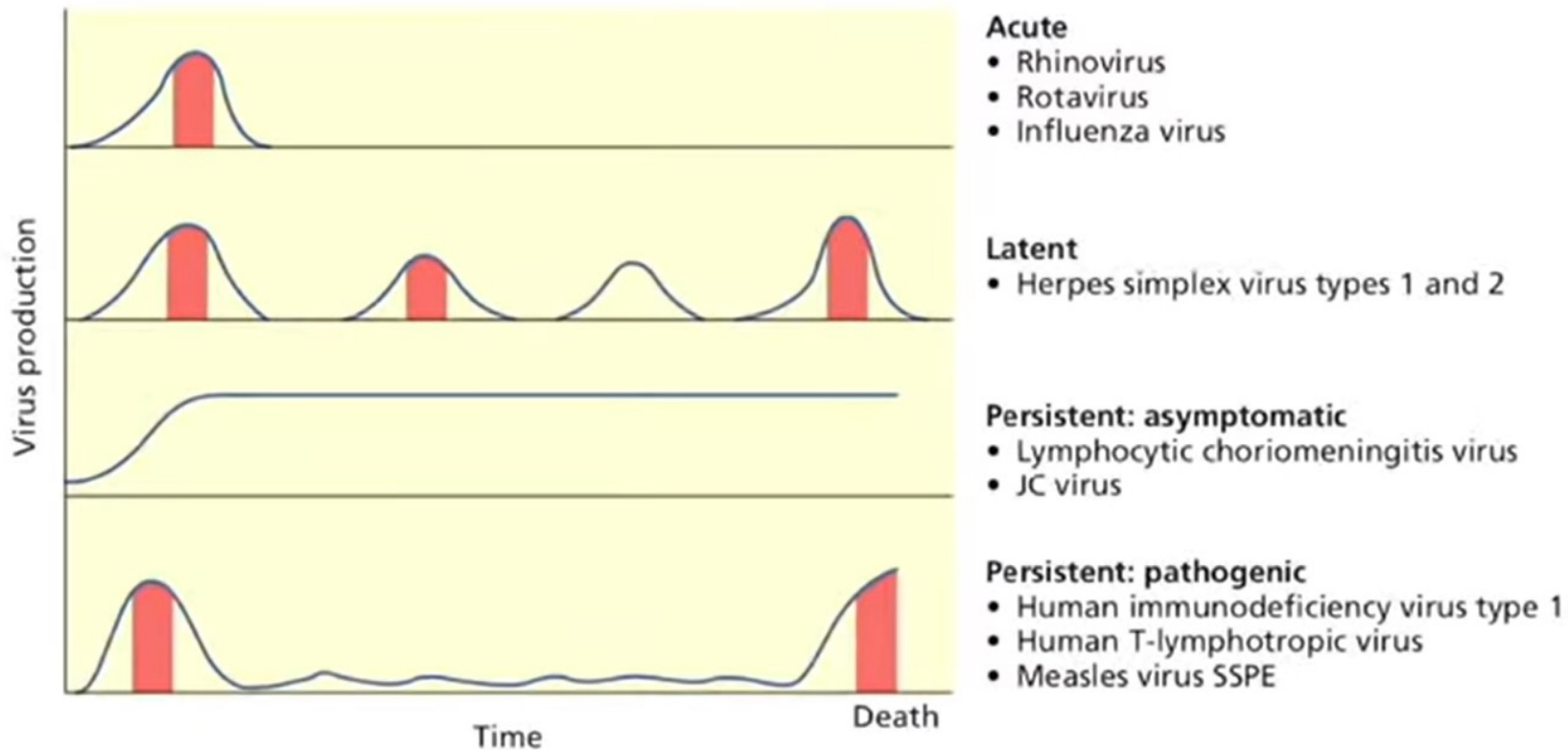
S. No.	Topic
1.	Origins of virology, viruses as a living system etc
2.	Classification of viruses
3.	Organization of viruses Protein structure and assembly, nucleic acid packaging, geometrical aspects, icosahedral and helical symmetry
4.	Virus attachment and entry in to host cells
5.	Cellular and molecular biology of Host virus interaction
6.	Genome replication and mRNA production by RNA viruses
7.	Reverse transcription and integration in to the host genome (retroviruses)
8.	DNA virus replication strategies
9.	Unique features of viral gene expression
10.	Translational control of viral gene expression
11.	Viral pathogenesis and cell transformation by viruses
12.	Viral Genetics, Viral vaccines, Antiviral chemotherapy, Persistence of viruses
13.	Hepadnaviruses, HIV, Polyomaviruses (SV40), Baculovirus, Topsoviruses, Potyviruses
14.	Virus evolution
15.	Viral vectors and gene therapy

Acute vs persistent infections

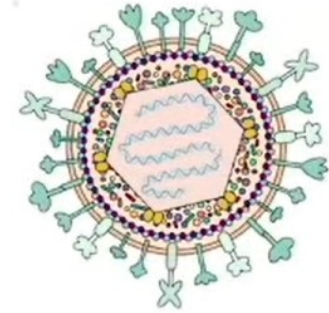
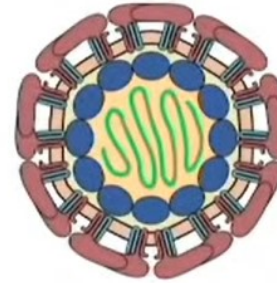
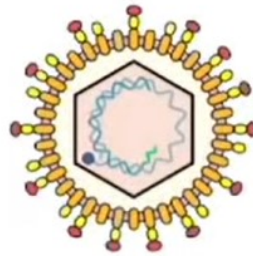


- Acute infection - rapid and self-limiting
- Persistent infection - long term, life of host
- Stable, characteristic for each virus
- Most persistent infections probably begin as an acute infection

General patterns of infection



Persistent infections



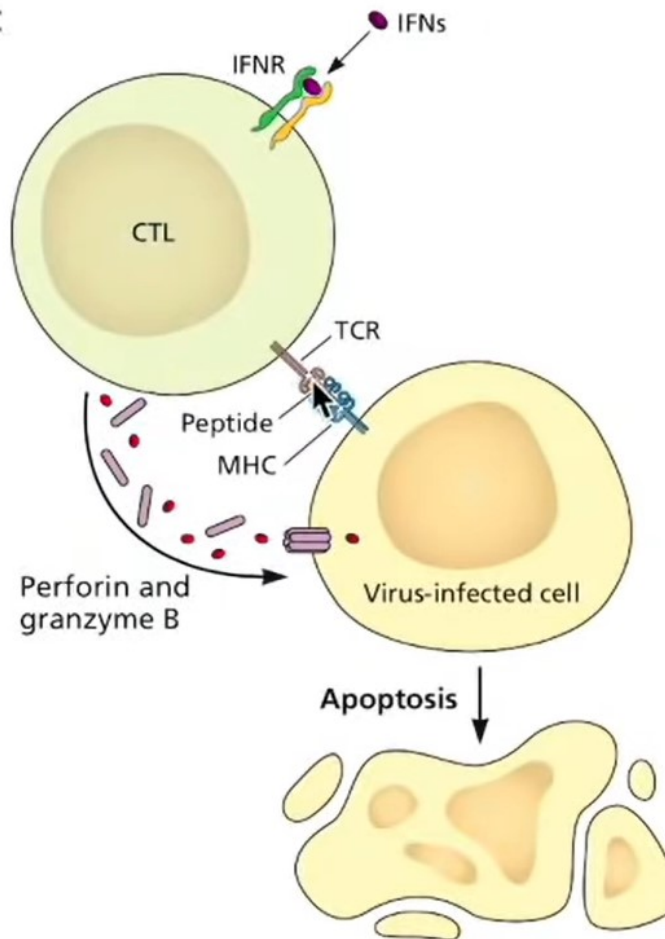
- Occur when primary infection is not cleared by immune response
- Virus particles, protein, genomes continue to be produced
- Viral genomes may remain after proteins are not detected

Persistent human infections

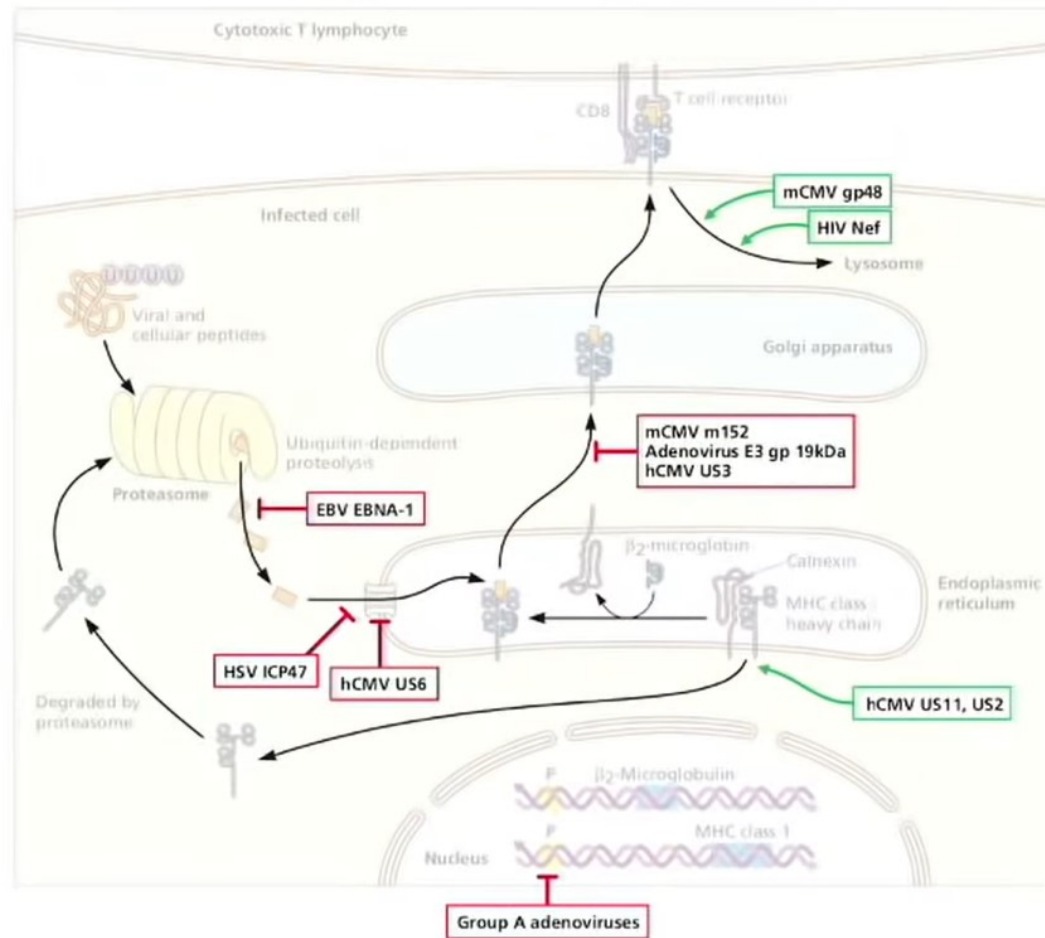
Virus	Site(s) of persistence	Consequence(s)
Adenovirus	Adenoids, tonsils, lymphocytes	None known
* Epstein-Barr virus	B cells, nasopharyngeal epithelia	Burkitt's lymphoma, Hodgkin's disease
* Human cytomegalovirus	Kidneys, salivary gland, lymphocytes, ^a macrophages, ^a stem cells, ^a stromal cells ^a	Pneumonia, retinitis
* Hepatitis B virus	Liver, lymphocytes	Cirrhosis, hepatocellular carcinoma
* Hepatitis C virus	Liver	Cirrhosis, hepatocellular carcinoma
Human immunodeficiency virus	CD4 ⁺ T cells, macrophages, microglia	AIDS
* Herpes simplex virus types 1 and 2	Sensory and autonomic ganglia	Cold sore, genital herpes
Human T lymphotropic virus types 1 and 2	T cells	Leukemia, brain infections
Papillomavirus	Skin, epithelial cells	Papillomas, carcinomas
* Polyomavirus BK	Kidneys	Hemorrhagic cystitis
* Polyomavirus JC	Kidneys, central nervous system	Progressive multifocal leukoencephalopathy
* Measles virus	Central nervous system	Subacute sclerosing panencephalitis, measles inclusion body encephalitis
Rubella virus	Central nervous system	Progressive rubella panencephalitis
* Varicella-zoster virus	Sensory ganglia	Zoster (shingles), postherpetic neuralgia

^aProposed but not certain.

The cytotoxic T lymphocyte response

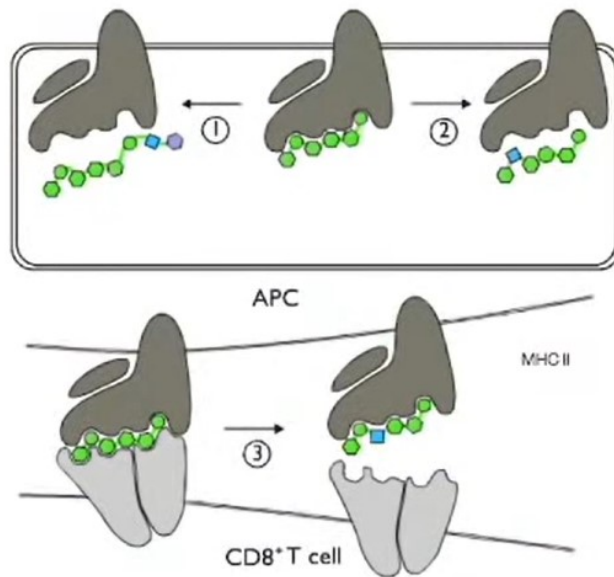


Modulation of MHC I system

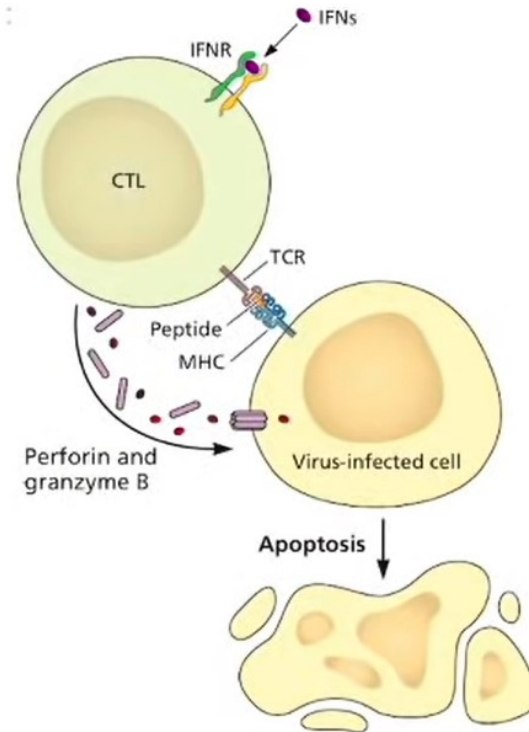


CTL escape mutants

- Herpes simplex virus
- Hepatitis C virus

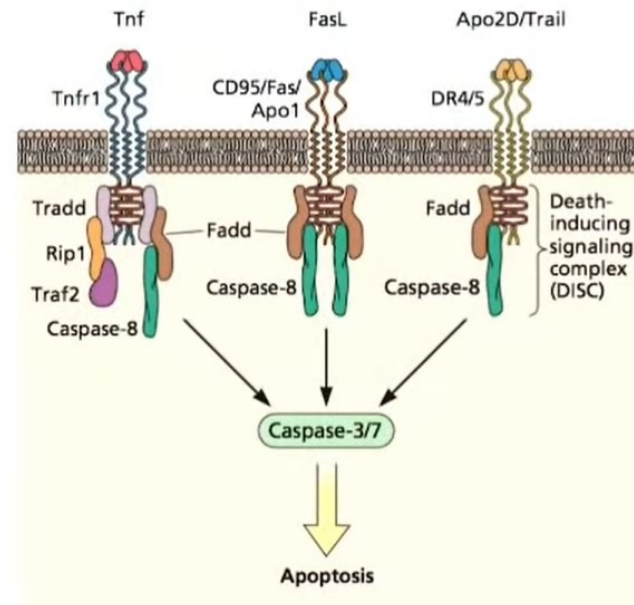
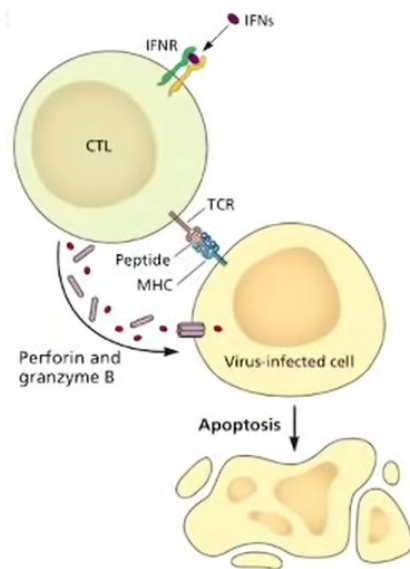


Changes may also affect proteasomal processing



Killing activated T cells

- When CTL engages an infected cell, the CTL may die instead of the target
- An example of viral defense
- A normal cell process to limit immunopathology



HIV, CMV induce FasL on infected cell surface

CTL