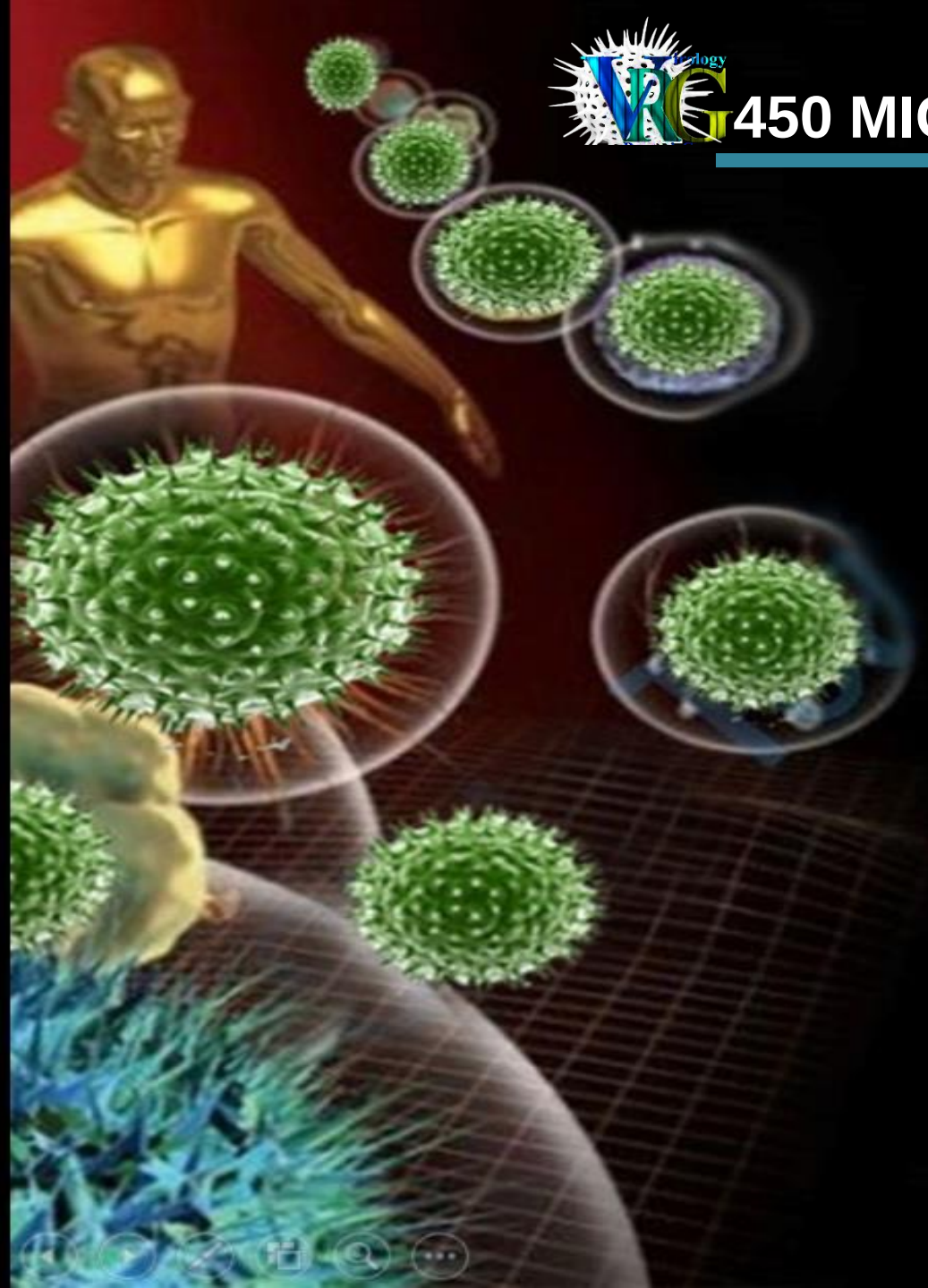

Lecture Thirteen

Viruses of Medical Importance

4- Human Immunodeficiency Virus (HIV) – part III

By

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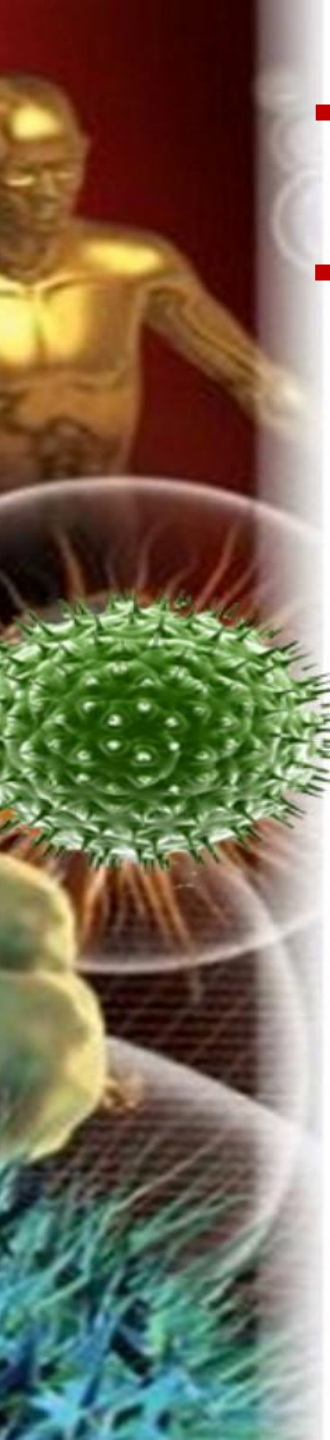


Learning outcomes

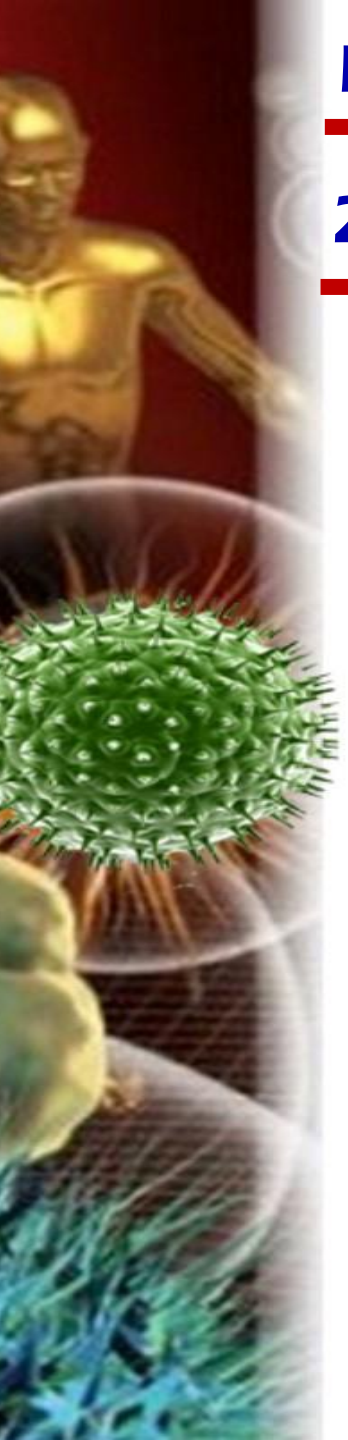
By the end of this lecture students should

- Know the history of HIV/AIDS (Done).
- Have the knowledge of HIV epidemiology and modes of transmission (Done).
- Recognize different symptoms associated with HIV/AIDS (Done).
- Be aware of different ways for prevention and control measures.

Prevention and Treatment

1- Prevention measures

- **Safe sex (typical behavior with legal partner).**
- **Test of blood and blood fractions used in transfusion.**
- **Use of new sterile injection needles and medical instruments.**
- **Male circumcision is associated with lower risk for HIV**
  May reduce male-to-female transmission; lesser extent on female-to-male transmission
- **Tenofovir gel for prevention of HIV infection in women**
  HIV incidence lowered as much as 54% in high adherence subjects; intermediate adherers (38%); low adherers (28%).
  Followed for 30 months; insert gel within 12hr before sex and a second dose as soon as possible within 12hr after sex
- **Preexposure Prophylaxis (PREP)**
  The use of a fixed-dose combination of daily oral tenofovir disoproxil fumarate and emtricitabine (TDF/FTC).
  The self-administration of 1% tenofovir gel



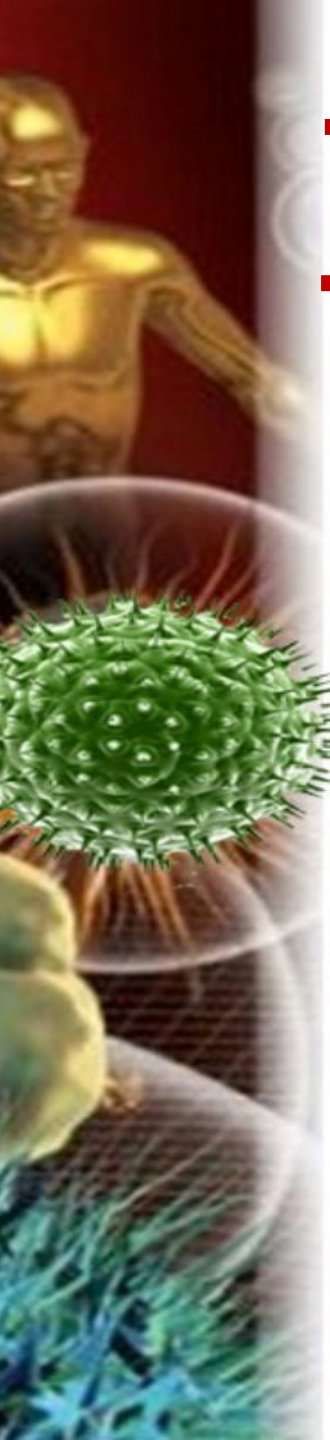
Prevention and Control

2- Vaccines

No vaccines are available to-date but trials ongoing.

Obstacles to an effective vaccine for HIV

1. The immune responses conferring protection and mediating viral clearance and the viral antigens that elicit these responses are not defined.
2. HIV displays great antigenic diversity among individuals.
3. HIV mutates readily to generate escape mutants and genetic diversity within individuals.
4. The HIV envelope glycoprotein is heavily glycosylated, which shields many potential epitopes.
5. Mucosal immunity may be needed.
6. Enhancing or blocking antibodies may exist.
7. The viral genome integrates into the host cell chromosome.
8. The major target organ of HIV is the immune system.
9. No inexpensive, simple animal models exist.
10. Most effective viral vaccine vectors are subject to pre-existing antivector immunity and elicit immunity that compromises re-use.
11. High-titer, broadly-reactive neutralizing antibody responses do not occur within a year in any subject or over many years in most subjects with natural infection. Such antibodies require extensive affinity maturation.
12. No immunogen has been designed that elicits neutralizing antibody that is not strain-specific or that has a high titer.



Prevention and Control

3- Treatment

There are more than 30 drugs approved for use in HIV infected patients

- These drugs are belonging to 5 main classes:

1. Entry/fusion inhibitors
2. Nucleoside/Nucleotide Reverse Transcriptase Inhibitors
3. Non-Nucleoside Reverse Transcriptase Inhibitors
4. Integrase inhibitors
5. Protease inhibitors

Prevention and Control – Video

Nucleoside or nucleotide reverse transcriptase inhibitors:

Abacavir, zidovudine, tenofovir,

Non-nucleoside or nucleotide reverse transcriptase inhibitors:

Efavirenz, etravirine, nevirapine

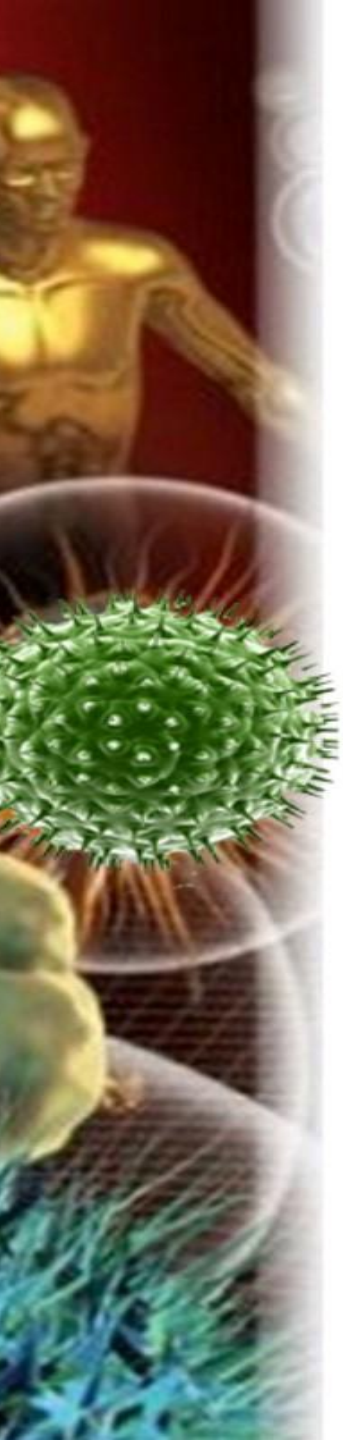
Protease inhibitors (PIs)

Indinavir, Amprenavir, atazanavir

Entry/fusion inhibitors: Enfuvirtide

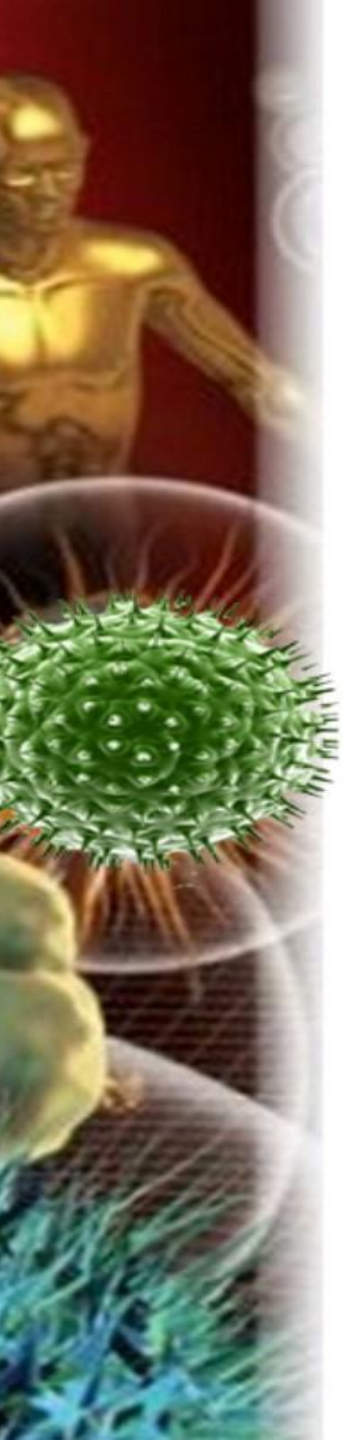
Integrase inhibitors

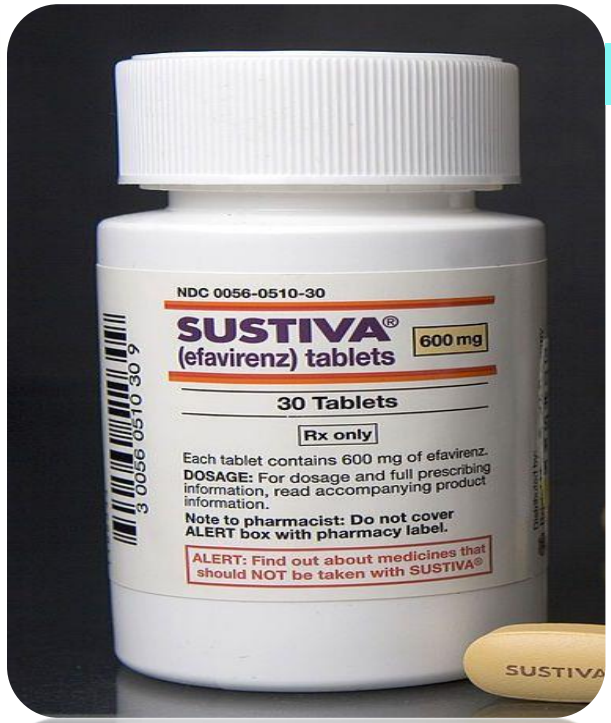
Raltegravir



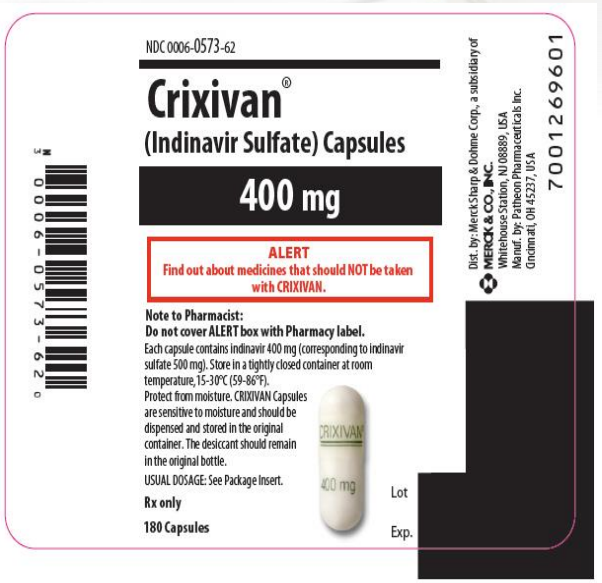
Class of Antiretroviral Drug	Drug Names
Nucleoside or nucleotide reverse transcriptase inhibitors (NRTIs)	Abacavir, emtricitabine (FTC), zidovudine (AZT), didanosine (DDI), zalcitabine (DDC), lamivudine (3TC), tenofovir (disoproxil fumarate), and stavudine (D4T)
Nonnucleoside reverse transcriptase inhibitors (NNRTIs)	Efavirenz (EFV), etravirine, nevirapine, and delavirdine In clinical trials: Rilpivirine, GSK2248761 (Viiv) and RDEA806 (Ardea)
Protease inhibitors (PIs)	Amprenavir, atazanavir, darunavir, fosamprenavir, indinavir, lopinavir/ritonavir, nelfinavir (NFV), ritonavir, saquinavir, and tipranavir
Pharmacokinetic Enhancers	Ritonavir In clinical trials: Cobicistat
Fusion entry inhibitors	Enfuvirtide
CCR5 entry inhibitors	Maraviroc In clinical trials: Vicriviroc , Monoclonal Abs: ibilazumab, PRO140
Integrase inhibitors	Raltegravir In clinical trials: Elvitegravir, S/GSK1349572
Maturation Inhibitors (new class)	In clinical trials: Bevirimat and Vivecon (MPC-9055)

*HAART, highly active antiretroviral therapy. Note: This list is likely to be incomplete because new antiretroviral drugs are rapidly being approved.





Active Against HIV-1 not HIV-2




Thank
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