



Lunch and Learn:
how to interpret your
labs and importance of
adherence

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Learning objectives

- Understand the basics of labs monitored in people living with HIV
- Learn how taking medication affects the lab results
- Discuss importance of adherence
 - What are strategies for adherence?
- Medication options

What questions do you have related to labs and medication?

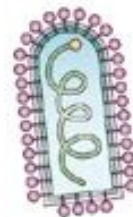
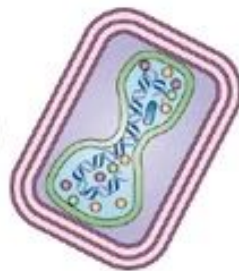
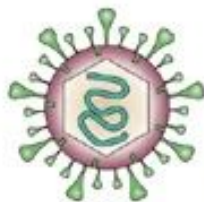
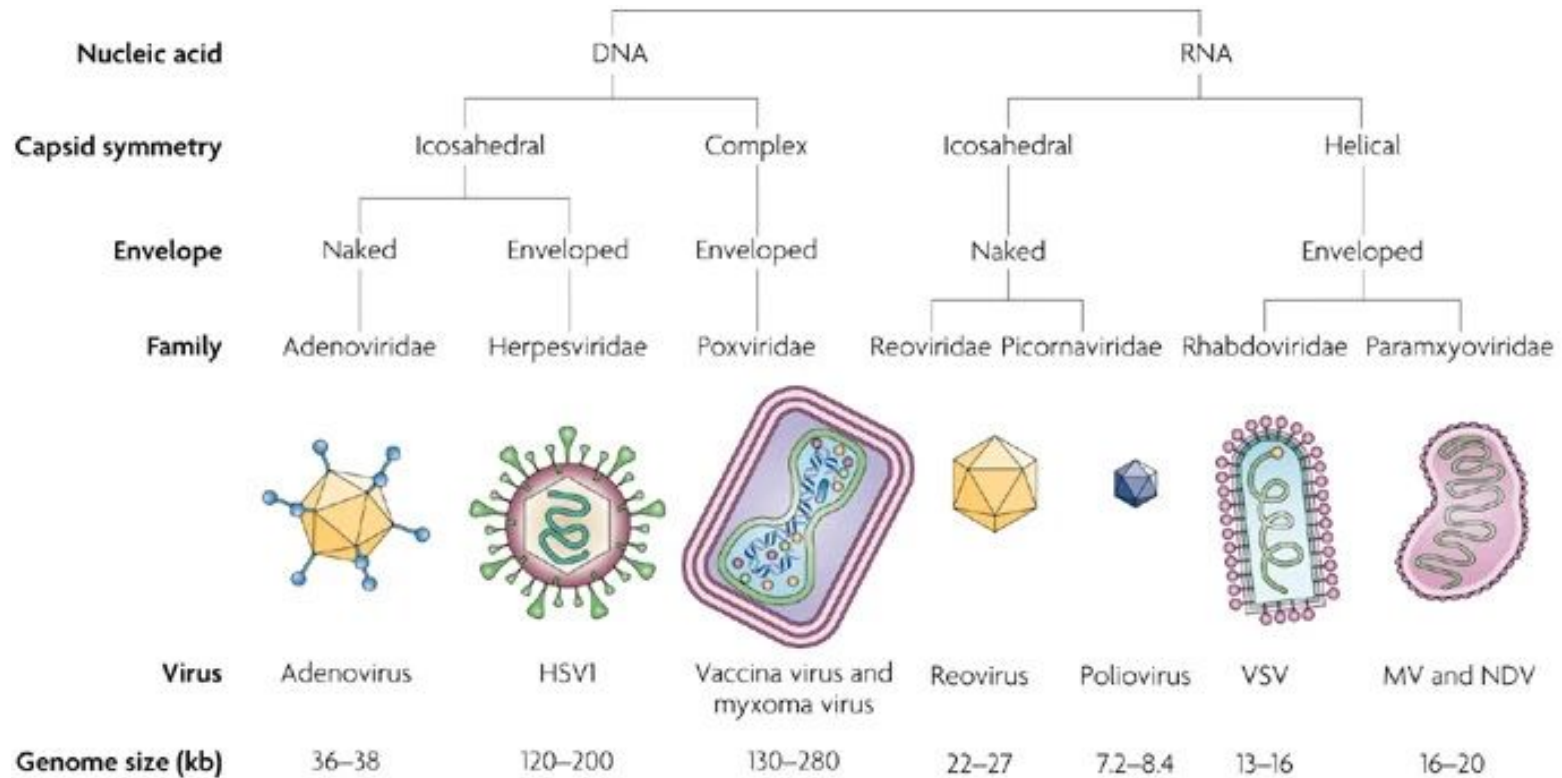
Specific lab tests

Labs monitored in general

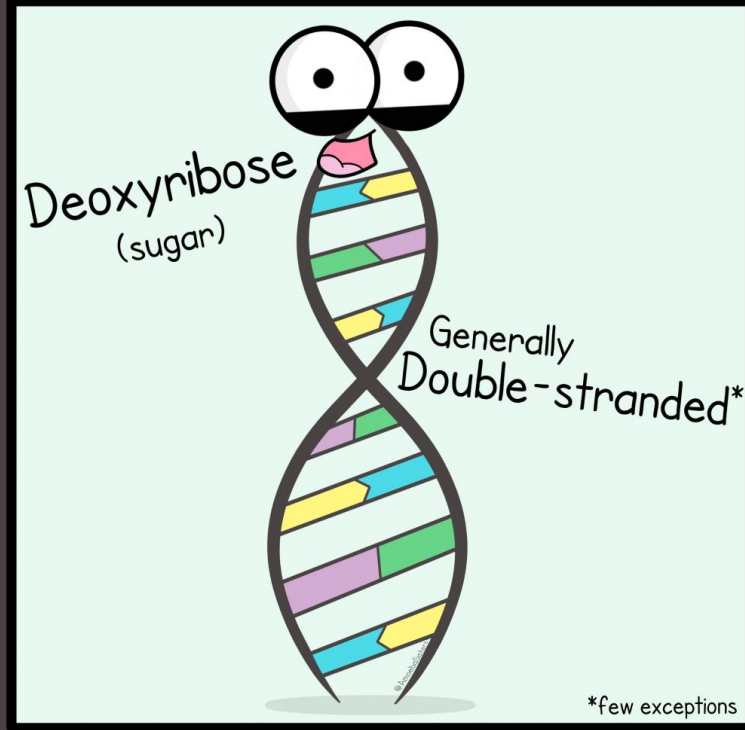
- Hgb A1C
- Lipid panel
- Thyroid
- Liver/kidney monitoring
- STI testing

Labs monitored in people living with HIV (PLHIV)

- CD4 count/T cells
- Viral load/HIV RNA Quantitative
- Quantiferon Gold

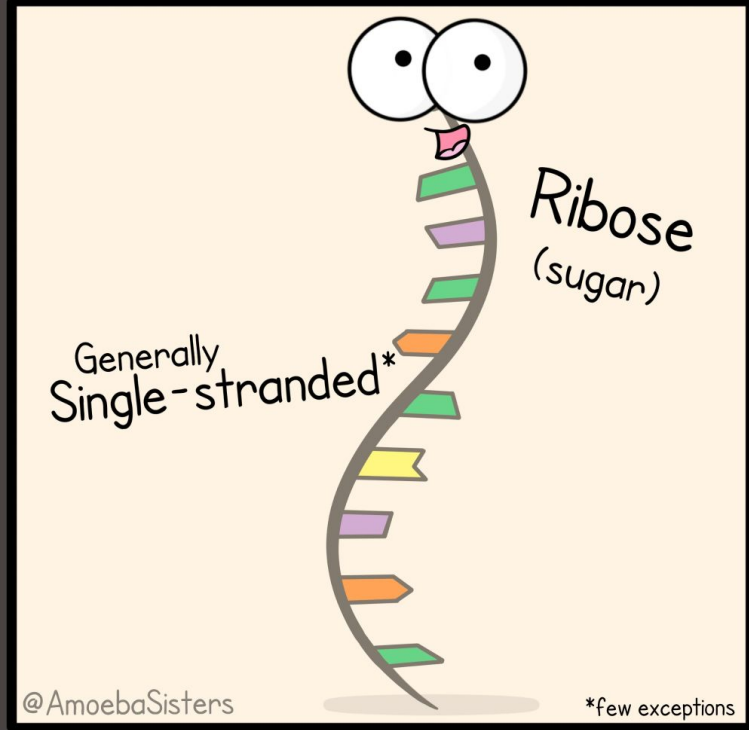


DNA (Deoxyribonucleic Acid)

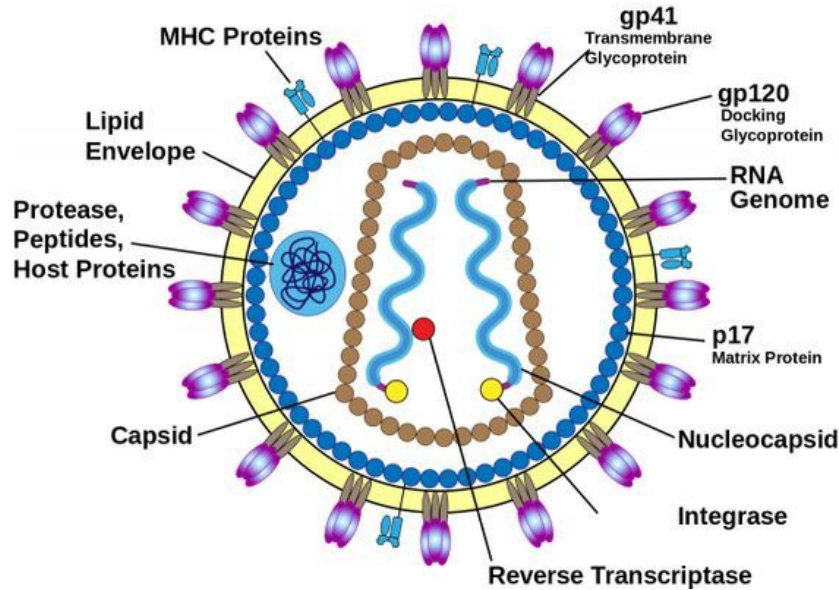


- Adenine
- Thymine
- Cytosine
- Guanine

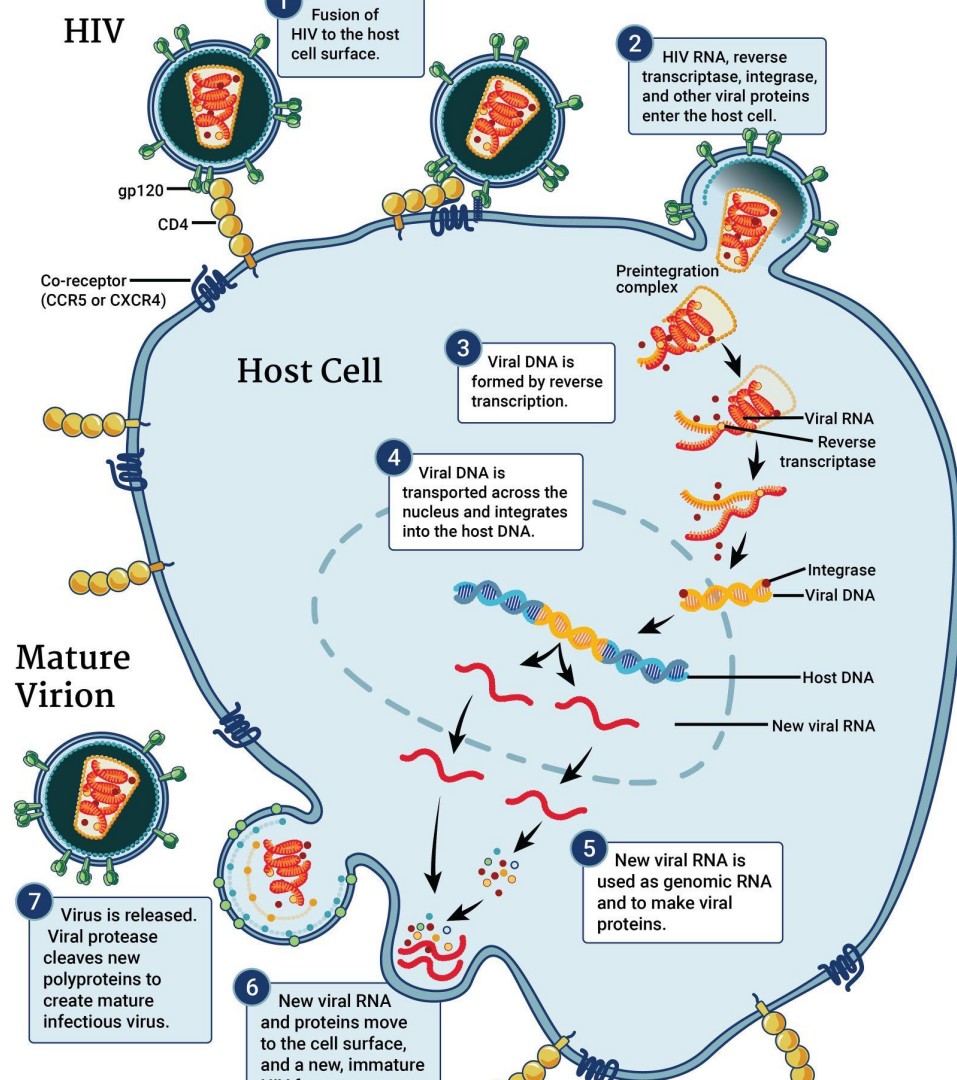
RNA (Ribonucleic Acid)



- Adenine
- Uracil
- Cytosine
- Guanine



Retrovirus: RNA viruses have an enzyme (reverse **transcriptase**) capable of making a complementary DNA copy of the viral RNA, which then is integrated into a host cell's DNA.



Goals of therapy

- ❖ **Increase the CD4 count/%**
 - Normal range 500-1200
 - >25%
- ❖ Earlier start to treatment helps preserve CD4 count at higher levels
- ❖ Below 200/15%, increased risk of infections
- ❖ **Decrease the viral load**
 - Many terms: undetectable, suppressed...
 - “Not detected”
 - “Detected, <20”
 - <20 copies, <30, <40

What does undetectable mean?

- ❑ Being undetectable...
 - ❑ helps people stay healthy and live longer
 - ❑ prevents sexual transmission
- ❑ There may be small, temporary increases in viral load called “blips” followed by a decrease back to undetectable levels.
 - ❑ Relatively common and does not indicate that antiretroviral therapy has failed to control the virus.
- ❑ Even when viral load is undetectable, HIV is still present in the body.
- ❑ The virus lies dormant inside a small number of cells in the body called viral reservoirs.
- ❑ When therapy is interrupted for any reason, the virus begins to multiply, becoming detectable in the blood again.

HIV-1 RNA copies per mL, TMA	* <30	* 659,712
HIV-1 RNA Log 10x, TMA	<1.47	5.82

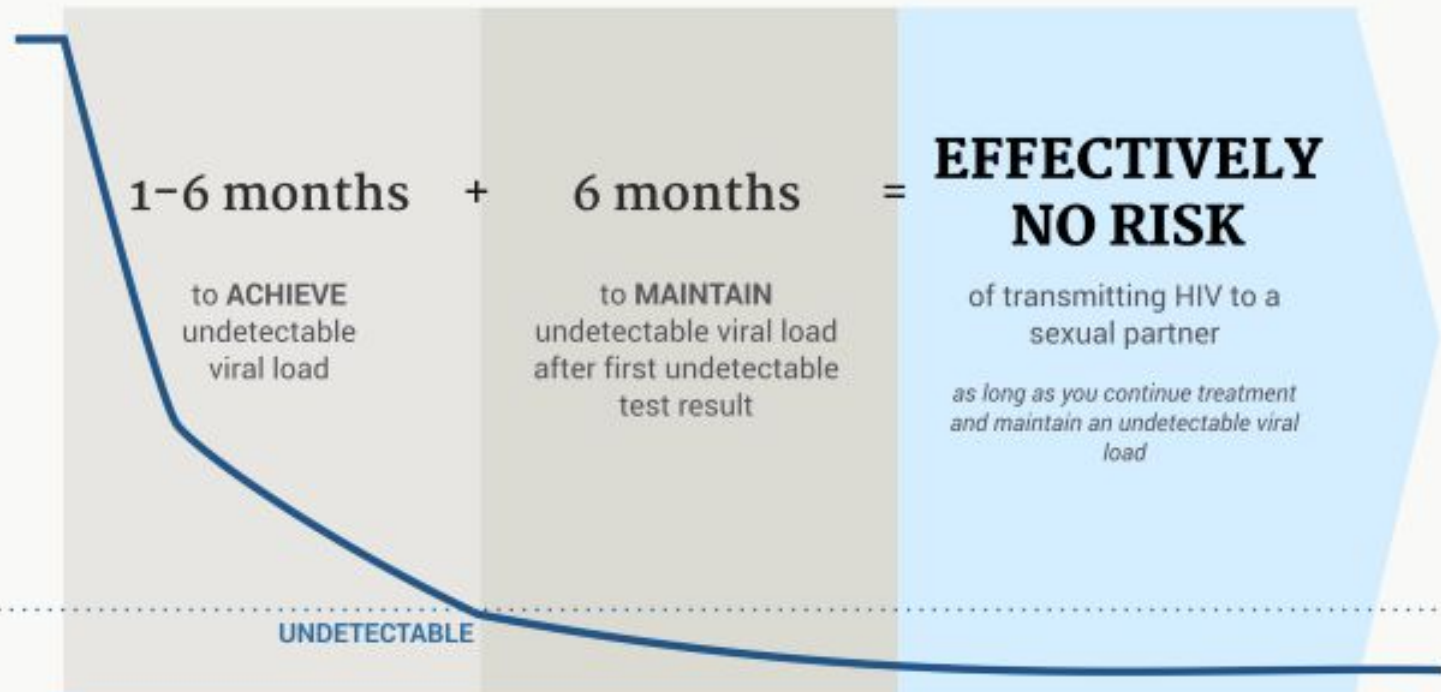
Target Not Detect	Not applicable
Target Not Detect	Not applicable
<20 copies/mL	< 1.30
Target Not Detect	Not applicable
<20 copies/mL	< 1.30
53 copies/mL	1.72
<20 copies/mL	< 1.30
Target Not Detect	Not applicable
1,929 copies/mL	3.29
73,709 copies/mL	4.87
<20 copies/mL	< 1.30
63 copies/mL	1.80

Flow Cytometry

<input type="checkbox"/> Pct CD3	(L) 49.6 %	(L) 51.7 %	(L) 49.5 %	(L) 50.8 %	55.3 %	73.4 %
<input type="checkbox"/> Abs CD3	1,161 /cumm	1,290 /cumm	941 /cumm	1,012 /cumm	955 /cumm	1,586 /cumm
<input type="checkbox"/> Pct CD4	33.5 %	35.0 %	30.8 %	31.2 %	31.5 %	(L) 15.5 %
<input type="checkbox"/> Abs CD4	783 /cumm	873 /cumm	586 /cumm	622 /cumm	545 /cumm	(L) 336 /cumm
<input type="checkbox"/> Pct CD8	14.0 %	14.9 %	17.4 %	17.9 %	21.6 %	(H) 56.5 %
<input type="checkbox"/> Abs CD8	327 /cumm	372 /cumm	330 /cumm	357 /cumm	373 /cumm	(H) 1,220 /cumm
<input type="checkbox"/> CD4/CD8 Ratio	2.4	2.4	1.8	1.7	1.5	(L) 0.3
<input type="checkbox"/> Pct Lymph Flow	* 26.2 %	* 39.5 %	* 33.9 %	* 38.0 %	* 35.6 %	* 36.4 %
<input type="checkbox"/> WBC Flow	8.9 K/cumm	6.3 K/cumm	5.6 K/cumm	5.2 K/cumm	4.8 K/cumm	5.9 K/cumm

<input type="checkbox"/> Pct CD4	(L) 23.7 %	(L) 10.2 %
<input type="checkbox"/> Abs CD4	545 /cumm	(L) 249 /cumm

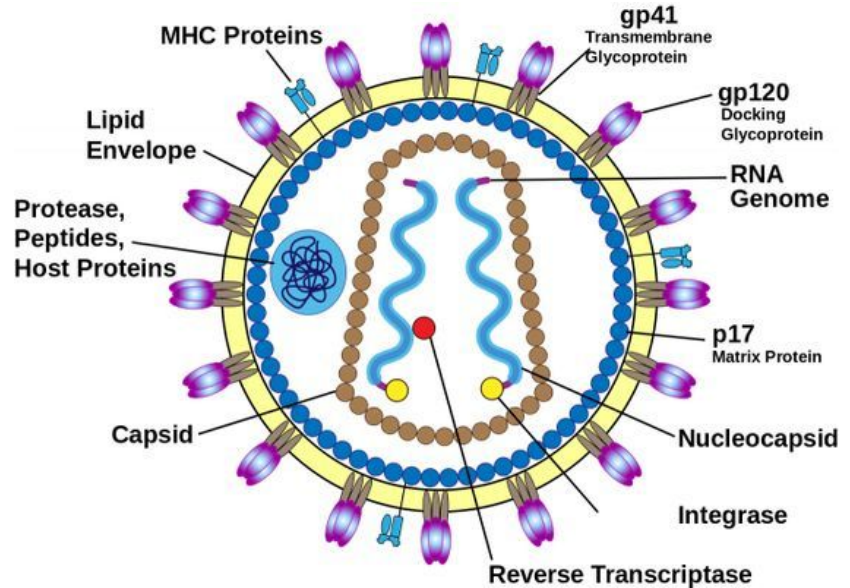
Ampiretroviral drugs	Resistance Predicted	Mutations Detected
	!	!
NRTIs		
ZDV (zidovudine or Retrovir)	! YES!	M41L, D67N, L210W, T215C
ABC (abacavir or Ziagen)	! PRB!	M41L, D67N, L210W, T215C
ddI (didanosine or Videx)	! YES!	M41L, D67N, T69D, L210W, ! T215C
3TC (lamivudine or Epivir)	! NO!	
FTC (emtricitabine or Emtriva)	! NO!	
d4T (stavudine or Zerit)	! YES!	M41L, D67N, L210W
TDF (tenofovir or Viread)	! YES!	M41L, D67N, L210W
	!	!
NNRTIs		
ETR (etravirine or Intelence)	! NO!	
EFV (efavirenz or Sustiva)	! NO!	
NVP (nevirapine or Viramune)	! NO!	
RPV (rilpivirine or Edurant)	! NO!	
	!	!
PIs		
FPV (fos-amprenavir or Lexiva)	! NO!	
IDV (indinavir or Crixivan)	! NO!	
NFV (nelfinavir or Viracept)	! NO!	
SQV (saquinavir or Invirase)	! NO!	
LPV (lopinavir or Kaletra)	! NO!	
ATV (atazanavir or Reyataz)	! NO!	
TPV (tipranavir or Aptivus)	! NO!	
DRV (darunavir or Prezista)	! NO!	
	!	!



Take every pill every day as prescribed

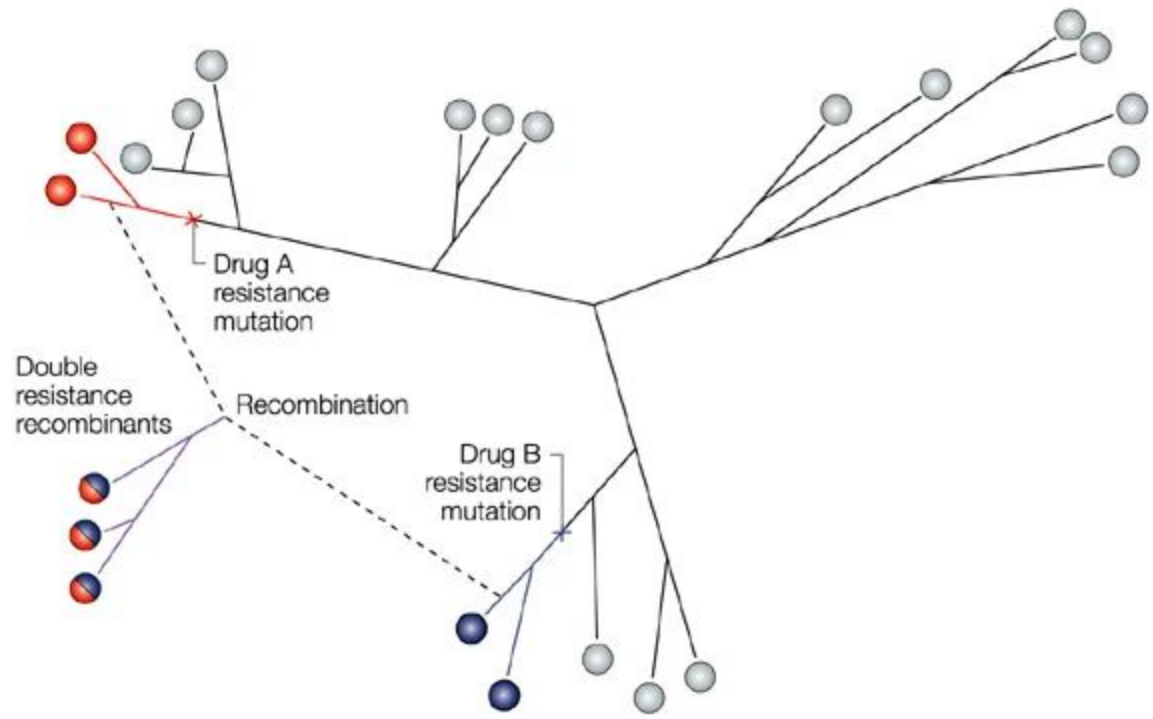
Why is adherence important?

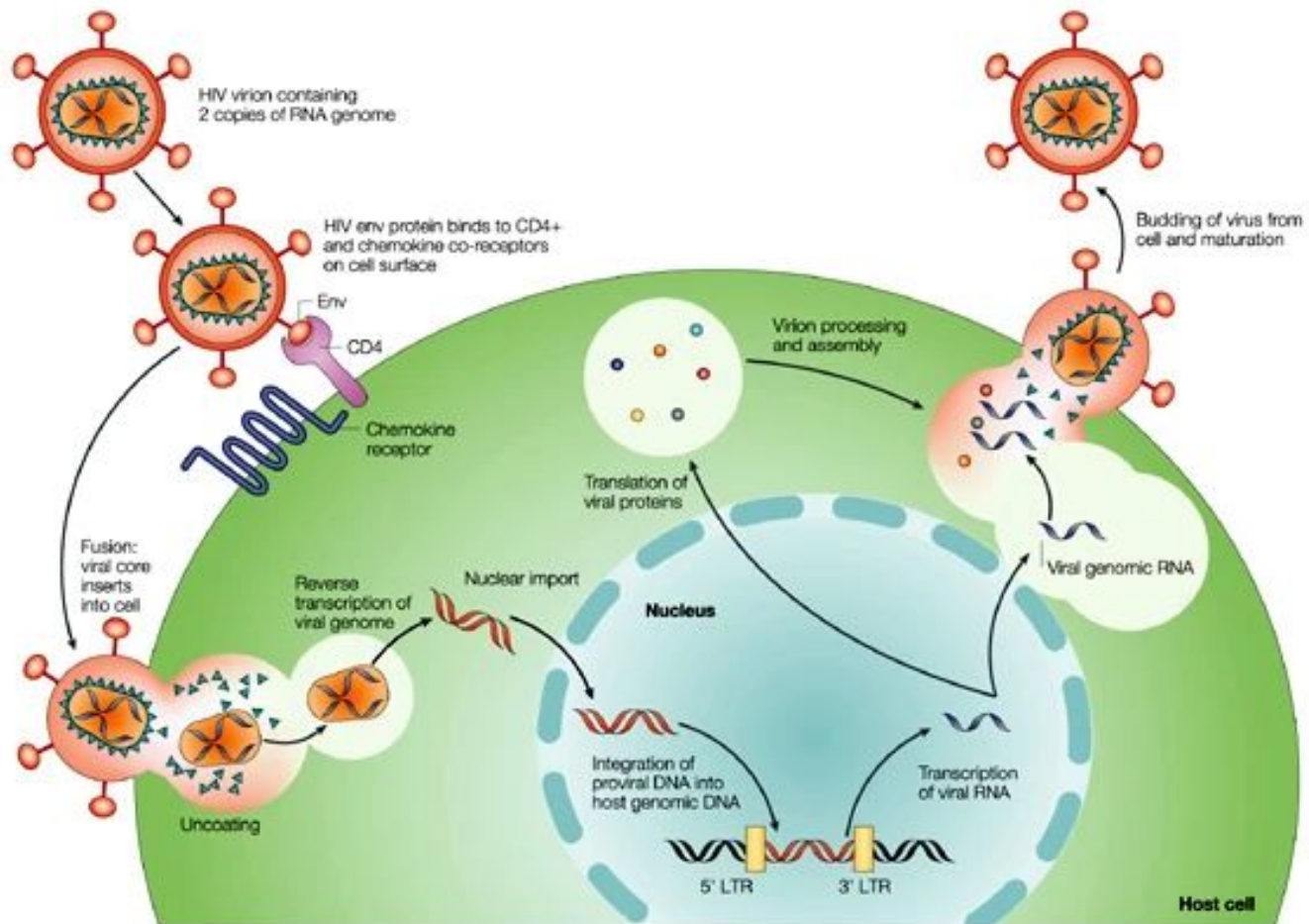
- Stopping and re-starting treatment can cause drug resistance to develop, making that treatment regimen ineffective and limiting future treatment options.
- Drug-resistant mutations can be seen in drug-naive patients.
- Most infected cells harbor two or more different proviruses.



Why is adherence important?

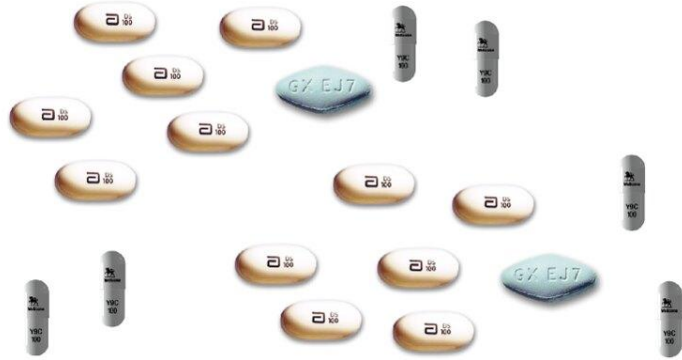
- Highly active antiretroviral therapy (HAART) also called anti-retroviral therapy (ARVs)
 - Involves combinations of drugs that act against different aspects of the viral life cycle
- The discovery of latent reservoirs of HIV-1 in patients on HAART was one of the key components in understanding the ability of the virus to persist long after the initiation of therapy.
 - The viruses in reservoirs are protected from interaction with drugs and can be extremely long-lived.
- Recombination, which allows the virus to accumulate and exchange drug-resistant mutations leads to rapid evolution of drug-resistant mutants, even between different reservoirs.
- Specifically, recombination might accelerate progression to AIDS and provide an effective mechanism (coupled with mutation) to evade drug therapy.





Antiretroviral therapy for HIV infection

In the 1990s



Up to 20 pills daily, taken at different intervals throughout the day

Today



As little as 1 pill per day, delivering multiple drugs

Timing of starting medication

- In 2015, findings from a large study offered evidence to begin treatment as soon as possible after diagnosis, without waiting for CD4+ cell counts to decline.
- Overall, the risk of serious AIDS events, serious non-AIDS events, or death was reduced by 57 percent among participants who received early treatment.

Types of treatment

BICTEGRAVIR
(50 mg)

EMTRICITABINE
(200 mg)

**TENOFOVIR
ALAFENAMIDE**
(25 mg)



Tips for adherence

- ★ Set an alarm on your phone.
- ★ Associate with another regular activity.
 - Brushing teeth
 - Bedtime
 - Work
- ★ Keep in a location where it helps you remember.
 - In work bag
 - On sink in bathroom
 - Next to bed
- ★ Use a pill box.
 - Easier access
 - You can tell if dose for the day was taken
- ★ Use a pill keychain.
- ★ Buddy system.



Tips for adherence

- Injectable eliminates need for remembering daily pill, though may still have other medication
 - If you take multiple meds, pharmacy can also package meds together in pill packs.
- If confidentiality is an issue, potentially remove label or transfer bottle, but be careful not to let it fall into other hands.
- What has worked for you?