CATIE

Building Blocks

A CATIE Webinar Series

Viral Replication

How HIV replicates and how drugs work to control it

Presented by:

Thomas Egdorf, Regional Health Education Coordinator, CATIE

Date:

Tuesday, February 4th, 2014, 1-2pm EST

Why is it important to understand the HIV viral replication cycle

- To build an understanding of how HIV works in the body
- Increased knowledge of the drug classes
- Understand how the medications work to prevent HIV replication

Learning Objectives

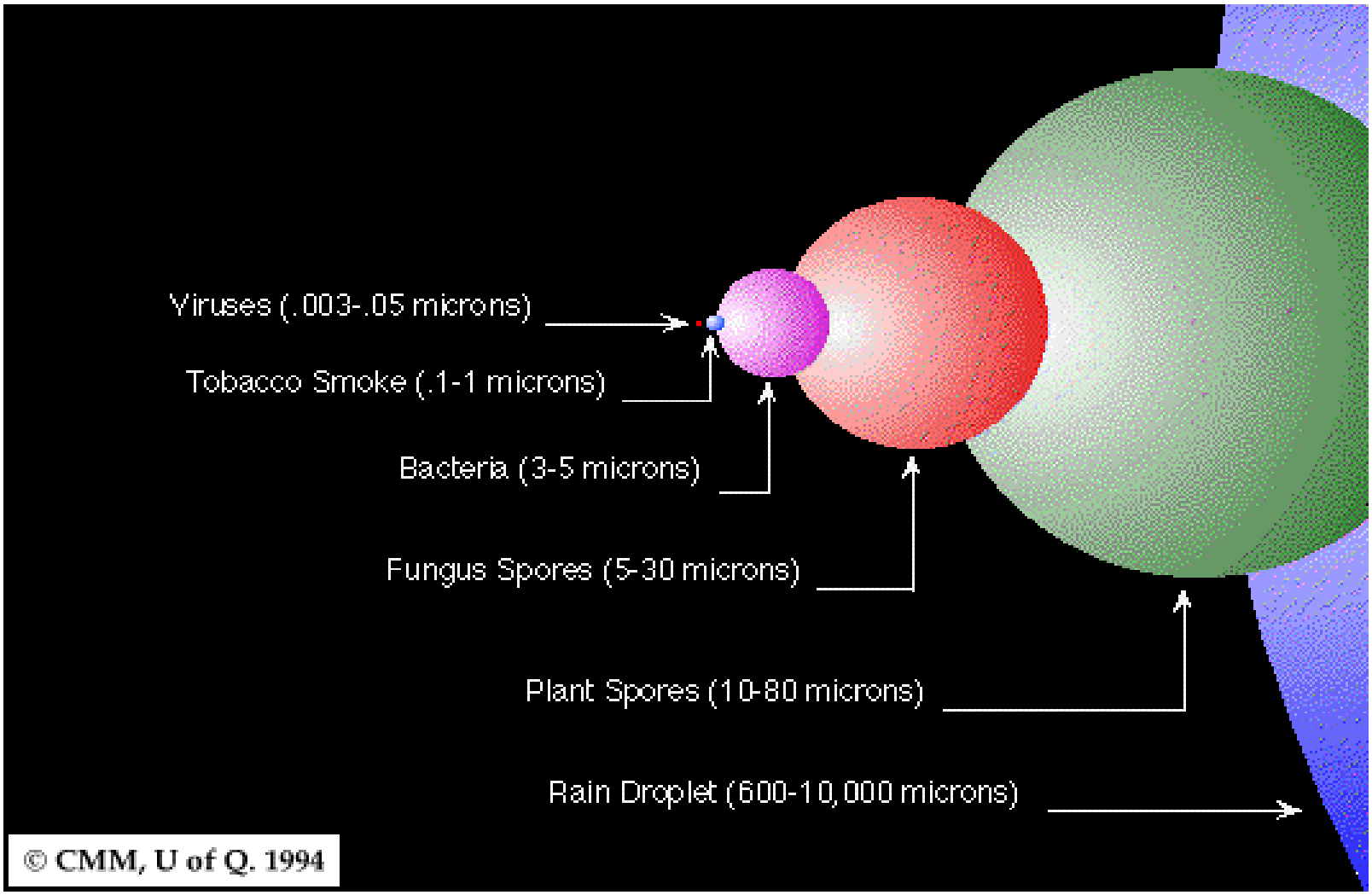
- 1. Name and describe the five steps of the replication cycle
- 2. Name the three enzymes involved in viral replication
- 3. Name the five drug classes and locate where they work in the replication cycle

What is a virus?

- Viruses are tiny organisms that may lead to mild to severe illnesses in humans, animals and plants. This may include flu or a cold to something more life threatening like HIV.

- **Are viruses alive?**

How big are viruses?



Structure of a virus

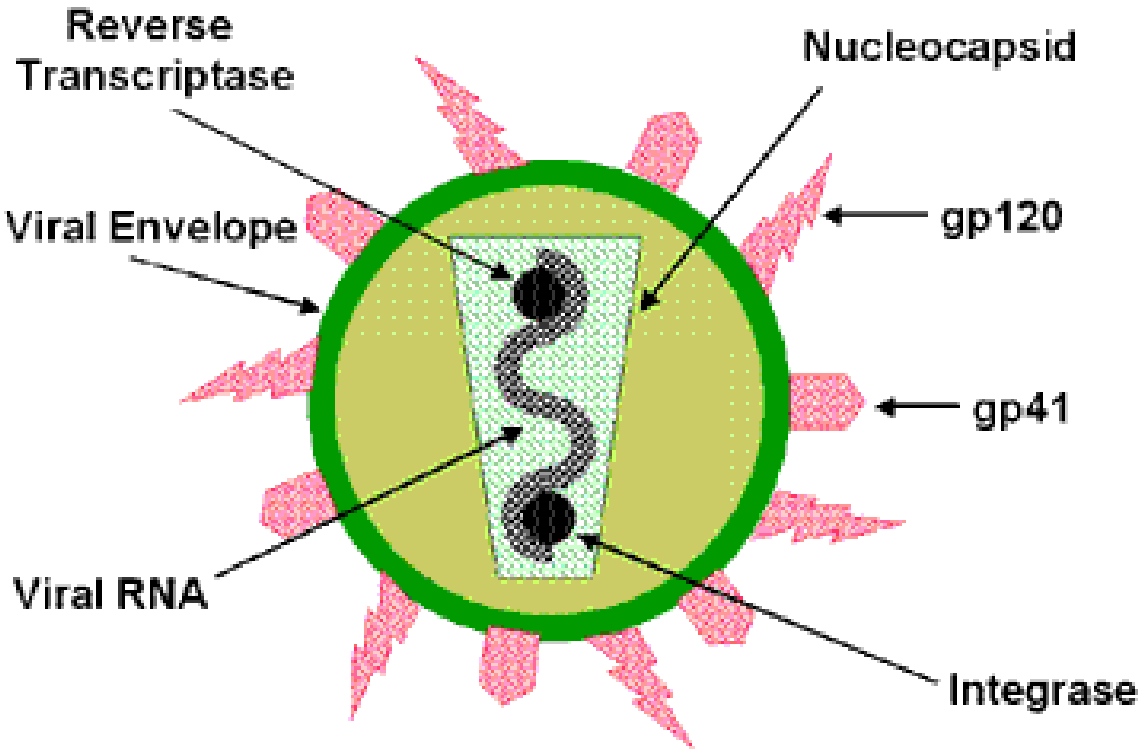


Figure 1. **Human Immunodeficiency Virus**

What is the difference between Virus and Retrovirus?

- Retroviruses are a group of viruses, so retroviruses carry special characteristics, which are not seen in viruses.

- Virus contains genetic material as DNA or RNA but retrovirus contains only RNA.

What is the difference between Virus and Retrovirus? Con't

- If the virus has DNA, it inserts DNA into the host cell, and it is integrated directly into the host genome at the lytic phase, *whereas* retrovirus has RNA as its genetic material and needs to convert RNA to DNA before insert it into the host genome.

- So, viruses have transcription process, whereas retroviruses have reverse transcription process.

What is an immune system

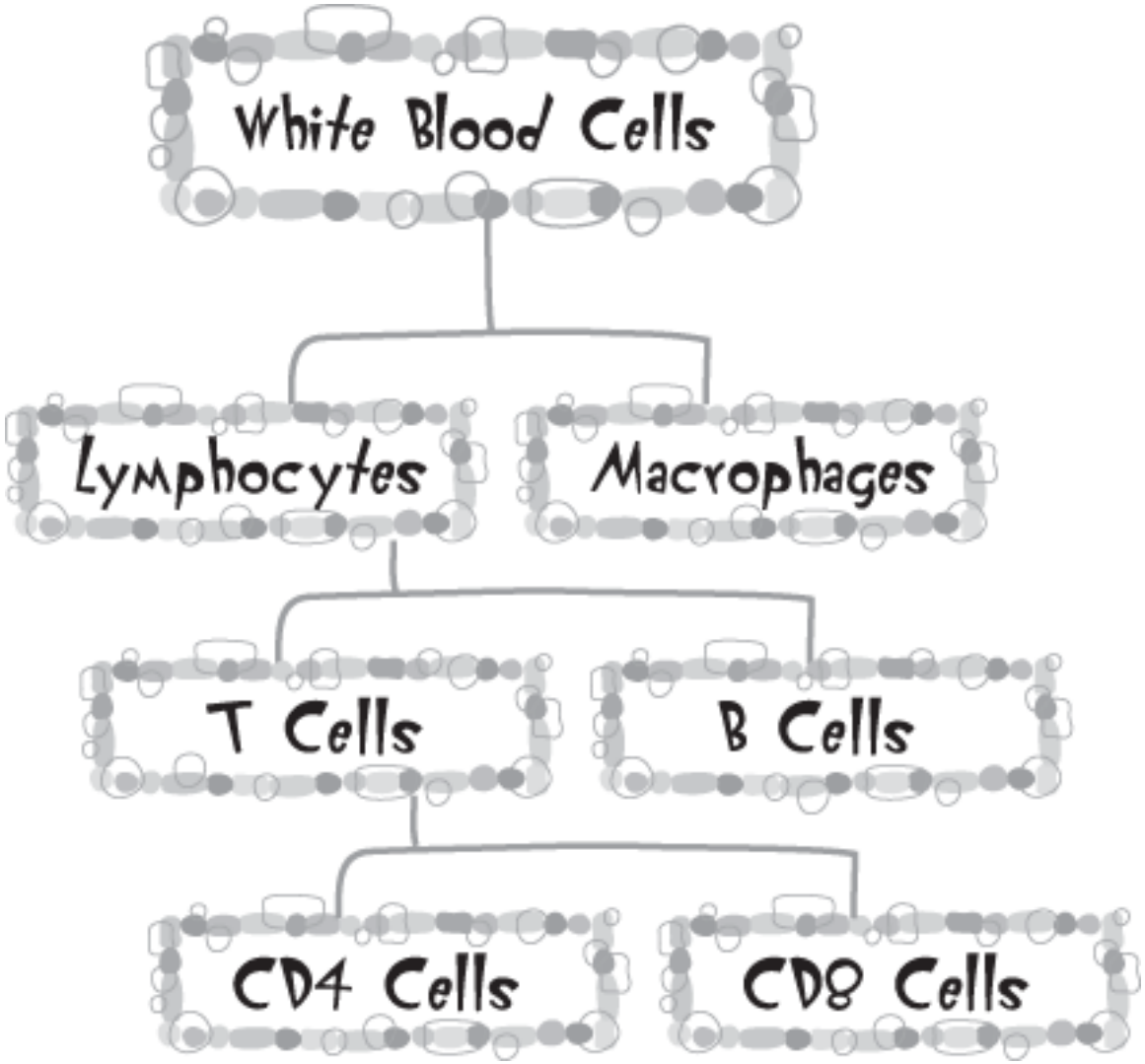
- The immune system is the body's defence against disease. It protects the body from disease-causing germs, such as bacteria, viruses, fungi and parasites, as well as cancerous cells.

Where is our immune system located?

- Outside the body
- Inside the body
- Lymphatic system
- Immune cells

Lymphatic system

Immune Cells

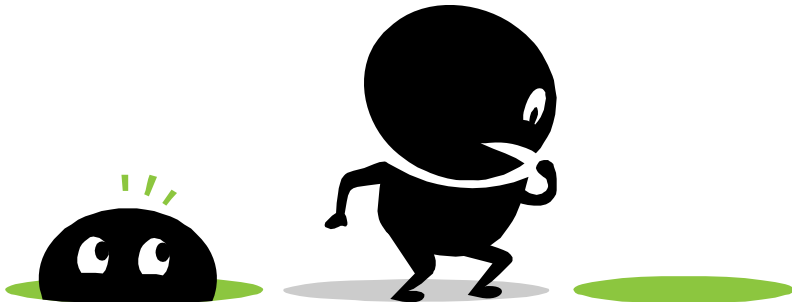


CD4 Cells

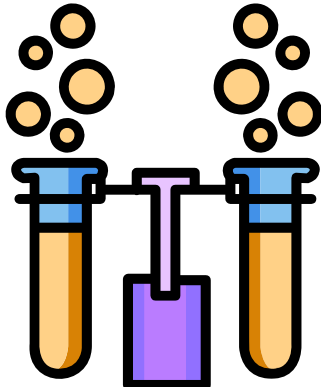
- Their Job
- Must be active for HIV to infect

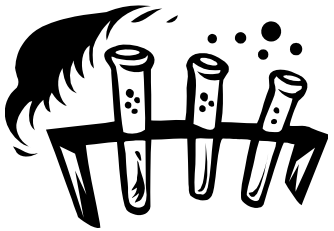
Viral reservoirs

- Where are they hiding



CD4 counts and Viral Load





Viral Replication Video

- Play video now

Summary - Entry

STEP	ENZYME	DRUG CLASS
Entry	---	Entry/Fusion Inhibitors

Summary – Reverse Transcription

STEP	ENZYME	DRUG CLASS
Reverse Transcription	Reverse Transcriptase	NRTIs/NNRTIs

Summary - Interation

STEP	ENZYME	DRUG CLASS
Integration	Integrase	Integrase Inhibitors

Summary - Production

STEP	ENZYME	DRUG CLASS
Production	Protease	Protease Inhibitors

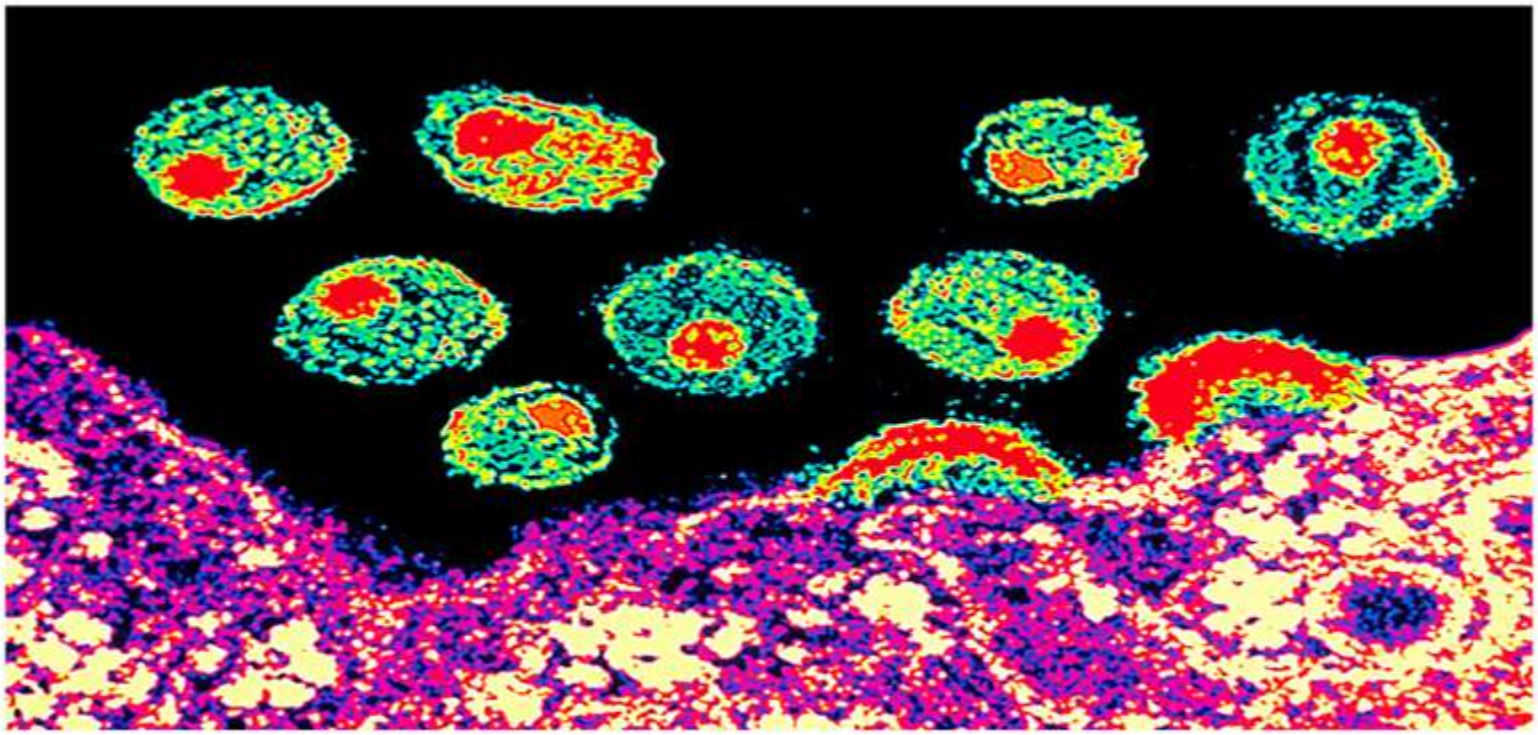
Summary - Maturation

STEP	ENZYME	DRUG CLASS
Maturation	---	Maturation Inhibitors (in development)

Summary - ALL

STEP	ENZYME	DRUG CLASS
Entry	---	Entry/Fusion Inhibitors
Reverse Transcription	Reverse Transcriptase	NRTIs/NNRTIs
Integration	Integrase	Integrase Inhibitors
Production	Protease	Protease Inhibitors
Maturation	---	Maturation Inhibitors (in development)

Part of the Maturation step



HIV budding

Control vs Cure

- Retrovirus replication mistakes
- HIV reservoirs
- Medications control not kill HIV

Recap

- Name and describe the five steps of the replication cycle
- Name the three enzymes involved in viral replication
- Name the five drug classes and locate where they work in the replication cycle

Thank you

~ Next Webinar ~

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HIV and Aging

Presenter: Thomas Egdorf, Regional Health Education Coordinator, CATIE

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Please evaluate this webinar!