

30 Years With AIDS: Where It Came From And Why It's Still With Us



Kevin McCarthy is a fourth year PhD Student in the Harvard Virology Program. He works in the laboratory of Dr. Welkin Johnson where research focuses on understanding what is required for HIV and related viruses to “jump” between species. Kevin’s research aims to understand how one protein, that protects monkeys from such a “jump” with HIV, works.

Kevin will discuss the origins of HIV. Where did it come from and what is the history of the virus in the United states and around the world?



Ben Morris is a third year PhD student in the lab of Dr. Johannes Walter. His thesis work deals with protein degradation during DNA replication, using frog egg extracts. Ben also enjoys singing patter songs with the Gilbert and Sullivan companies at Harvard and MIT (and in the tissue culture room in lab, when no one else is around)

Ben will explain the basic molecular biology of HIV. How does HIV replicate and what characteristics of the virus make it so unique and difficult to get rid of?



Jamie Schafer is a third year PhD student in the Harvard Virology Program. Her project looks at natural killer cells, a type of immune cell, and how they may be involved in controlling SIV replication early in infection. Outside of lab you’ll usually find her cooking, eating, reading cookbooks, or grocery shopping.

Jamie will tell you about how the immune system tries to fight off the virus and what are the past and present strategies for developing an HIV vaccine.

Useful definitions

AIDS: Acquired Immunodeficiency Syndrome: The disease caused by HIV infection

SIV: Simian Immunodeficiency Virus. A virus related to HIV that infects other simian (referring to monkeys, apes, and humans) species

Cross species transmission: When a virus that normally infects one type of animal “jumps” into a species that normally does not harbor that virus.

Phylogenetic tree: A “family tree” showing the relationship between multiple entities

Node: where two lines on a phylogenetic tree meet

Common ancestor: Any two lines on a phylogenetic tree connected to the same node must have the same ancestors.

Epidemic: A term for an infectious disease that has spread to many people within a contained geographic area

Pandemic: A term for an infectious disease that has spread to multiple continents or worldwide.

Hemorrhagic fever: A severe condition caused by viruses characterized by high fever and uncontrolled bleeding

DNA: deoxyribonucleic acid. Molecules, that are chains of nucleic acids, that contain the instructions for the cell to build proteins and to make copies of itself

RNA- Ribonucleic acid. Molecules, that are chains of nucleic acids, that are the intermediate step in the conversion of DNA into protein

Protein: Molecules, than are chains of amino acids, that do work to make the cell function

Mutation: when a nucleotide within the DNA chain is replaced with a different nucleotide

Fusion: the joining of the viral membrane with the cell membrane, allowing the virus to enter the cell

Reverse transcription: the process of RNA being converted into DNA

Integration: when the virus’s DNA inserts into the DNA of the cell

Budding: the processes of the virus exiting the cell

Highly Active Antiretroviral Therapy: A treatment for HIV that involves more than one medication, usually taken simultaneously. The rationalization being that simultaneous administration of multiple drugs will prevent the virus from mutating and therefore prevent development of drug resistance.

Attenuated vaccine: A living, weakened version of the virus or bacterium that normally causes disease

Subunit vaccine: Containing a piece of the virus or bacterium that normally causes disease

Antibodies: Proteins, made by B cells, that bind non-self molecules very specifically

Glycan shield: Sugars covering most of the proteins on HIV’s surface

T cells: Immune cells that mature in the thymus; helper T cells help B cells make antibody and killer T cells kill infected cells

B cells: Immune cells that mature in the bone marrow and make antibodies

Recombinant vaccine: A living vaccine that is a harmless virus with the surface proteins of HIV