Human Immunodeficiency Virus

Structure of HIV

- HIV is a *Lentivirus* a subgroup of retrovirus (a virus that is composed not of DNA but of RNA)
- DNA will transcript to RNA but then it will reverse transcriptase and start the process of producing Viral DNA (infected DNA)
- You continually produce infected clones
- The viral DNA survives in the host cell as a provirus, it can either lay in wait or it can start infecting T-Helper cells

How did HIV start?

- Simian Immunodeficiency Viruses (SIV) - genomes of these viruses are linked to infected chimpanzees and gorillas.
- It is estimated that it originated in 1908
- Humans came in contact with the blood of infected primates once they were slaughtered for bushmeat.
- It could have been contained to the small villages of west and central Africa, since sexual promiscuity is low.
- European colonialism disrupted the containment.
- The colonialism brought a greater population, and prostitution, which increased transportation of the Virus.

Symptoms

- There could be NO SYMPTOMS
- Flulike symptoms may show up
- Fever, usually accompanied by fatigue, swollen lymph glands, sore throat, and headaches
- Skin rash
- Nausea, vomiting or diarrhea
- Weight loss (sometimes known as AIDS wasting)
- Night sweats
- Nail changes (thickening or curving of the nails)
- Yeast Infections, cold sores or genital herpes
- Confusion or Difficulty concentrating (HIV related dementia)
- Numbness or tingling in the hands or feet

Transmission

- Direct contact with:
  - Blood
  - Semen
• Breast milk
• Needles (sharing)
• HIV can survive more than 1.5 days inside our cells and 6 hours outside the cells

HIV Statistics in the United States

• CDC estimates that 1.2 million people are living with HIV infection.
• Out of those 168 thousand are unaware of their infection.
• There are about 50 thousand new HIV infections per year.
• About 14 thousand people with an AIDS diagnosis died in 2011

How HIV becomes AIDS

• CD4 T cells are infected, if the number stays high then that means your immune system is responding as it should, with the aid of CD8 T cells
• Low CD4 T cells numbers are bad, once the number drops to about 200 cells this means that you now have AIDS
• Due to the immune system being under attack, the body cannot fight diseases, you do not die of AIDS but of some other disease or virus

Opportunistic Infections Associated with AIDS

• Persistent Diarrhea
• Gastroenteritis
• Fever, encephalitis, blindness
• Shingles
• Tuberculosis
• Pneumonia
• Meningitis
• Cancer of skin and blood vessels
• Abnormal cervical growth

Prevention

• PROTECT, PROTECT, PROTECT
• If you are sexually active use a condom, ALWAYS.
• Know your partner.
• Do not share needles.
• Get tested regularly, you can test yourself in the comfort of your own home.

Treatment

• Once you have HIV you have it for LIFE
• But you can live a full life with medications, a healthy lifestyle, and healthy diet.
• Medications used are usually known as a “cocktail” because a combination of drugs must be taken in order to minimize the growth of resistant strains (this is a lifelong medication)
• *Zydovudine* - nucleoside analog (inhibit reverse transcriptase)
• *Tenoflor*-nucleotide analog (inhibit reverse transcriptase)
• *Nevirapine* - non-nucleoside agent (blocks RNA synthesis)
• *Atazanavir, indivavir, and saquinavir* - are protease inhibitors

**References**

*Microbiology An Introduction. 11th Edition* Tortora, Funke, Case. Ch. 13, pgs. 390, Ch. 19, pgs. 545-554, Ch. 20, pgs. 575-576

16 Signs You May Have HIV. Health.com

Where Did HIV Come From? IFLscience.com