HIV

World wide prevalence--some places only babies and grandparents alive.

first US cases 1981

now about 500,000 with 300,000 dead*

combo therapy has cut death rate about 4fold

HIV in Arkansas pdf

the virus

the viral genome
I. Infects CD4 and macrophages [and mac-like cells like those in the brain] and intestinal epithelium. Impairs their function for example,

nef decreases CD4 expression --compromises T cell function;

syncytia are fragile, easily lysed

Why infect these cells?
1. BINDING Virus has a receptor [determines both the host [species] and tissue tropism] CD4 plus CXCR4 on T, plus CCR5 on mac so ATTACHMENT

2. TRANSCRIPTION --lots of viral DNA, RNA and protein made in these cells

HIV replication cycle
a. other viral infections in these cells often activate the HIV by acting on LTR [theirs and its]
b. growth signals [generic, antigen stimulation plus growth factors = lymphokines]
c. tax gene product causes cells to make IL2, IL3, GM-CSF, and IL2R more virus, thus more viral "apartments"

II. Alters antigenicity this includes by mutation to new forms
Error prone pol 1/2000 is error thus ~5/genome
a. immune escape especially gp120 [SU]
b. new tropisms, new disease characters

Course of infection
inf. Mac [CD4+CCKR5], these become major reservoir, WHEN lots of virus in blood=viremia
fatigue, flu-like symptoms, sometimes fever and big lymph nodes [l.n.].

2. T cells [CD4 + CXCR4], virus replicates in l.n., much less virus in blood until l.n. destroyed [down # CD4 T cells]
now immunosupression a symptom.

infection stages

III. Ways HIV can kill cells

DIRECT:
1. cDNA[lots] correlates with death [reason unknown]
2. increase permeability of cell mb
3. syncytia formation
4. induction of apoptosis [programed cell death]

INDIRECT:
5. opsonization and phagocytosis by mac, virus still infectious
6. CTL killing of HIV infected CD4 T cells
7. AntibodyDependent Cellular Cytotoxicity [ADCC] kill of mac and T
8. Death induced by high amounts of antigen stimulating the T cell receptor without any other positive growth signals --death by the mechanism normally used to maintain tolerance to self.

AIDS has complications of the following infections and malignancies:

Kaposi's sarcoma

pneumonia due to Pneumocystis carinni, a fungus that forms cysts

former leading cause of death in AIDS patients now prevented by medication. Most humans infected in early childhood

usual inf 2.5 y.o. and gone in a year

Toxoplasmosis

CMV --owl eyes in sections to blindness

Mycobacterium avium complex [M. kansasii, scrofulaceum,xenopi,szulgai,, ganavese, haemophilum,celatum] jointly called MAC