

AIDS – An Introduction

Brief AIDS History

1872. First description of Kaposi's sarcoma

1950. PCN effective against most STD's

1952. Probably initial case of AIDS in US

Ca 1960. OCP's

Late 70's. Sharp rise in STD's among gay men

1980. Discovery of first HTLV: first human retrovirus

3/1981. AIDS from transfusion in a neonate

Spring 1981. First US cases of AIDS reported to CDC

1/1982. CDC task force assembled

7/1982. Hemophiliac cases reported

5/1983. AIDS virus (LAV) isolated in France

5/1984. AIDS virus (HTLV-III) isolated in US

3/1985. Licensed serum tests for HIV at blood banks

6/1985. First International Conference on AIDS to name the virus HIV

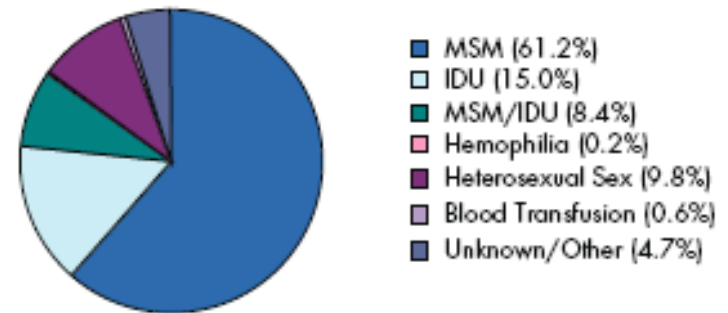
12/1985. HIV-2 confirmed

NV Data

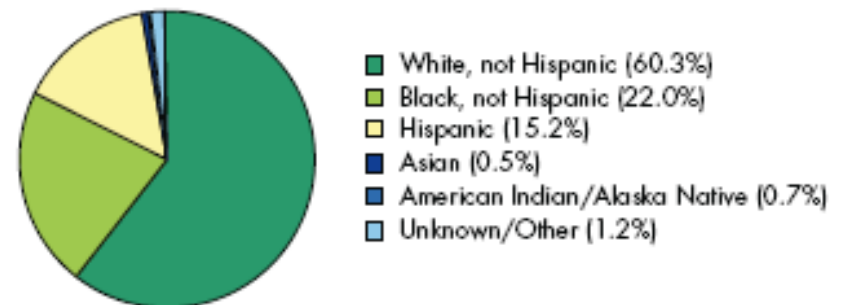
- NV typically in top 13 states with AIDS cases.
- Ratio is slightly higher than 10 men for every woman
- Gay/Bi group declining in AIDS incidence
- IVDU group increasing in AIDS incidence

- 2007 data – CDC's most currently available data (2008) shows no significant differences.
- http://www.cdc.gov/nchhstp/stateprofiles/Nevada/Nevada_Profile_s.htm

Reported AIDS Cases Among Adults and Adolescents by Transmission Category, Cumulative through 2007, Nevada
N = 6,095



Reported AIDS Cases by Race/Ethnicity, Cumulative through 2007, Nevada
N = 6,124

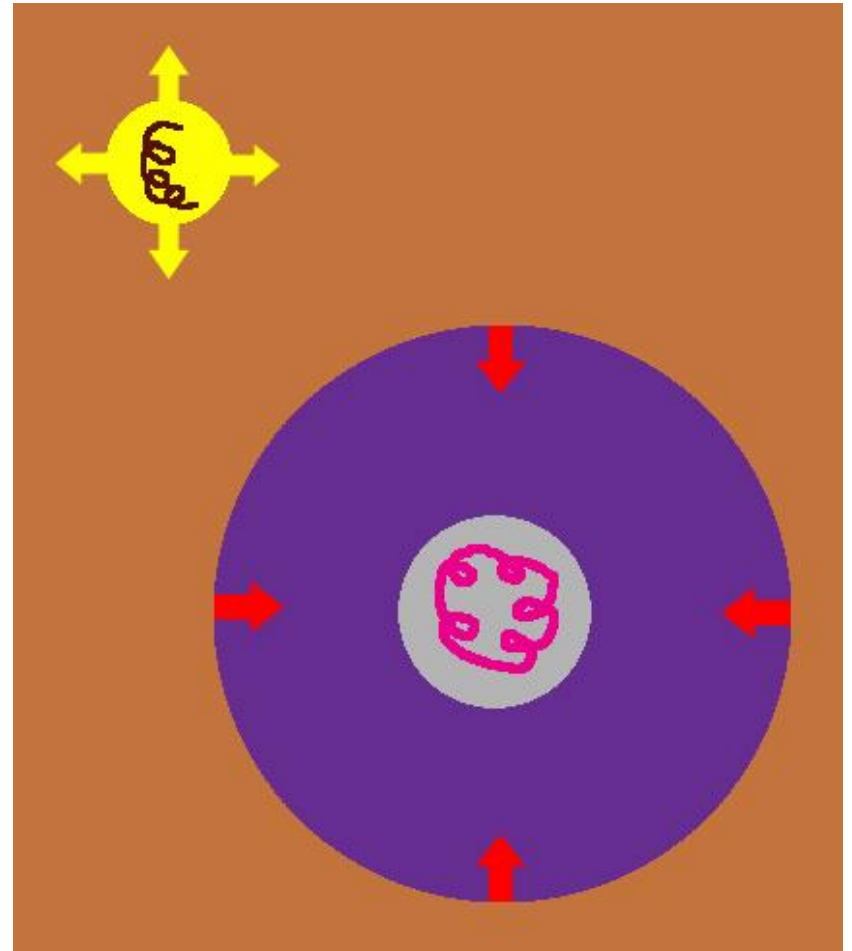


HIV Transmission Modes

1. HIV-infected blood infused into you
2. Infected mother to gestating fetus
3. Using dirty needles (IVDU/A)
4. Having sex with someone who is HIV-positive without protecting yourself

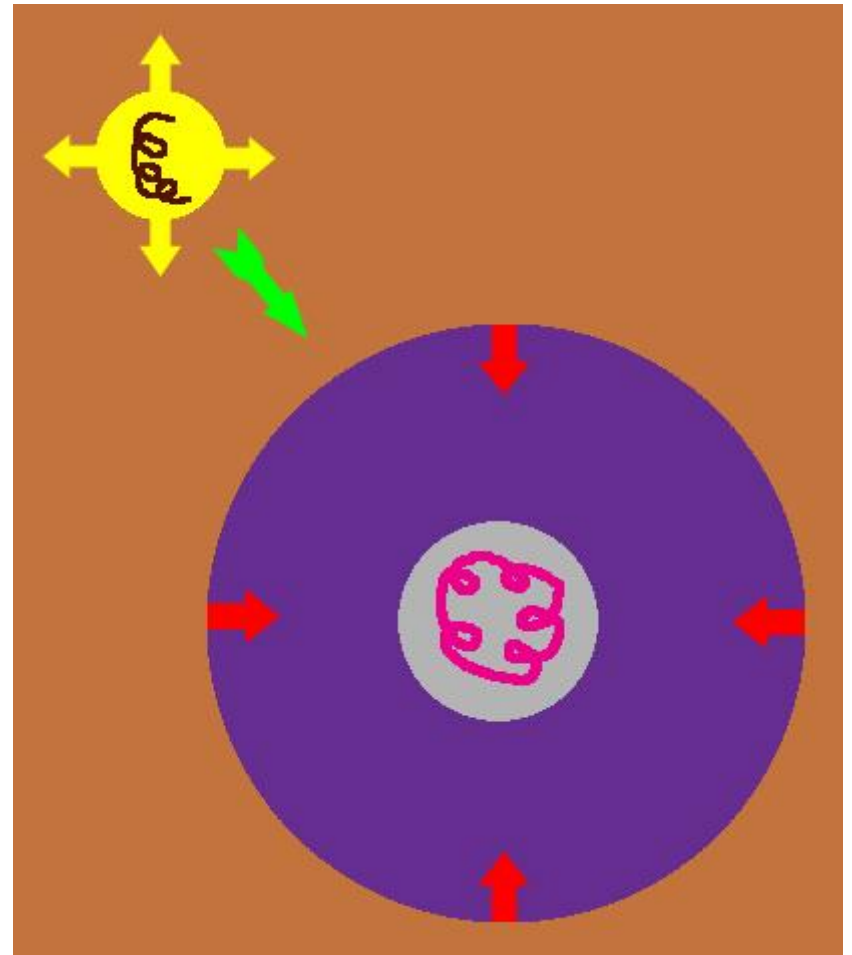
HIV Infects a T₄ Cell -- 1

- HIV with gp 120
- HIV with RNA
- Contains RT
- T4 cell
- T4 cell with CD4 receptor
- Nucleus with DNA



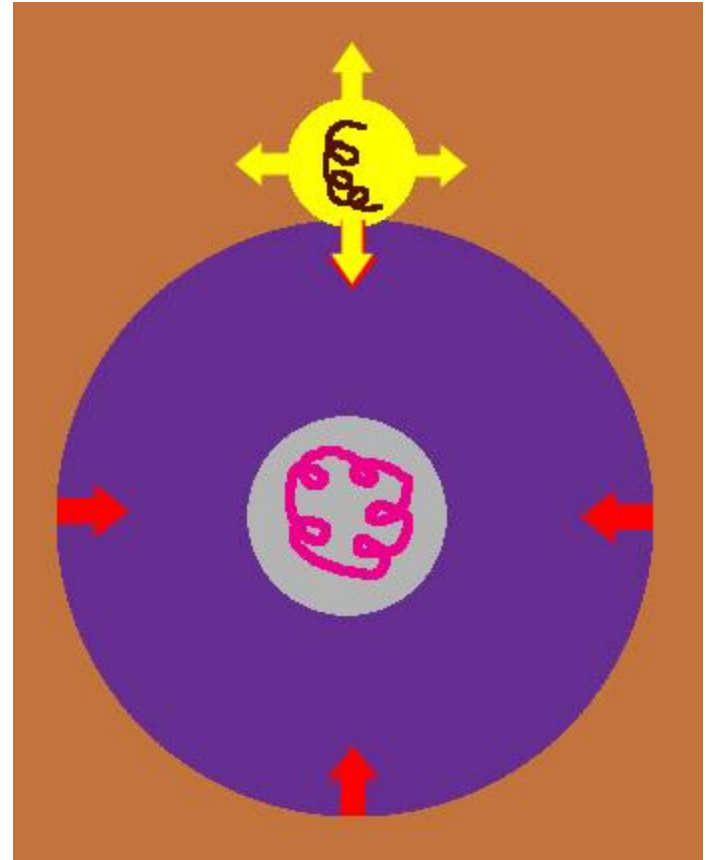
HIV Infects a T₄ Cell -- 2

- gp 120 and CD4 receptor recognize each other



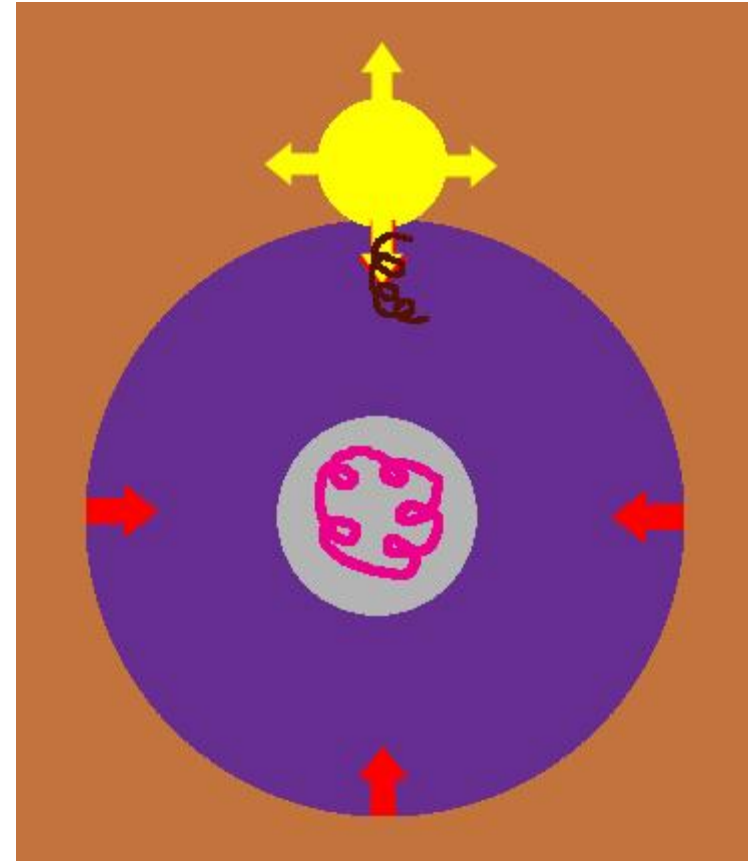
HIV Infects a T₄ Cell -- 3

- HIV and T₄ cell bind together



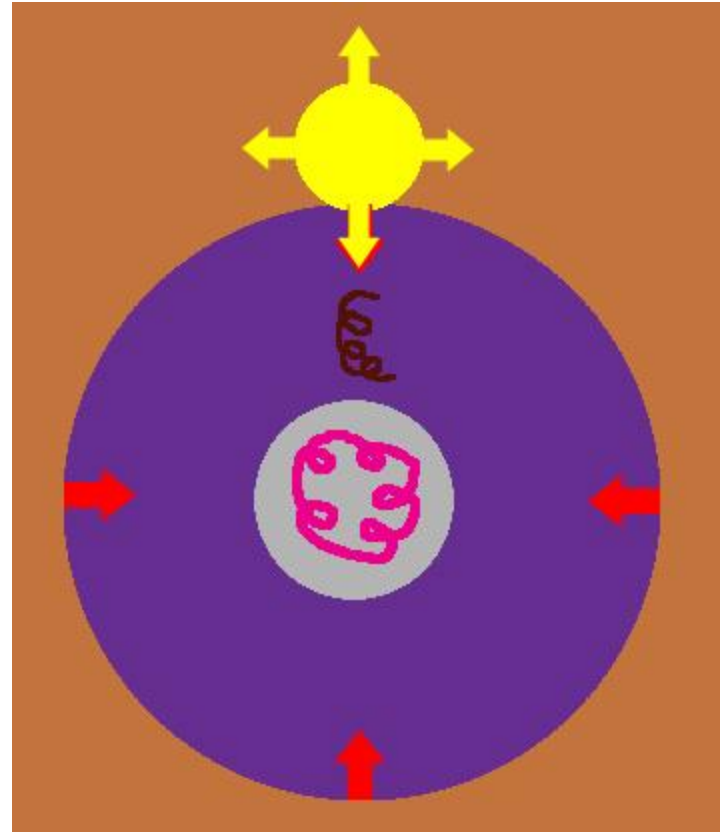
HIV Infects a T₄ Cell -- 4

- HIV and T₄ cell “pop” together like 2 soap bubbles
- HIV RNA is ejected into the cytosol of the T₄ cell



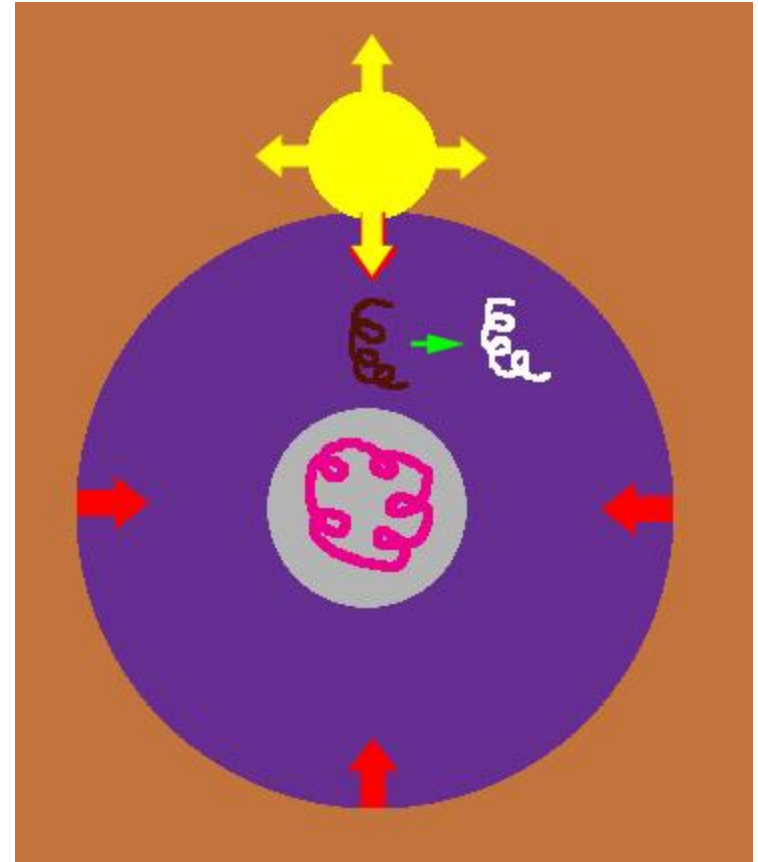
HIV Infects a T₄ Cell -- 5

- HIV RNA with RT aligns in cytosol



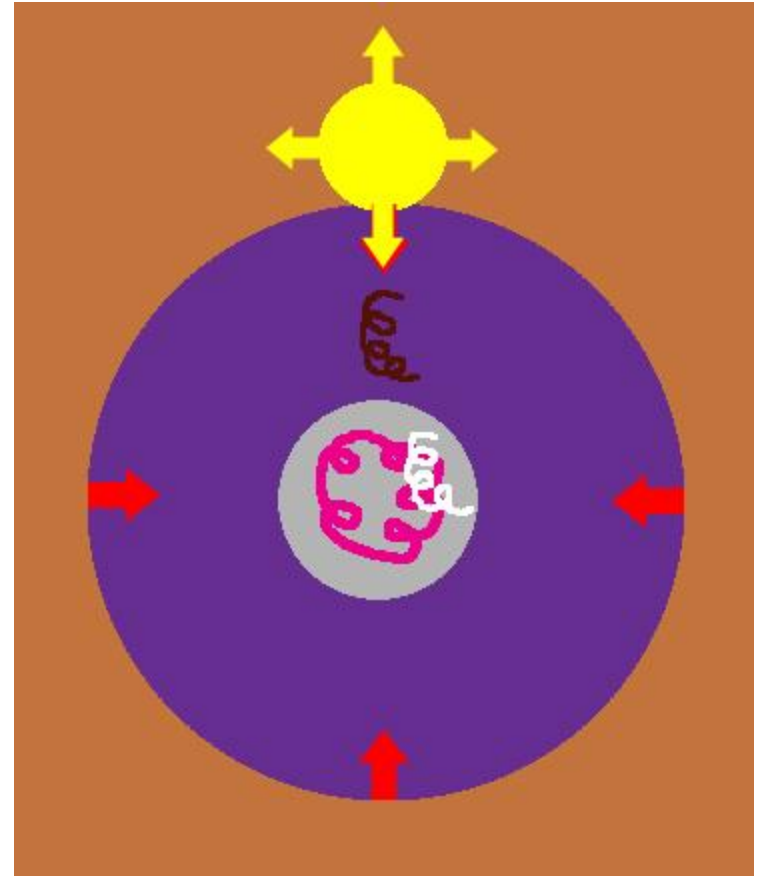
HIV Infects a T₄ Cell -- 6

- RT drives reverse transcription for HIV pro-viral DNA synthesis



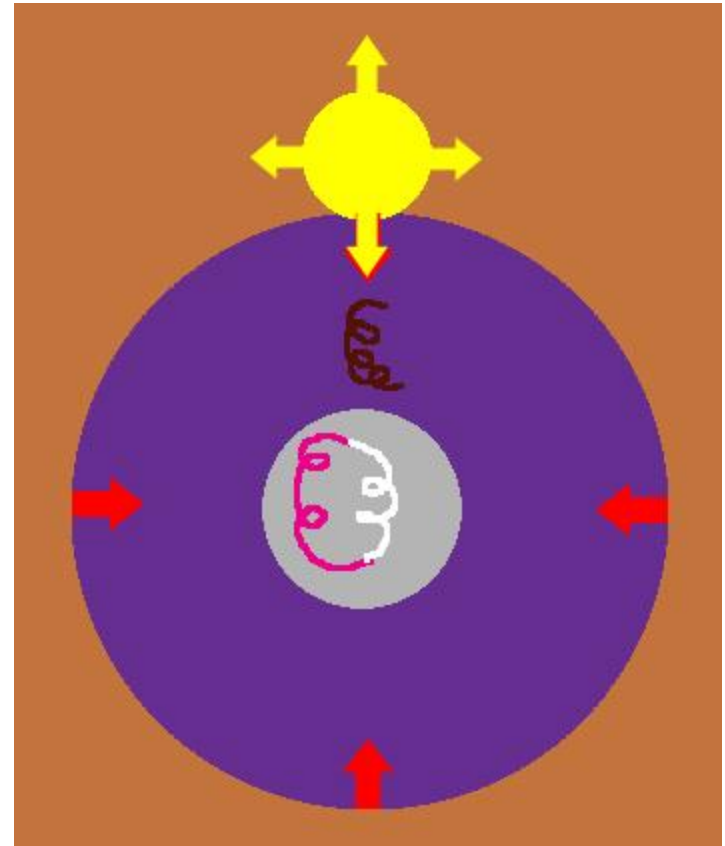
HIV Infects a T₄ Cell -- 7

- Pro-viral DNA transported to nucleus of T₄ cell



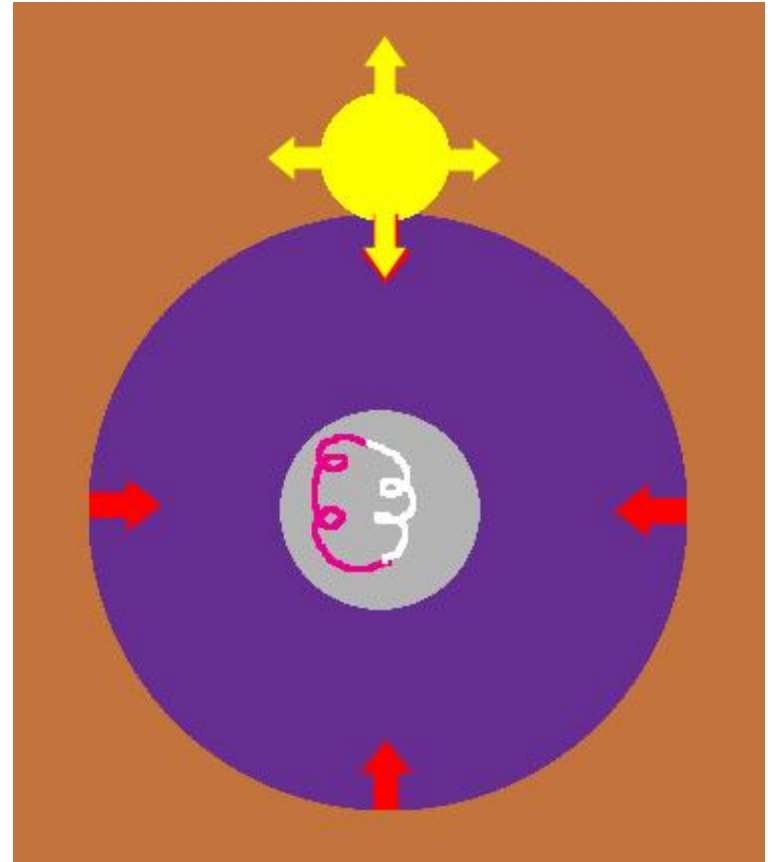
HIV Infects a T₄ Cell -- 8

- Pro-viral DNA
integrated into T₄ cell's
DNA by Integrase



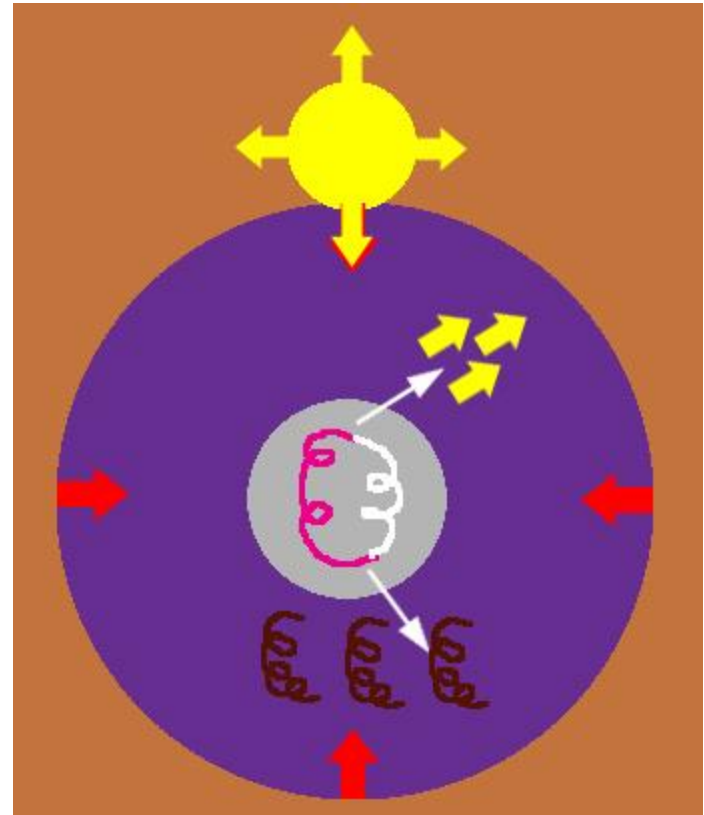
HIV Infects a T₄ Cell -- 9

- T₄ intracellular and intranuclear “machinery” goes to work



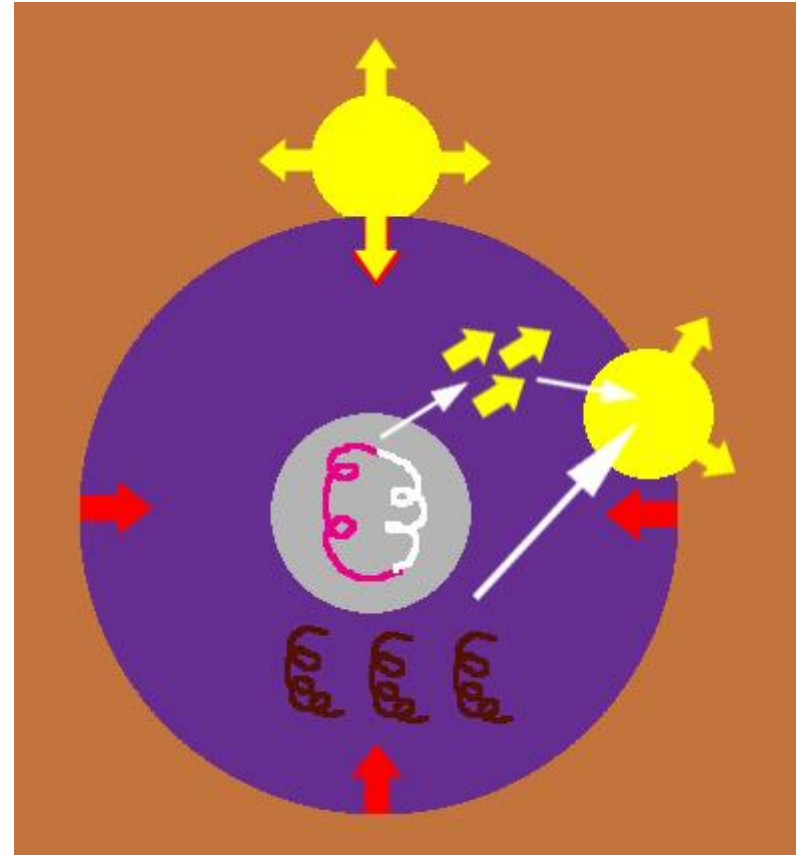
HIV Infects a T₄ Cell -- 10

- New HIV RNA transcribed
- New gp 120 synthesized
- Both head to cell membrane



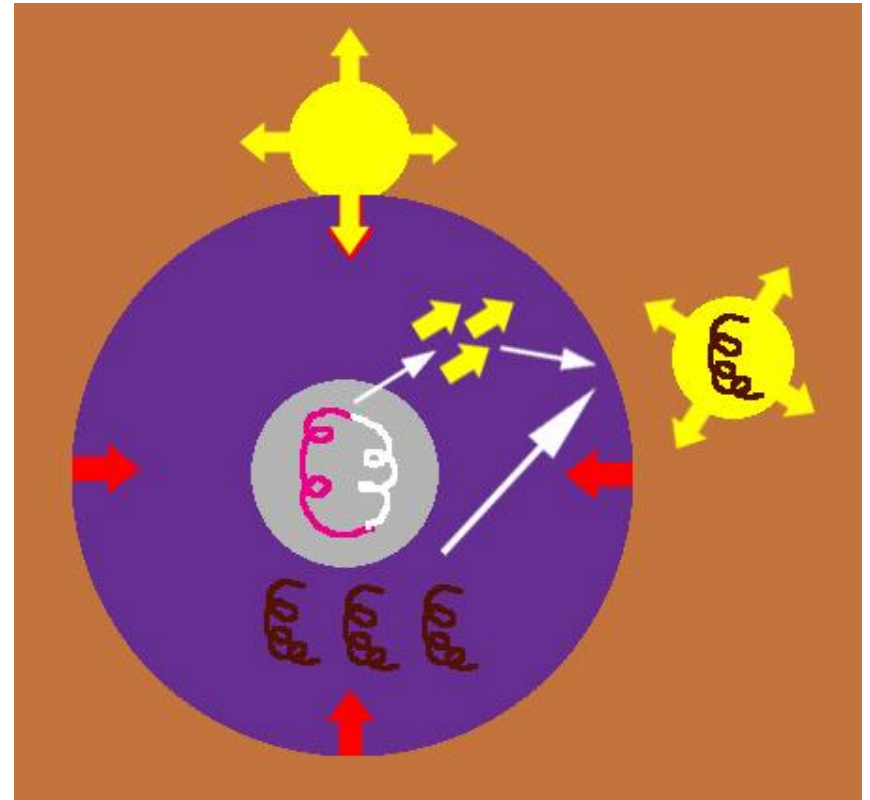
HIV Infects a T₄ Cell -- 11

- New HIV virion buds off
– only one in the cartoon – millions per cell in reality



HIV Infects a T₄ Cell -- 12

- Virion buds off to infect another cell



HIV Infects a T₄ Cell -- 13

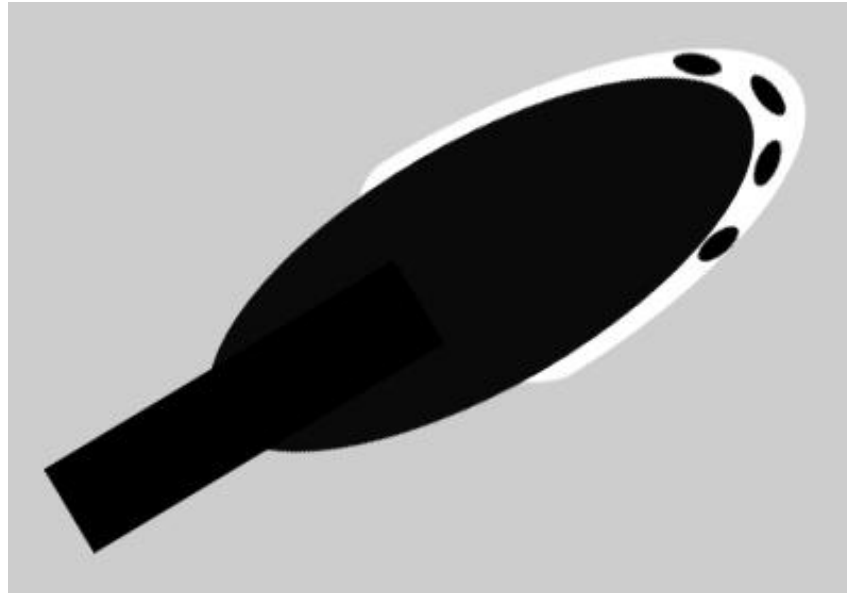
- After T₄ cell is worn out, it destructs
- T₄ count goes down



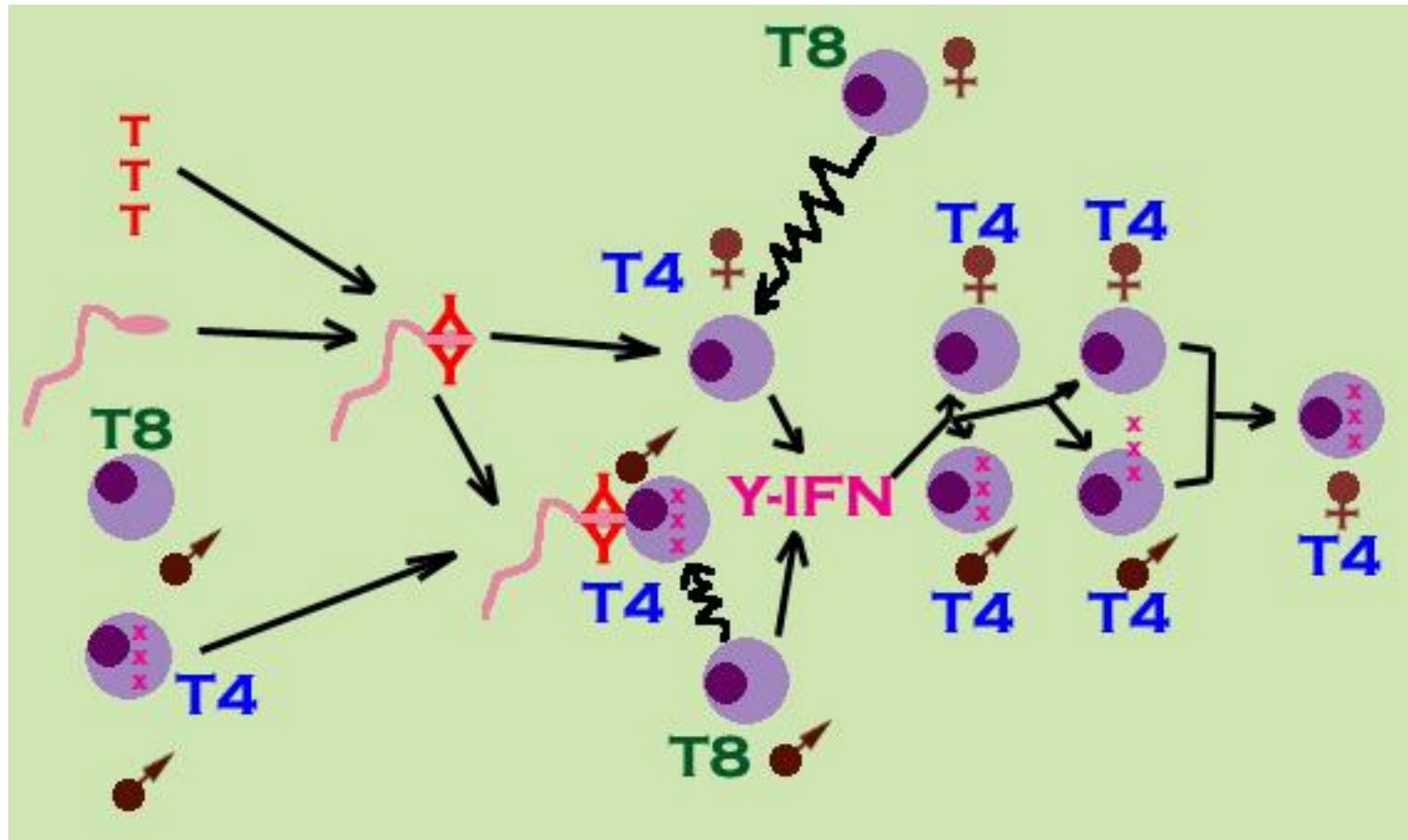
Body Fluids of *Highest* HIV Infectivity

- Blood
- Semen
- Vaginal and Cervical Secretions, INCLUDING Menstrual Fluid
- Breast Milk

Sperm and HIV



Putative Mechanism – Male to Female



Body Fluids of *Lowest* HIV Infectivity

- Saliva
- Tears
- Perspiration/Sweat
- Urine
- Feces

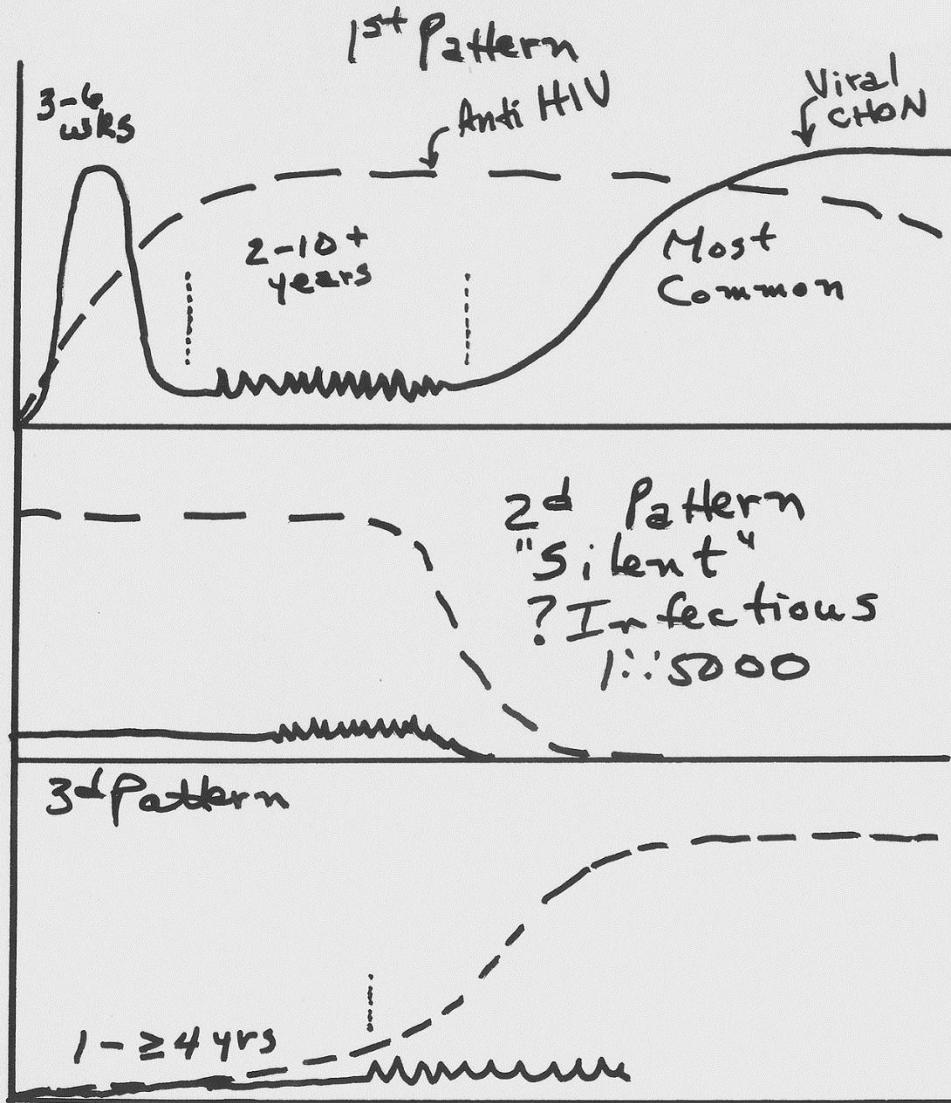
HIV Infection by Casual Contact between Family Members

Study Group		# Tested	# HIV Seropositive	
Children less than 6 years old		21	1 [*]	
	Children of an AIDS patient	15	1 [*]	
	Children of others	6	0	
Children 6-18 years old		47	0	
Adults		33	0	
			[*] This child was determined to have been born to two IVDU's, both of whom were anti-HIV positive.	
Total Tested		101		
SOURCE: NEJM 314 : 344, 1986.				

HIV Infection by Casual Contact between Family Members -- Criteria

- 90% shared toilets
- AIDS patient was kissed on the cheek by 83%
- AIDS patient was hugged by 79%
- 48% shared drinking glasses with an AIDS patient
- 37% shared beds
- 25% shared eating utensils with an AIDS patient
- AIDS patient was kissed on the lips by 17%
- 9% shared razor blades

Patterns of Infection



23% of HIV(+) partners
= HIV(-) 2° routine
testing

Provirus in T cells
2° PCR

Overview of Stages in HIV → AIDS

1. Initial infection
2. Asymptomatic period
3. Initial symptomatology
 1. Lymphadenopathy
 2. Wasting syndrome/fever/night sweats
 3. Neurological disease
4. Early immune failure
 1. Shingles (VZV)
 2. Thrush/mucocutaneous candidiasis (Candida)
 3. Hairy leukoplakia (EBV)
5. Full-blown AIDS
 1. PCP
 2. KS
 3. Other protozoal infections
 4. Systemic fungal infections
 5. MAC/TB/other bacterial infections
 6. Viral infections (CMV)
 7. Other CA's -- BL

Risk Behaviors for HIV Infection – Exposure Behaviors

1. Anal receptive sex
2. Multiple sexual partners
 1. Odds increase geometrically rather than linearly
3. Needle and Syringe sharing
4. Frequency of injection
 1. The more often dirty needles are used, the greater the risk of auto-injection
5. Blood transfusions
 1. VERY low risk due to PCR
6. Needlestick
 1. Depends on quantity of virus present
7. Parent from risk group
 1. Sperm can carry HIV; HIV can cross placenta during gestation; mother's blood and infant's blood can mix at parturition

Risk Behaviors for HIV Infection – Non-Infectious Trigger Factors

1. Malnutrition

1. Don't eat well, get sick easier – depends – remember previous immunity lecture

2. Recreational/prescribed drugs

1. Interfere with judgement or impair immune function

3. Emotional stress

1. If stressed out, immune system impaired

4. Age

1. The older a person is, the easier it is to get sick

5. Pregnancy

1. Another added stress albeit physiological

Risk Behaviors for HIV Infection – Infectious Trigger Factors

1. STD's
2. Tuberculosis – MDRMT
3. Co-incident immune impairment
 1. E.g., HSV infection, Hep B infection

Risk Behaviors in HIV Sexual Transmission

Male-to-Female Transmission of HIV	RISK	Female-to-Male Transmission of HIV	RISK
HX of STD within past 5 years for female partner	3.1	Frequent prostitute contact	3.2
Patient with full blown AIDS	5.4	Acquisition of genital ulcer disease	4.7
Anal intercourse	5.8	Uncircumcised	8.2

Preventing Sexual HIV Transmission

- Numerous studies have shown that latex condoms prevent HIV transmission
- Numerous studies have shown that Nonoxynol-9 is “virucidal” for HIV and bactericidal for *N. gonorrhoeae*
- Numerous studies have shown that using Nonoxynol-9 coupled with latex condoms every time during coitus prevents seroconversion

Barrier Precautions

- Gloves: stay between you and body fluids – stay between your patient and you, too – barrier for items contaminated with body fluids, mucus membranes, broken skin
- Gowns/Aprons: stay between your clothes and all of the above; HELP prevent soiling your clothes and prevent transmitting infectious substances to your patient off your clothing
- Masks/Face Shields/Goggles: protects mucus membranes and your own broken skin from being sprayed with body fluids
- Handwashing: do it all the time and follow up with a good lotion; reduces commensal colonization which might keep your patient[s] alive for a better quality of life
- **ALL barriers are double-edged: for you and for YOUR PATIENTS!**

Psychosocial Stresses on Health Care Workers

Common Stresses/Stressors	Interventions/Treatment
Contagiousness; Transmissibility	Educate
Uncomfortable with IVDU and homosexuality	Adequate staff; adequate stress reduction; adequate security in oneself and his/her image and being
Prolonged and intensive care	Crisis intervention; individual support; cognitive techniques
Facing own mortality	BIGGEE; have VERY clear policies and goals for tx; remember, patient and family in charge FIRST ; MD, SECOND
Repetitive grief	Crisis intervention; individual support; cognitive techniques; have VERY clear policies and goals for tx; remember, patient and family in charge FIRST ; MD, SECOND
Conflicts over goals of tx	Personal stress reduction; remember who is “in charge”; if it ain’t your problem, don’t take it on

Opportunistic Diseases – Frank!

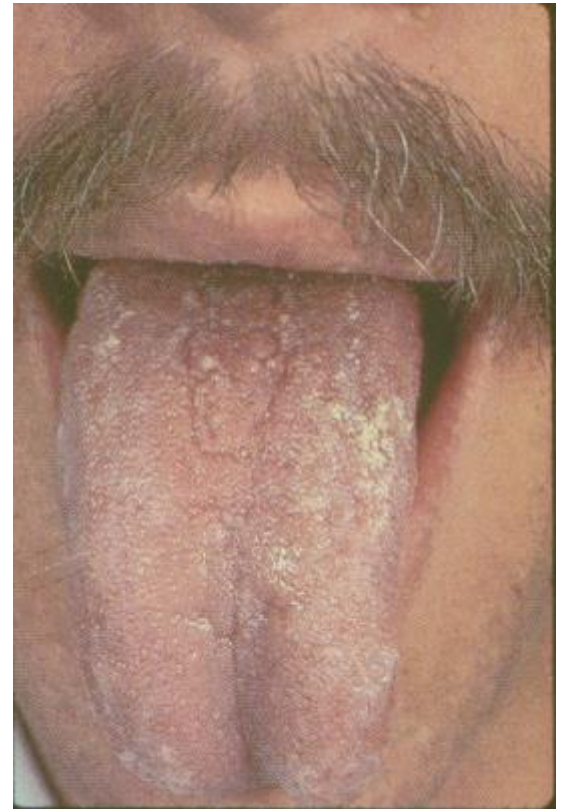
THRUSH

- Thrush is caused by *Candida albicans*. This is the same, generally speaking, "yeast" (really a fungus, although it's more socially acceptable to tell someone that you have a "vaginal yeast infection" rather than a "vaginal fungal infection" -- it's been aestheticized to fit into our sensitive culture) that causes yeast infections.
- Thrush in AIDS patients is an opportunistic disease since the immune system has been shut pretty well down and the defenses of the body are minimal, at best.



THRUSH

- More of the same.

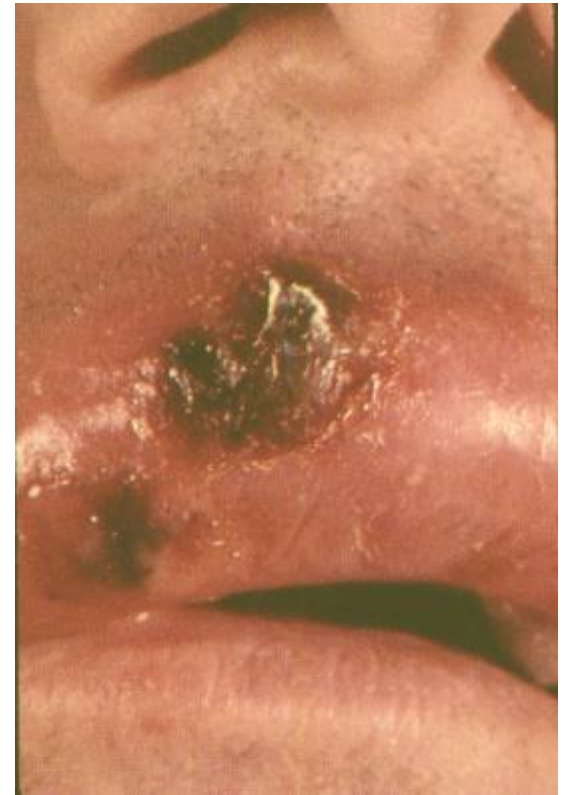
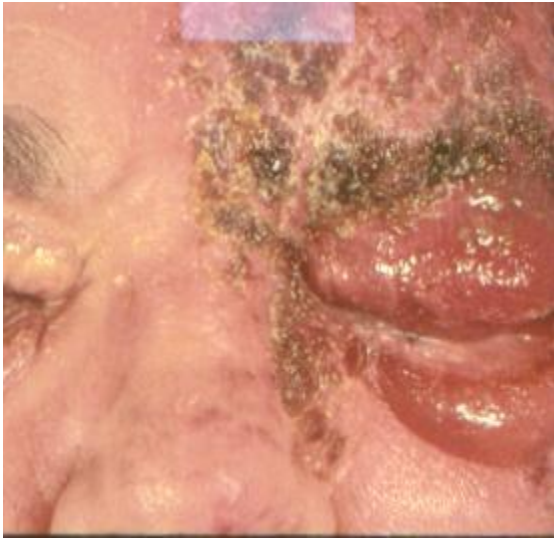


Mucocutaneous candidiasis

- Candida gets into the skin and mucous membranes and infects the skin and membranes.
- This is an exacerbated type of infection caused by Candida that people who keep their hands wet all the time get when they don't wear gloves and don't dry off their hands frequently. Dish washers are good examples of those who generally get this localized infection.
- AIDS exacerbates all of these diseases by shutting down the immune system.



HERPES



- Illustrates how shingles (left; caused by varicella zoster virus; the virus that causes chicken pox and shingles) is exacerbated when a person has AIDS.
- Illustrates, again, how having AIDS makes "simple" infections worse. This shows cold sores/fever blisters caused by HSV1, right. Typically, there is only one lesion. Patients with AIDS tend to have more than one lesion.

Burkitt's Lymphoma

- Illustrates Burkitt's Lymphoma in a child at autopsy, left. There is slight bilateral parotid enlargement. This is another opportunistic disease of AIDS.



AIDS Embryopathy

- Note the widened outer canthal and inner canthal spaces, the slight obliquity of the eyes, the triangular philtrum (the space beneath the nasal septum usually covered by moustaches) and the "pouty" lips.
- A fella by the name of Pueschel, back east, has a Ph.D. in adolescent psychology, an M.D. (pediatrician) and Masters of Public Health. He also has a son in his mid-30's or so with Down Syndrome.
- He noticed a long time ago, that there were numerous similarities between the facies of children born with trisomy 21, fetal alcohol syndrome, AIDS embryopathy and drug babies.
- He has postulated that all of these changes are through the 21st chromosome.



Kaposi's Sarcoma (KS)

- KS was well known before AIDS was. It is an opportunistic tumor of connective tissue that goes through various stages. It seems to respond to radiation therapy reasonably well. Another characteristic of KS is that it tends to be bilaterally symmetrical, i.e., if you have one tumor on a part of your left side of your body, you'll eventually get one in the same place on your right side of your body.
- Patch KS at right.



Plaque KS



Nodular KS



Nodular KS



Diffuse Disseminated KS

- In the trachea. This tumor not only expresses itself superficially, but in deep tissues, as well.



Patch, Plaque and Nodular KS of the Penis



Nodular and Disseminated KS of the Penis



Chancre

- A form of genital ulcer disease.
- Chancres do not hurt and "go away" within a week or 10 days, hence, people continue to have unprotected sex, passing whatever microorganisms they have back-n-forth between themselves.



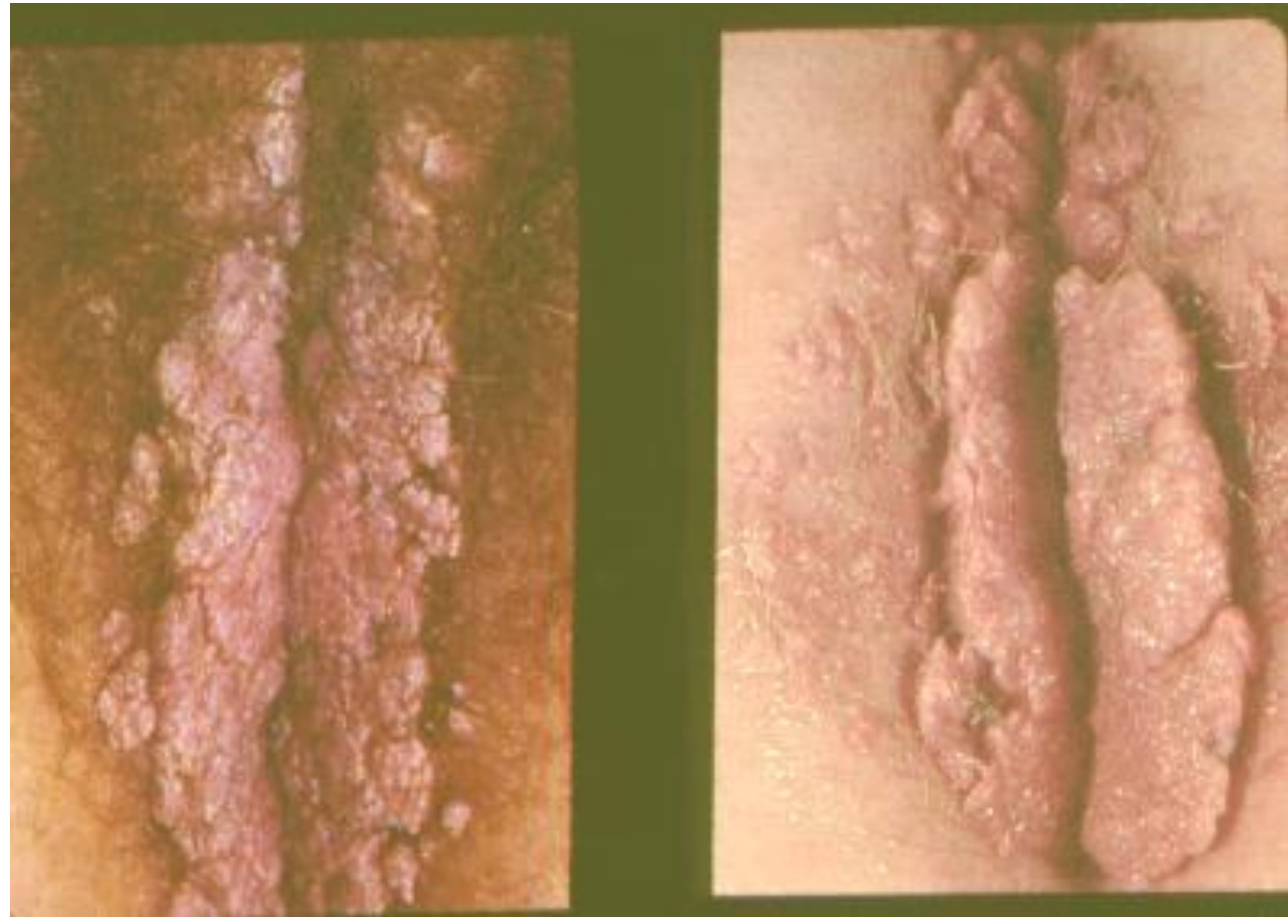
Herpes Simplex 2 (HSV2)

- What lesions from herpes simplex 2 (HSV2) look like on both the female and the male.
- It seems that not only are these blisters contagious, but in some instances, HSV2 can be transmitted from what appears to be healthy skin, i.e., micro-lesions will transfer HSV2 from one person to another during unprotected sex.
- Also getting difficult to dx correctly due to oral sex, i.e., might be HSV1.



Condyloma Accuminatum

- On the left is the female. The labia are encrusted with condyloma. On the right is the male. The anal skin tags are encrusted with condyloma.



Cytomegalovirus (CMV)

- The dermatologic manifestations, perianally, of cytomegalovirus (CMV) in an AIDS patient.

