Vaccines (general)

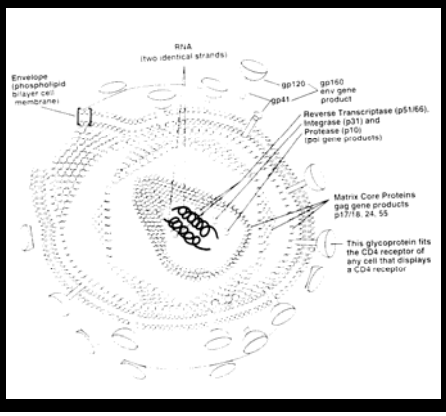
- Active vs Passive
  - Active
    - long lasting
    - body makes its own active response so that there are T and B memory cells made
  - Passive
    - receive pre-formed antibodies made in someone else
    - short acting, but quicker to respond

Examples of Vaccines

- Active-
  - made from toxins that are changed (toxoids)
  - made from attenuated viruses and bacteria
  - made from dead organisms (not as effective)
  - made from fragments of proteins
- Must be tested extensively for safety!!

Examples of Vaccines

- Passive
  - made in other animals (tetanus)
    - danger of foreign proteins and allergic reactions
  - gamma globulin (pooled human serum)
    - danger of disease
- Why use one or the other???



AIDS Disease

- Caused by retrovirus (HIV-1 and HIV-2)
  - HIV-1 more virulent than HIV-2
  - double stranded RNA (2 identical strands)
  - reverse transcriptase
  - blood borne disease
- Caused by direct contact
  - blood exchange
  - does not survive in environment

AIDS Properties

- High mutation rate
  - due to mistakes of reverse transcriptase
  - changes gp 120 protein which binds to CD4 molecule on T helper cells (other cells also may have CD4 such as macrophages and B cells)
  - changes antigenicity so immune system cannot fight effectively, but immune system does fight disease

Disease Progress

- Infection
  - (lysogenic virus-- inserts into host DNA)
- Dormant
- Activated only when T cell is activated
- Replicates and kills T helper cells
- Lack of IL-2 (effects both T & B cell function)

Disease Progress

- Seroconversion (6 months)
- Body fights effectively for short time
- T helper cells drop below 200
- Overt AIDS symptoms
  - weight loss
  - illness
  - opportunistic infections
  - T cell number below 200

Disease Treatment

- Reverse transcriptase inhibitors
- Protease inhibitors
- cocktails of these
- steroids
- weight gain
- IL-2
- interferon

AIDS Vaccine

- How to make it and against what?
  - Gp 120-- changes too often
  - CD4-- has other functions that are imp't
  - attenuated virus
  - other strain virus? HIV-2???
  - Viral proteins (i.e., capsid)
  - what model to test it in?

Tests for AIDS

- Blood test
  - ELISA= enzyme-linked immunosorbant assay
    - tests for the presence of antibodies against AIDS virus in patients serum
    - T lymphocyte number
    - test for gp 120 and gp 24 antigens
    - PCR- tests for presence of AIDS DNA (not RNA) in T cell genome (can detect it in 1 out of a million cells)