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)