I. Cancer
   A. Background
      1. cancer is not a single disease
         a. more than 100 distinct diseases
         b. uncontrolled growth of body cells
         c. formation of tumors
            (1) benign = noncancerous
               (a) don’t spread to other tissues
               (b) can be removed surgically and don’t recur
            (2) malignant = cancerous
               (a) invade surrounding tissues
               (b) can metastasize and form secondary tumors
      2. uncontrolled cell growth is the result of mutations
         a. mutations can be caused by internal or external factors
         b. internal factors include heredity, immune conditions, hormones
         c. external factors are carcinogens
            (1) some viruses
            (2) chemicals
            (3) radiation
         d. cell growth is normally highly regulated
            (1) oncogenes = genes that induce cell division
            (2) suppressor genes = stop cell division and prevent tumors
            (3) mutations in either type can lead to uncontrolled growth
         e. recent trends show a dramatic increase in cancer rates
            (1) 22% between 1973 and 1991
            (2) aging population
            (3) improvements in detection
            (4) sharp rise in smoking-related cancer, especially among women
            (5) death rate has been declining
         f. overall increase in cancer survivability
            (1) almost half of diagnosed cases survive five years
            (2) at five years, half of all victims survive cancer
            (3) many cancers can be cured today
               (a) Hodgkin’s disease
               (b) testicular cancer
               (c) most skin cancers
               (d) some forms of lymphoma
               (e) bone cancer
               (f) leukemia
               (g) kidney cancer in children
      3. cancer has many causes but smoking and diet account for almost 2/3s of cancer deaths in the U.S.
         a. two-pack per day smokers are 12-25x more likely to die from lung cancer than non-smokers
            (1) also linked to cancers of the mouth, larynx, pharynx, esophagus, pancreas,
bladder, and possibly the prostate
(2) cigarette smoking linked to about 30% of all cancers
(3) second hand smoke also increases cancer risks
4. diet accounts for another 30% of cancer deaths in the U.S.
a. saturated fat, especially animal, is linked to some forms of cancer including prostate and colorectal
b. risk is lowered with a diet rich in fruits, vegetables, and grains
c. selenium may help prevent cancer
   (1) high levels are toxic
   (2) found in fish, meat, whole grains, and vegetables
5. other factors that increase the risk of cancer
a. heavy alcohol consumption
b. environmental chemicals
c. radiation, including UV
d. obesity
e. microbes, especially viruses that cause STDs
   (1) *Helicobacter pylori* is associated with stomach cancers
6. genetic factors account for 5-10% of cancer deaths in the U.S.
7. a sedentary lifestyle may contribute to higher rates of colon cancer
B. Types of cancer
1. cancer can develop in any organ or tissue
   a. carcinoma = malignant tumors that form in epithelial tissue
      (1) most common type of cancer
      (2) skin, large intestine, lungs, prostate, breast
   b. sarcoma = malignancy of connective tissues (muscles or bones)
   c. lymphoma = cancers of the lymphatic system
   d. leukemia = cancer of the blood or blood-forming tissues
   e. melanoma = cancer of melanin-containing cells of the skin
   f. most cancers are named after the organ or tissue where the primary cancer or primary tumor forms
2. breast cancer
   a. second leading type of cancer in woman, about 1 in 8, after lung cancer
   b. lifestyle changes may be associated with increased rate (increased estrogen)
      (1) later child bearing
      (2) earlier menstruation
   c. death rate is decreasing due to improved detection and treatment
   d. primary risk factor are heredity and age
   e. other factors
      (1) early menarche (before 12)
      (2) late completion of menopause (after 55)
      (3) few or no births
      (4) delayed childbearing (first child after 30)
   f. warning signs
      (1) lumps or thickening felt in breast
      (2) change in size or shape of breast
(3) discharge from the nipple
(4) change in the color or texture of the skin or areola

g. lowering the risk
   (1) regular exercise, especially before age 40
   (2) limiting alcohol consumption (less than 2 drinks per day)

3. lung cancer
   a. leading cancer killer in the U.S.
   b. most preventable cancer
      (1) 90% attributable to smoking
      (2) damage occurs over a period of years

4. colorectal cancer
   a. third leading cancer killer in the U.S.
   b. slow-growing and rare in young people
   c. risk factors include heredity, advanced age, and inflammatory bowel disease
   d. prevention is assisted by exercise and diets high in fiber and low in fats

5. prostate cancer
   a. second most common cancer in American men after skin cancer
   b. second leading cancer killer of men after lung cancer
   c. grows slowly and occurs late in life
   d. survival rates are increasing tremendously
   e. primary risk is age, but other factors are diet and heredity
   f. prevention can be through decreasing dietary fat and increasing consumption of tomatoes

6. skin cancer
   a. most common and most rapidly increasing cancer in the U.S.
   b. three major types
      (1) basal cell carcinoma (highly curable)
      (2) squamous cell carcinoma (highly curable)
      (3) melanoma (highly malignant)
         (a) often occur early in life
         (b) if untreated can spread to organs
   c. major risk factor is the sun (UV radiation)
   d. prevention is through early detection, sun protection, and a low fat diet

7. ovarian cancer
   a. high death rate, largely due to late detection
   b. main risk factor is heredity
      (1) age
      (2) breast cancer
      (3) not having borne children

8. cervical cancer
   a. common but easily detected (Pap smear) and treated
   b. major risk is HPV infection
      (1) high number of sex partners
      (2) young age at first intercourse
      (3) smoking
9. Leukemia
   a. cancer of the body’s blood-forming tissues
   b. abnormal white blood cells can interfere with organs and immune system
   c. cause is commonly unknown but some are due to HTLV-1
   d. low survival rates (less than 40% five year survival)

10. promising treatments
   a. traditional methods to kill, reduce or remove cancerous cells
      (1) radiation
      (2) chemotherapy
      (3) hormonal therapy
   b. new chemotherapeutic agents have higher specificity for cancer cells and cause less damage to healthy cells
      (1) encapsulation in lipids leads to increased uptake by cancer cells
      (2) attaching antibodies increases specificity
   c. gene therapy (highly experimental)
      (1) inject genes into cancer cells to make them more vulnerable
      (2) strengthening the immune system
   d. immunotherapy
   e. alternative medicine