Cancer Topics

1) cancer cells
2) cancer stages
3) cancer causes
4) detection & treatment
5) diseases

Char. of Cancer Cells

1) primitive cells (lack differentiation)
2) big (abnormal) nuclei
3) fast growth (unlimited replication)
4) aggressive growth (tumors)
5) not inhibited (ignore growth factors
6) become abnormal (disorderly shape)
7) forms new blood vessel (angiogenesis)
8) travels to new site (metastasis)

Terms

1) **cancer**
   - **disease of uncontrolled cell growth**
   - **usually caused by gene mutations**

2) **apoptosis**
   - **programmed cell death, absent in cancer**

3) **metastasis**
   - **malignant cancer cells moves to new site (spreads)**

4) **angiogenesis**
   - **new blood vessels to support cancer cells**

5) **oncology - study of cancer**

Cancer Stages (2)

a&b) mutation - genetic alteration

c) tumor - hyperplasia & dysplasia, fast & wrong growth

d) invasive tumor - in situ cancer
         - removed by chem. peeling, freezing, or scraping

e) malignant tumor - invade blood & lymph vessels

f) distant tumor - cancer travels to new site
         - metastasis; colon to lung cancer

Cancer Causes

1) mutant genes

2) heredity (inheritable susceptibility)
   - breast, ovarian, eye, thyroid cancers

3) environment
   - radiation, smoke, pollutants, viruses

4) dietary choices & exercise
   - high fat, red meat, fruits & veg, exercise

3) age - repair mech. wear out

4) random - unknown causes

Cancer from Gene Mutations

1) **proto-oncogenes**
   - **lose ability to regulate growth**
     -> fast growth -> cancer

2) **tumor suppressor genes**
   - **lose ability to suppress growth**
     -> fast growth -> cancer

3) **mutator genes**
   - **lose ability to recognize DNA repair**
     problems -> cancer

Environment - Carcinogens

1) radiation
   - Ux-rays, UV (sunlight), radon gas (uranium)

2) chemicals/pollutants
   - tobacco smoke, soot, asbestoes, dyes, pesticides

3) virus
   - HPV (human papillomavirus) (cervix & penis)
   - hepatitis: B & C (liver)
   - HIV (immune sys)
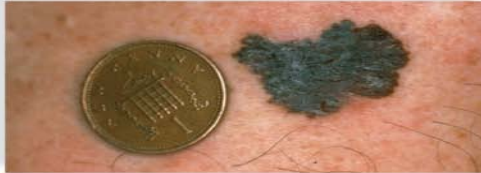   - epstein-barr (immune sys)

3) diet - red meat, saturated animal fat

Detection

1) self exam - ABCDE, breast, testes

2) medical images - x-ray, PET, MRI
   +: detect tumors
   -: cost, and side effects

3) tumor marker tests
   - blood tests for antigens, antibodies

4) genetic test
   +: knowledge of disease potential
   -: controversial, insurance issues

ABCDE

A = Asymmetry: one-half of mole does not look like the other half.

B = Border: irregular scalloped or poorly circumscribed border.

C = Color: varied from one area to another; shades of tan, brown, black, or sometimes white, red, or blue.

D = Diameter: larger than 6 mm (the diameter of a pencil eraser).

E = Elevated: above skin surface, and **evolving,** or changing over time

Asymetry
  - irregular shape
Border
  - irreg. border
Color
  - darker
Diameter
  - larger
Elevate/Evolve
  - protrudes
  - changes

Treatment

approx. 50% cure

1) conventional
    - surgery, radiation, chemotherapy,
      bone marrow transplant
    +: remove cancer cells
    -: tough, side effects, low chances

2) new (review text)
    - immune therapy
    - angiogenesis
    - gene therapy

HeLa Cells - Research

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Henrietta Lacks
 - 1951 cervical cancer cells
 - reliable, grows fast, sturdy, 65 years
 - polio vaccine
 - crucial to human disease research
   (polio, virus, leukemia, cancer)
 - space experiments & world-wide
 - not financially benefit her family

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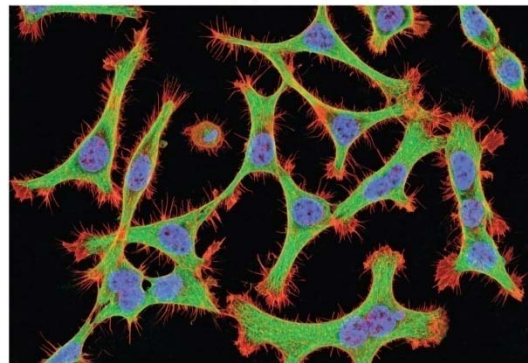
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HeLa cells

Diseases (cancer)

Review the symptoms and treatments:
1) skin
2) prostate
3) breast
4) lung
5) colon & rectum
6) lymphoma
7) urinary bladder
8) uterus
9) kidney
10) leukemia (WBC)