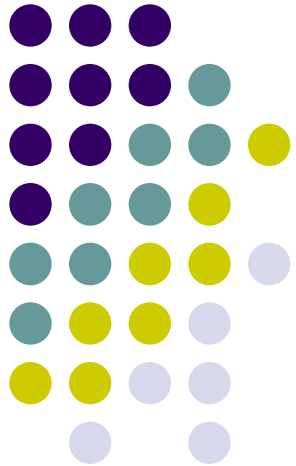
Learning Objectives

- To learn the causes, diagnoses, treatments, and preventative measures for cancer

Did You Know That….

- Every hour of every day, about 20 people will be diagnosed with cancer and eight people will die from cancer across Canada.

Cancer



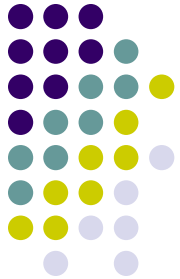
What is cancer?

- Mitosis gone wild
- A group of diseases in which cells divide uncontrollably, caused by a change in DNA
- One or more checkpoints in the cell cycle fails *(specialized proteins monitor cell activities and the cell's surroundings)*
- A rapidly growing lump of cells is a tumour

Tumours

- **Benign** tumours are not cancerous and have no serious effect on surrounding tissues
- **Malignant** tumours interfere with surrounding tissues and are considered cancerous
- **Metastasis** is the movement of cancer cells from a tumour in one part of the body to another part of the body, forming secondary tumours.

How are cancer cells different?



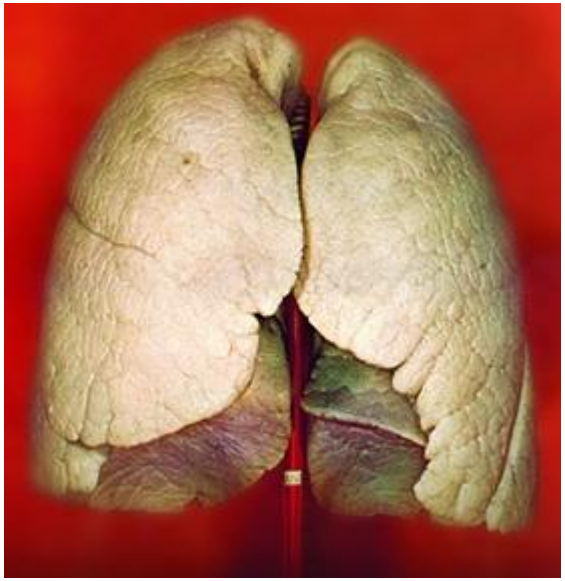
- Cancer cells divide more quickly than other cells.
- Normal body cells grow, divide and eventually die. Cancer cells simply grow and divide.
- Cancer cells do not need to be in contact with other cells in order to divide.
- Cancer cells can metastasize.
- Cancer cells do not specialize.

What causes cancer?

- Substances known to cause mutations in the genetic code leading to uncontrolled growth, are called carcinogens.
- A carcinogen is any environmental factor that causes cancer
- X-ray and UV radiation, tobacco smoke, asbestos, organic solvents are a few examples of environmental carcinogens

Smoking and Cancer

- 90% of all lung cancers are caused by smoking
- Smoking can increase the risk of developing over a dozen types of cancer



How is Cancer Diagnosed?

- The two major diagnosis techniques are blood tests and imaging technologies

Imaging Technologies

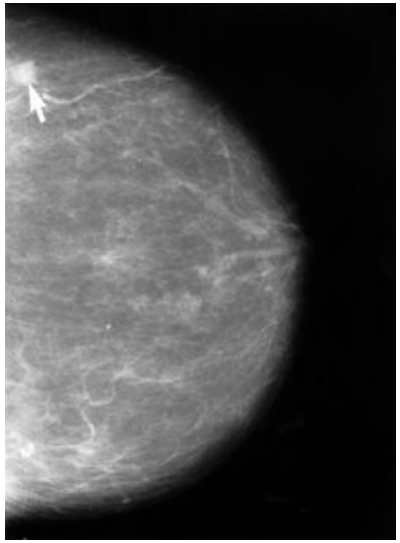
- Endoscopy: a fibre-optic cable with a camera is fed into the body to allow the doctor to look for abnormal growths

Imaging Technologies

- X-rays: allow doctors to observe large masses of tissue (eg. Lungs, breast tissue) and bones
- The down side of X-rays is the damage they may cause to healthy tissues

Ewing's Sarcoma

Breast cancer tumour



Imaging Technologies

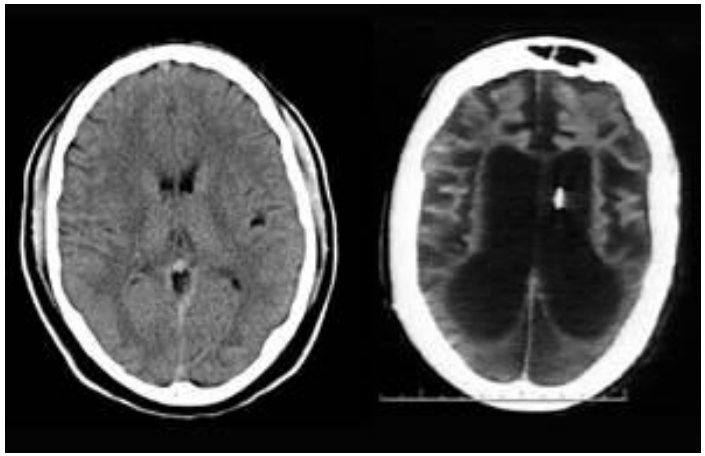
- Ultrasound: uses high frequency sound-waves (not radiation) to create a digital image of soft tissues such as the liver, uterus, and heart

Endometrial Malignancy

Imaging Technologies

- CT, or CAT scan: Computerized Axial Tomography allows multiple X-rays from different angles to be assembled into a series of detailed images

Normal CT scan of brain →

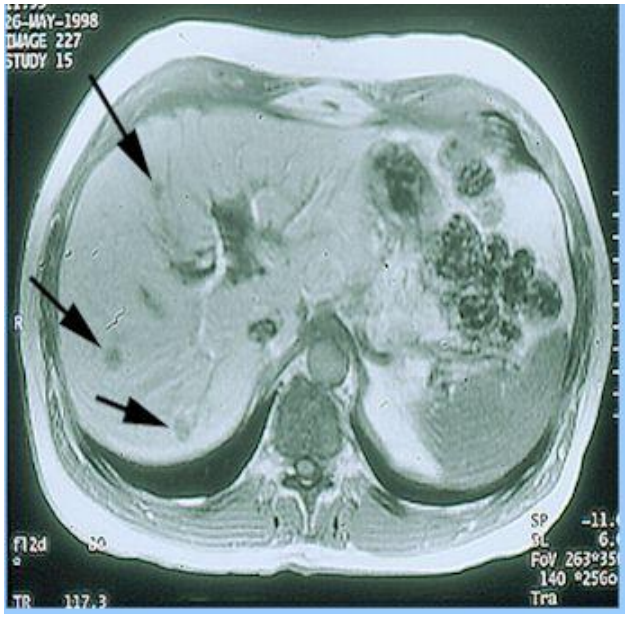


CT scan of brain with massive tumour ←

Imaging Technologies

- MRI (Magnetic Resonance Imaging): radiation and a magnetic field create more detail than CAT scan
- 3-D models are assembled by computers

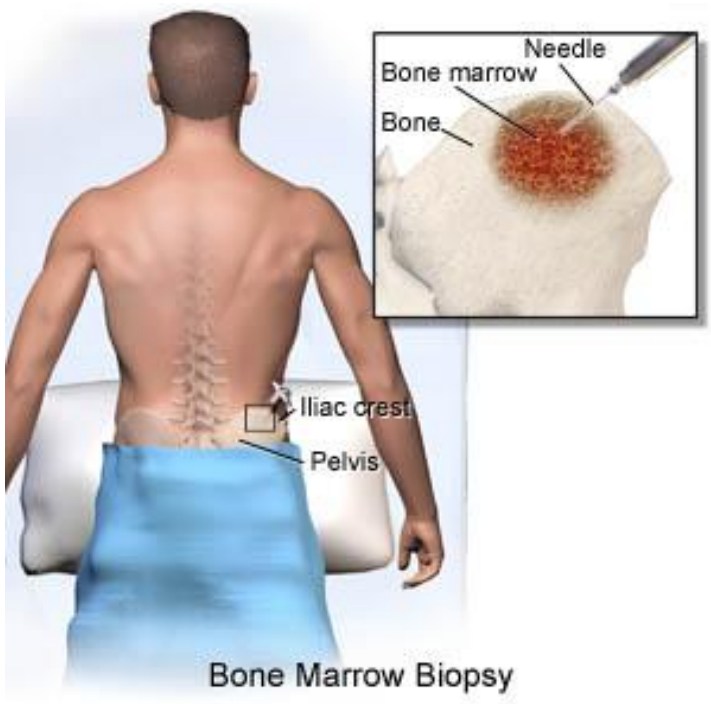
Liver MRI showing cancerous tumours

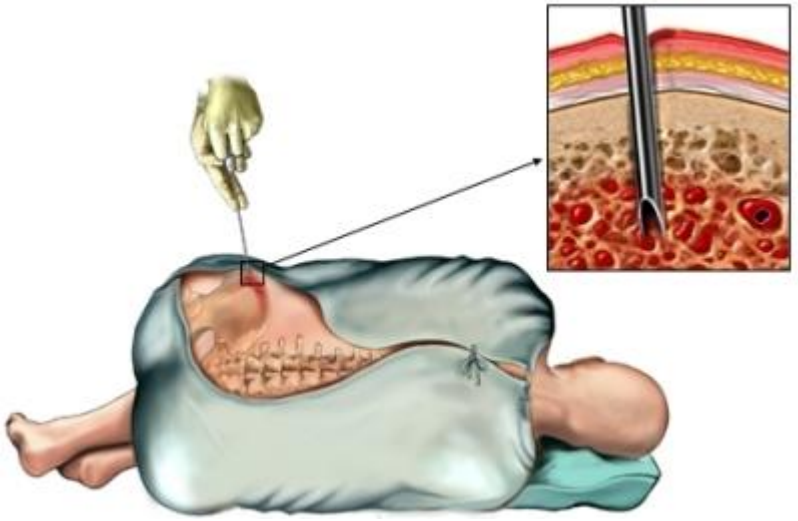


Examining Cells

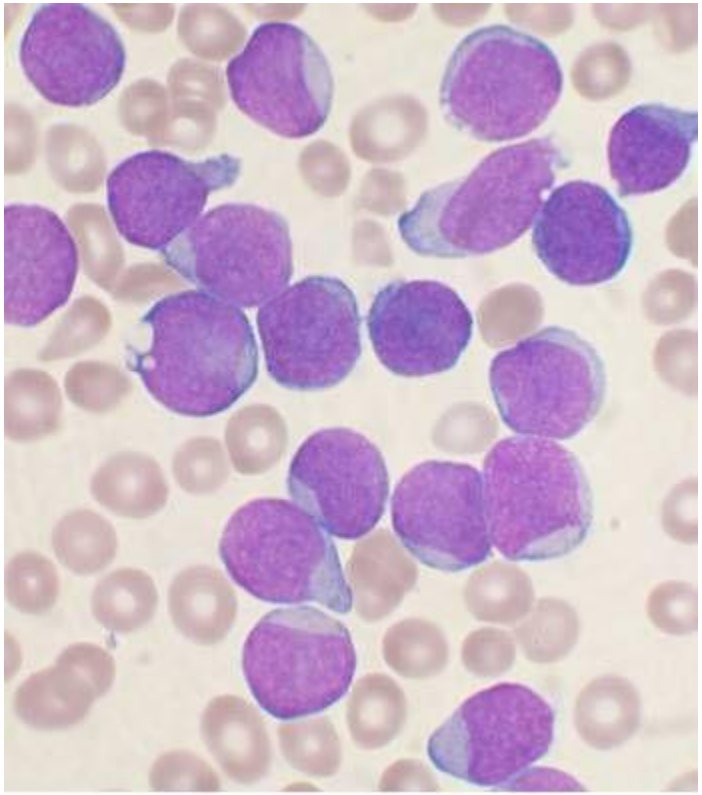
- Suspect cells must be viewed under a microscope to make a definitive diagnosis of cancer
- Blood cells and skin cells are easily obtained
- Tissue biopsy is necessary when tissue must be surgically removed for observation and diagnosis

Biopsy

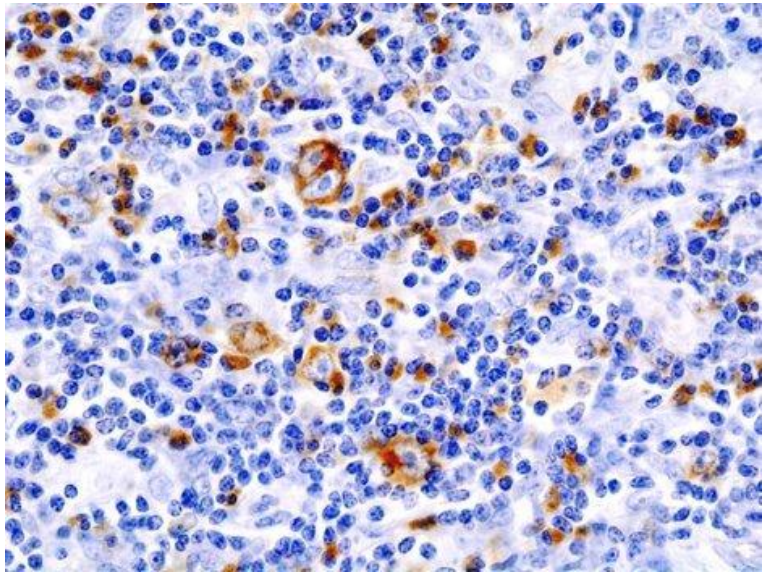

Needle
Bone marrow
Bone
Iliac crest
Pelvis
Bone Marrow Biopsy



Blood Microscopy

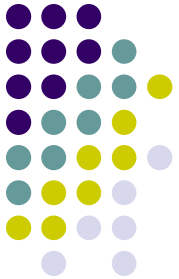


Leukemia



Hodgkin's Lymphoma

How is Cancer Treated?



- Conventional Treatments
  - Surgery
  - Chemotherapy
  - Radiation therapy

Surgery

- Physical removal of cancerous tumour

Chemotherapy

- Chemical ‘cocktail’ to slow or stop cancer cells from dividing and spreading, and hopefully to kill the cancer cells
- Drugs are either injected or taken orally
- Often the first stage of cancer treatment as it shrinks the tumour to make it easier to remove surgically
- It also accesses microscopic tumours
- The downside is nausea, hair loss, and fatigue

Chemotherapy

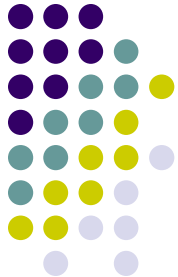
Oral Chemotherapy

Chemotherapy administered by injection (IV drip)

Radiation Therapy

- Cancer cells divide rapidly, making them very vulnerable to radiation damage
- Radiation is aimed directly at tumour to minimize damage to healthy tissue

Emerging Technologies



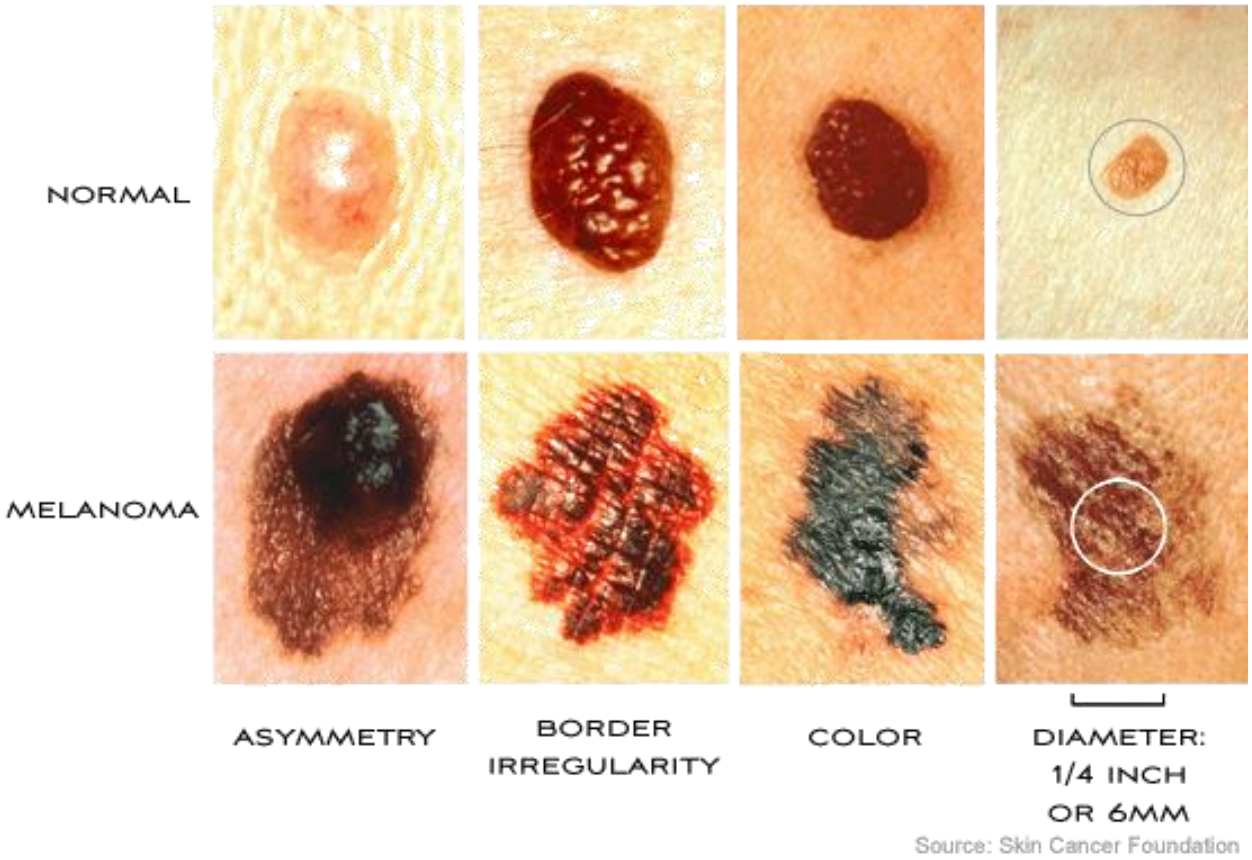
- Biophotonics: beams of light are directed at malignant tumours
- Immuno-technology: antibodies and vaccinations aimed at tumour destruction
- Antiangiogenesis: preventing blood flow to tumours

Reducing Your Cancer Risk

- Cancer is not contagious!
- Cancer screening is checking for cancer in the absence of symptoms
- Can be done at home (breast self-exams, testicular self-exams)
- As part of routine checkups (pap test, PSA test)
- Or at special appointments (mammograms)
- Genetic screening is recommended in cases of family history with cancer

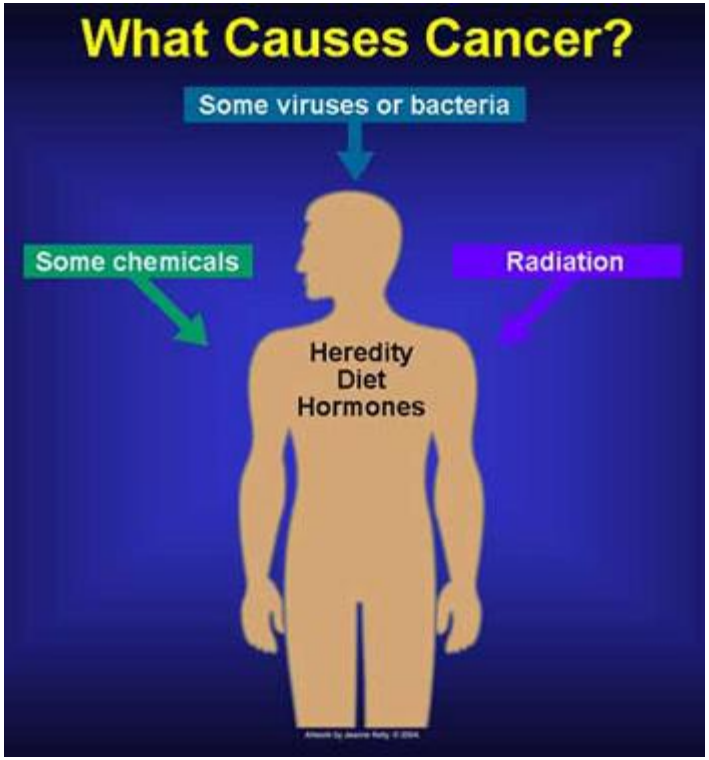
Reducing Your Cancer Risk

- Check your skin regularly for moles following the ABCD test



Reducing Your Cancer Risk

- Educate yourself about the risks in your family history, your environment and your lifestyle choices



Lifestyle Choices

- No smoking
- Exercise
- Healthy diet
- Healthy body weight

To Do:

- Video: The angiogenesis revolution
- Answer questions 1 – 10, Page 55