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Introduction:

Cancer is the leading cause of death in less developed countries and the second leading cause of death in developing countries[ ]. The last 50 years has seen a better understanding of the causes and treatments of cancer. Hence, the stigma, early detection and technology have improved the prognosis of cancer patients to an unprecedented level, but what is Cancer?
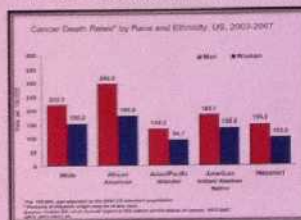
Cancer is a term used to describe a large group of diseases that are characterized by a cellular malfunction. Healthy cells are programmed to know what to do and when to do it. Cancerous cells do not have this programming so they grow and replicate out of control[ ]. They also serve no biological function hence these cells are most properly termed as a neoplasm at this point[ ].

Cancer Statistics:

2011 Estimated US Cancer Deaths[ ]

Cancer Death Rates by Race and Ethnicity, US, 2003-2007[ ]

Tumors:

The neoplasmic mass often forms a clumping of cells known as a tumor. Non-cancerous cells divide and replace at a controlled rate. A cancerous tumor is a mass of abnormal cells that divide extremely quickly and don't carry out the normal functions of their tissue[ ]. These cells are often irregular in size and shape. As these cells divide and multiply, a tumor can gradually enlarge. There are two major distinctive tumors:

Benign Tumors (Noncancerous):
- Enclosed in a fibrous shell or capsule
- Concerned if they interfere with surrounding tissues or vessels or impede the function of the body
- Take up Space

Malignant Tumors (Cancerous):
- Not usually contained (Metastasis)
- Invade and emit clawlike protrusions that disrupt the RNA and DNA of normal cells (act like a virus)

a. Benign mole   b. Melanoma

Major Types of Cancer:

In general, a cancer is named according to the type of tissue in which it first forms. Classification of Cancer[ ]:

Sarcomas: cancer of connective tissue

Carcinomas: cancer arising from epithelium (skin)

Lymphomas: cancer of lymphoid tissue

Leukemias: cancer of stem cells

Gliomas: cancer of brain glial cells

What Causes Cancer (Risk Factors):

Biological Factors
- Genetic Predisposition
- Reproductive and hormonal risks

Occupational and Environmental Factors
- Asbestos, nickel, chromate, hydrocarbons, vinyl chloride, and benzene (All carcinogens)
- Radioactive substances like UV radiation, X-rays, Radon, cosmic rays, and gamma radiation

Social and Psychological Factors:
- Stress
- Anxiety and depression

Chemicals in Food:
- Sodium nitrate
- Clostridium botulism

Viral Factors
- Herpes-related virus and human papillomavirus
- Viral DNA may be inserted into a host cell's DNA

Medical Factors:
- Diethylstilbestrol (DES)
- Chemotherapy

Cancer and Genetics:

Cancer is a genetic disease that develops in a predictable sequence of steps like Carcinogenesis-transformation of a normal cell into a cancerous cell[ ]. Also cancer can result from genetic alterations in multiple genes like colon cancer where the Chromosome 5q, 12p, 18q, 17p are altered[ ]. Inherited mutations in the APC gene dramatically increase risk of colon cancer[ ].

Cancer usually involves several genes like tumor suppressor genes. BRCA1 and BRCA2 are examples of a tumor suppressor gene[ ]. Also more than half of cancers have a mutated or missing p53 gene which codes for a regulatory protein that turns off cell division when the cell is stressed or damaged[ ].

Detecting Cancer:

Early and Accurate diagnosis of cancer is important to maximize the chances that a cancer can be cured. Some common cancer signs to look out for are a sore that does not heal, unusual bleeding or bloody discharge, thickening or lump, indigestion or difficulty swallowing, obvious change in a wart or mole, and nagging cough[ ]. Several tests a person can do to detect cancer are[ ]:

Blood Tests Detect chemical indications of cancer like tumor markers.

Medical Imaging Reveals the site and size of a tumor like magnetic resonance imaging (MRI), X-rays, ultrasound, computerized tomography (CT), radioactive tracers, and DNA probe.

Biopsy A sure way to diagnose cancer is by a removal and microscopic examination of tissue.

Microscope Image Shows Cancerous Cells in Breast Tissue:

Cancer Treatment and Prevention:

- *Chemotherapy*-drugs used to kill cancer cells; disrupt some aspect of cell division. The downside is that it's toxic to health cells.
- *Radiation Therapy*-radioisotopes used such as Ra-226 and Co-60. Used when cancer is small or has not spread.
- *Surgery*-physical removal of cancer cell.
- *Exercise*
- *Eat vegetables and fruits*
- *Don't smoke*