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## A CANCER DISEASE: A REVIEW

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### ABSTRACT

Cancer known medically as a malignant neoplasm, is a broad group of various diseases, all involving unregulated cell growth. In cancer, cells divide and grow uncontrollably, forming malignant tumors, and invade nearby parts of the body. The cancer may also spread to more distant parts of the body through the lymphatic system or bloodstream. Not all tumors are cancerous. Benign tumors do not grow uncontrollably, do not invade neighboring tissues, and do not spread throughout the body. There are over 200 different known cancers that afflict humans. The present review discussed on types, signs & symptoms and treatment of cancer.

**Key words:** Cancer, Types, Signs & Symptoms, Treatment.

### INTRODUCTION

Cancer is a disease that begins in the cells of the body. In normal situations, the cells grow and divide as the body needs them. No more, no less. This orderly process is disturbed when new cells form that the body was not needed and old cells don't die when they should. These extra cells lump together to form a growth or tumor.

Two types of tumors exist,

- ❖ Benign
- ❖ Malignant.

Benign tumors are not cancerous. They can usually be removed and generally don't grow back once they're gone. The cells in benign tumors don't spread and it is rare for a benign tumor to be life-threatening.

Malignant tumors, on the other hand, are cancerous. The cells in them are abnormal and divide randomly and chaotically. The cells behave aggressively and attack the tissue around them. They also can jump away from the malignant tumor and enter the bloodstream or lymphatic system to form new tumors in other parts of the body. This type of spread is known as metastasis [1].

### History of Cancer

Cancer is not a new disease. Written descriptions of it can be found on Egyptian papyrus dating back to roughly 1600 BC. The Egyptians blamed the disease on the

gods and treated it with a cauterizing tool they called "the fire drill". Apparently the drill did not work, as the writing on the papyrus says, "There is no treatment."

The Greek physician Hippocrates is believed to be the first person to use the word "carcinoma", which describes the crab-like way that both the ulcer-forming and non-ulcer forming tumors spread. Over time, the word shortened to "cancer".

When the first autopsy was performed by Italian anatomist Giovanni Morgagni in 1761, the foundation was laid for the scientific study of cancer, also known as oncology.

The 18th century John Hunter was one of the first people to suggest operating on a tumor. Unfortunately for his patients, anesthesia was not developed until a century later. Not surprisingly, surgery began to flourish once anesthesia was introduced.

When the modern microscope was invented in the 19th century, it allowed scientists to study cancer with the unaided eye and the modern pathologic study of cancer was born. Surgeons could now remove tissue and pass it to pathologists, who could tell the surgeon whether or not an operation successfully removed a tumor [2].

### TYPES OF CANCER

Cancers are classified into following types

**Blood Cancer:**

The cells in the bone marrow that give rise to red blood cells, white blood cells, and platelets can sometimes become cancerous. These cancers are several types.

- ❖ Leukemia
- ❖ Lymphoma
- ❖ Multiple Myeloma
- ❖ Waldenstrom's Macroglobulinemia

**Bone Cancer**

Bone cancer is a relatively rare type of cancer that can affect both children and adults, but primarily affects children and teens. There are several types of bone cancer, but the most common types are:

- ❖ Ewing's Sarcoma
- ❖ Osteosarcoma

**Brain Cancer**

Brain tumors can be malignant (cancerous) or benign (non-cancerous). They affect both children and adults. Malignant brain tumors don't often spread beyond the brain. However, other types of cancer have the ability to spread to the brain. Types of brain cancer include:

- ❖ Adult Brain Tumor
- ❖ Brain Stem Glioma, Childhood
- ❖ Cerebellar Astrocytoma, Childhood
- ❖ Cerebral Astrocytoma/Malignant Glioma, Childhood
- ❖ Ependymoma, Childhood
- ❖ Medulloblastoma, Childhood
- ❖ Supratentorial Primitive Neuroectodermal Tumors and Pineoblastoma, Childhood
- ❖ Visual Pathway and Hypothalamic Glioma, Childhood

**Breast Cancer**

Breast cancer is a common type of cancer that affects women and much less commonly, men. More than 200,000 women are diagnosed with breast cancer in the United States each year. Types of breast cancer include, but are not limited to:

- ❖ Ductal carcinoma in situ
- ❖ Lobular carcinoma in situ
- ❖ Inflammatory breast cancer
- ❖ Paget's disease of the nipple
- ❖ Invasive types of breast cancer

**Digestive/Gastrointestinal Cancers**

This is a broad category of cancer that affects everything from the esophagus to the anus. Each type is specific and has its own symptoms, causes, and treatments.

- ❖ Anal Cancer
- ❖ Bile Duct Cancer, Extrahepatic
- ❖ Carcinoid Tumor, Gastrointestinal
- ❖ Colon Cancer
- ❖ Esophageal Cancer
- ❖ Gallbladder Cancer
- ❖ Liver Cancer, Adult Primary

- ❖ Liver Cancer, Childhood
- ❖ Pancreatic Cancer
- ❖ Rectal Cancer
- ❖ Small Intestine Cancer
- ❖ Stomach (Gastric) Cancer

**Endocrine Cancers**

The endocrine system is an instrumental part of the body that is responsible for glandular and hormonal activity. Thyroid cancer is the most common of the endocrine cancer types and generally, the least fatal.

- ❖ Adrenocortical Carcinoma
- ❖ Carcinoid Tumor, Gastrointestinal
- ❖ Islet Cell Carcinoma (Endocrine Pancreas)
- ❖ Parathyroid Cancer
- ❖ Pheochromocytoma
- ❖ Pituitary Tumor
- ❖ Thyroid Cancer

**Eye Cancer**

Like other organs in the human body, the eyes are vulnerable to cancer as well. Eye cancer can affect both children and adults.

- ❖ Melanoma, Intraocular
- ❖ Retinoblastoma

**Genitourinary Cancers**

These types of cancer affect the male genitalia and urinary tract.

- ❖ Bladder Cancer
- ❖ Kidney (Renal Cell) Cancer
- ❖ Penile Cancer
- ❖ Prostate Cancer
- ❖ Testicular Cancer
- ❖ Urethral Cancer

**Gynecologic Cancers**

This group of cancer types affects the organs of the female reproductive system. Specialized oncologists called gynecologic oncologists are recommended for treating gynecologic cancer.

- ❖ Cervical Cancer
- ❖ Endometrial Cancer
- ❖ Gestational Trophoblastic Tumor
- ❖ Ovarian Cancer
- ❖ Uterine Sarcoma
- ❖ Vaginal Cancer
- ❖ Vulvar Cancer

**Head and Neck Cancer**

Most head and neck cancers affect moist mucosal surfaces of the head and neck, like the mouth, throat, and nose. Causes of head and neck cancer vary, but cigarette smoking plays a role. Current research suggests a strong HPV link in the development of some head and neck cancer.

- ❖ Hypopharyngeal Cancer
- ❖ Laryngeal Cancer
- ❖ Lip and Oral Cancer
- ❖ Metastatic Squamous Neck Cancer
- ❖ Nasopharyngeal Cancer
- ❖ Oropharyngeal Cancer
- ❖ Paranasal Sinus and Nasal Cavity Cancer
- ❖ Parathyroid Cancer
- ❖ Salivary Gland Cancer

### Respiratory Cancers

Cigarette smoking is the primary cause for cancer affecting the respiratory system. Exposure to asbestos is also a factor.

- ❖ Lung Cancer, Non-Small Cell
- ❖ Lung Cancer, Small Cell
- ❖ Malignant Mesothelioma
- ❖ Thymoma and Thymic Carcinoma

### Skin Cancers

Non-melanoma skin cancer is the most common type of cancer among men and women. Exposure to the UV rays of the sun is the primary cause for non-melanoma skin cancer and also melanoma.

- ❖ Cutaneous T-Cell Lymphoma
- ❖ Kaposi's Sarcoma
- ❖ Melanoma
- ❖ Merkel Cell Carcinoma
- ❖ Non-Melanoma Skin Cancer

### Causes or Risk Factors of Cancer

These are the most common risk factors for cancer

- ❖ Growing older
- ❖ Tobacco
- ❖ Sunlight
- ❖ Ionizing radiation
- ❖ Certain chemicals and other substances
- ❖ Some viruses and bacteria
- ❖ Certain hormones
- ❖ Family history of cancer
- ❖ Alcohol
- ❖ Poor diet, lack of physical activity, or being overweight [3,4].

### SYMPTOMS OF CANCER

The following are symptoms that may occur in specific types of cancers

#### Bladder cancer

Blood in the urine, pain or burning upon urination, frequent urination, or cloudy urine.

#### Bone cancer

Pain in the bone or swelling around the affected site, fractures in bones; weakness, fatigue, weight loss, repeated infections, nausea, vomiting, constipation,

problems with urination, weakness or numbness in the legs, bumps and bruises that persist.

#### Brain cancer

Dizziness, drowsiness, abnormal eye movements or changes in vision, weakness, loss of feeling in arms or legs or difficulties in walking, fits or convulsions, changes in personality & memory or speech, headaches that tend to be worse in the morning and ease during the day, that may be accompanied by nausea or vomiting.

#### Breast cancer

A lump or thickening of the breast, discharge from the nipple, change in the skin of the breast, a feeling of heat, or enlarged lymph nodes under the arm.

#### Colorectal cancer

Rectal bleeding (red blood in stools or black stools), abdominal cramps, constipation alternating with diarrhea, weight loss, loss of appetite, weakness, pallid complexion.

#### Kidney cancer

Blood in urine, dull ache or pain in the back or side, lump in kidney area, sometimes accompanied by high blood pressure or abnormality in red blood cell count.

#### Leukemia

Weakness, paleness; fever and flu-like symptoms, bruising and prolonged bleeding, enlarged lymph nodes, pain in bones and joints; frequent infections, weight loss, night sweats.

#### Lung cancer

Wheezing, persistent cough for months, blood-streaked sputum, persistent ache in chest, congestion in lungs; enlarged lymph nodes in the neck.

#### Melanoma

Change in mole or other bump on the skin, including bleeding or change in size, shape, color, or texture.

#### Non-Hodgkin's lymphoma

Painless swelling in the lymph nodes in the neck, underarm, or groin, persistent fever, feeling of fatigue, unexplained weight loss, itchy skin and rashes, small lumps in skin, bone pain, swelling in the abdomen, liver or spleen enlargement.

#### Oral cancer

A lump in the mouth, ulceration of the lip, tongue or inside of the mouth that does not heal within a couple of weeks, dentures that no longer fit well, oral pain, bleeding, foul breath, loose teeth, and changes in speech.

**Ovarian cancer**

Abdominal swelling; in rare cases, abnormal vaginal bleeding, digestive discomfort.

**Pancreatic cancer**

Upper abdominal pain and unexplained weight loss, pain near the center of the back, intolerance of fatty foods, yellowing of the skin, abdominal masses, enlargement of liver and spleen.

**Prostate cancer**

Urination difficulties due to blockage of the urethra, bladder retains urine, creating frequent feelings of urgency to urinate, especially at night, bladder not emptying completely, burning or painful urination, bloody urine, tenderness over the bladder, and dull ache in the pelvis or back.

**Stomach cancer**

Indigestion or heartburn, discomfort or pain in the abdomen, nausea and vomiting, diarrhea or constipation, bloating after meals, loss of appetite, weakness and fatigue, bleeding - vomiting blood or blood in the stool.

**Uterine cancer**

Abnormal vaginal bleeding, a watery bloody discharge in postmenopausal women, a painful urination, pain during intercourse, pain in pelvic area [5].

**ANTICANCER DRUGS****1. Antimetabolites**

- ❖ Capecitabine
- ❖ Cladribine
- ❖ Cytarabine
- ❖ Floxuridine
- ❖ 5-Fluorouracil
- ❖ Gemcitabine
- ❖ 6-Mercaptopurine
- ❖ 6-Thioguanine

**2. Antibiotics**

- ❖ Bleomycin
- ❖ Dactinomycin
- ❖ Daunorubicin
- ❖ Doxorubicin
- ❖ Epirubicin
- ❖ Idarubicin

**3. Alkylating Agents**

- ❖ Busulfan
- ❖ Carmustine
- ❖ Chlorambusil
- ❖ Cyclophosphamide
- ❖ Dacarbazine
- ❖ Lomustine
- ❖ Mechlorethamine

- ❖ Melphalan
- ❖ Streptozocin
- ❖ Temozolamide

**4. Microtubule inhibitors**

- ❖ Paclitaxel
- ❖ Vinblastine
- ❖ Vincristine
- ❖ Vinorelbine

**5. Steroid Hormones and their Antagonists**

- ❖ Aminoglutethimide
- ❖ Anastrozole
- ❖ Bicalutamide
- ❖ Estrogens
- ❖ Exemestane
- ❖ Flutamide
- ❖ Goserelin
- ❖ Letrozole
- ❖ Leuprolide
- ❖ Megestrol acetate
- ❖ Nilutamide
- ❖ Prednisone
- ❖ Tamoxifen
- ❖ Toremifene

**6. Monoclonal Antibodies**

- ❖ Bevacizumab
- ❖ Cetuximab
- ❖ Rituximab
- ❖ Trastuzumab

**7. Others**

- ❖ Asparaginase
- ❖ Cisplatin
- ❖ Carboplatin
- ❖ Etoposide
- ❖ Gefinitib
- ❖ Interferons
- ❖ Irinotecan
- ❖ Oxaliplatin
- ❖ Procarbazine
- ❖ Topotecan [6]

**CANCER PREVENTION**

Cancer prevention is easier than you think. With a few simple lifestyle changes, you can drastically reduce your risk of many types of cancer. Many factors play a role in cancer development, but the good news is that most can be avoided.

**1. Avoid Smoking and Exposure to Smoke**

Smoking is the most significant cancer risk factor that we can reduce. It is responsible for not only lung cancer, but many other types of cancer. One of the best ways to prevent cancer is to quit smoking or never start.

Avoiding secondhand smoke is also a way to prevent cancer. Secondhand smoke is the smoke exhaled from a smoker or a lit cigarette, pipe or cigar. This smoke contains more than 60 known carcinogens". These carcinogens interrupt normal cell development. This interference is what ignites cancer development.

## **2. Practice Sun Safety and Recognize When Skin Changes Occur**

Skin cancer is the most common type of cancer among men and women, and it accounts for about half of all cancer diagnoses. The good news is that skin cancer is one of the most preventable types of cancer. The first step in preventing skin cancer is to avoid UV ray exposure. We can do this by wearing sunscreen, avoiding mid-day sun, wearing protective clothing when outdoors, and by staying away from tanning beds.

## **3. Eat Your Fruits and Veggies**

A well-balanced diet is advantageous for many reasons. A diet rich in fruits and vegetables greatly reduces your risk of developing cancer and many other conditions. Fruits and vegetables contain antioxidants, which help repair our damaged cells. Green, orange and yellow fruits and vegetables are your best bet to help prevent cancer. Studies also show that dark fruits, like blueberries and grapes, may also have anti-cancer properties. Cruciferous vegetables such as broccoli and cauliflower appear to pack a powerful punch at preventing cancer, according to numerous studies. Other cruciferous vegetables include bok choy, Brussel sprouts, and cabbage.

## **4. Limit Red Meat and Animal Fat**

Numerous studies show that a diet high in animal fat increases the risk for several types of cancer, particularly colon cancer. Red meat contains much more fat than poultry and fish, so reducing the amount of red meat in your diet may help to prevent cancer. A diet high in fat also is major cause of obesity, which is a risk factor for many types of cancer.

## **5. Limit Your Alcohol Intake**

Drinking excessive amounts of alcohol regularly increases your risk factor for many types of cancer. Studies suggest that men who consume 2 alcoholic drinks per day and women who have 1 alcoholic drink per day significantly increase their risk factors for certain types of cancer.

## **6. Exercise for Cancer Prevention**

The American Cancer Society recommends exercising 30 minutes, at least 5 days a week for cancer prevention. Exercising doesn't have to mean going to the gym to lift weights. There are plenty of ways to get exercise into your day. Check out these 10 ways to prevent cancer through exercise for great gym alternatives.

## **7. Know Your Personal and Family Medical History**

Knowing your family history of cancer is important to properly assess your risk factor for certain types of cancer. We know that cancers like breast, colon, ovarian, and possibly other types can be hereditary. If you know that a certain type of cancer runs in your family, let your doctor know. Together, you can determine a proper screening plan and assess your true risk. Genetic testing and counseling is available and may be recommended based on your family's medical history.

## **8. Know what you're being exposed to in Your Work Environment**

Chemicals in the workplace may increase your risk of developing many types of cancer, including kidney cancer and bladder cancer. If you are exposed to fumes, dust, chemicals, etc. in the workplace, you have a legal right to know what you are being exposed to. Gasoline, diesel exhaust, arsenic, beryllium, vinyl chloride, nickel chromates, coal products, mustard gas, and chloromethyl ethers are all carcinogens and can be found in some work environments. Talk to your employer about limiting exposure.

## **9. Practice Safe Sex**

Unsafe sex can result in the infection of the human papillomavirus (HPV), a known cause for cervical cancer and a risk factor for many other types of cancer. HPV is a common sexually transmitted infection that is spread through sexual, skin-to-skin contact. A vaccine, Gardasil, to prevent HPV was approved by the FDA in 2006 and protects against four strains of HPV that are associated with cervical cancer and other types. HIV/AIDS is also associated with some types of cancers.

## **10. Get Screened for Cancer Regularly**

Cancer screening tests can be useful not only in detecting cancer, but also helping prevent it. Screening tests like the colonoscopy and Pap smear can detect abnormal cellular changes before they turn cancerous. The key to their effectiveness, however, is that they are done regularly. Other cancer screening tests are available and may be useful for early detection, but not necessarily cancer prevention. Prostate cancer screening through digital rectal exams and PSA tests can help detect prostate cancer early. Mammograms and other imaging tools are also recommended to detect breast cancer in women [7,8].

## **CONCLUSION**

Cancer is unlikely that there will ever be a single "cure for cancer" any more than there will be a single treatment for all infectious diseases. Angiogenesis inhibitors were once thought to have potential as a "silver bullet" treatment applicable to many types of cancer, but this has not been the case in practice. Experimental cancer treatments are treatments that are being studied to see

whether they work. Typically, these are studied in clinical trials to compare the proposed treatment to the best existing treatment. They may be entirely new treatments, or they may be treatments that have been used successfully in one type of cancer, and are now being tested to see whether they are effective in another type. More and more, such treatments are being developed alongside companion diagnostic tests to target the right drugs to the right patients, based on their individual biology.

Cancer research is the intense scientific effort to understand disease processes and discover possible therapies.

Research about cancer causes focuses on the following issues:

- Agents (e.g. viruses) and events (e.g. mutations) which cause or facilitate genetic changes in cells destined to become cancer.
- The precise nature of the genetic damage, and the genes which are affected by it.
- The consequences of those genetic changes on the biology of the cell, both in generating the defining properties of a cancer cell, and in facilitating additional genetic events which lead to further progression of the cancer.

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