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Review Article

Cancer causes and treatment

Ashu Saini *[1]

***Department of Biochemistry, Om Sterling Global University, Hisar, Haryana, India**

*Corresponding Author

Email: saini.ashu099@gmail.com

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ABSTRACT

Cancer is a genetic disease caused by proliferation and multiplication of tumor cells in the body. Cancer occurs due to uncontrolled growth and development of tumor cells in the body. There are more than 100 different types of cancers categorized on the basis of the affected tissue or organ of the human body. Cancers can be cured by means of both conventional tonic approaches, i.e., surgery, radiation therapy and chemotherapy, and nonconventional or complementary therapeutic methods, including hormone therapy, immunotherapy, nano therapy etc. These well-established therapeutic interventions specifically target the tumors and either inhibit or slow down the growth rate of cells, but incompetent to completely provide protection and largely distress the normal cells, tissues, and organs.

Keywords: *Cancer, Camptothecin, Chemotherapy, Paclitaxel, Tumors*

INTRODUCTION

We all know there are many types of cancer. Cancer starts due to the uncontrolled growth of abnormal cells[1]. Normal cells grow, divide, and die in an orderly manner[2]. Cancer cells occur due to damage to DNA which regulates all activities in each cell. In normal condition when DNA becomes damaged the body can

repair it[3]. In cancer cells damaged DNA cannot be repaired. People can inherit damaged DNA, which results in approximately 10 percent of all cancers[4]. But sometimes a person's DNA becomes damaged by exposure to radiation in the environment. Cancer can start anywhere in the body and forms a solid tumor[5].

Certain cancers such as leukemia and myeloma known as liquid tumors. These cancer cells involve the blood and blood-forming organs (bone marrow) and circulate through other tissues, where they grow[6]. Sometimes mutation occurs in the body cells and formation of abnormal cells in the body. Abnormal cells grow and multiply in an uncontrolled manner. Formation of tumors due to proliferation of abnormal cells continuously[7]. The place where a cancer starts is called the primary site and it can spread to other parts of the body8. For example, breast cancer that spreads to the liver is called metastatic breast cancer but not liver cancer[9].

Different types of cancer can behave very differently. For example, lung cancer and breast cancer are different diseases that grow at different rates and respond to different treatments[10]. That is why people with cancer need treatment that is aimed at their particular type of cancer[11]. And nanoparticles (lycopene) act as targeted drug delivery (system) it can target only tumor cells or affected organ not healthy tissues or organ. This treatment is very effective due to the small size of nps[12]. It reduces

cancer risk in the human body and side effects in the body[13]. Because nps also reduce dosage quantity which prevents low risk of contamination in the body[14].

REVIEW OF LITERATURE

Formation of cancer genes in the body

Cancer genes (oncogenes) develop in the body due to mutation in DNA[15]. Hence cancer is a genetic disease caused by changes in the arrangement of genes that control the growth and division of cells in the body[16]. Our body has the capacity to eliminate damaged or mismatched DNA cells from the body before the formation of tumor cells in the body[17]. But due to the age factor, our body is unable to eliminate mismatched DNA cells from the body[18]. This is the main reason for the higher risk of cancer occurring later in life[19].

Three types of genes that causes cancer

1. Proto-oncogenes
2. Tumor suppressor
3. DNA repair genes

Mechanism of cancer spreading in the human body

The process by which cancer cells spread to other parts of the body is called metastasis[20].

For example, breast cancer that forms a metastatic tumor in the lung is metastatic breast cancer, not lung cancer[21]. Normal cells may become cancer cells by proliferation and uncontrolled growth of tumor cells[22]. The human body cells undergo

abnormal changes i.e. hyperplasia, dysplasia[23].

The difference between a normal cell and a cancerous cell

Normal cells divide and multiply in a controlled manner. Cancerous cells multiply uncontrollably.

Normal cells are programmed to die (apoptosis). Cancerous cells ignore those directions.

Normal cells for solid organs stay put. All cancerous cells are able to move around.

Normal cells don't grow as fast as cancerous cells.

Accumulate multiple changes in their chromosomes, such as duplications and deletions of chromosome parts. Some cancer cells have double the normal number of chromosomes.

Types of Cancer

Carcinoma

Adenocarcinoma is a cancer that forms in epithelial cells that produce fluids or mucus[24]. Most cancers of the breast, colon, and prostate are adenocarcinomas[25]. Squamous cell carcinoma is a cancer that forms in squamous cells, Squamous cells also line many other organs, including the stomach, intestines, lungs, bladder, and kidneys[26].

Sarcoma

Sarcomas are cancers that form in bone and soft tissues, including muscle, fat, blood vessels, lymph vessels, and fibrous tissue (such as tendons and ligaments)[27].

Leukemia

Cancers that begin in the blood-forming tissue of the bone marrow are called leukemias[28].

Lymphoma

Lymphoma is a cancer that begins in lymphocytes (T cells or B cells)[29]. These are disease-fighting white blood cells that are part of the immune system[30].

Multiple Myeloma

It begins in plasma cells the abnormal plasma cells called myeloma cells, build up in the bone marrow and form tumors in bones[31].

Melanoma

It begins in cells that become melanocytes, which are specialized cells that make melanin[32]. Most melanomas form on the skin, but melanomas can also form in other pigmented tissues, such as the eye[33].

Symptoms and causes

- Weight loss
- Chronic tiredness
- Persistent pain
- Fever that occurs mostly at night
- Skin changes, particularly moles that change shape and size or new moles

Left untreated, cancer may cause additional symptoms, including:

- Bruising or bleeding more easily
- Lumps or bumps under the skin
- Difficulty breathing
- Difficulty swallowing

Factors causes Cancer

Smoking: Smoking cigarettes and cigars and using e-cigarettes increases the chance of lung, pancreatic, esophageal, and mouth cancer[34].

Unhealthy Diet: Eating high-fat or high-sugar foods can increase the risk of many types of cancer.

Heavy Radioactive Polluted Environment: Exposure to toxins in the environment such as asbestos, pesticides, and radon can eventually lead to cancer[35].

Radiation exposure: Ultraviolet (UV) radiation from the sun increases the risk of skin cancer[36].

Prevention

- We must stop smoking or tobacco.
- By doing exercise in daily routine.
- Avoid toxins, including asbestos, radon, and pesticides.
- Protect against sun damage.
- Have regular cancer screenings.

Diagnosis of Cancer

We can diagnose cancer by doing following tests

- Blood tests
- Imaging tests
- Biopsies

Blood tests

- Complete blood count (CBC)
- Blood protein tests.
- Circulating tumor cell tests.

Imaging tests

Computed tomography (CT) scan: CT scans detect cancerous tumors' location and impact on our organs and bones[37].

X-rays: X-rays use to create images of our bones and soft tissues.

Positron emission test (PET) scan: PET scans produce images of our organs and tissues at work[38].

Ultrasound: An ultrasound uses high-intensity sound waves that show structures inside of our body[39].

Magnetic resonance imaging (MRI): MRIs use a large magnet, radio waves and a computer to create images of our organs and other structures inside of our body.

Iodine meta-iodobenzylguanidine (MIGB): This nuclear imaging test helps detect cancer, including carcinoid tumors and neuroblastoma.

Biopsies

A biopsy is a procedure to obtain cells, tissue, fluid or growths to check under a microscope. There are several kinds of biopsies:

- Needle biopsy
- Skin biopsy
- Bone marrow biopsy
- Endoscopic or laparoscopic biopsy
- Excisional or incisional biopsy
- Perioperative biopsy

Cancers have four stages

Stage I: The cancer is localized to a small area and hasn't spread to lymph nodes or other tissues.

Stage II: The cancer has grown, but it hasn't spread.

Stage III: The cancer has grown larger and has possibly spread to lymph nodes or other tissues.

Stage IV: The cancer has spread to other organs or areas of your body. This stage is also referred to as metastatic or advanced cancer.

Treatment of cancer

Common cancer treatments include:

Chemotherapy: It is the most common cancer treatments. The powerful drugs destroy cancer cells. It can be used in the form of pills or intravenously.

Radiation therapy: In this treatment radiations kills cancer cells with high dosages of radiation.

Surgery: Cancerous tumors may be removed with surgery.

Hormone therapy: Hormones that block other cancer-causing hormones.

Immunotherapy for cancer: Immunotherapy is a cancer treatment that engages our immune system to fight against disease. The treatment may be called biological therapy.

Targeted therapy for cancer: Targeted therapy is a cancer treatment that targets the genetic changes or mutations that turn healthy cells into cancer cells.

Bone marrow transplant: It is astem cell transplantation, this treatment replaces damaged stem cells with healthy ones.

Side effects of cancer treatment

- Anemia
- Nausea and vomiting

- Fatigue
- Pain

Cancer that comes back Sometimes, cancer treatment doesn't eliminate all cancerous cells. Those cells can become new cancerous tumors. Cancer that comes back, or recurrent cancer, may appear at the same place as original cancer, in nearby lymph nodes, or spread to organs and tissues far away from the original site.

Medical researchers estimate 5% to 12% of all cancers are caused by inherited genetic mutations that you can't control.

Complications

Cancer and its treatment can cause several complications, including:

- Pain
- Fatigue
- Difficulty breathing
- Nausea
- Diarrhea or constipation
- Weight loss
- Chemical changes in your body
- Brain and nervous system problems

CONCLUSIONS

Normal cells divide as well as multiply in a controlled manner but the Cancerous cells multiply uncontrollably. In this review, we have presented a detailed overview about cancer, its types, causes, stages, treatment, side effects, and complications. The author has further contributed in brief, the mechanism and genetic factors responsible for cancer.

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