SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF CIVIL ENGINEERING

19GET277- Biology for Engineers

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AP/CIVIL

Definitio, Causes, Symptoms, Diagnosis, Treatment and Prevention of Cancer

CANCER- DEFENITION

Cancer refers to any one of a large number of diseases characterized by the development of abnormal cells that divide uncontrollably and have the ability to infiltrate and destroy normal body tissue. Cancer often has the ability to spread throughout your body.

Cancer is the second-leading cause of death in the world. But survival rates are improving for many types of cancer

CANCER- CAUSES

- Cancer is caused by changes (mutations) to the DNA within cells. The DNA inside a cell is packaged into a large number of individual genes, each of which contains a set of instructions telling the cell what functions to perform, as well as how to grow and divide. Errors in the instructions can cause the cell to stop its normal function and may allow a cell to become cancerous.

What do gene mutations do?

A gene mutation can instruct a healthy cell to:

- Allow rapid growth. A gene mutation can tell a cell to grow and divide more rapidly. This creates many new cells that all have that same mutation.

CANCER- CAUSES

- Fail to stop uncontrolled cell growth: Normal cells know when to stop growing so that you have just the right number of each type of cell. Cancer cells lose the controls (tumor suppressor genes) that tell them when to stop growing. A mutation in a tumor suppressor gene allows cancer cells to continue growing and accumulating.
- Make mistakes when repairing DNA errors: DNA repair genes look for errors in a cell's DNA and make corrections. A mutation in a DNA repair gene may mean that other errors aren't corrected, leading cells to become cancerous.
- These mutations are the most common ones found in cancer. But many other gene mutations can contribute to causing cancer.

CANCER- CAUSES

What causes gene mutations?

- Gene mutations can occur for several reasons, for instance:
- Gene mutations you're born with: You may be born with a genetic mutation that you inherited from your parents. This type of mutation accounts for a small percentage of cancers.
- Gene mutations that occur after birth: Most gene mutations occur after you're born aren't inherited. A number of forces can cause gene mutations, such as smoking, radiation, viruses, cancer-causing chemicals (carcinogens), obesity, hormones, chronic inflammation and a lack of exercise.
- Gene mutations occur frequently during normal cell growth: However, cells contain a mechanism that recognizes when a mistake occurs and repairs the mistake. Occasionally, a mistake is missed. This could cause a cell to become cancerous.
- It's not clear just how many mutations must accumulate for cancer to form. It's likely that this varies among cancer types.

CANCER- CAUSES

How do gene mutations interact with each other?

- **The gene mutations you're born with and those that you acquire throughout your life work together to cause cancer.**
- **For instance, if you've inherited a genetic mutation that predisposes you to cancer, that doesn't mean you're certain to get cancer.**
- **Instead, you may need one or more other gene mutations to cause cancer.**
- **Your inherited gene mutation could make you more likely than other people to develop cancer when exposed to a certain cancer-causing substance.**

CANCER- SYMPTOMS

Signs and symptoms caused by cancer will vary depending on what part of the body is affected.

Some general signs and symptoms associated with, but not specific to, cancer, include:

- Fatigue
- Lump or area of thickening that can be felt under the skin
- Weight changes, including unintended loss or gain
- Skin changes, such as yellowing, darkening or redness of the skin, sores that won't heal, or changes to existing moles
- Changes in bowel or bladder habits
- Persistent cough or trouble breathing
- Difficulty swallowing
- Hoarseness
- Persistent indigestion or discomfort after eating
- Persistent, unexplained muscle or joint pain
- Persistent, unexplained fevers or night sweats
- Unexplained bleeding or bruising

CANCER- PREVENTION

Doctors have identified several ways to reduce your risk of cancer, such as:

- Stop smoking: Smoking is linked to several types of cancer — not just lung cancer. Stopping now will reduce your risk of cancer in the future.
- Avoid excessive sun exposure: Harmful ultraviolet (UV) rays from the sun can increase your risk of skin cancer. Limit your sun exposure by staying in the shade, wearing protective clothing or applying sunscreen.
- Eat a healthy diet: Choose a diet rich in fruits and vegetables. Select whole grains and lean proteins. Limit your intake of processed meats.
- Exercise most days of the week. Regular exercise is linked to a lower risk of cancer. Aim for at least 30 minutes of exercise most days of the week. If you haven't been exercising regularly, start out slowly and work your way up to 30 minutes or longer.

CANCER- PREVENTION

- Maintain a healthy weight. Being overweight or obese may increase your risk of cancer. Work to achieve and maintain a healthy weight through a combination of a healthy diet and regular exercise.
- Drink alcohol in moderation: If you choose to drink alcohol, do so in moderation. For healthy adults, that means up to one drink a day for women and up to two drinks a day for men.
- Schedule cancer screening exams. Talk to your doctor about what types of cancer screening exams are best for you based on your risk factors.
- Ask your doctor about immunizations. Certain viruses increase your risk of cancer. Immunizations may help prevent those viruses, including hepatitis B, which increases the risk of liver cancer, and human papillomavirus (HPV), which increases the risk of cervical cancer and other cancers. Ask your doctor whether immunization against these viruses is appropriate for you.

CANCER- TREATMENT

Cancer treatment can include different options, depending on the type of cancer and how advanced it is.

- Localized treatment. Localized treatment usually involves using treatments like surgery or local radiation therapy at a specific area of the body or tumor.
- Systemic treatment. Systemic drug treatments, such as chemotherapy, targeted therapy, and immunotherapy, can affect the entire body.
- Palliative treatment. Palliative care involves relieving health symptoms associated with cancer, such as trouble breathing and pain.
- Different cancer treatments are often used together to remove or destroy as many cancerous cells as possible.

CANCER- TREATMENT

The most common types of treatment are:

Surgery

- **Surgery removes as much of the cancer as possible. Surgery is often used in combination with some other therapy in order to make sure all of the cancer cells are gone.**

Chemotherapy

- **Chemotherapy is a form of aggressive cancer treatment that uses medications that are toxic to cells to kill rapidly dividing cancer cells. It may be used to shrink the size of a tumor or the number of cells in your body and lower the likelihood of the cancer spreading.**

Radiation therapy

- **Radiation therapy uses powerful, focused beams of radiation to kill cancer cells. Radiation therapy done inside of your body is called brachytherapy, while radiation therapy done outside of your body is called external beam radiation.**

CANCER- TREATMENT

Stem cell (bone marrow) transplant

- **This treatment repairs diseased bone marrow with healthy stem cells. Stem cells are undifferentiated cells that can have a variety of functions. These transplants allow doctors to use higher doses of chemotherapy to treat the cancer. A stem cell transplant is commonly used to treat leukemia.**

Immunotherapy (biological therapy)

- **Immunotherapy uses your body's own immune system to attack cancer cells. These therapies help your antibodies recognize the cancer, so they can use your body's natural defenses to destroy cancer cells.**

Hormone therapy

- **Hormone therapy removes or blocks hormones that fuel certain cancers to stop cancer cells from growing. This therapy is a common treatment for cancers that may use hormones to grow and spread, such as certain types of breast cancer and prostate cancer.**

CANCER- TREATMENT

Targeted drug therapy

- **Targeted drug therapy uses drugs to interfere with certain molecules that help cancer cells grow and survive. Genetic testing may reveal if you are eligible for this type of therapy. It may depend on the type of cancer you have and the genetic mutations and molecular characteristics of your tumor.**

Clinical trials

- **Clinical trials investigate new ways to treat cancer. This may include testing the effectiveness of drugs that have already been approved by the Food and Drug Administration (FDA) but for other purposes. It can also include trying new drugs. Clinical trials can offer another option for people who may have not seen the level of success they wanted with conventional treatments. In some cases, this treatment may be provided for free.**

CANCER- TREATMENT

Alternative medicine

Alternative medicine may be used to complement another form of treatment. It may help decrease symptoms of cancer and side effects of cancer treatment, such as nausea, fatigue, and pain. Alternative medicine for cancer can include:

- acupuncture
- yoga
- massage
- meditation
- relaxation techniques

Thankyou