

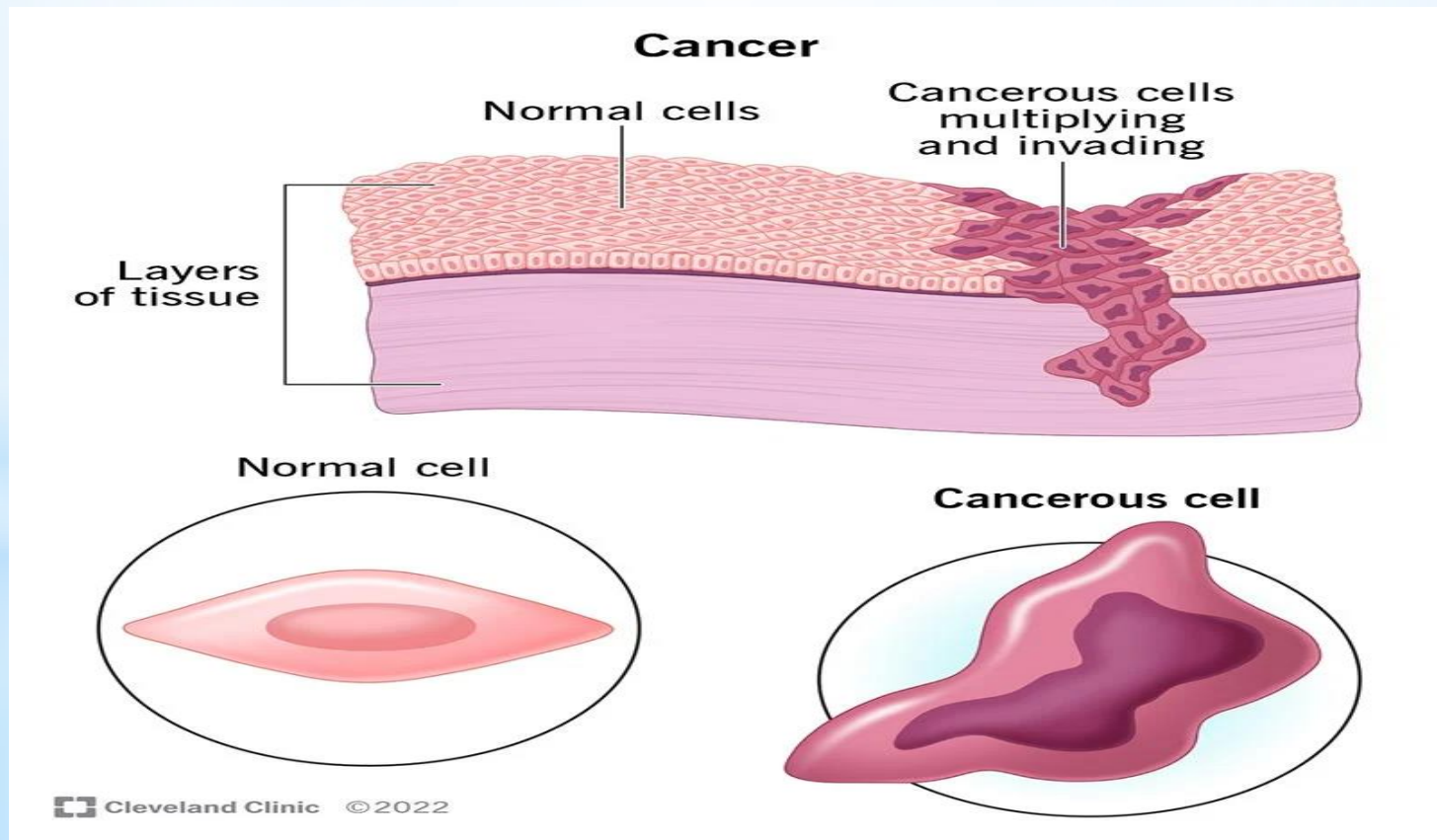
Laser in cancer treatment and other diseases

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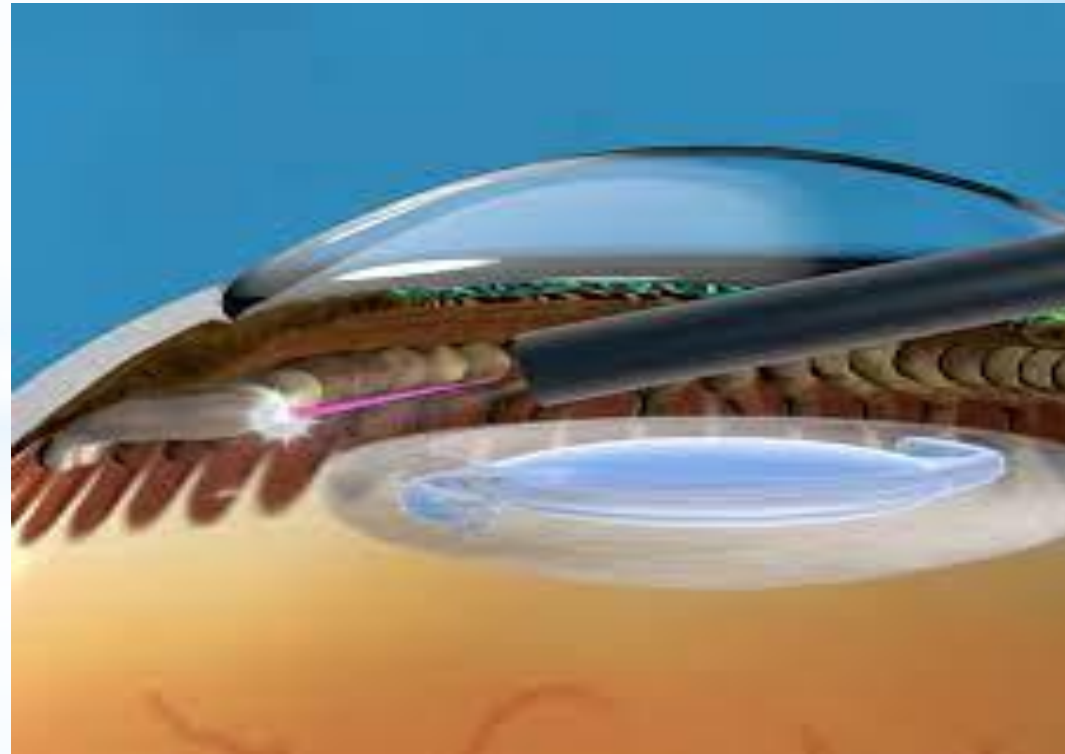
- Cancer is happen when normal cells become cancerous cells that multiply and spread.
- Cancer is the second most common cause of death in the U.S.



- ✓ **Lasers can be used in 2 main ways to treat cancer:**
 - **To shrink or destroy a tumor with heat**
 - **To activate a chemical – known as a photosensitizing agent – that kills only the cancer cells. (This is called photodynamic therapy or PDT.)**
 - **Though lasers can be used alone, they are often used with other cancer treatments, such as chemotherapy or radiation therapy.**

1. Shrinking or destroying tumors directly

- The CO2 and Nd:YAG lasers are used to shrink or destroy tumors. They can be used with thin, flexible tubes called endoscopes that let doctors see and work inside certain parts of the body that could not otherwise be reached except by major surgery.
- Using an endoscope also helps position the laser beam to accurately hit its target.



**Lasers are used this way to treat many kinds of cancer.
Here are some examples:**

- In the colon and rectum (large intestine), lasers can be used to remove polyps, which are small growths that might become cancer.
- Lasers can be used to treat certain skin pre-cancers and cancers, as well as pre-cancers or very early cancers of the cervix and surrounding areas.

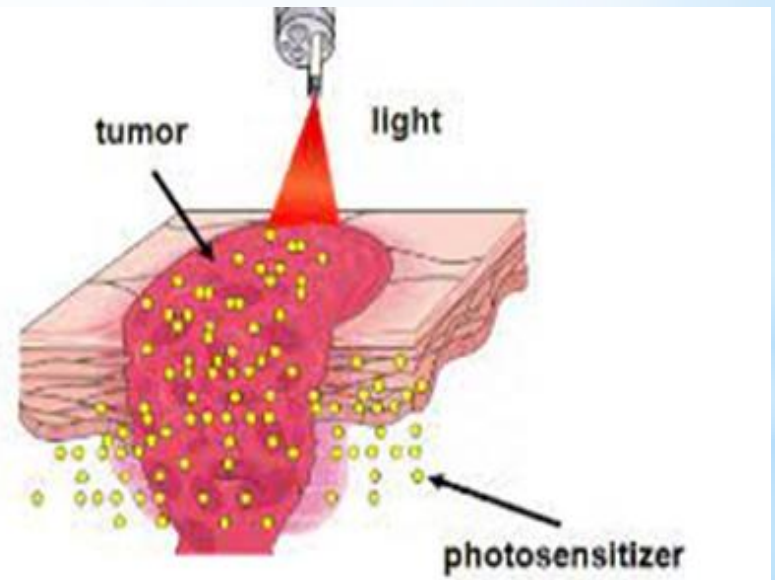


- Lasers can sometimes be used to treat cancer that has spread to the lungs from other areas, as well as cancer that is causing a blockage in the airway.
- In certain cases, small cancers of the head and neck may be treated with lasers.
- A type of laser treatment called **laser-induced interstitial thermotherapy (LITT)** can be used to treat some types of tumors, such as certain tumors in the liver and brain. It uses heat to help shrink tumors by damaging cells or depriving them of the things they need to live (like oxygen and food).

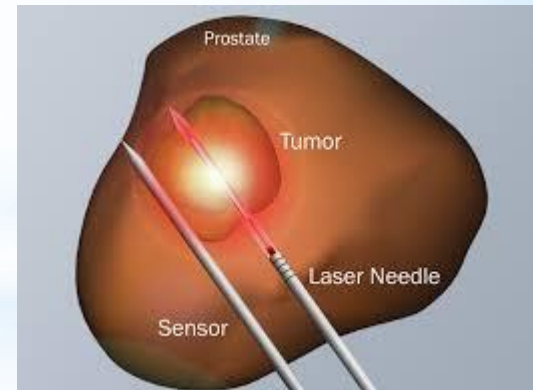
2. Photodynamic therapy

- For most types of photodynamic therapy (PDT), a special drug called a photosensitizing agent is put into the bloodstream.
- Over time it is absorbed by body tissues. The drug stays in cancer cells for a longer time than in normal cells.
- Photosensitizing agents are turned on or activated by certain types of light. For example, an argon laser can be used in PDT. When cancer cells that contain the photosensitizing agent are exposed to light from this laser, it causes a chemical reaction that kills the cancer cells. Light exposure must be carefully timed so that it's used when most of the agent has left healthy cells, but is still in the cancer cells.

- PDT is sometimes used to treat cancers and pre-cancers of the esophagus (swallowing tube), bile duct, bladder, and certain kinds of lung cancer that can be reached with endoscopes.



- PDT is also being looked at for use in other cancers, such as those of the brain, pancreas, and prostate.
- Researchers also are looking at different kinds of lasers and new photosensitizer drugs that might work even better.



Treating cancer-related side effects with lasers

- Lasers are also being looked at to treat or prevent side effects of common cancer treatments.
- For instance, low-level laser therapy (LLLT) might be helpful in treating the arm swelling (lymphedema) that can result from breast surgery.
Lymphedema in the arm is a risk when lymph nodes in the armpit are removed during surgery.
- Some studies are also looking at LLLT for preventing or treating severe mouth sores caused by chemotherapy.

Positive aspects of laser treatment

- Lasers are more precise and exact than blades (scalpels). For instance, the tissue near a laser cut (incision) is not affected since there is little contact with skin or other tissue.
- The heat produced by lasers helps clean (sterilize) the edges of the body tissue that it's cutting, reducing the risk of infection.
- Since laser heat seals blood vessels, there is less bleeding, swelling, pain, or scarring.
- Operating time may be shorter.

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- Laser surgery may mean less cutting and damage to healthy tissues (it can be less invasive). For example, with fiber optics, laser light can be directed to parts of the body through very small cuts (incisions) without having to make a large incision.
- More procedures may be done in outpatient settings.
- Healing time is often shorter

Limitations of laser treatment

- Not many doctors and nurses are trained to use lasers.
- Laser equipment costs a lot of money and is bulky compared with the usual surgical tools used. But advances in technology are slowly helping reduce their cost and size.
- Strict safety precautions must be followed in the operating room when lasers are used. For example, the entire surgical team and the patient must wear eye protection.
- The effects of some laser treatments may not last long, so they might need to be repeated. And sometimes the laser cannot remove all of the tumor in one treatment, so treatments may need to be repeated.

- Laser therapy may be used to:
- shrink or destroy tumors, polyps, or precancerous growths.
- relieve symptoms of cancer.
- remove kidney stones.
- remove part of the prostate.
- repair a detached retina.
- improve vision.
- treat hair loss resulting from alopecia or aging.
- treat pain, including back nerve pain.

Lasers for birthmarks

- Some lasers, such as pulsed dye lasers and intense pulsed light therapy, are safely used on infants and children to treat a wide range of conditions, including port wine stain and hemangioma birthmarks. In most cases, intense pulsed light treatments require about two to three sessions



- Laser hair removal can be performed on all skin types and colors, as long as there is a contrast between your skin and hair color.
- In remove tattoos
- Depending on how many treatments you receive, most of the treated hair can be destroyed. "Pigment or tattoo removal lasers can be used with varying intensity for minimal downtime or more downtime with fewer treatments.



- These are just a few of the conditions that lasers can treat. Laser and light treatments are also useful to reduce premature signs of skin aging like wrinkles and age spots; reduce scars, including scars caused by acne; tighten skin; reduce melasma; treat spider veins; and other concerns.
- Your board-certified dermatologist can help determine if any of these treatments are right for you.



Who shouldn't have laser therapy?

- Some laser surgeries, such as cosmetic skin and eye surgeries, are considered elective surgeries.
- Some people decide the potential risks can outweigh the benefits of these types of surgeries. For example, some health or skin conditions may be aggravated by laser surgeries. As with typical surgery, poor overall health also increases your risk of complications.

- Talk to your doctor before deciding to undergo laser surgery for any kind of operation.
- Based on your age, overall health, healthcare plan, and the cost of laser surgery, your doctor may recommend that you choose traditional surgical methods. For example, if you're younger than 18 years, you should not get Lasik eye surgery.

Lasik surgery

- LASIK surgery is performed with a laser programmed to remove a defined amount of tissue from a part of your eye called the cornea.

What does LASIK do to the eye?

- LASIK uses an excimer laser (an ultraviolet laser) to remove a thin layer of corneal tissue. This gives the cornea a new shape so that light rays are focused clearly on the retina. LASIK causes the cornea to be thinner



How do I prepare for laser therapy?

- Plan ahead to ensure that you have time to recover after the operation. Also make sure someone can take you home from the procedure. You will likely still be under the influence of anesthesia or medications.
- A few days before the surgery, you may be advised to take precautions such as stopping any medications that can affect blood clotting, such as blood thinners.



*Thank
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