

## Getting Photodynamic Therapy

- [What is photodynamic therapy?](#)
- [What is PDT used for?](#)
- [Side effects of PDT](#)

### What is photodynamic therapy?

Photodynamic therapy (PDT) is a treatment that uses special drugs, sometimes called *photosensitizing agents*, along with light to kill cancer cells. The drugs only work after they have been activated or “turned on” by certain kinds of light. PDT may also be called *photoradiation therapy*, *phototherapy*, or *photochemotherapy*.

Depending on the part of the body being treated, the photosensitizing agent is either put into the bloodstream through a vein or put on the skin. Over a certain amount of time the drug is absorbed by the cancer cells. Then light is applied to the area to be treated. The light causes the drug to react and form a special kind of oxygen molecule that kills the cells. PDT might also help by destroying the blood vessels that feed the cancer cells and by alerting the immune system to attack the cancer.

The period of time between when the drug is given and when the light is applied is called the *drug-to-light interval*. It can be anywhere from a couple of hours to a couple of days, depending on the drug used.

The light used in PDT comes from certain kinds of lasers or from light-emitting diodes (LEDs). The kind of light used depends on the type of cancer and where it is located in the body. PDT is usually done as an outpatient procedure (meaning you won't have to stay in the hospital) but is sometimes combined with surgery, chemotherapy or other anti-cancer drugs, or radiation therapy.

### Pros and cons of PDT

Studies have shown that PDT can work as well as [surgery](#) or [radiation therapy](#) in treating certain kinds of cancers and pre-cancers. It has some advantages, such as:

- It has no long-term side effects when used properly.
- It's less invasive than surgery.
- It usually takes only a short time and is most often done as an outpatient procedure.
- It can be targeted very precisely.
- Unlike radiation, PDT can be repeated many times at the same site if needed.
- There's usually little or no scarring after the site heals.
- It often costs less than other cancer treatments.

But PDT has limits, too:

- PDT can only treat areas where light can reach. This means it's mainly used to treat problems on or just under the skin, or in the lining of organs that can be reached with a light source. Because light can't travel very far through body tissues, PDT can't be used to treat large cancers or cancers that have grown deeply into the skin or other organs.
- PDT can't be used to treat cancers that have spread to many places.
- The drugs used for PDT leave people very sensitive to light for some time, so special precautions must be taken after the drugs are put in or on the body.
- PDT can't be used in people who have certain blood diseases.

## What is PDT used for?

PDT can be used in people with certain types of cancer to help them live longer and improve their quality of life. It's becoming more widely recognized as a valuable treatment option for certain types of localized cancers (cancers that have not spread far from where they started).

## PDT drugs approved in the US to treat cancer

Several photosensitizing agents are currently approved by the US Food and Drug Administration (FDA) to treat certain cancers or pre-cancers. Here are two of the most widely used:

- Porfimer sodium (Photofrin) is a very widely used and studied photosensitizer. It's

activated by red light from a laser. It's approved by the FDA to treat patients with certain kinds of cancers of the esophagus and lung, and is being studied in other types of cancer.

- Aminolevulinic acid (ALA or Levulan) is a drug that's put right on the skin. It's used to treat actinic keratosis (AK), a skin condition that can become cancer, and is used only on the face or scalp. A special blue light, rather than laser light, is used to activate this drug.

Researchers are always looking for new PDT drugs, and new ways to give them. PDT is also being combined with other types of treatment, such as surgery and radiation therapy. Future possibilities include other combination treatments with PDT drugs, as well as new PDT drugs that can target tumor cells better, can leave normal cells more quickly, and allow the treatment light to penetrate deeper.

## **Side effects of PDT**

Not everyone getting photodynamic therapy will have the same side effects. Be sure to ask your doctor which side effects you might expect, what can be done to help, if there are any treatments for your side effects, and which side effects you need to report right away. Get the phone number to call if you have problems after regular office hours.

### **Photosensitivity reactions**

The most common side effect of PDT is sensitivity to bright lights and sunlight. These reactions caused by PDT light can show up on the skin where the drug is applied. They usually involve redness and a tingling or burning sensation. For a period of time after treatment, you'll need to be careful to not expose treated areas of your face and scalp to light.

- Stay out of strong, direct light.
- Stay indoors as much as possible.
- Wear protective clothing and wide-brimmed hats to avoid sunlight when outdoors.
- Avoid beaches, snow, light colored concrete, or other surfaces where strong light may be reflected.

Sunscreens will not protect the skin from photosensitivity reactions.

### **Skin changes**

Depending on the type and location of treatment, the treated skin might turn red and may swell for a period of time. With some treatments, blisters may form. This may last hours to days after treatment. The skin may also have a burning sensation or may be itchy or change color after treatment.

### **Swelling and pain**

Swelling in the treated area can lead to pain and problems with the tissues and organs working properly.

### **Immune system changes**

Sometimes PDT treatments can make the immune system work differently, usually by stimulating it to work more. Sometimes it can become weaker for period of time. In very rare cases, PDT can cause skin cancer at the site where treatment was given. Some researchers believe this happens if the immune system is weakened by PDT.

### **References**

Juarranz A, Jaen P, Sanz-Rodriguez F, Cuevas J, Gonzalez S. Photodynamic therapy of cancer: basic principles and applications. *Clinical and Translational Oncology*; 2008;10(3), 148-154.

Kwiatkowski S, Knap B, Przystupski D, Saczko J, Kedzierska E, Knap-Czop K....Kulbacka J. Photodynamic therapy: mechanisms, photosensitizers and combinations. *Biomedicine & Pharmacotherapy*; 2018;106:1098-1107.

Tampa M, Sarbu, M, Matei C, Mitran C, Mitran M, Caruntu C...Georgescu S. Photodynamic therapy: a hot topic in dermato-oncology. *Oncology Letters*; 2019;17(5),4085-4093.

Last Revised: November 19, 2021

### **Written by**

The American Cancer Society medical and editorial content team  
(<https://www.cancer.org/cancer/acs-medical-content-and-news-staff.html>)

Our team is made up of doctors and oncology certified nurses with deep knowledge of cancer care as well as journalists, editors, and translators with extensive experience in medical writing.

American Cancer Society medical information is copyrighted material. For reprint requests, please see our Content Usage Policy ([www.cancer.org/about-us/policies/content-usage.html](http://www.cancer.org/about-us/policies/content-usage.html)).

**cancer.org | 1.800.227.2345**