

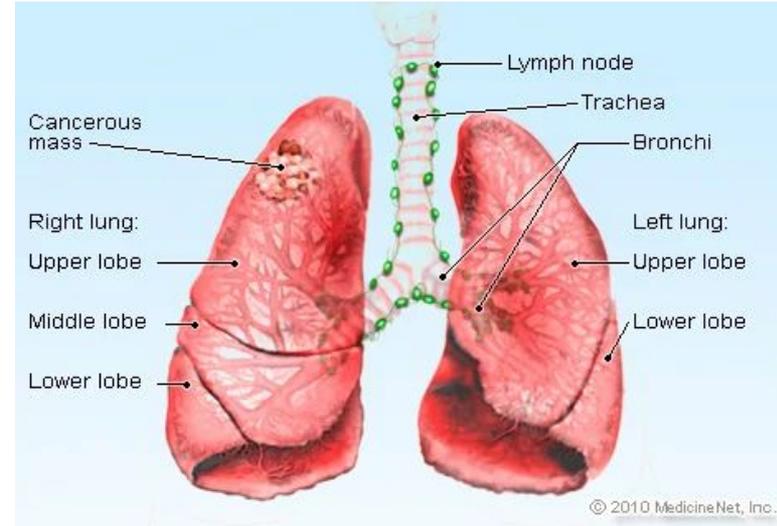
NON-SMALL CELL LUNG CANCER RESEARCH



Presented by Bridgeport Hospital

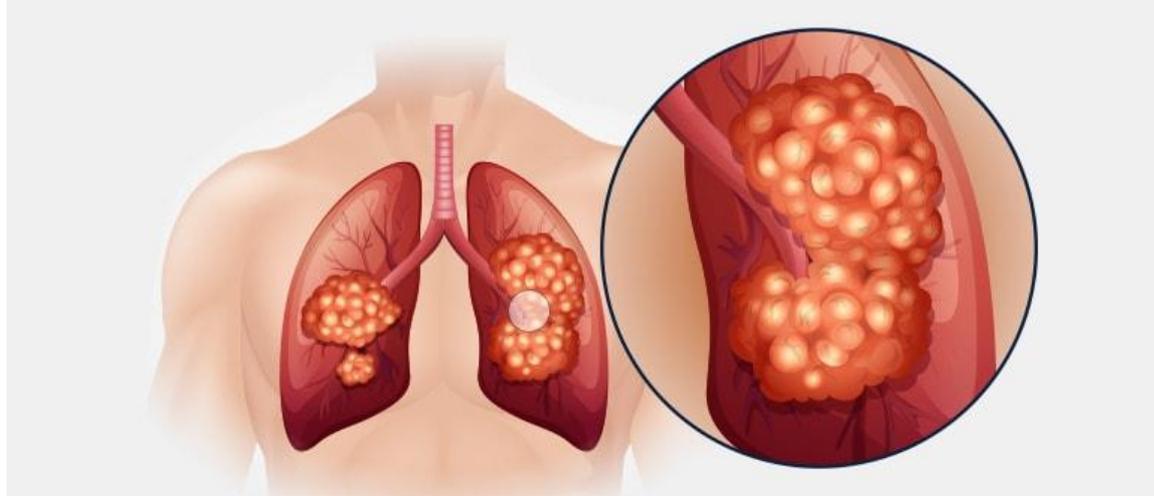
WHAT BODY PART IS AFFECTED BY LUNG CANCER?

Lung cancer can affect any part of the lungs and any part of the respiratory system. It starts when abnormal cells grow out of control and spreads through the healthy lung tissue. It often first targets the lymph nodes.



Lung adenocarcinoma is a form of non-small cell lung cancer, and one of the most common types of lung cancer.

WHAT BODY PART IS AFFECTED BY LUNG CANCER?



HEALTHY VS. CANCEROUS CELLS

NORMAL	CANCEROUS
Normal lungs expand and inhale oxygen	Abnormal cells cannot create healthy lung tissue
Air travels down the throat and into the trachea, also known as the windpipe	They can spread and invade other tissues to form tumors
When they contract, waste (carbon dioxide) is exhaled	Tumors sabotage the tissues and interfere with the lungs' ability to provide oxygen.
Oxygen passes through the alveoli, into the capillaries and into the blood.	Small cell lung cancers usually grow more quickly and are more likely to spread than non-small cell lung cancer.

LUNG CANCER - MITOSIS:

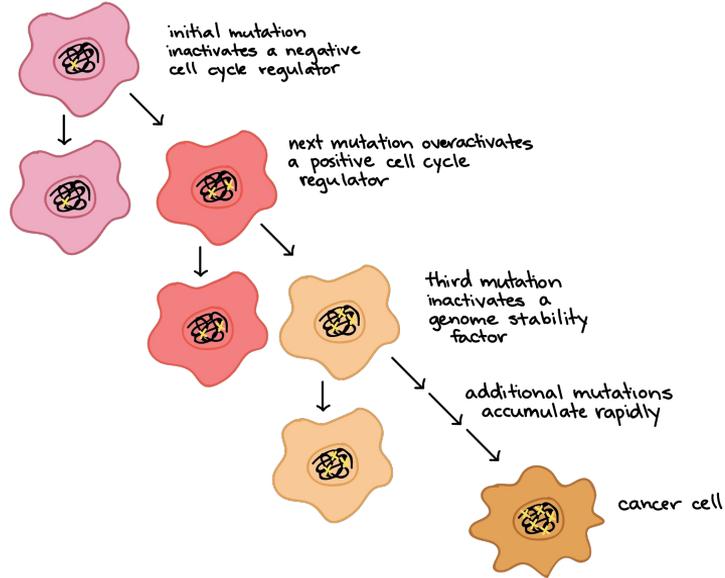
The cell cycle can be completely thrown out of routine when cancer is introduced. This vicious disease is due to genetic mutations, most often in the *TP53* (tumor suppressor), *EGFR* (receptor), and the *KRAS* (signal gene). Everything goes awry causing uncontrolled cell multiplication. The p53 gene can be found in G1 and G2 checkpoints, they act as a “brake pedal.” The malfunctions are from the disappearance of this break pedal.

LUNG CANCER - MITOSIS (CONTINUED):

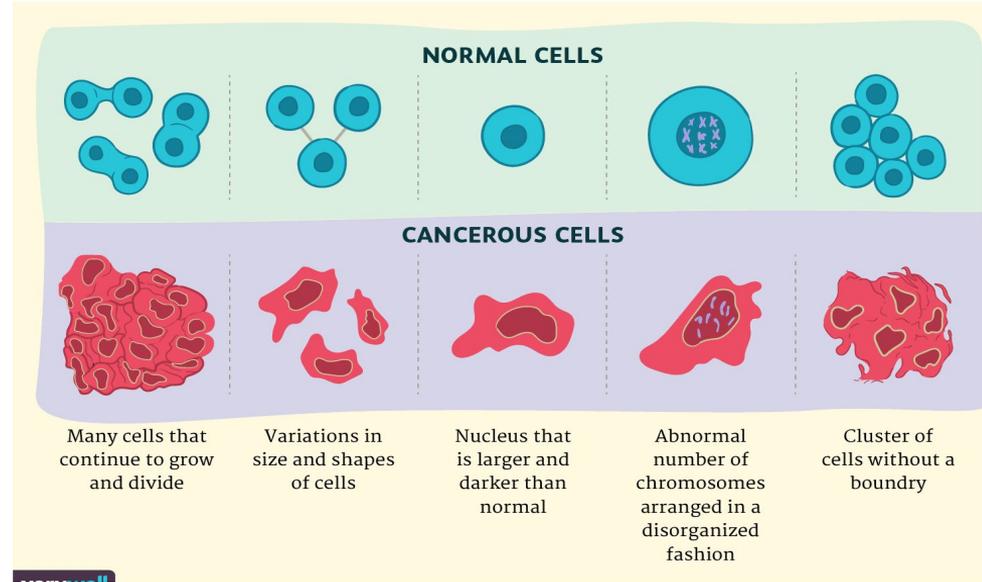
There is a direct correlation between mitosis for normal cells compared to cancer cells. Cancer cells have a higher mitotic index because they multiply and divide at higher rates than normal cells. The mitotic index is an important prognostic {to predict a likely outcome of a disease or ailment} factor, and a 2017 study shows that the mitotic index of pulmonary adenocarcinoma is useful for a prognostic marker.

LUNG CANCER - MITOSIS DIAGRAMS

HYPOTHETICAL SERIES OF MUTATIONS LEADING TO CANCER:



Mutations Leading to Cancer. (Khan Academy, N.D)



Normal vs Cancer cells within the body. (

LUNG CANCER - GENETICS:

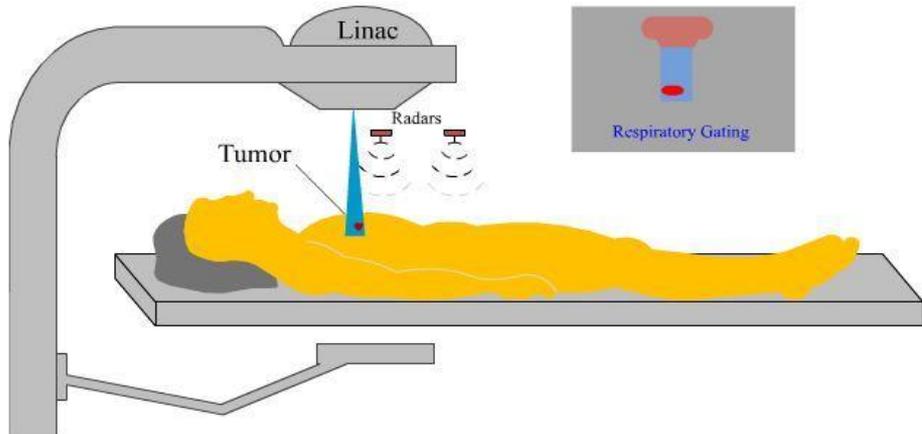
In the majority of cases, lung cancer isn't inherited through genetics. But when lung cancer is, the cancer risk follows an autosomal {any chromosome besides sex chromosomes} dominant pattern. Meaning that one copy of the altered gene in each cell is likely to increase the person's chance of developing the disease but, this does not mean that everyone that inherits the mutation will develop lung cancer.

LUNG CANCER - GENETICS (CONTINUED):

A cancer begins with a mutation in a cell's DNA. DNA mutations can be caused by the normal aging process or through environmental exposures, such as cigarette smoke, breathing in asbestos fibers, and to exposure to radon {radioactive} gas.

LUNG CANCER - TREATMENTS:

Our treatment for lung adenocarcinoma would be radiation therapy along with immunotherapy. They target cancerous cells and tumors.



LUNG CANCER - TREATMENTS (CONTINUED):

Radiation therapy is using high-energy particle or waves, such as x-rays, gamma rays, electron beams, or protons to destroy or damage cancer cells.

Radiation therapy can be taken as an external beam or internally.



LUNG CANCER - TREATMENTS (CONTINUED)

Immunotherapy is the treatment of a disease that uses a drug to improve a person's immune system to fight against a certain disease.

Immunotherapy stimulates your own immune system to work harder in attacking cancer cells and it gives your immune system man-made proteins to aid this process.

(American Cancer Society, 2017)

MECHANISM

Radiation works by making small breaks in the DNA within cells. These breaks within the DNA keep cancer cells from growing and dividing, causing them to die. (American Cancer Society, 2017)

- <https://www.mskcc.org/cancer-care/diagnosis-treatment/cancer-treatments/immunotherapy/checkpoint-inhibitors>
- <https://labiotech.eu/features/pd-1-pd-l1-checkpoint-inhibitors/>
- <https://labiotech.eu/medical/immunotherapies-durvalumab-side-effects/>

LUNG CANCER - MECHANISM (CONTINUED):

In order to increase the effectiveness of radiation therapy, we want to use PET scans and CT scans to guide the radiation so that higher doses can be delivered directly to the tumor, causing less damage to healthy tissue. (Lungevity, 2018)

LUNG CANCER - MECHANISM (CONTINUED):

LUNG CANCER - MECHANISM (CONTINUED):

To treat Lung Adenocarcinoma with immunotherapy we will use a drug known as PD-1 and/or PD/L1. PD-1 is a checkpoint protein that affects T-Cells. It acts in the way of a switch by turning on attacking cells in the body. When binded with PD-L1, the T-cells target cancer cells specifically. Some cancer cells have large amounts of PD-L1 which help them evade the immune system and attack. (American Cancer Society, 2017)

LUNG CANCER - EFFECTIVENESS

LUNG CANCER - SIDE EFFECTS - RADIATION THERAPY

Possible side effects of radiation therapy are fatigue, nausea and vomiting, loss of appetite and weight loss, skin changes in areas treated (ranging from mild redness to blistering and peeling), hair loss where radiation enters the body, can damage the lungs, cause a cough, cause breathing problems, and cause shortness of breath.

LUNG CANCER - SIDE EFFECTS - IMMUNOTHERAPY

Side effects of the drugs used in immunotherapy can include (as stated by the American Cancer Society) fatigue, cough, nausea, itching, skin rash, loss of appetite, constipation, joint pain, and diarrhea. To go deeper into the side effects, the most frequent toxicities reported for PD-1 agents were mild fatigue, rash, pruritus (severe itching), diarrhea, and colitis (inflammation of the inner lining of the colon).

LUNG CANCER—SIDE EFFECTS—IMMUNOTHERAPY (CONTINUED)

Also, since these drugs aim to remove the brakes on the body's immune system, sometimes the immune system starts attacking other parts of the body. This can cause serious or life threatening problems in the lungs, intestines, liver, hormone-making glands, kidneys, or other organs.

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