

BIOMEDICAL BREAKTHROUGHS & MY LIFE

Introduction : What Is Lung Cancer?

Lung cancer, or bronchogenic carcinomas, is a cancer that creates tumors in one or both lungs from the uncontrollable growth of abnormal cells. The lung's ability to create oxygen for the body is impaired the more tumors there are and there are two kinds of tumors, a benign tumor and a malignant tumor. Benign tumors do not spread and stay in place, whereas malignant tumors travel through the body either through the bloodstream or the lymphatic system. There are 4 stages of lung cancer. In stage one, the cancer is only located in the lungs and has not spread into any lymph nodes, lymph nodes are small structures that filter harmful substances. In stage two, the cancer is in the lungs and the nearby lymph nodes. In stage three, cancer is in the lungs and the lymph nodes in the middle of the chest. In stage four, the cancer is in both of the lungs, the fluid around the lungs, or other parts of the body. There are two main types of lung cancer, small cell lung cancer (SCLC), which accounts for about 10% - 15% of lung cancers, and non-small lung cancer (NSCLC), which accounts for about 85% of lung cancers. My grandfather, on my father's side, found out he had stage four non-small cell lung cancer (NSCLC) May 28, 2012, on Memorial Day, and died October 25, 2012.

Treatment: How to Treat NSCLC

The five basic ways to treat NSCLC are surgery, radiation therapy, chemotherapy, targeted therapy, and immunotherapy.

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Student Name: Elma Lu

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Teacher's Name: Mary Thurber

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For surgery, the surgeon must remove the tumor and the surrounding border or margin of healthy lung tissue. In radiation therapy, high energy x-rays or other particles are used to destroy cancer cells and shrink the tumor. Both surgery and radiation therapy cannot treat widespread cancer cells and can only destroy cancer cells directly. Also, the patients may experience fatigue or loss of appetite if they receive radiation therapy. If the radiation is directed to neck or nearby, the patient may experience a sore throat and will have struggle swallowing. The patient may also encounter a sunburn-like skin irritation where the radiation is directed. Other side effects may include cough, fever or shortness of breath even long after the therapy. Although surgery is the treatment of choice for lung cancer, there is no conclusive evidence to how effective it is. A small trial was conducted for the effectiveness of surgery v.s. radiation but it was inconclusive. Chemotherapy uses drugs to eliminate cancer cells, the drug's normal purpose is the prevent the spread of cancer cells. Chemotherapy is used through the bloodstream and is delivered through a pill but most of the time it is an injection. The treatment commonly uses a combination of two to three different kinds of drugs. The common drugs include Carboplatin (Paraplatin) or cisplatin (Platinol), Docetaxel (Docefrez, Taxotere), Gemcitabine (Gemzar), Nab-paclitaxel (Abraxane), Paclitaxel (Taxol), Pemetrexed (Alimta), and Vinorelbine (Navelbine). Some side effects include fatigue, risk of infection, nausea, vomiting, diarrhea, appetite loss, and hair loss, however these side effects depend on the person and the dose taken. Targeted therapy tracks specific cancer genes that contribute to the spread of cancer cells and blocks the growth without harming healthy cells. The doctor may run tests to find the most effective treatment and identify the genes of the tumor. Immunotherapy increases the strength of body's immune system so it increases the body's natural defense against the cancer cells. My grandfather was treated with radiation therapy, chemotherapy, and targeted therapy. The side effects included fever, from radiation; fatigue, from chemotherapy and radiation; and weight loss or appetite loss, also from chemotherapy and radiation.

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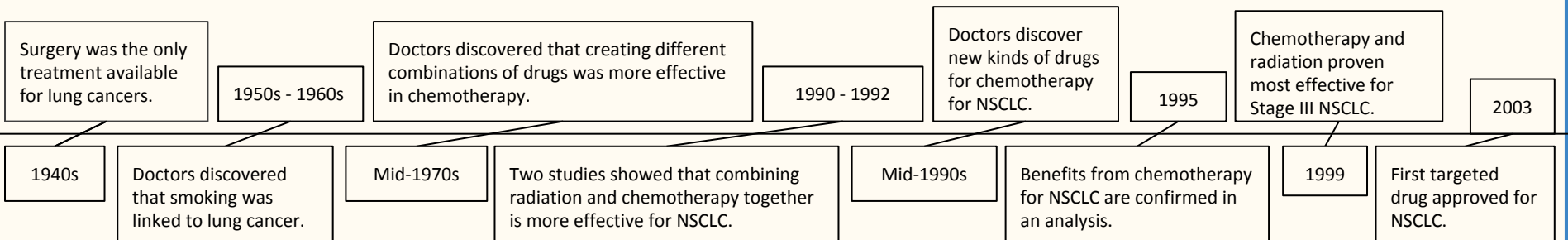
Personal Life: How has Lung Cancer Affected My Life?

Lung cancer has been around since the beginning of mankind, however it was only in 1761 when it was actually identified as a disease. Smoking is the main reason for lung cancers, in either smoking or secondhand smoke. This was most likely the reason why my grandfather had lung cancer, he was a heavy smoker and smoked many cigarettes a day. This is very common in China, infact, many of my male relatives outside of my nuclear family smoke . Smoking is not an uncommon action in China, it is so accepted, people even smoke indoors. After my grandfather passed away , my entire family was greatly affected by his death. Experiencing this, I don't want any of my other relatives to pass away from lung cancer either.



Image: My grandpa with my grandma while he was under treatment for NSCLC.

History of Lung Cancer : A Timeline (Not to Scale)



Interview with my father (Siqing Lu: My grandpa's son)

- How did lung cancer affect grandpa's life?
 - It was damaging. The lung cancer reached his spine and affected his entire nervous system so he was unable to move. He also had breathing problems.
- What do you think was the main cause of grandpa's lung cancer?
 - The environment, smoking, and stress. He was stressed about grandma's health. * My grandma has not recovered from her stroke and can be seen in a wheelchair in the first image *
- Do you think there was anything grandpa could have done to prevent having non-small cell lung cancer?
 - If he had stopped smoking early on.
- What do you have to say about our other family members smoking?
 - It is better if they stop
- Did you think the treatments that grandpa had (radiation therapy, Chemotherapy, targeted therapy) had any effect? Were they positive or negative?
 - It was not negative, but the positives were very limited, radiation therapy helped prevent broken bones and the other treatments improved his immune system.
- What do you have in hopes for treating lung cancer in the future?
 - I hope they find more treatments soon or even a cure.



Image (drawn by me) : Smoking is the main cause of NSCLC.