LABORATORY TESTS RELATED TO LUNG CANCER

"Lung cancer can affect people of all genders. In this material, the terms “male” and “man” are used to refer to people assigned male at birth. The terms “female” and “woman” are used to refer to people assigned female at birth.

WHAT ARE THE LUNGS?

The lungs are paired organs in the thoracic cavity (chest) that are main part of the respiratory system. One of the functions of the lungs is to inhale oxygen and exhale carbon dioxide. The right lung has three lobes and the left lung has two lobes. The trachea is divided into two bronchi which enter the lungs. Bronchi divide into smaller branches called bronchioles, which have air sacs at the end called alveoli.
LUNG CANCER

Primary lung cancer is a malignant tumor that originates in the lungs. Lung cancer usually begins in the lining of the bronchi, in the bronchioles or alveoli. The two main types of lung cancer are non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC). Secondary lung cancer is a metastatic malignant tumor that arises elsewhere in the body but travels to the lung and forms a lesion. The signs and symptoms of lung cancer include shortness of breath, a persistent cough, chest pain, coughing up blood and weight loss. Although most people with lung cancer have a history of smoking (90%), lung cancer does occur in those who have never smoked —10% of men with lung cancer and 20% of women with lung cancer were never smokers.

NON-SMALL CELL LUNG CANCER (NSCLC)

NSCLC is the most common type of lung cancer and it accounts for 80-85% of lung cancers. There are different subtypes of non-small cell lung cancers, which begin in different cells of the lungs. Most patients with lung cancer are often asymptomatic which makes regular screening essential for early detection. Screening is particularly necessary for smokers in the 50 to 80 years age range who currently smoke or quit in the last 15 years and smoked an average of one cigarette pack per day for 20 years. The signs and symptoms of NSCLC include fatigue, cough, shortness of breath, coughing up phlegm or mucus and unintentional weight loss.

ADENOCARCINOMA

Adenocarcinoma begins in the cells that produce substances such as mucus most often in the periphery of the lung. Adenocarcinoma is common in both people with a history of smoking and those who do not.

LARGE CELL CARCINOMA

Large cell carcinoma tumors can begin anywhere in the lungs and grow very quickly. The malignant tumors consist of large and abnormal-looking cells.

SQUAMOUS CELL CARCINOMA

This type of cancer begins in flat cells that replace the lining of airways in the lungs called squamous cells. Squamous cells are not normally found in the lungs. Through repeated damage such as the damage caused by cigarette smoke, damaged cells change their program (metaplasia) to become squamous cells. Squamous cell carcinoma usually begins in the bronchi near the center of the lungs where damaged cells are more likely to occur. People with this type of cancer usually have a history of smoking.

SMALL CELL LUNG CANCER (SCLC)

SCLC contributes to about 10-15% of all lung cancers. This type of lung cancer spreads and grows very rapidly. It usually begins in the airways of the lungs. Nearly all small cell lung cancer cases are linked to cigarette smoking. The signs and symptoms include a persistent cough, wheezing, unintentional weight loss, swelling in the face and chest pain or discomfort.
STAGES OF LUNG CANCER

The stages of lung cancer determine how far the cancer has spread and what parts of the body it has spread to. The complete staging system is quite complex and takes into account the size of the tumor with various other considerations. Your treatment plan and prognosis will depend on the staging portion of your diagnosis. Below is a short description of each stage.

STAGES OF NON-SMALL CELL LUNG CANCER

STAGE 0:
The cancer is only in the top lining of the bronchus or lung and has not spread to other parts of the body; this stage is almost impossible to detect but may be found incidentally or with advanced imaging.

STAGE I:
The tumor measures 4 cm or smaller and has not spread to nearby lymph nodes or other parts of the body.

STAGE II:
The cancer is classified as IIA or IIB depending on the size and spread within the lung and/or to nearby structures and/or lymph nodes. Stage II applies either to tumors larger than 4 cm but no larger than 5 cm that are confined to the lung or have spread no further than the closest lymph nodes, or tumors confined to the lung that are no bigger than 7 cm that have
- Reached the main bronchus
- Or caused a portion or the entire lung to collapse or has pneumonitis
- Or spread to the innermost tissue that wraps around the lungs and/or heart.

STAGE III:
The cancer is classified in three groups as IIIA, IIIB or IIIC depending on the size, location of the tumor and how far it has spread. In stage III, the cancer has spread to lymph nodes in the mediastinum or directly invaded into the mediastinum which is the area in the chest between the lungs.

STAGE IV:
The tumor is any size and has spread to distant lymph nodes or spread to other organs in the body.

STAGES OF SMALL CELL LUNG CANCER

There are two stages used to describe the progression of small cell lung cancer.

LIMITED STAGE:
The cancer is located in one side of the chest such as the lung or the lymph nodes in the same area of the chest.

EXTENSIVE STAGE:
The cancer has spread to tissue outside the first affected lung such as the opposite lung, lymph nodes in the other side of the chest or to other parts of the body.
LABORATORY TESTS RELATED TO LUNG CANCER

*Please note that reference ranges are set by individual laboratories for their specific populations so reference ranges might differ slightly.

BIOPSY:
During this procedure, a sample of lung tissue is removed. The sample is analyzed for the presence and the type of lung cancer.

BIOMARKER TESTING:
Biomarkers are characteristics peculiar to your tumor that are helpful in predicting the likelihood of responding to certain drugs. This specialized testing is often described as “molecular testing” and includes multiple tests for a number of markers that may be important, especially for tumors for which surgery by itself may not be enough. Testing is usually performed on a biopsy rather than a blood sample.

THORACENTESIS:
This test collects a sample of pleural effusion, which is a fluid that has collected around the lungs. This test is important because the fluid is analyzed to assess whether the cancer has spread to the lining of the lungs.

SPUTUM CYTOLOGY:
During this test, a sample of sputum (mucus) is coughed up from the lungs and analyzed to look for cancer cells. This test is important because it helps diagnose cancers that begin in the major airways such as squamous cell lung cancer.

LABORATORY TESTS RELATED TO MONITORING LUNG CANCER

Cancer Antigen 15-3: This test measures the levels of the protein, CA 15-3 in the blood. This test is important because the levels of CA 15-3 in the blood indicate how the tumor is responding to treatment. The typical reference range* for CA 15-3 is less than 30 U/mL.

QUESTIONS TO ASK YOUR DOCTOR

• What kind of lung cancer do I have?
• What stage is the cancer?
• What is the course of action based on my laboratory results?
• What are all my treatment options?
• Why do you recommend this particular treatment?
• How will we know that the treatment is working?
  What should I watch for?
• Do I need to make any lifestyle or dietary changes?
• What are the follow-up tests and what are their importance?
• What happens if the tumor markers are higher than we would like to see?
When Tanya interviewed a lung cancer patient for work, she noticed she had been experiencing symptoms that were eerily similar to the patient. She went home, contacted her primary care physician, and requested specific laboratory tests. The test results came back with a diagnosis of non-small lung cancer (NSCLC). Tanya had never smoked so she was shocked when she heard the diagnosis. The severity of her diagnosis was emphasized by her doctor urging her to clear her calendar and cancel any plans she had so that she could focus on her treatment. A month after her diagnosis, she had surgery to have a right lower lobectomy where the majority of her right lung was successfully removed.

Two years after her cancer diagnosis, she married the love of her life, Nathan, and today Tanya is cancer free.

“These tests are crucial and life-saving, she says. I am beyond grateful to still be taking deep breaths through my lungs each day.”

To learn more about Tanya, go to www.ascp.org/patients

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**Without lab tests, I’m certain that I wouldn’t be here today.**

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Champions@ascp.org

For more information and to get involved: www.ascp.org/patients