Molecular Testing in Non-Small Cell Lung Cancer

Non-Small Cell Lung Cancer

Cancer is a disease of cells. Cancer cells have lost their ability to grow in a normal, controlled manner. Unlike normal cells, cancer cells form tumors because too many cells are made. Cancer cells may also spread to and grow in a site distant from where the cancer started. Cancer cells may replace normal cells and cause vital organs, like the brain, to stop working as they should.

Most lung cancers start in cells that line the airways of the lungs. These lung cancers include small cell lung cancers and non-small cell lung cancers. Non-small cell lung cancers are much more common. Subtypes of non-small cell lung cancer include squamous cell carcinoma, adenocarcinoma, large cell carcinoma, and other rare forms. This flyer explains what molecular testing is and when it should be used to plan treatment of non-small cell lung cancers.

What is molecular testing?

Inside of cells are coded instructions, called genes, for building new cells and controlling how cells behave. There are about 30,000 specific genes in a cell. The genes inside of cancer cells are not the same as the genes inside normal cells. Doctors have identified some of the abnormal genes that help cancer cells grow and survive. They also have learned how these abnormal genes make proteins that control cancer cell growth and survival. Molecular testing determines if such abnormal genes or proteins are present. It will identify which abnormal gene you have. Although similar types of cancer have common abnormal genes, each person's cancer is somewhat unique.

Why get tested?

Your doctors will use the results of molecular testing to decide which cancer treatments are likely to work best for the type of cancer you have. Targeted therapy is the use of a drug or drugs that stop or block the growth of cancer cells with an abnormal gene that is found by

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molecular testing. Targeted therapy destroys mostly cancer cells but does destroy some normal cells. Compared to other cancer drugs, such as chemotherapy, targeted therapy is less harmful to normal cells.

Who should be tested?

Molecular testing is used to plan treatment for non-small cell lung cancer that has spread outside the chest. Most of the time, testing is done among patients with stage IV cancer or with cancer that has come back after treatment and spread outside the lung. Because less is known about abnormal genes in squamous cell cancer, very few people with squamous cell carcinoma will have abnormal genes for which targeted treatments are available. Therefore, at this point, molecular testing is recommended only for people with squamous cell carcinoma who never smoked or who have mixed subtypes. Molecular testing is recommended for all other non-squamous subtypes—adenocarcinoma, large cell carcinoma, and other rare forms.

How is testing done?

Molecular testing is done at a CLIA-certified laboratory. For now, a sample of cancer cells from the tumor is needed for molecular testing. Cancer cells can be removed from your body by either a biopsy or surgery. Please talk with your doctors about options for removing samples as there are many methods. A sample from the tumor is needed to first learn if you have cancer and secondly to perform molecular testing. There may not be enough tissue from one biopsy to do molecular testing. If not, a second biopsy may be needed to collect enough cancer cells for testing.

NCCN offers a complete guide to the treatment of non-small cell lung cancer for patients and caregivers. Visit **NCCN.org/patients** for a copy of the NCCN Guidelines for Patients®: Non-Small Cell Lung Cancer.

This flyer is a resource of the National Comprehensive Cancer Network® (NCCN®). NCCN is a not-for-profit alliance of 23 of the world's leading cancer centers. Its mission is to improve the lives of patients with cancer.

Experts from NCCN have written treatment guidelines for lung cancer doctors. These treatment guidelines suggest what the best practice is for cancer care. The information in this flyer is based on these guidelines.

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