

# UNDERSTANDING Metastatic *RET* Fusion-Positive Non-Small Cell Lung Cancer (NSCLC)

## ABOUT METASTATIC LUNG CANCER

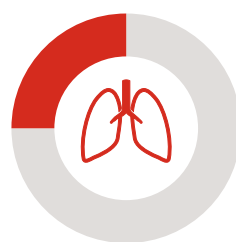
Lung cancer is a cancer that starts in a person's lungs. Metastatic cancer means cancer cells have spread to other parts of the body.

Lung cancer may spread to other parts of the body, including bones, adrenal glands, the brain, and the liver. People with lung cancer whose cancer cells have spread to these places likely have metastatic cancer.



Lung cancer is the:<sup>1</sup>

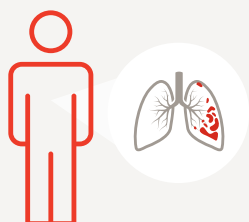
- **2nd most common** cancer
- Leading cause of cancer death among both men and women, accounting for almost **25% of all cancer deaths**.



Every year, more people die of lung cancer than of **colon, breast, and prostate** cancers combined.<sup>1</sup>

## THE AMERICAN CANCER SOCIETY ESTIMATES THAT IN 2022, THERE WILL BE:<sup>1</sup>

About  
**236,740**  
new cases of lung cancer  
in the U.S.



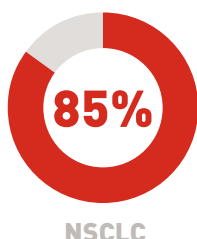
About  
**130,180**  
deaths from lung cancer  
in the U.S.



## ABOUT METASTATIC NSCLC

There are two main types of lung cancer: small cell lung cancer (SCLC) and NSCLC.

About 85% of people with lung cancer have NSCLC.



The main subtypes of NSCLC are **adenocarcinoma, squamous cell carcinoma, and large cell carcinoma**.

These subtypes start from different types of lung cells, but are grouped together as NSCLC because they usually have a similar treatment and prognosis.<sup>2</sup>



## WHAT IS METASTATIC *RET* FUSION-POSITIVE NSCLC?

Metastatic NSCLC can be driven by a gene in a person's body. One of those genes is *RET* (rearranged during transfection).<sup>3</sup>

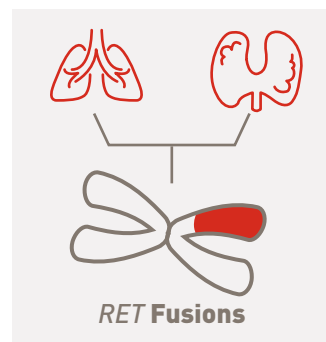
We all have something called *RET* in our bodies, similar to how we have faucets in our homes. When a person has a *RET* alteration, it's like that faucet gets stuck in the "on" position, allowing water to spread, just as *RET* alterations allow cancer to grow.<sup>3,4</sup>



The two main types of these cancer-promoting *RET* gene alterations are mutations and fusions.<sup>3,5</sup>

*RET* fusions can drive cancer growth of several tumor types, and are most commonly found in NSCLC and certain types of thyroid cancer.<sup>3</sup>

*RET* fusions have been identified in approximately **2%** of NSCLC cases.<sup>3</sup>



## HOW ARE GENOMIC ALTERATIONS IN CANCER IDENTIFIED?

The best way to know if a cancer has an alteration that can be treated is to **talk to a doctor about getting tested for all treatable biomarkers**.<sup>6</sup>

A biomarker test is a type of genomic test that can tell the doctor a lot about the cancer's DNA.<sup>7</sup> Certain biomarker tests require a doctor to biopsy the tumor, which means removing some tissue or blood for testing.<sup>\*8,9</sup>

These tests help oncologists develop a treatment plan for their patients. Knowing what is driving the cancer can help the patient and his or her doctor choose the right treatment.<sup>6</sup>



\*If a tumor has been biopsied previously, some tissue may already be available for testing.

1. American Cancer Society. Key Statistics for Lung Cancer. Available at: <https://www.cancer.org/cancer/lung-cancer/about/key-statistics.html>. Accessed October 4, 2022. 2. American Cancer Society. What is Lung Cancer? Available at: <https://www.cancer.org/cancer/lung-cancer/about/what-is.html>. Accessed October 4, 2022. 3. Drilon A, Hu ZI, Lai GGY, Tan DSW. Targeting *RET*-driven cancers: lessons from evolving preclinical and clinical landscapes. *Nat Rev Clin Oncol*. 2018;15(3):150. 4. Pinheiro APM, Pocock RH, Dixon MD, et al. Using metaphors to explain molecular testing to cancer patients. *Oncologist*. 2017;22:445-449. 5. Mulligan LM. *RET* revisited: expanding the oncogenic portfolio. *Nat Cancer Rev*. 2014;14(3):173-186. 6. Gregg JP, Li T, Yoneda KY. Molecular testing strategies in non-small cell lung cancer: optimizing the diagnostic journey. *Transl Lung Cancer Res*. 2019;8(3):286-301. 7. Committee on Policy Issues in the Clinical Development and Use of Biomarkers for Molecularly Targeted Therapies; Board on Health Care Services; Institute of Medicine; National Academies of Sciences, Engineering, and Medicine; Graig LA, Phillips JK, Moses HL, eds. *Biomarker Tests for Molecularly Targeted Therapies: Key to Unlocking Precision Medicine*. Washington, DC: National Academies Press (US); 2016: 1-21. 8. Biopsy: what you need to know. Medical News Today. [https://www.medicalnewstoday.com/articles/174043.php#what\\_is\\_a\\_biopsy](https://www.medicalnewstoday.com/articles/174043.php#what_is_a_biopsy). Accessed February 6, 2020. 9. Cheung AHK, Chow C, To KF. Latest development of liquid biopsy. *J Thorac Dis*. 2018;10:S1645-S1651.

# What is the Process for Comprehensive Biomarker Testing?

Comprehensive biomarker testing may delay starting treatment for a couple of weeks, **but getting the results before beginning treatment can help inform treatment decisions and is something to discuss with your doctor. Learn more about the process below:**

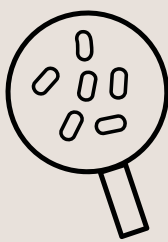
It's important to note that "biomarker testing" helps identify mutations when an error has occurred in a gene. Mutations can be:

- **Acquired (Somatic):** Present only in the tumor and not passed on to children
- **Inherited (Germline):** Present in all cells of the body and passed down to children

Most biomarkers that are used to make treatment decisions in lung cancer are acquired. Inherited biomarkers are still being researched.<sup>1</sup>

**1** A biopsy is performed at your next patient visit.

A biopsy is an examination of tissue removed from the body **to discover the presence, cause or extent of a potential disease**



Sometimes this is offered at the local care center or at a community hospital. If you have a solid tumor, the sample may be taken during surgery.

**2** The sample/biopsy is sent to a certified lab to be examined by a pathologist.

**3** A discussion with your doctor or healthcare team is necessary to determine whether comprehensive biomarker testing is appropriate for your care.

**4** Based on that discussion, a biomarker test may be ordered by your healthcare provider.

**5** The pathologist examines the sample/biopsy to find an appropriate tumor sample to test.

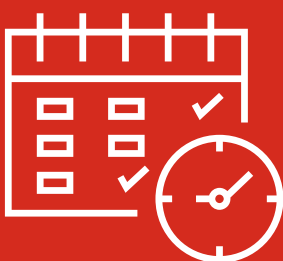
**6** The pathologist sends the tumor sample to the lab for analysis. The results can take 2 weeks.<sup>2</sup>

**7** Based on the results, the lab/pathologist creates a report that outlines the genetic alterations detected, including biomarkers in cancer cells from the biopsy.

**8** The report is shared with your doctor or healthcare team to inform a personalized treatment plan. In some cases, a targeted therapy — designed for a specific gene alteration — may be available.

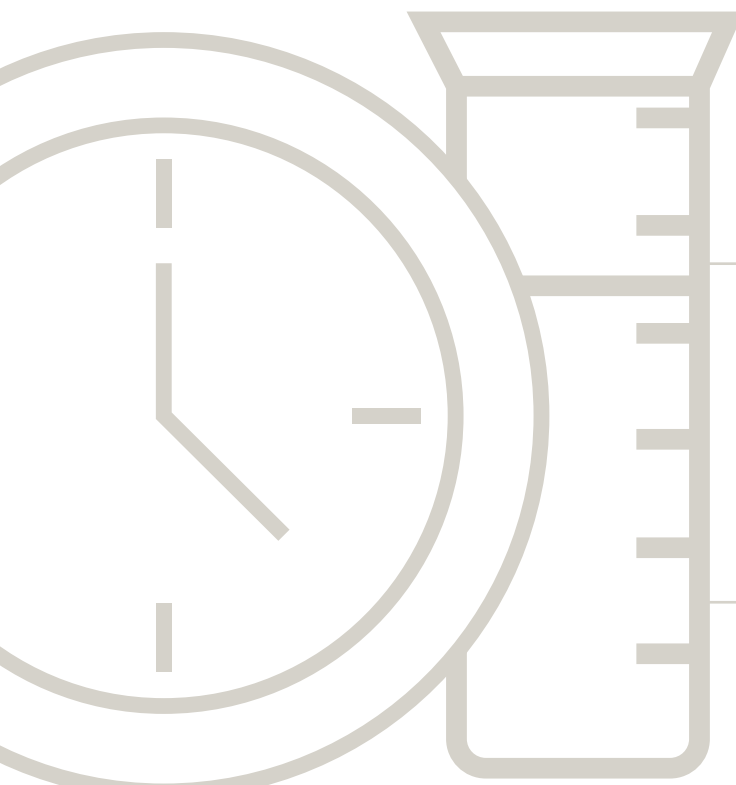


**Total length of process may take 3 – 4 weeks.**



While 3 – 4 weeks can seem like a long time after a cancer diagnosis, **it's worth the wait to understand your specific cancer type and the genes that drive it.** As more targeted treatments become available through clinical trials and FDA approvals, there is hope for more personalized medicines that specifically target your cancer.

# Comprehensive Biomarker Testing is Worth the Wait



Next-generation sequencing (NGS) is the leading option for comprehensive biomarker testing to detect many genomic alterations in a single test, **which provides information about each individual's specific cancer diagnosis.**



Recent scientific discoveries have led to a better understanding of the genomic makeup of many forms of cancer, including the identification of **"biomarkers" — biological characteristics found in the body that can be a sign of a condition or disease.**<sup>1</sup>



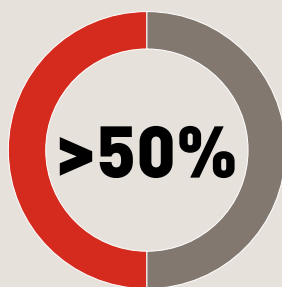
Understanding these alterations is critical for people living with cancer and their healthcare teams to **identify a targeted treatment option.**

**The American Society of Clinical Oncology recommends biomarker testing for all patients with advanced or metastatic cancer<sup>2</sup>**

**Reliable comprehensive biomarker testing is important for cancer care and worth waiting for the results.**

## Comprehensive Biomarker Testing in Lung Cancer:

Over 50% of patients with non-small cell lung cancer (NSCLC) **will have either an actionable genomic target or high levels of PD-L1 expression<sup>3</sup>**



Of the 11 important driver mutations in lung cancer, 9 of the biomarkers below are actionable, **meaning they have FDA approved treatments<sup>4</sup>**



Tumor genetic alterations found in biomarker testing for lung cancer patients include:

**ALK, BRAF, EGFR, HER2, KRAS, MET, NTRK, PD-1, PI3K, RET, ROS1<sup>4,5</sup>**



Global Resource for Advancing Cancer Education



**Sources:**  
1. National Cancer Institute. Dictionary of Cancer Terms: Biomarker. Accessed October 26, 2022. <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/biomarker?redirect=true>. 2. Chakravarty D, et al. Somatic Genomic Testing in Patients With Metastatic or Advanced Cancer: ASCO Provisional Clinical Opinion. *J Clin Oncol*. 2022 Apr 10;40(11):1231-1258. doi: 10.1200/JCO.21.02767 3. Huang RSP, et al. Landscape of Biomarkers in Non-small Cell Lung Cancer Using Comprehensive Genomic Profiling and PD-L1 Immunohistochemistry. *Pathol Oncol Res*. 2021;27:592997. Published 2021 Mar 11. doi:10.3389/pore.2021.592997 4. Vu P, Patel SP. Non-small cell lung cancer targetable mutations: present and future. *Precis Cancer Med* 2020;3:5. 5. Riely GL. What, When, and How of Biomarker Testing in Non-Small Cell Lung Cancer. *J Natl Compr Canc Netw*. 2017;15(5S):686-688. doi:10.6004/jnccn.2017.0073