

Oncology



An Interactive Guide to Anaplastic Lymphoma Kinase Positive (ALK+) Metastatic Non-Small Cell Lung Cancer (NSCLC)

Our understanding of lung cancer has changed from one disease to many subtypes

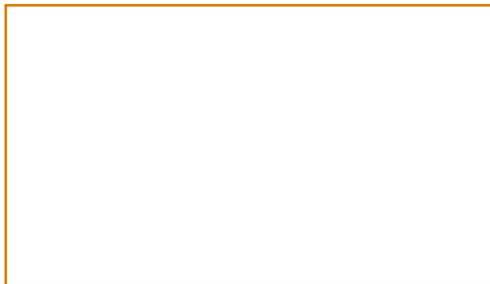


Learning about lung cancer: How ALK+ NSCLC fits in

Lung cancer is the leading cause of cancer death worldwide in both men and women¹. Each year, there are 1.8 million people diagnosed with lung cancer². Non-small cell lung cancer (NSCLC) is the most common type of lung cancer, accounting for 85-90% of cases, and adenocarcinoma is the most common type of NSCLC³. 2-7% of NSCLC cases are driven by a rearrangement of the anaplastic lymphoma kinase (ALK) gene⁴.

True or false?

Click to find out.



Genetic subtypes

Click the lungs below to learn more.

1. American Cancer Society. Cancer Facts & Figures 2013. American Cancer Society. <http://www.cancer.org/acs/groups/content/@epidemiologysurveillance/documents/document/acspc-036845.pdf>. Accessed February 3, 2014. 2. Estimated number of incidence cases, both sexes, worldwide in 2012. International Agency for Research on Cancer Website. http://gco.iarc.fr/today/online-analysis-pie?mode=cancer&mode_population=continents&population=900&sex=0&cancer=11&type=0&statistic=0&prevalence=0&color_palette=default. Globocan 2012. 3. American Cancer Society. Detailed Guide: Lung Cancer (Non-Small Cell). American Cancer Society. <http://www.cancer.org/acs/groups/cid/documents/webcontent/003115-pdf.pdf>. Accessed February 3, 2014. 4. National Comprehensive Cancer Network (NCCN). NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines): Non-Small Cell Lung Cancer. NCCN 2014 3:1-148. 5. Riess JW, Wakelee HA. Metastatic Non-Small Cell Lung Cancer Management: Novel Targets and Recent Clinical Advances. *Clinical Advances in Hematology & Oncology*. 2012; 10: 226-224. 6. Pao W, Girard N. New driver mutations in non-small-cell lung cancer. *Lancet Oncol*. 2011;12:175-180. 7. Paik PK, Arcila ME, Fara M, et al. Clinical Characteristics of Patients With Lung Adenocarcinomas Harboring BRAF Mutations. *J Clin Oncol*. 2011;29:2046-2051. 8. Takeuchi K, Soda M, Togashi Y, et al. RET, ROS1 and ALK fusions in lung cancer. *Nature*. 2012;378-381.

There are many distinct types of NSCLC

While NSCLC used to be treated primarily based on histology, or how cancer cells look under a microscope, research in the last several years has shown that **other critical factors contribute to the diagnosis and treatment of NSCLC**¹. The identification of unique genetic mutations and biomarkers that are responsible for tumor growth have changed the way we approach NSCLC, and have led to the development of personalized treatment approaches.

From One
to Many

Approximately what % of patients with the adenocarcinoma type of NSCLC have an actionable genomic mutation driving their cancer?²



Select from these options:

What genetic changes occur in ALK+ NSCLC?³

Click the DNA to learn more.

1. Reade CA, Ganti AK. EGFR targeted therapy in non-small cell lung cancer: potential role of cetuximab. *Biologics*. 2009; 3: 215-224. 2. Korpanty GJ, Graham D, Vincent M. Biomarkers that currently affect clinical practice in lung cancer: EGFR, ALK, MET, ROS-1, and KRAS. *Frontiers in Oncology*. 2014; 4:1-8. 3. Non-Small Cell Lung Cancer, Version 4.2016. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines) Website. https://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf. Published January 12, 2016.

A typical patient with ALK+ NSCLC

Which of these three do you feel is the most likely to be diagnosed with lung cancer?

Patient
Profile

Patient 1

Patient 2

Patient 3

Empty response box for patient selection.

1. Liu M, Cai X, Yu W, Lv C, Fu X. Clinical significance of age at diagnosis among young non-small cell lung cancer patients under 40 years old: a population-based study. *Oncotarget*. 2015; 6(42): 44963–44970. Accessible via <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4792604/>. 2. Comprehensive Genomic Analysis in Tissue and Blood Samples From Young Patients With Lung Cancer. U.S. National Institutes of Health Clinical Trials Website. <https://clinicaltrials.gov/show/NCT02273336>. Verified October 2015. 3. Centers for Disease Control and Prevention. Cigarette Smoking Among Adults - United States, 2006. *Morbidity and Mortality Weekly Report*. Centers for Disease Control and Prevention. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5644a2.htm>. Accessed February 3, 2014. 4. American Cancer Society. Detailed Guide: Lung Cancer (Non-Small Cell). American Cancer Society. <http://www.cancer.org/acs/groups/cid/documents/webcontent/003115-pdf.pdf>. Accessed February 3, 2014.

Molecular testing in NSCLC is key

Molecular testing can provide **important information** about the **genetic makeup** of a patient's tumor and further classify the **specific type of NSCLC**¹.

Oncologists and pathologists

Oncologists and pathologists are encouraged to use molecular testing at the time of diagnosis on all patients with advanced NSCLC to better understand which biomarkers may be driving the cancer².

In fact, testing for biomarkers may²:

- Help a physician choose the most appropriate therapy
- Help to guide the selection of available and appropriate clinical trials for the patient

Patients with advanced NSCLC are more likely to benefit from molecular testing since earlier-stage tumors are typically addressed through surgery to provide the best chance of removing the cancer³.



In 2013, three leading professional organizations* issued **new evidence-based guidelines** on molecular testing. In 2016 these guidelines were validated².

Recommendations included²:

Click the numbers below.

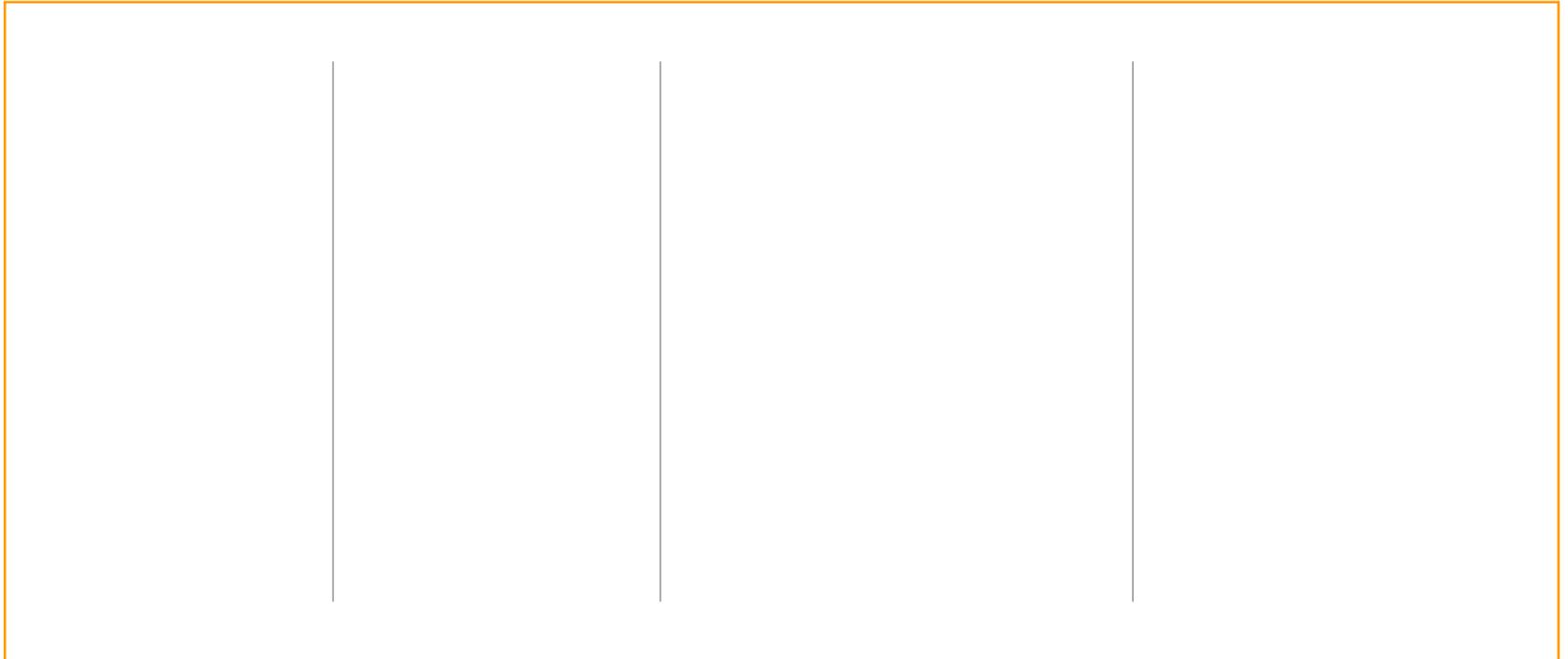
Molecular
Testing

* The College of American Pathologists (CAP), International Association for the Study of Lung Cancer (IASLC) and Association for Molecular Pathology (AMP)

1. National Human Genome Research Institute. Frequently Asked Questions About Genetic Testing. National Human Genome Research Institute. <http://www.genome.gov/19516567#al-2>. Accessed February 3, 2014. 2. Non-Small Cell Lung Cancer, Version 4:2016. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines) Website. https://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf. Published January 12, 2016. 3. Lung Cancer (Non-Small Cell) Detailed Guide. American Cancer Society Website. <http://www.cancer.org/acs/groups/cid/documents/webcontent/003115-pdf.pdf>. Updated May 16, 2016.

Current treatment options for NSCLC

Click the options below.



Treatment

Multiple factors are taken into account when making treatment decisions, including **type and stage of disease**, whether or not **biomarkers such as ALK** have been identified, and the **age and overall health** of the patient. Nevertheless, currently available therapeutic options and biomarkers have transformed the way we approach the treatment of NSCLC².

1. Lung Cancer (Non-Small Cell) Detailed Guide. American Cancer Society Website. <http://www.cancer.org/acs/groups/cid/documents/webcontent/003115-pdf.pdf>. Updated May 16, 2016. 2. Riess JW, Wakelee, HA. Metastatic Non-Small Cell Lung Cancer Management: Novel Targets and Recent Clinical Advances. *Clinical Advances in Hematology & Oncology*. 2012;10: 226-224.

Identifying disease progression in ALK+ NSCLC

Even after treatment with an ALK inhibitor, lung cancer patients may experience **disease progression**, where their cancer may continue to grow or spread, even after starting therapy¹. For patients with ALK+ NSCLC, common sites of disease progression (or metastasis) may include brain, liver and bone. Patients should **work closely with their healthcare team** to regularly monitor for symptoms of disease progression.

Possible symptoms of progression, or NSCLC, may include²:

Click the options below.

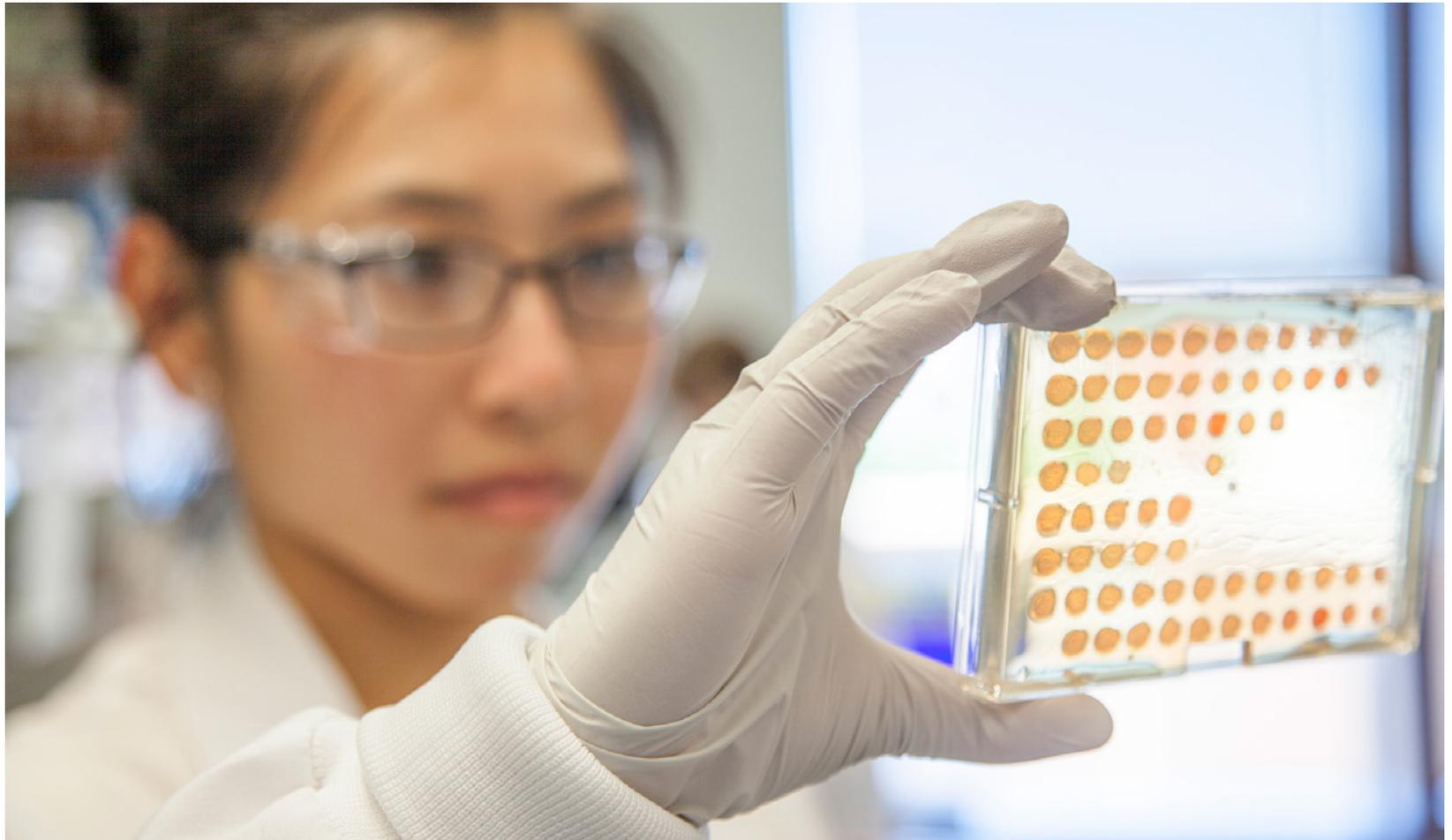
Disease
Progression

1. Katayama R, Shaw AT, Khan TM, et al. Mechanisms of acquired crizotinib resistance in ALK-rearranged lung cancers. *Sci Transl Med*. 2012;4(120):1-12. doi:10.1126/scitranslmed.3003316. 2. Lung Cancer (Non-Small Cell) Detailed Guide. American Cancer Society Website. <http://www.cancer.org/acs/groups/cid/documents/webcontent/003115-pdf.pdf>. Updated May 16, 2016.

The need for more ALK+ NSCLC therapies

Targeted oncology has changed the diagnosis and treatment of ALK+ NSCLC. However, **more research is needed**.

As a leader in the forefront of oncology, **Novartis is committed** to ongoing research in lung cancer with the goal of developing new medicines for patients in need.



Research
Continues

How much do you know about ALK+ NSCLC?

Below is a review of key facts and important statistics related to ALK+ NSCLC.

Click on each statement to reveal the answer.

10

25%

ALK, EGFR,
ROS1, PD-L1

2-7%

12

Test Your
Knowledge

1. Korpanty GJ, Graham D, Vincent M. Biomarkers that currently affect clinical practice in lung cancer: EGFR, ALK, MET, ROS-1, and KRAS. *Frontiers in Oncology*. 2014; 4:1-8. 2. Non-Small Cell Lung Cancer, Version 4:2016. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines) Website. https://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf. Published January 12, 2016. 3. Katayama R, Shaw AT, Khan TM, et al. Mechanisms of acquired crizotinib resistance in ALK-rearranged lung cancers. *Sci Transl Med*. 2012;4(120):1-12. doi:10.1126/scitranslmed.3003316. 4. Lovly C, Horn L, Pao W. 2016. Molecular Profiling of Lung Cancer. My Cancer Genome. <https://www.mycancergenome.org/content/disease/lung-cancer/>. Updated March 2016. 5. Lindeman NI, Cagle PT, et al. Molecular Testing Guideline for Selection of Lung Cancer Patients for EGFR and ALK Tyrosine Kinase Inhibitors. *Arch Pathol Lab Med*. 2013; 137: 828-1174.