# The Latest on Biomarker Testing for Lung Adenocarcinoma

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**Julie McDowell:**

Advances in therapies for lung adenocarcinoma have risen from advances in biomarker testing. The biomarker testing landscape is evolving quickly, as is its impact on patient care. Pathologists need to keep current in the field explains Dr. Jeff Chang in this CAPcast interview. Dr. Chang recently wrote an article on this topic for the precision medicine section of cap.org. Dr. Chang is a member of the CAP's Personalized Healthcare Committee, as well as the Associate Editor for the Archives of Pathology and Laboratory Medicine Journal. Dr. Chang, your article mentions that we've seen great advances in targeted lung cancer therapies that rely on biomarker testing. What are some of the developments, whether scientific, regulatory, or other, that are included here?

**Dr. Jeff Chang:**

Yeah. The major advances in therapy stint from genomic medicine that become reality after the first human genome project was completed in year 2000. After that innovative technologies, particularly the next generation sequencing, has been applied to discover driver mutations in various cancers and to develop small molecules to specifically target those driver mutations. Thus, allowing the possibility of precision medicine. The clinical laboratories and pathologists that then use the next generation sequencing technology and the bioinformatics to develop biomarker testing platforms to truly enable the procedure medicine in clinical practice.

**Julie McDowell:**

What advantages does biomarker testing offer over previously available therapies?

**Dr. Jeff Chang:**

Previously available therapies such as chemotherapy and radiotherapy try to kill cancer cells regard based of their genetic mutations. These treatments are not specific and are often not as effective, and they have significant toxicities. On the other hand, the biomarker testing results allow the oncologist to choose the right targeted therapy for the right patient carrying specific driver mutations. For example, they can choose EGFR inhibitors for sensitizing EGFR mutations. These therapies are more effective with much less toxicity.

**Julie McDowell:**

Your article detailed several biomarkers in related targeted therapies. In your opinion, which of these targeted biomarker therapies are the most promising in lung cancer treatment?

**Dr. Jeff Chang:**

Several targeted therapy are promising. The first one is EGFR inhibitors are the most commonly used targeted therapies, with multiple drug has been approved by FDA and they are the first targeted therapy approved for adjuvant therapy settings. Several mutation associated with resistance has also been well studied and have treatment available such as Osimertinib for the EGFR T790M mutation after the treatment of initial EGFR inhibitors. ALK and ROS1 inhibitors are another class of targeted therapy with multidrugs for oncologists to choose, based on patient's condition and the mutation type. A recently approved KRAS-G12C inhibitor also appear very promising. Since this is a very common mutation in lung adenocarcinomas and the targeted therapy has been long awaited.

**Julie McDowell:**

Are there any other developments in lung cancer therapy on the horizon for which pathologists should keep a watch?

**Dr. Jeff Chang:**

Yes. Other targeted therapy beyond EGFR inhibitors are undergoing clinical trial for adjuvant therapy setting. If the outcome of these trial are successful, the demand for biomarker testing will likely be doubled, so the pathologists need to prepare to handle this volume of testing. Another one is the need for KRAS mutation testing with the ability to specify the mutation position will also increased because the recently approved therapy targeting the KRAS-G12C mutation. Additionally, our inhibitors targeting the mutation other than G12C are currently undergoing clinical trials and. Inhibitors targeting EGFR Exon 20 mutation, which are currently considered as non-sensitizing mutation, have shown promising result in clinical trials. Therefore, testing request for this type of mutation will also gain momentum. All of these changes will likely further force laboratories to move away from single gene testing and adapt the next generation sequencing platform for multiple gene sequencing. Pathologists are encouraged to frequently check the procedure medicine website hosted by personalized healthcare committee by CAP for new development.

**Julie McDowell:**

Finally, Dr. Chang, do you have any parting thoughts you'd like to share on this topic?

**Dr. Jeff Chang:**

Yes. Pathologists play an essential role in biomarker testing, including making the correct diagnosis, selecting the appropriate biomarker testing method, overseeing the quality of such tests and communicating the biomarker testing result to the oncologist. Additionally, pathologists have to mindful to conserve the tissue for biomarker testing. Particularly since a lot of metastatic cancers are by diagnosed by small needle core biopsy, which resulting in limited amount of tissue. At our institution, we routinely pre-cut 30 [inaudible] slides for each biopsy to avoid cutting tissue blocks multiple times and wasting tissue. We use minimum amount of immunohistochemical stents to establish the diagnosis. We then proceed to molecular biomarker testing for driver mutations by NGS. If molecular marker testing find no targetable mutations, we then do biomarker testing for immunotherapy such as PDO [inaudible]. It is also important to know that targeted therapies are more effective than immunotherapy. So if patients have driver mutations, the first choice for them is targeting the driver mutations and not immunotherapy. Or by doing so, more than 95% of our patients receive appropriate biomarker testing for their ideal treatment.

**Julie McDowell:**

Well, thank you Dr. Chang. Please visit cap.org and enter precision medicine in the search function to find Dr. Chang's article, which is entitled Biomarker Testing for a Lung Adenocarcinoma in 2021- Summary for the Practicing Pathologist. Thank you for listening to this CAPcast. Be sure to listen to our other CAPcasts from the CAP on our SoundCloud channel by downloading the SoundCloud app on your mobile device, and we're also on Apple Podcast and the Stitcher app. To find this podcast, search for the word CAPcast on these apps. Once you find our podcast, be sure to click the subscribe button so you don't miss new CAPcast episodes.