EGFR Mutation Test Options at Progression

There are 2 categories of tests that are acceptable for use according to the NCCN

A new biopsy sample is required when testing for an epidermal growth factor receptor (EGFR) mutation at progression. The following 2 test categories are both considered acceptable methods to test for EGFR T790M mutations at progression[1]:

- FDA-approved in vitro diagnostic (IVD) tests[2]
- Laboratory-developed tests (LDTs) are required to adhere to performance specifications established by the Clinical Laboratory Improvement Amendments of 1988 (CLIA) under the regulation of the Centers for Medicare & Medicaid Services.[3,4] LDTs are designed, manufactured, and used within a single laboratory.[5]

Diagnostic EGFR T790M mutation tests at progression

There is only one FDA-approved test for detecting EGFR T790M mutations at progression[6]

cobas® EGFR Mutation Test v2 (Roche Diagnostics USA)

- Able to detect the EGFR T790M mutation at progression in addition to EGFR activating mutations at diagnosis (eg, exon 19 deletions and the L858R mutation)
- The test is approved to use DNA isolated from formalin-fixed, paraffin-embedded (FFPE) tumor tissue or circulating tumor DNA (ctDNA) from plasma[6]

Reminder: A new sample is required to test for EGFR T790M mutations at the time of progression.

LDTs for detecting EGFR T790M mutations

As you can see in the chart below, there are a number of commercially available LDTs to identify the EGFR T790M adaptive mutation at progression. While these LDTs are not FDA approved, they are validated and must adhere to specifications established by CLIA.[5]

Companies Offering CLIA-Validated LDTs for Detecting EGFR T790M Mutations

Company	Test Name	Sample Type	Turnaround Time
Guardant Health[7,8]	Guardant 360	Blood	14 days
Biodesix[9,10]	GeneStrat®	Blood	3 days
Sysmex Inostics[11,12]	OncoBEAM™	Tissue/Blood	<10 days
Foundation Medicine[13-15]	FoundationOne/Act®	Tissue/Blood	14 days
Exosome Diagnostics[16]	ExoDx™ Lung	Blood	5 days
Biocept[17]	Biocept Liquid Biopsy	Blood	<7 days
Trovagene[18,19]	Trovera™ EGFR	Urine/Blood	10 days

10 WORKING DAYS - The recommended turnaround time from the receipt of sample to reporting of EGFR mutation testing results according to guidelines from CAP, IASLC, and AMP[20]

When ordering an EGFR mutation test, it is important to verify turnaround time when the order is placed. If the test results are taking longer than expected, or exceed the recommended 10 days, it is recommended that you contact the laboratory.

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References: 1. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Non–Small Cell Lung Cancer V.5.2017. © National Comprehensive Cancer Network, Inc 2017. All rights reserved. Accessed April 28, 2017. To view the most recent and complete version of the guideline, go online to NCCN.org. **2.** US Food and Drug Administration. In Vitro Diagnostic Device Labeling Requirements. http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/Overview/DeviceLabeling/InVitroDiagnosticDeviceLabelingRequirements/. Accessed October 24, 2016. **3.** Fitzgibbons PL, Bradley LA, Fatheree LA, et al. Principles of analytic validation of immunohistochemical assays: Guideline from the College of American Pathologists Pathology and Laboratory Quality Center. *Arch Pathol Lab Med*. 2014;138(11):1432-1443. doi: 10.5858/arpa.2013-0610-CP. **4.** Centers for Medicare & Medicaid Services. Clinical Laboratory Improvement Amendments (CLIA). https://www.cms.gov/Regulations-and-Guidance/Legislation/CLIA/index.html?redirect=/clia/. Accessed December 19, 2016. **5.** US Food and Drug Administration. Laboratory Developed Tests. https://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/InVitroDiagnostics/LaboratoryDevelopedTests/default.htm. Accessed May 1, 2017. **6.** US Food and Drug Administration. List of Cleared or Approved Companion Diagnostic Devices (In Vitro and Imaging Tools). http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/InVitroDiagnostics/ucm301431.htm. Accessed October 16, 2016. **7.** Guardant Health. Guardant 360 73-Gene Panel. http://www.guardanthealth.com/medical-professionals/#gene-panel. Accessed November 2, 2016. **8.** Guardant Health. How Guardant 360 Works. http://www.guardanthealth.com/guardant360/#how-it-works. Accessed October 19, 2016. **9.** Biodesix. GeneStrat genomic test. http://www.biodesix.com/genestrat/. Accessed October 16, 2016. **10.** Clinical Laboratory Improvement Amendments Certificate of Compliance: Biodesix Inc. Baltimore, MD: Centers for Medicare & Medicaid Services; May 20, 2015. **11.** Sysmex Inostics. Sysmex OncoBEAM™ EGFR. http://www.sysmex-inostics.com/our-services/product-single-view/oncobeamTM-egfr-3805.html. Accessed October 19, 2016. **12.** Inostics' Lab Gains CLIA Licensure [news release]. Mundelein, IL: Sysmex Inostics Inc; May 30, 2013. http://www.sysmex-inostics.com/news-and-events/press-releases/inostics-blood-based-mutation-testing-receives-clia-certification-83.html. Accessed December 19, 2016. **13.** Foundation One Technical Information and Test Overview [informational leaflet]. Cambridge, MA: Foundation One; 2014. http://foundationone.com/ONE-I-001-20140804_(nobleed)TechnicalSpecs.pdf. Accessed December 19, 2016. **14.** Foundation ACT Technical Specifications Overview [informational leaflet]. Cambridge, MA: Foundation Medicine; 2016. http://foundationone.com/docs/FoundationACT/FM-ACT_TechnicalSpecsOverview_FINAL.pdf. Accessed December 19, 2016. **15.** Foundation Medicine. Foundation One Licenses and Accreditation. http://foundationone.com/licenses.php. Accessed December 19, 2016. **16.** Exosome Diagnostics. Lung Cancer. http://www.exosomedx.com/lung-cancer-0. Accessed December 19, 2016. **17.** Biocept Inc. Biocept Lung Cancer Liquid Biopsy. http://biocept.com/technology/lung-cancer-offering/. Accessed May 1, 2017. **18**. Trovagene. EGFR Mutation Testing. https://www.trovagene.com/egfr-mutation-testing/. Accessed May 1, 2017. **19.** Trovera™ Urine Liquid Biopsy Test Provides EGFR Status to Inconclusive Tissue Biopsy: Case Report in Non-Small Cell Lung Cancer [press release]. San Diego, CA: Trovagene Inc; August 9, 2016. **20.** Lindeman NI, Cagle PT, Beasley MB, et al. Molecular testing guideline for selection of lung cancer patients for EGFR and ALK tyrosine kinase inhibitors: guideline from the College of American Pathologists, International Association for the Study of Lung Cancer, and Association for Molecular Pathology. Arch Pathol Lab Med. 2013;137(6):828-860.