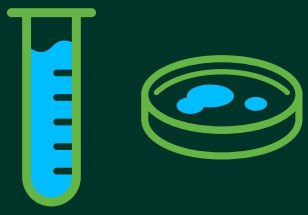
Testing for TRK Fusion Cancer

Some cancers are caused by specific changes in genes. Genes carry instructions for proteins in cells. An abnormal change to the genes can lead to an alteration of the proteins. As a result, these altered proteins can drive the growth and spread of tumors.

Genomic Testing

The altered genes can be identified through **genomic testing**, a test that can identify genomic alterations.[1]



Gene testing could help identify potential therapeutic options appropriate for the cancer.[1,2]

Studies show that

of patients who undergo genomic testing may have actionable, genomic alterations.

In a prospective clinical trial of 843 patients with **advanced cancers who went through genomic testing, 49% of patients** were found to have an **actionable alteration**.[2]

In an analysis of 500 patients treated at the MD Anderson Cancer Center with **advanced cancer in multiple tumor types** who had undergone genomic testing, **30% were found to have actionable alterations**.[1]

In 2 studies of genomic testing in **pediatric solid tumors, between 31% and 39%** of patients had **tumors with actionable alterations**.[3,4]

One alteration that can be identified through genomic testing is a **neurotrophic tyrosine receptor kinase *(NTRK)* gene fusion**.[5]

NTRK gene fusions cause the expression of **tropomyosin receptor kinase (TRK) fusion proteins,** acting like a light switch that tells the tumor to continue growing.[6-8]

TRK fusion proteins are a driver of the spread and growth of tumors in both adult and pediatric patients with **TRK fusion cancer**.[6,9]

Only specific tests can detect ***TRK fusion cancer*** [6,8]

Next-generation sequencing (NGS) currently provides a comprehensive view of a large number of genes and may identify *NTRK* gene fusions, as well as other actionable genomic alterations.[10,11]

Immunohistochemistry (IHC) uses antibodies to detect the presence of proteins in a given sample.[12]

Fluorescence *in situ* hybridization (FISH) is a laboratory technique used to look at specific pieces of the DNA binding to fluorescent probes, lighting up when viewed under a microscope.[13]

For more information visit: **trkcancer.com**

References

1. Boland GM, Piha-Paul SA, Subbiah V, et al. Clinical next generation sequencing to identify actionable aberrations in a phase I program. Oncotarget. 2015;6(24):20099-20110.
2. Massard C, Michiels S, Ferte C, et al. High-throughput genomics and clinical outcome in hard-to-treat advanced cancers: results of the MOSCATO 01 trial. Cancer Discov. 2017;7(6):586-595.
3. Harris MH, DuBois SG, Glade Bender JL, et al. Multicenter feasibility study of tumor molecular profiling to inform therapeutic decisions in advanced pediatric solid tumors: the individualized cancer therapy (iCat) study. JAMA Oncol. 2016;2(5):608-615.
4. Parsons DW, Roy A, Yang Y, et al. Diagnostic yield of clinical tumor and germline whole-exome sequencing for children with solid tumors. JAMA Oncol. 2016;2(5):616-624.
5. Stransky N, Cerami E, Schalm S, Kim JL, Lengauer C. The landscape of kinase fusions in cancer. Nat Commun. 2014;5:4846. doi:10.1038/ncomms5846.
6. Vaishnavi A, Le AT, Doebele RC. Cancer Discov. 2015;5(1):25-34.
7. Amatu A, Sartore-Bianchi A, Siena S. ESMO Open. 2016;1(2):e000023.
8. Kumar-Sinha C, Kalyana-Sundaram S, Chinnaiyan AM. Landscape of gene fusions in epithelial cancers: seq and ye shall find. Genome Med. 2015;7:129. doi:10.1186/s13073-015-0252-1.
9. Okimoto RA, Bivona TG. Tracking down response and resistance to TRK inhibitors. Cancer Discov. 2016;6(1):14-16.
10. Abel HJ, Al-Kateb H, Cottrell CE, et al. Detection of gene rearrangements in targeted clinical next-generation sequencing. J Mol Diagn. 2014;16(4):405-417.
11. Rogers T-M, Arnau GM, Ryland GL, et al. Multiplexed transcriptome analysis to detect ALK, ROS1 and RET rearrangements in lung cancer. Sci Rep. 2017;7:42259. doi:10.1038/srep42259.
12. Hechtman JF, Benayed R, Hyman DM, et al. Pan-trk immunohistochemistry is an efficient and reliable screen for the detection of NTRK fusions. Am J Surg Pathol. 2017;41(11):1547-1551.
13. Cui C, Shu W, Li P. Fluorescence In situ Hybridization: Cell-Based Genetic Diagnostic and Research Applications. Frontiers in Cell and Developmental Biology. 2016;4:89. doi:10.3389/fcell.2016.00089.

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