Tumor Diagnostics

CancerDetect®

Highly sensitive detection of actionable variants from liquid biopsy with low tumor content

CeGaT

Liquid Biopsy Analyses in Tumor Diseases

Liquid biopsy (LB) analysis is an optimal alternative testing method in cases where tumor tissue is unavailable, e.g., inoperable tumors or poor patient condition. It can be performed non-invasively (without further tumor biopsy) using a blood collection in special liquid biopsy tubes. LB-analysis detects cell-free DNA (cfDNA) circulating in the bloodstream.

Since often only a fraction of the cfDNA originates from the tumor, we have developed a highly sensitive approach called CancerDetect® with a lower reporting threshold of 0.25% allele frequency. Here we focus on detecting actionable, therapy-relevant, and most frequently mutated hotspots in the tumor genome, as well as selected gene fusions (details see right).

Therefore, on the one hand, the results of LB analysis can play a major role in therapy decisions. On the other hand, LB can be used to monitor tumor patients.

Gene Directory

Gene	NM_Nr.	Enriched region (incl. example hotspot (HS)-variants)
AKT1	NM_005163.2	Exon 2 (HS E17)
ALK	NM_004304.5	Exons 22-25 (incl. HS F1174, G1202, F1245, R1275)
AR	NM_000044.6	Exons 4, 5 and 8
BRAF	NM_004333.6	Exons 11 and 15 (incl. HS V600)
CDKN2A	NM_000077.5	Entire coding region
CTNNB1	NM_001904.4	Exons 2, 6 and 7 (incl. HS S37, S45, K335, N387)
EGFR	NM_005228.5	Exons 2, 3, 6, 7, 15, 18-21 (incl. HS A289, G598, E746_A750del, T790, L858)
ERBB2	NM_001904.4	Exons 8, 17, 19-21 (incl. HS S310, R678, V842)
ERBB3	NM_001982.4	Exons 3, 7-9, 23 (incl. HS V104, E928)
ESR1	NM_000125.4	Exons 4, 5, 7, 8 (incl. HS K303, Y537, D538)
FGFR1	NM_023110.3	Exons 11-13 (incl. HS N577, K687)
FGFR2	NM_000141.5	Exons 6, 8, 11-13 (incl. HS S252, N549)
FGFR3	NM_000142.5	Exons 6, 8, 13 (incl. HS R248, S249, Y375)
GNA11	NM_002067.5	Exons 4 and 5 (incl. HS R183, Q209)
GNAQ	NM_002072.5	Exons 2, 4 and 5 (incl. HS T96, R183, Q209)
GNAS	NM_000516.7	Exon 8 (HS R201)
H3-3A	NM_002107.7	Exon 1 (HS K27, G34)
HRAS	NM_005343.4	Exons 1-3 (incl. HS G12, Q61)
IDH1	NM_005896.4	Exon 2 (HS R132)
IDH2	NM_002168.4	Exon 4 (HS R140, R172)
JAK2	NM_004972.4	Exon 12 (HS V617)
KIT	NM_000222.3	Exons 9, 11, 13, 14, 17 (incl. HS W557_K558del, D816)
KRAS	NM_004985.5	Exons 1-3 (incl. HS G12, G13, Q61)
MET	NM_001127500.3	Exons 13, 15, 18 (incl. HS L982_D1028del, T1010, Y1248, Y1253)
NRAS	NM_002524.5	Exons 1-3 (incl. HS G12, Q61)
PDGFRA	NM_006206.6	Exons 11, 13, 17 (incl. HS D842)
PIK3CA	NM_006218.4	Exons 1, 4, 7, 9, 13, 20 (incl. HS R93, E542, E545, H1047)
PTEN	NM_000314.8	Entire coding region
RET	NM_020975.6	Exons 10, 11, 13-16 (incl. HS C634)
TERT	NM_198253.3	Promotor HS c.-124 (C228), c.-146 (C250)
TP53	NM_000546.6	Entire coding region

DNA-based detection of selected structural variations in these genes:
ALK, RET, ROS1, FGFR2, FGFR3, NTRK1

All relevant variants in a named exon are analysed. Exon numbers refer to coding exons (CDS) in a given transcript. Diagnostics is not necessarily limited to the example hotspot mutations listed. Exons not named and all variants within are not part of the analysis.

Patient Case

Patient and indication:

- 42 years old, female, metastatic non-small cell lung cancer (NSCLC) with an *EGFR L858R* variant in the primarius
- relapse after initial response to afatinib treatment
- recurrent tumor inoperable, no tumor biopsy possible

Primary finding:

The result of an analysis of cell-free DNA using a standard lung cancer panel remained negative.

CancerDetect®-finding:

Our CancerDetect® analysis revealed a 2% tumor content in the liquid biopsy and detected the known *EGFR L858R* variant, as well as an additional *EGFR T790M* variant. The *EGFR T790M* variant represents one of the most common resistance mechanisms to tyrosine kinase inhibitors (TKIs) and typically occurs in NSCLC patients after first-line TKI treatment. In this patient, treatment was adjusted with the third-generation EGFR inhibitor osimertinib.

Would You Like to Know More?

For further information visit:
www.cegat.com/cancerdetect

The Benefits of CancerDetect®

- The highly sensitive liquid biopsy analysis detects variants at a novel allele frequency (NAF) of 0.25%. Thus, it detects even the smallest amounts of cell-free tumor DNA.
- CancerDetect® identifies variants in genes that are known to be driver variants and relevant to a broad range of tumor entities.
- Detection of selected therapy-relevant gene fusions for targeted therapy options.
- Due to its simple, non-invasive, and repeatable sampling, it is ideal for monitoring and early detection of recurrence.
- Due to the highly sensitive detection of tumor-specific biomarkers, the analysis of cell-free tumor DNA can be used to monitor tumor dynamics in real-time and to intervene or adjust treatment if necessary (e.g., acquired resistance).
- The high coverage of 50,000 - 100,000x in the raw data enables the detection of therapy-relevant variants even with a low tumor content in the sample.

Our medical report includes listing of all clinically relevant variants and therapy options identified. Our interdisciplinary team of scientists and physicians prepares and discusses each medical report, ensuring issuing of medically meaningful reports. This includes listing any clinically relevant variants and therapy options identified. Our interdisciplinary team of scientists and physicians prepares and discusses each medical report. Like so, we ensure the highest quality.

Are you interested?
We are delighted to hear from you.

Send us an email at **tumor@cegat.com** or reach us via phone at **+49 7071 565 44-55.** We will be happy to send you more information about our tumor diagnostics.

About Us

CeGaT is a global provider of genetic analyses for a wide range of medical, research, and pharmaceutical applications.

Founded 2009 in Tübingen, Germany, the company combines state-of-the-art sequencing technology with medical expertise – with the aim of identifying the genetic causes of diseases and supporting patient care. For researchers and pharmaceutical companies, CeGaT offers a broad portfolio of sequencing services and tumor analyses. CeGaT generates the data basis for clinical studies and medical innovations and drives science forward with its own insights.

The owner-managed company stands for independence, comprehensive personal customer service, and outstanding quality. CeGaT's laboratory is accredited according to CAP/CLIA, DIN EN ISO 15189, DIN EN ISO/IEC 17025, and thus meets the highest international standards. To obtain first-class results, all processes are carried out in-house under scientific and medical supervision.

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