CytoCell

ogt

A Sysmex Group Company

Pathology Probes for Lung Cancer

Features

- Improve confidence in result interpretation with high intensity signals and minimal background
- Maximise signal quality when probes are used in conjunction with our Tissue Pretreatment Kit
- Enhance detection and scoring accuracy with robust, easy-to-analyse probes
- Save time and minimise mixing errors with easy-to-use, pre-mixed probes
- Optimise stock levels and minimise wastage with flexible pack sizes to meet your needs

Lung Cancer

Lung cancer is the second most commonly diagnosed cancer, as well as the leading cause of cancer death in both sexes. Worldwide, lung cancer accounted for 2.21 million new cases and 1.8 million deaths in 2020[1].

Recent advances have been made in the diagnosis of lung cancer and the use of genomic technologies for the detection of the most common form, non-small cell lung cancer (NSCLC).

The OGT Partnership

Behind every sample is a life that can be improved through the right care decisions. The OGT partnership approach is key to providing the highest level of service, working closely with you to understand your unique challenges, customising our approach to meet your exact needs. Choose CytoCell® probes for your FISH analysis; our effective, accurate and simple to use products help clinical decision makers to reach the right decisions for each patient.

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin* 2021;0:1–41.

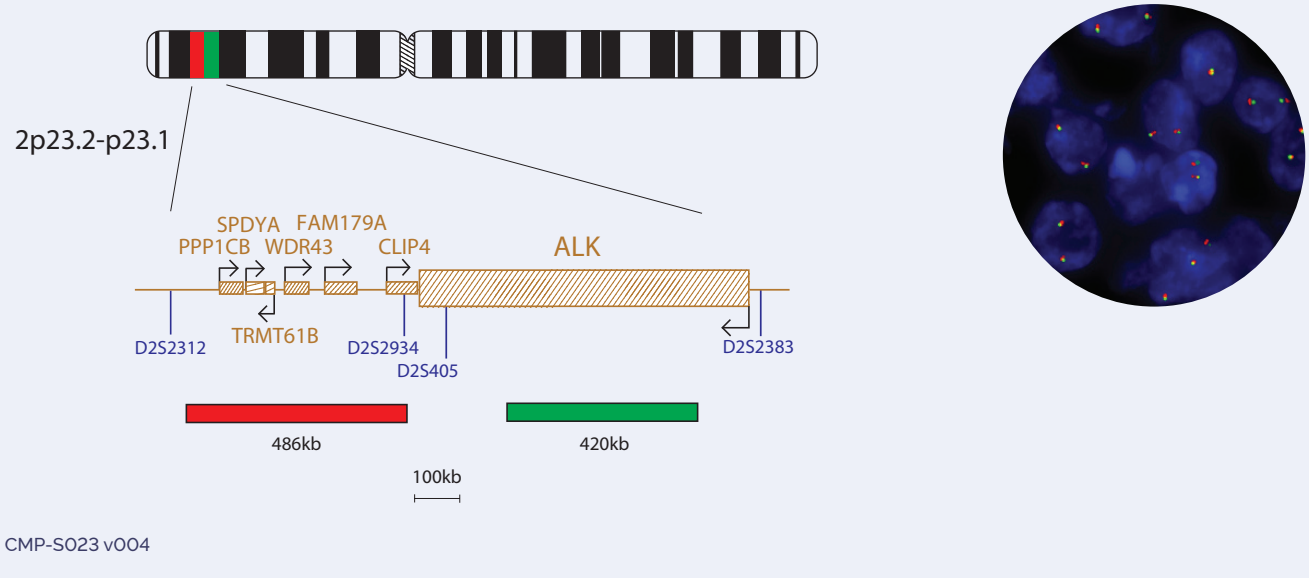
ALK Breakapart

Cat. No. **LPS 019-S** (5 tests) | Cat. No. **LPS 019** (10 tests)

Transforming rearrangements of the ALK *(ALK receptor tyrosine kinase)* gene at 2p23 have been recognised in a subset of human haematological and solid tissue malignancies[1].

ALK fuses with NPM1 *(nucleophosmin 1)* in anaplastic lymphoma, resulting in constitutive kinase activity, which inhibits apoptosis and promotes cellular proliferation[2]. In non-small cell lung cancer (NSCLC), approximately 5% of patients will harbour ALK rearrangements, the majority as a result of an inversion involving chromosome 2, inv(2) (p21p23), causing ALK to fuse with the EML4 (EMAP like 4) gene[2,3]. ALK-driven tumours can be treated with crizotinib, a selective small-molecule inhibitor of ALK and its oncogenic variants[3].

ALK translocations have also been reported in a number of other malignancies including inflammatory myofibroblastic tumour[4] and renal medullary carcinoma[5]. Additionally, ALK amplification has been reported as a frequent occurrence in oesophageal cancer[6].



CMP-S023 v004

References

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2. Takeuchi K, *et al.* Clin Cancer Res. 2008;14(20):6618-6624.
3. Kwak, *et al.* N Engl J Med. 2010;363(18):1693-1703.
4. Griffin, *et al.* Cancer Res 1999;59:2776-2780.
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EGFR Amplification

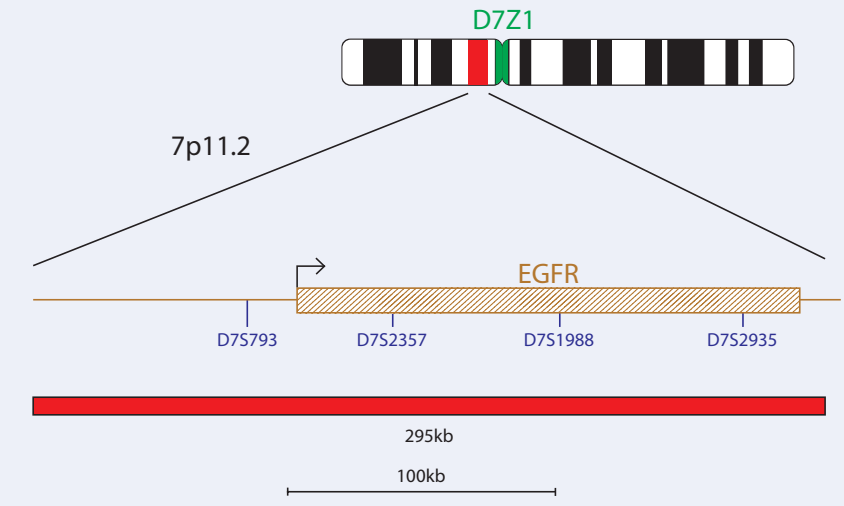
Cat. No. **LPS 003-S** (5 tests) | Cat. No. **LPS 003** (10 tests)

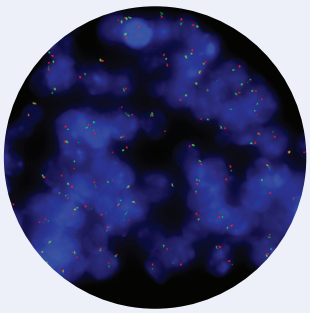
The EGFR *(epidermal growth factor receptor)* gene at 7p11.2, encodes a type 1 tyrosine kinase receptor for members of the epidermal growth factor family. Binding of the epidermal growth factor receptor and epidermal growth factor proteins lead to signal transduction cascades and regulate signaling pathways to control cellular proliferation[1].

Abnormally-elevated EGFR kinase activity can lead to proliferative diseases such as non-small-cell lung carcinoma (NSCLC), which accounts for 80-85% of all lung cancers[2], and less frequently breast cancer[3], amongst others.

There are a number of EGFR-inhibitor drugs in clinical use, for example: gefitinib and erlotinib in NSCLC, lapatinib in breast cancer or cetuximab in colorectal cancer[4,5]. Approximately 10% of lung cancer patients show a rapid and dramatic response to these tyrosine kinase inhibitors (TKIs)[6,7].

FISH has been shown to be useful for determining the amplification status of EGFR in NSCLC, aiding the selection of patients for treatment with EGFR TKIs[8].





CMP-S003 v003

References

1. Voldborg, *et al.* Annals of Oncology 1997;8: 1197-1206.
2. Jemal A, *et al.* CA Cancer J Clin 2006;56:106-30.
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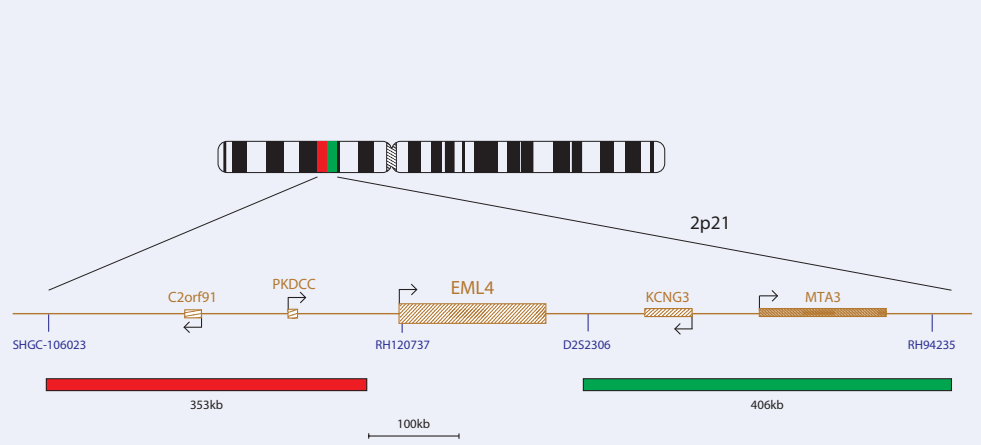
5. Jonker D, *et al.* N Engl J Med 2007; 357:2040-2048.
6. Lynch TJ, *et al.* N E J Med 2004;350:2129-39.
7. Pao W, *et al.* Proc Natl Acad Sci USA 2004;101(36):13306-11.
8. Hirsch FR, *et al.* JCO 2008;26(20): 3351-7.

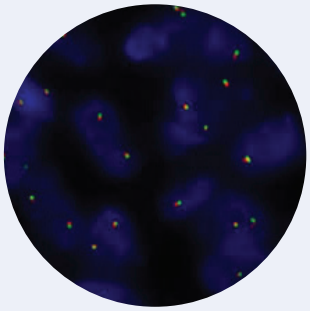
EML4 Breakapart

Cat. No. **LPS 020-S** (5 tests) | Cat. No. **LPS 002** (10 tests)

The protein encoded by the EML4 *(EMAP like 4)* gene at 2p21 is involved in microtubule formation and stabilisation[1].

A novel gene fusion of EML4 and ALK *(ALK receptor tyrosine kinase)* has been identified in patients with non-small cell lung cancer (NSCLC). The EML4-ALK fusion results from an inversion within chromosome 2p, inv(2)(p21p23), and is detected in approximately 5% of NSCLC cases[2,3,4]. ALK-driven tumours can be treated with crizotinib, a selective small-molecule inhibitor of ALK and its oncogenic variants[5].





CMP-S024 v003

References

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2. Lin, *et al.* Mol Cancer Res 2009;7(9):1466-1476.
3. Martelli, *et al.* AJP 2009;174(2):661-670.
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5. Kwak, *et al.* N Engl J Med. 2010;363(18):1693-1703.

ROS1 Breakapart and ROS1 *Plus* Breakapart

The ROS1 (*ROS proto-oncogene 1, receptor tyrosine kinase*) gene at 6q22.1 is an ALK (*ALK receptor tyrosine kinase*) gene paralogue which encodes a type I integral membrane protein with tyrosine kinase activity[1].

ROS1 rearrangements define a molecular subset of non-small cell lung cancer (NSCLC) and are seen in approximately 2% of patients with NSCLC[2]. A number of partner genes have been identified, including SLC34A2, CD74 and SDC4[3]. It has been shown that these ROS1 fusions activate the pSTAT3, PI3K/AKT/mTOR and SHP-2 phosphatase pathways[4,5].

NSCLC patients with ROS1 rearrangements have been shown to respond to treatment with ALK/MET tyrosine kinase inhibitors, such as crizotinib[6]".

The ROS1 Breakapart probe covers the region proximal to the ROS1 gene and the region distal to the GOPC gene.

The ROS1 *Plus* design covers the ROS1 region and the region deleted in ROS1-GOPC fusions.

References

1. Matsushime H, *et al.* Mol Cell Biol 1986;6:3000-4.
2. Bergethon K, *et al.* J Clin Oncol 2012;30(8):863-70.
3. Davies KD, *et al.* Cancer Res 2012;72(8):1538-7445.
4. Birchmeier C, *et al.* Proc Natl Acad Sci 1987;84:9270-9274.
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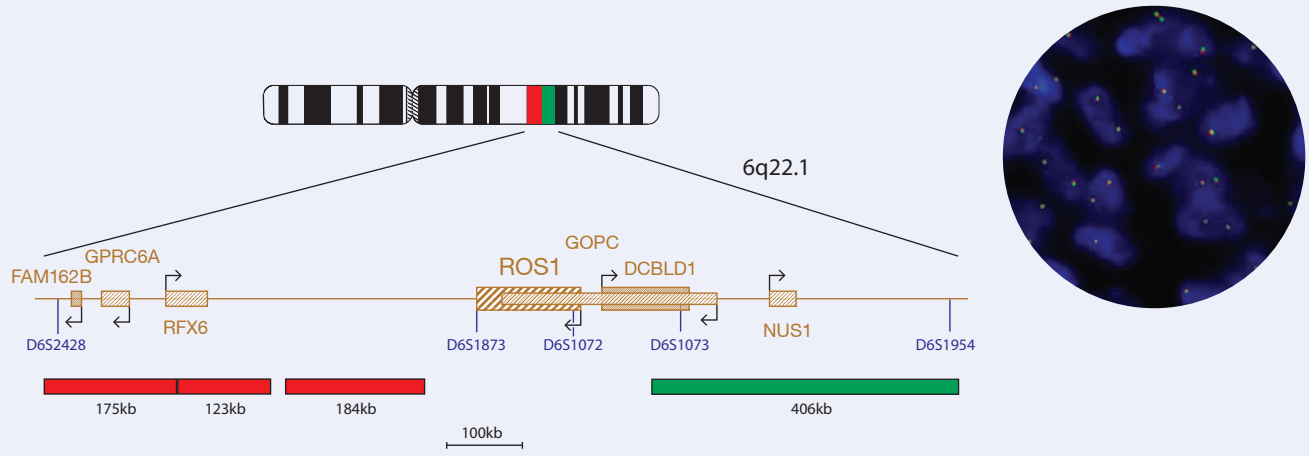
ROS1 Breakapart

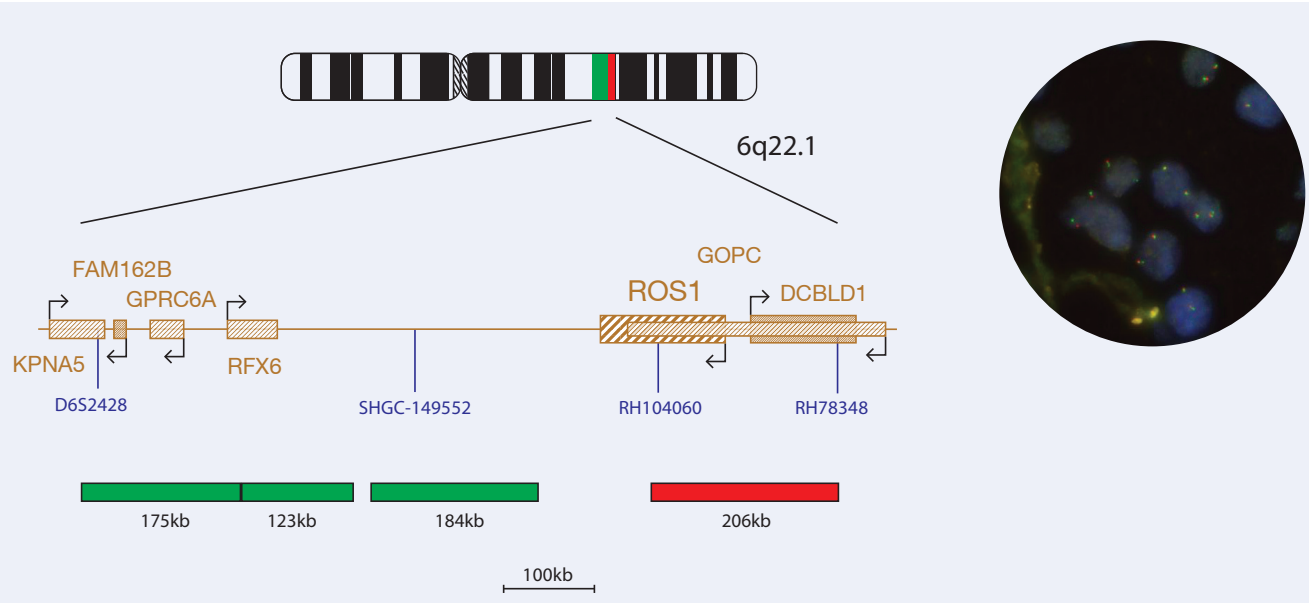
Cat. No. **LPS 022-S** (5 tests) | Cat. No. **LPS 022** (10 tests)



CMP-S045 v003

ROS1 *Plus* Breakapart

Cat. No. **LPS 046-S** (5 tests) | Cat. No. **LPS 046** (10 tests)



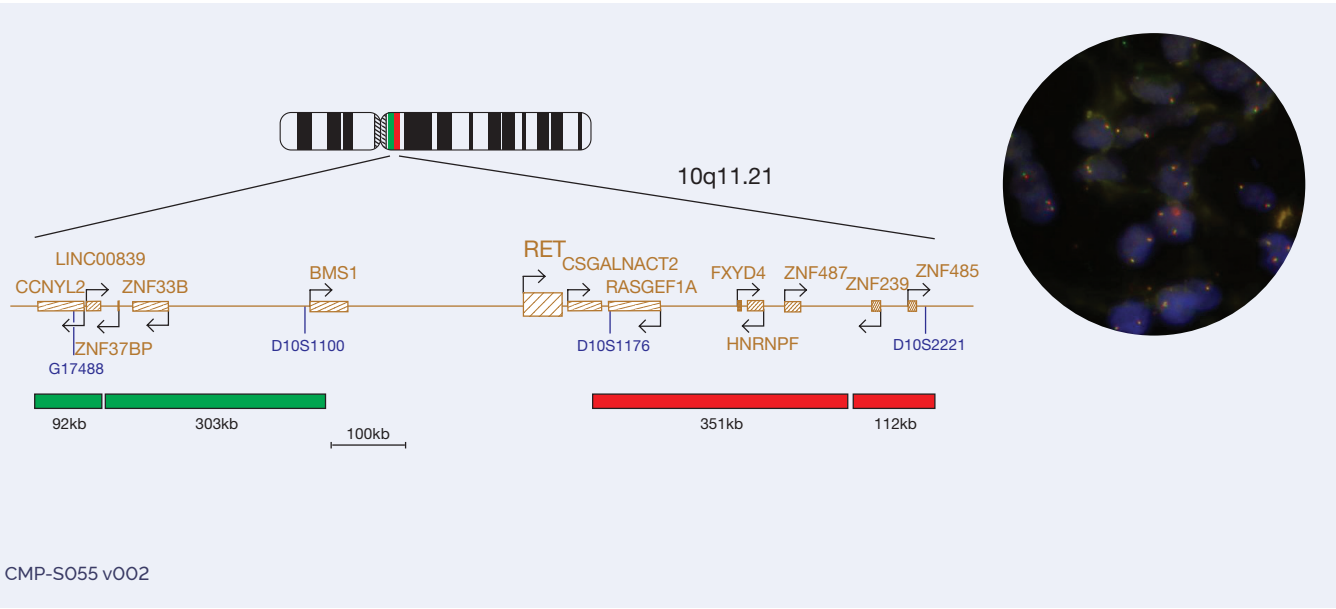
CMP-S060 v003

RET Breakapart

Cat. No. **LPS 045-S** (5 tests) | Cat. No. **LPS 045** (10 tests)

The RET *(ret proto-oncogene)* gene at 10q11.21 encodes for a transmembrane tyrosine kinase receptor involved in the control of cell differentiation, cell proliferation, and cell survival[1].

Rearrangements involving the RET gene are recognised recurrent abnormalities seen in 1-2% of patients with lung adenocarcinomas, where it is seen fused with KIF5B[2,3], and papillary thyroid carcinoma where it is seen fused to a number of different partner genes including: CCDC6, PRKAR1A and NCOA4[4,5]. The features of the proteins encoded by all types of RET fusion gene are similar to those of ALK: coiled-coil domains in the N-terminal fusion partners cause the RET domains to dimerise, resulting in activation of RET tyrosine kinase in the absence of ligands[3].



CMP-S055 v002

References

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2. Kohno T, *et al.* Nat Med 2012;18(3):375-7.
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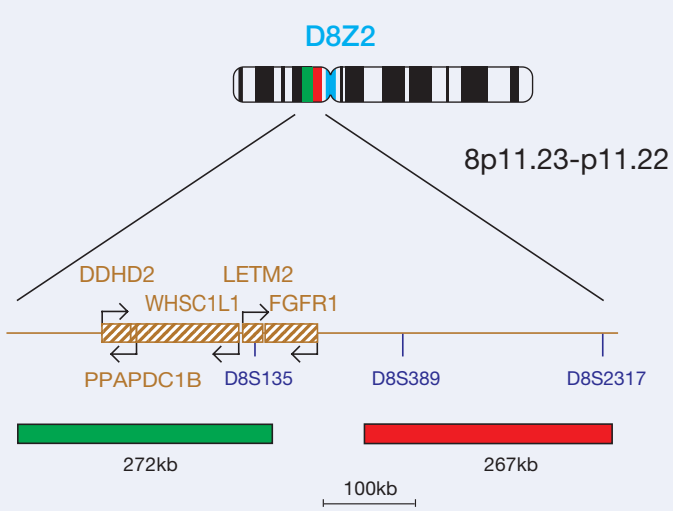
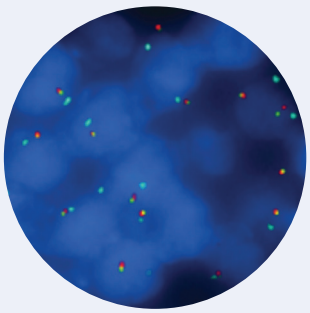
FGFR1 Breakapart/Amplification

Cat. No. **LPS 018-S** (5 tests) | Cat. No. **LPS 018** (10 tests)

The FGFR1 *(fibroblast growth factor receptor 1)* gene, at 8p11.23, has been shown to be amplified in approximately 9% of non-small-cell lung cancers (NSCLC)[1]. Amplification of this gene has been associated with a poor prognosis in NSCLC[2,3].





CMP-S009 v004

References

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3. Seo AN, *et al.* Virchows Arch. 2014;465(5):547-58.

Tissue Pretreatment Kit

Cat. No. **LPS 100***

Our tissue pretreatment kit is designed to prepare slides for FISH analysis on formalin-fixed paraffin-embedded (FFPE) tissue.

Our extensive Pathology FISH range has been optimised to produce excellent visual results with our ready-to-use Tissue Pretreatment Kit.

With ease-of-use and convenience in mind, our simple two stage FFPE slide preparation protocol employs ready-to-use reagents, which have been optimised to increase the permeabilisation of cell membranes and facilitate penetration of the desired FISH DNA probe.

* This product is provided under an agreement between Life Technologies Corporation and Cytocell Ltd and is available for human diagnostics or life science research use only.

Also of interest

Probe Name	Chromosome Region	Probe Type	Control Probe	No. Tests	Cat. No.ǂ
1p36/1q25 & 19q13/19p13	1p36.32/19q13.33	Deletion	1q25.2/19p13.2	5 or 10	LPS 047
C-MET (MET)	7q31.2	Amplification	D7Z1	5 or 10	LPS 004
HER2 (ERBB2)	17q12	Amplification	D17Z1	5 or 10	LPS 001
MDM2	12q15	Amplification	D12Z1	5 or 10	LPS 016
P16 (CDKN2A)	9p21.3	Deletion	D9Z3	5 or 10	LPS 036
P53 (TP53)	17p13.1	Deletion	D17Z1	5 or 10	LPS 037
RB1	13q14.2	Deletion	LAMP1	5 or 10	LPS 011
SRD (CHD5)	1p36.31	Deletion	ZNF672	5 or 10	LPS 010
TMPRSS2/ERG	21q22.2-q22.3/21q22.13-q22.2	Deletion/Breakapart	ERG	5 or 10	LPS 021
TOP2A	17q21.2	Amplification/Deletion	D17Z1	5 or 10	LPS 002
ZNF217	20q13.2	Amplification	DEFB128	5 or 10	LPS 005

ǂ For 5 test kit add -S to catalogue number, e.g: LPS ###-S.

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