

# BRAF V600E (T1799A) MUTATION

## ORDERING INFORMATIONS

REF: *ONC-021-25*  
CND Code: *W01060299*  
RDM Code: *1703276/R*  
Tests: *25 Reactions: 31*  
Manufacturer *BioMol Laboratories s.r.l.*

## CONTENTS OF THE KIT

*The kit consists of: reagents for Real-Time PCR amplification*  
*\*the reagents for the extraction of genomic DNA are not supplied in the kit*

For in vitro diagnostic use



## PRODUCT CHARACTERISTICS

Device belonging to the family of in vitro medical devices **REAL-TIME QUALITATIVE PCR-SOMATIC MUTATIONS**. Qualitative detection of V600E mutation of the BRAF gene by Real-Time PCR technique. Kit optimized for Real-Time PCR instrumentation Biorad CFX96 Dx, Biorad Opus Dx, Agilent AriaDx, Hyris bCUBE and Hyris bCUBE3 with Hyris bAPP.

## SCIENTIFIC BACKGROUND

Oncogenic BRAF mutations are present in approximately 6% of human cancers and 40-50% of melanomas. BRAF mutations have also been identified in other common cancers, such as colorectal cancer (CRC) and non-small cell lung cancer (NSCLC), albeit at a lower frequency than melanoma (about 10% and 2-5%, respectively).

Other cancer types in which BRAF mutations are relatively common (> 5%) include: thyroid cancer, small bowel cancer, and gastrointestinal neuroendocrine cancer.

## CLINICAL SIGNIFICANCE

The most frequently encountered activating BRAF mutation (approximately 90%) is a point mutation in exon 15 of the gene (c.1799T>A), which causes the substitution of a valine residue in glutamic acid at codon 600 (V600E) of the protein. This mutation confers two oncogenic properties to the BRAF protein: 1) increases the activity of the BRAF kinase domain (~500-fold compared to the wild-type one), 2) allows BRAF to be active as a monomer when RAS activity is reduced, independent of RAS-mediated activation. The result is a hyperfunctioning protein that continuously activates ERK, bypassing RAS activation and ignoring ERK-dependent negative feedback.

Other BRAF V600 variants found in less than 10% of malignant melanomas include valine to lysine (V600K), valine to aspartic acid (V600D), valine to methionine (V600M), and valine to arginine (V600R) substitutions at codon 600.

§ *Mutations in the Serine/Threonine Kinase BRAF: Oncogenic Drivers in Solid Tumors. Cancers* 2024, 16, 1215. <https://doi.org/10.3390/cancers16061215>

§ *Molecular Pathways and Mechanisms of BRAF in Cancer* *Therapy Clin Cancer Res* 2022; 28:4618-28 doi: 10.1158/1078-0432.CCR-21-2138

§ *Classifying BRAF alterations in cancer: new rational therapeutic strategies for actionable mutations. Oncogene.* 2018 Mar 15. doi: 10.1038/s41388-018-0171-x. Review.

§ *BRAF in non-small cell lung cancer (NSCLC): Pickaxing another brick in the wall. Cancer Treat Rev.* 2018 Apr 24; 66:82-94. doi: 10.1016/j.ctrv.2018.04.006. Review.

§ *Molecular testing for BRAF mutations to inform melanoma treatment decisions: a move toward precision medicine. Mod Pathol.* 2018 Jan;31(1):24-38. doi: 10.1038/modpathol.2017.104.

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DESCRIPTION	LABEL	VOLUME	STORAGE
		<b>ONC-021-25</b>	
Mix oligonucleotides and probes	Mix V600F BRAF 10X	1 x 77,5 µl	- 20 °C
Buffer and enzyme mix	Mix Real-Time PCR 5X	1 x 155 µl	- 20 °C
Deionized H <sub>2</sub> O	Deionized H <sub>2</sub> O	1 x 1 ml	- 20 °C
Genomic DNA or recombinant DNA	Positive control <b>MUT V600E BRAF</b>	1 x 22 µl	- 20 °C
Genomic DNA or recombinant DNA	Negative control <b>WT V600E BRAF</b>	1 x 22 µl	- 20 °C

## TECHNICAL CHARACTERISTICS

COD. **ONC-021-25**

STABILITY	18 months
REAGENTS STATUS	Ready to use
BIOLOGICAL MATRIX	Genomic DNA extracted from whole blood, tissue, cells
POSITIVE CONTROLS	Recombinant DNA for at least 3 analytical sessions
NEGATIVE CONTROLS	Recombinant DNA for at least 3 analytical sessions
TECHNOLOGY	Real-time PCR; oligonucleotides and specific probes; 2 FAM/HEX fluorescence channels
VALIDATED INSTRUMENTS	Biorad CFX96 Dx, Biorad Opus Dx and Agilent AriaDx, Hyris bCUBE and Hyris bCUBE3 with Hyris bAPP.
RUNNING TIME	110 min
THERMAL CYCLING PROFILE	1 cycle at 95 °C (10 min); 50 cycles 95 °C (15 sec) + 60 °C (1 min)
ANALYTICAL SPECIFICITY	Absence of non-specific pairings of oligonucleotides and probes; absence of cross-reactivity
LIMIT OF DETECTION (LOD)	≥ 0,025 ng of genomic DNA; ≥ 2% B-RAF (MUT) VERSUS B-RAF (WT).
LIMIT OF BLANK (LOB)	0% NCN
REPRODUCIBILITY	99,9%
DIAGNOSTIC SPECIFICITY / DIAGNOSTIC SENSITIVITY	100%/98%