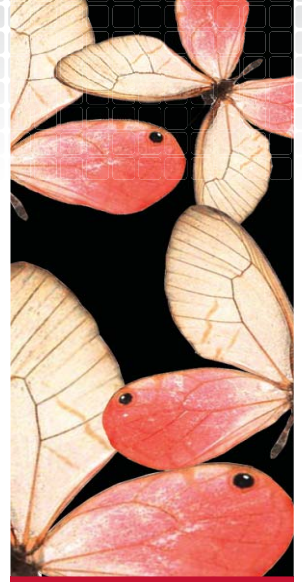




Research Use Only

BRAF Mutation Detection



**BRAF Mutation
Detection**

DETECTION OF BRAF Mutation

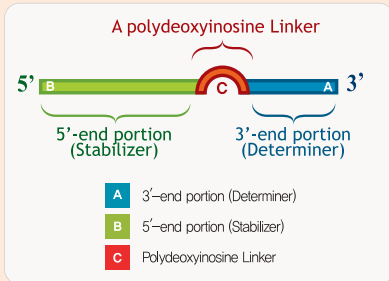
Detection of BRAF mutation (V600E)
characteristic for papillary thyroid carcinoma



DETECTION OF BRAF Mutation

Seeplex® (DPO™-based Multiplex) PCR System

Structure of DPO™



“Dual Priming Oligonucleotide (DPO) primer system that contains two separate priming regions connected by a polydeoxyinosine linker, prevents non-specific amplification without disturbing efficient amplifications of target sequences”

Reference

Chun, et al., Dual priming oligonucleotide system for the multiplex detection of respiratory viruses and SNP genotyping of CYP2C19 gene. *Nucleic Acids Research* 2007;35(6):e40

- ▶ **Detection of as less as 2% of the BRAF Gene Mutation (V600E) in the Mixture of Wild BRAF Genes**
- ▶ **Simple and Rapid Testing**
Applicable for auto-capillary electrophoresis system
- ▶ **Accurate Result**
Seeplex® PCR with higher sensitivity and specificity technology than PCR + RFLP or sequencing.
- ▶ **5 Hours of Turnaround Time**

Importance of detecting the BRAF gene mutation in papillary thyroid carcinoma (PTC)

BRAF mutations are common in melanoma, the colon cancer, gliomas, and lung cancer. In 80% cases, it was a single substitution (V600E). Mutation of the BRAF gene is also detected in PTC and the occurrence varies within the range of 26 – 69% (likely 45-50%). Therefore, detecting the BRAF gene mutation is a valuable prognostic and diagnostic marker for PTC¹⁻³.

1. M Xing, BRAF mutation in thyroid cancer, *Endocrine-Related Cancer*, 2005, 12, 245-262
2. Wojciechowska K and Lewinski A, BRAF Mutations in Papillary Thyroid Carcinoma, *Endocrine Regulations*, 2006, 40, 129-138
3. Ki-wook Chung et al, *Clinical Endocrinology*, 2006, 65, 660-666

Comparison of the BRAF gene mutation detection methods

	Seeplex® PCR	Conventional Molecular Diagnostic Methods		
	Seeplex® BRAF ACE Detection	PCR + RFLP	Sequencing	Real-time PCR
Cost	Low	Medium	High	High
Expertise	Unnecessary	Necessary	Necessary	Necessary
Procedure	Simple	Complicate	Complicate	Simple
Required additional test	NO	YES	YES	NO



Over 350 publications are released where Seegene's technologies are referred to.

DPO™ Technology

Trusted

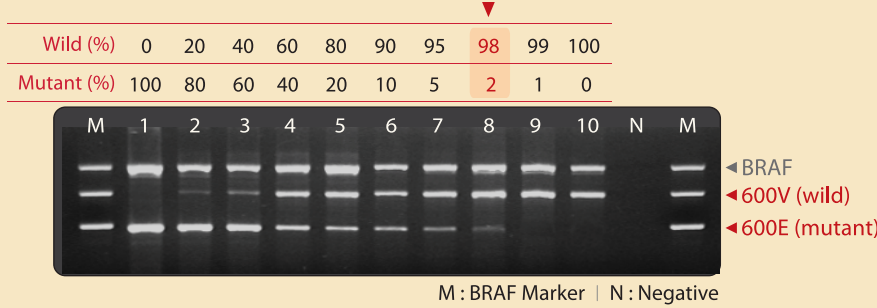


*ACE : Auto-Capillary Electrophoresis, ASE : Auto-Sequencer Electrophoresis

Product	Cat. No.	Size	Sample
BRAF ACE Detection	BR6300Z	25 rxns	<ul style="list-style-type: none"> Thyroid Tissue Fine Needle Aspiration Biopsy (FNAB)

Sensitivity test in the mixture of wild and mutant BRAF genes (Minority Test)

As less as 2% of BRAF gene mutation (V600E) in the sample can be detected.



Comparison of Sensitivity among Seeplex® BRAF ACE Detection, RFLP, and Sequencing

*Additional positive test results by Seeplex® BRAF ACE Detection were identified as malignant tumor by cytological method.

Result of 40 FNAB samples using <Seeplex® BRAF ACE Detection> and <PCR + RFLP>

	Seeplex®	RFLP
600V (wild)	13	15
600E (mutant)	27	25
Total	40	40

Seeplex® was able to detect 2 additional cases of the BRAF gene mutation.

- Result of cytology: Malignant tumor

Result of 95 FNAB samples using <Seeplex® BRAF ACE Detection> and <Sequencing>

	Seeplex®	Sequencing
600V (wild)	65	72
600E (mutant)	30	23
Total	95	95

Seeplex® was able to detect 7 additional cases of the BRAF gene mutation.

- Result of cytology: Malignant tumor

Examples of the Test Result

Using Seeplex® BRAF ACE Detection, three (sample 2, 5, and 7) out of seven patients were confirmed having the BRAF gene mutation.

Rapid and easy interpretation using auto-electrophoresis (ScreenTape® System)



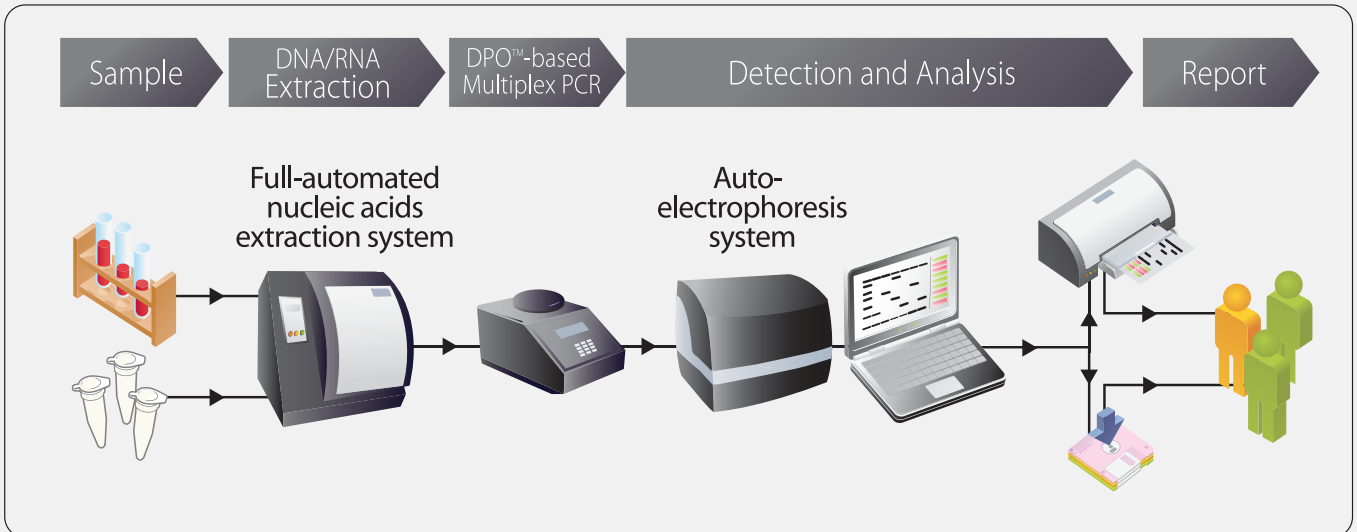
Sample ID	L	1	2	3	4	5	6	7
BRAF		+	+	+	+	+	+	+
600V		+	+	+	+	+	+	+
600E		-	+	-	+	+	-	+
Unidentified		-	-	-	-	-	-	-

Legend: Positive (Red), Negative (Green)

L : Ladder | 1~7 : Clinical samples

Sample	Result	Sample	Result
1	No mutation detected	5	Mutation (600E) detected
2	Mutation (600E) detected	6	No mutation detected
3	No mutation detected	7	Mutation (600E) detected
4	No mutation detected		

Seeplex® System for Automatic Detection



Seeplex® Key Products

Sepsis	Group Screening for 64 Sepsis-causing Pathogens Identification of 25 Sepsis-causing Pathogens Discrimination of 4 Drug Resistance Genes
Respiratory Pathogen	Detection of 12, 6, or 7 Respiratory viruses Detection of 6 Pneumonia bacteria Detection of 13 Respiratory viruses and 5 Pneumonia bacteria
HPV	Detection of 18 HPV types (13 high-risk and 5 low-risk HPV Types) Screening for HPVs (16, 18, High-risk, and Low-risk common) Screening for 2 STD pathogens (CT, NG) and HPVs (High-risk, Low-risk common) Genotyping of 6 HPV types (Pre-screening for HPV vaccination)
STD	Detection of 9, 7, 6, or 4 STD pathogens Screening for 2 STD pathogens (CT, NG) and HPVs (High-risk, Low-risk common)
Drug Resistance	Detection of Vancomycin-resistant Enterococci (van A, van B) Detection of Clarithromycin-resistant H. pylori (A2143G, A2142G) Detection of Lamivudine-resistant HBV (YVDD, YIDD, L528M, YSDD)
SNP	MTHFR C677T/A1298C genotyping CYP2C19 genotyping ApoE genotyping
TB	MTB and NTM discrimination for culture specimens MTB and M. bovis BCG discrimination for various specimens MTB Detection for various specimens (Nested PCR or Single PCR)

Headquarters

Seegene, Inc.
Taewon Bldg., 65-5, Bangyi-Dong,
Songpa-Gu, Seoul 138-050, Korea
Tel: +82 2 2240 4000, Fax: +82 2 2240 4040
www.seegene.co.kr

Seegene USA

9700 Great Seneca Highway, Rockville,
MD 20850, U.S.A.
Tel: +1 301 762 9066, +1 866 733 4949 (Toll free)
Fax: +1 301 762 9088, +1 866 733 4955 (Toll free)
www.seegene.com

Seegene Japan

Bansui Bldg. 2F, Toranomom 1-5-16, Minato-ku,
Tokyo, JAPAN
Tel: +81 3 3508 1377 Fax: +81 3 5501 3234
www.seegene.jp