Detection of EGFR Mutations in Quantity Insufficient Tissue Slides by High Sensitivity Assay Target Selector™ in Patients with Non-Small Cell Lung Cancer

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Introduction

- Lung cancer is the leading cause of cancer-related death worldwide
- The discovery of EGFR mutations and development of Tyrosine Kinase Inhibitors (TKIs) has a major improved clinical benefit over platinum-based therapies.
- Historically, tissue biopsies are used for assessing the biomarker status of solid tumor type.
- Analysis on tissue biopsies has challenges that impede accurate biomarker evaluation including intra-and inter tumor heterogeneity, or insufficient amounts of tissue.
- Biocept's Target Selector™ contains a highly sensitive technology to detect single gene mutations (Switch Blocker™) with a lower limit of detection between 0.01 and 0.03% without the need for tissue micro-dissection.
- Using the Switch Blocker™ technology, we evaluated the presence of L858R, Del19 and T790M mutations in EGFR as well as G12/G13 mutations in KRAS, of Formalin-Fixed Paraformaldehyde Embedded (FFPE) tissue slides that were deemed 'quantity insufficient' (QNS) for Next Gen Sequencing (NGS) analysis.

Switch Blocker ™ Workflow

FFPE slides with insufficient quantity for NGS (N=12 unique NSCLC patients)

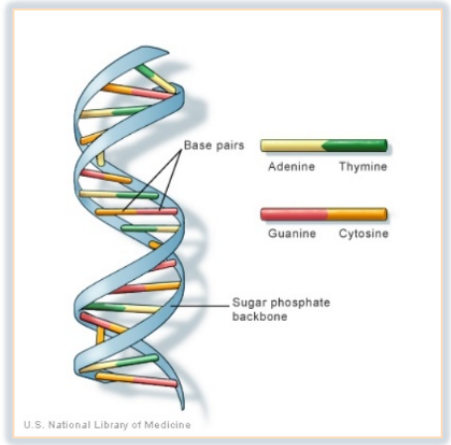
H&E Evaluation

H&E Negative (N=6)

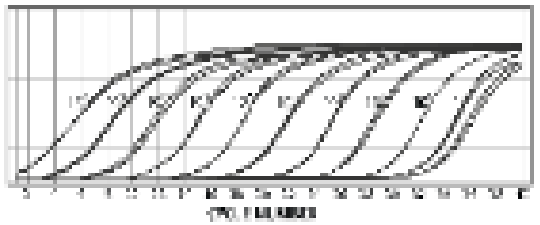
Halt further analysis

H&E Positive (N=6)

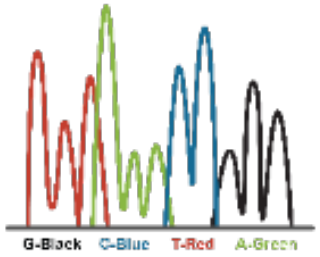
DNA Extraction



qPCR Mutation Detection



Mutation Sequence Verification

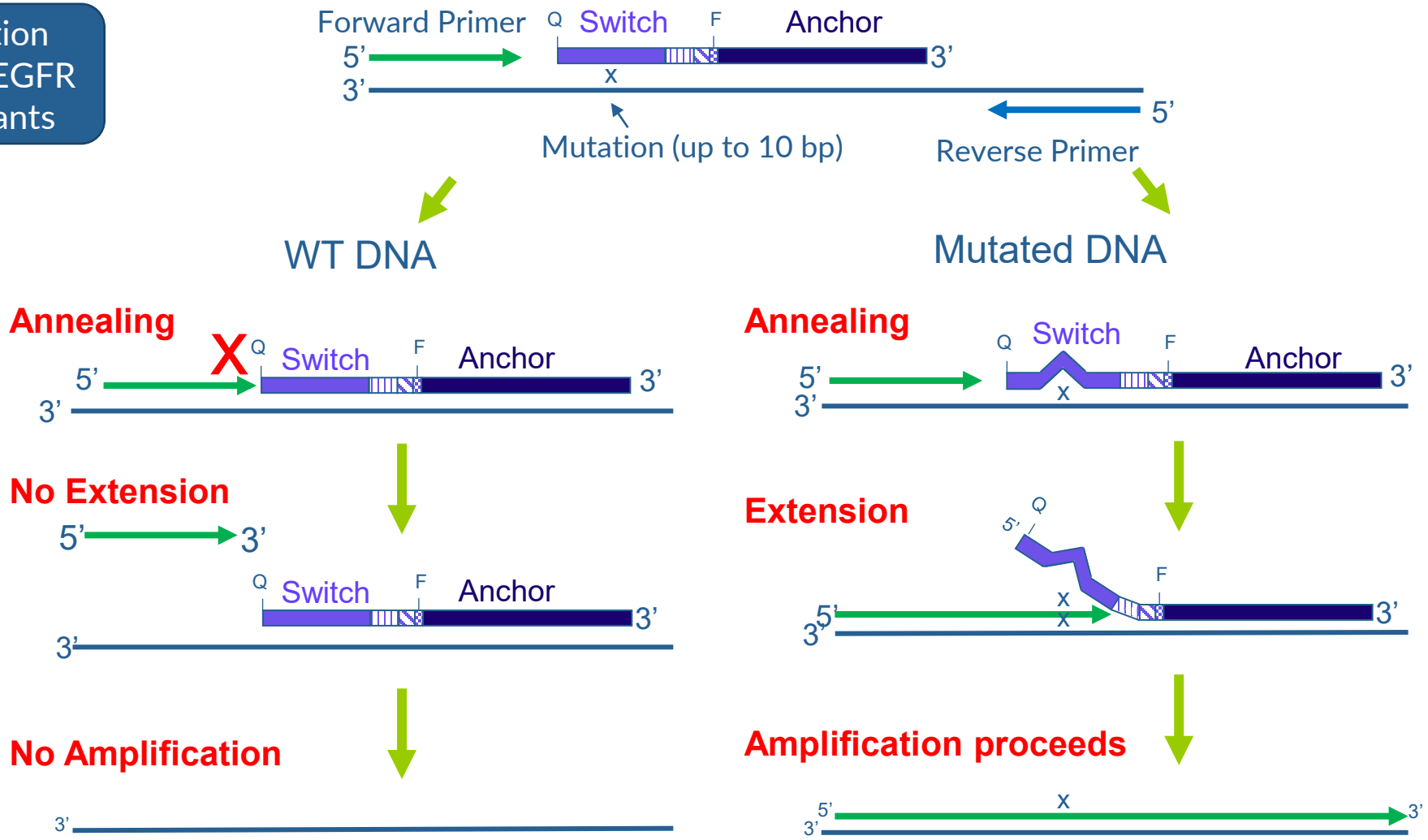


NEO GENOMICS

Biocept
Completing the Answer™

Switch Blocker™ Technology[1]

qPCR Mutation Detection of EGFR Mutant Variants



[1]. PlosOne (2019) and Journal of Clinical Pathology (2020)

Switch Blocker ™ Technology Identifies DNA in FFPE sections deemed QNS for Next-Gen Sequencing

Table 1. H&E Evaluation Results

Patient Number	H&E Result
1	Positive
2	Positive
3	Positive
4	Positive
5	Positive
6	Positive
7	Negative
8	Negative
9	Negative
10	Negative
11	Negative
12	Negative

Table 2. EGFR WT Ct and Copy number Results

Patient Number	EGFR WT Ct Value	Total EGFR copies
1	30.3	3184
2	30.2	3312
3	30.1	3638
4	28.9	7773
5	29.8	4500
6	NA	<1400

Switch Blocker ™ Technology Identifies Actionable Mutations in samples with insufficient amounts for NGS

Table 3. Results on EGFR and KRAS mutation detection in samples positive for H&E

Patient Number	Mutation Detected
1	None
2	Del19
3	L858R
4	None
5	KRAS G12V and L858R

Summary

- The Switch Blocker™ technology is a highly sensitive method that allows for the detection of mutations in specimens which are deemed QNS for NGS based assays.

- This could lead to the ability to detect mutational changes in actionable biomarkers in patients that would otherwise not be considered for evaluation.