DIACARTA®

For Lung Cancer

QFusion™ RET Fusion Detection Kit

XNA technology helps increase assay sensitivity and specificity

Lung cancer is the most commonly occurring malignancy in both men and women worldwide. Genomic alterations, including structural rearrangements in lung cancer, have significant predictive value in the treatment of disease.

Rearranged during transfection (RET) rearrangement occurs in about 1 – 2% of patients with non-small cell lung cancer (NSCLC), and 46% of these patients develop brain metastasis. The RET-positive patients are generally younger than the average NSCLC patients and smoked little or never smoked. Fusions between the kinase domain of RET and N-terminal region of other gene partners (RET fusion-positive) result in ligand-independent constitutive activation of RET, promoting cell proliferation and survival. Among the fusion gene partners, the most common partner is KIF5B (70-80% of cases) followed by CCDC6 and NCOA4.

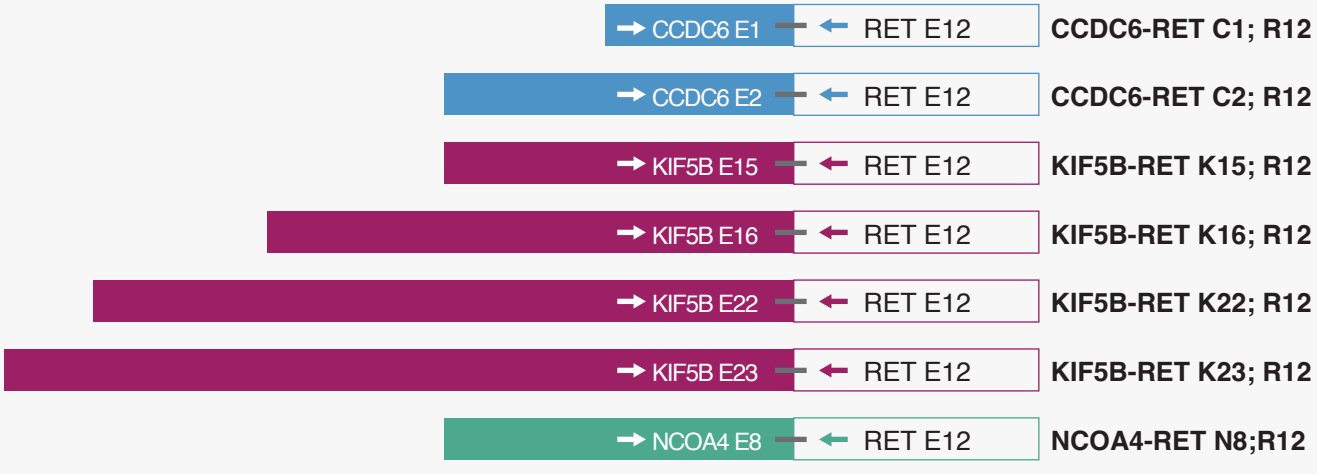

Figure 1. Schematic of RET fusions detected by QFusion™ RET fusion Detection kit

FDA approved two RET-specific tyrosine kinase inhibitors, selpercatinib and pralsetinib, for the treatment of advanced RET-positive NSCLC. These drugs are used as the first-line treatment for RET-positive stage IV patients.

Although NGS is used now for RET fusion detection, qPCR can be a cost-effective yet still accurate tool for detection since the RET fusion partners are very limited.

QFusion™ RET Fusion Detection Kit

The QFusion™ RET Fusion Gene Detection kit is an XNA-based real-time RT-qPCR based in vitro diagnostic test intended for qualitative and indiscriminatory detection of seven RET fusions (two CCDC6-RET, four KIF5B-RET, and one NCOA4-RET fusions) in RNA extracted from cells, tissues, and formalin-fixed paraffin-embedded (FFPE) samples. The kit identifies the presence or absence of fusions but does not specify the exact fusion partner and truncation position of the fusion. XNA-based RET fusion detection can increase assay sensitivity (reducing false negatives) and specificity (reducing false positives).

The assay has been validated on three instruments: Roche LightCycler 480II, AB QuantStudio5, and Bio-Rad CFX 384. The assay sensitivity: 50 copies and assay reproducibility: % CV is 0.7 to 3.2%, depending on the targets and instruments.

The QFusion™ RET Fusion Detection kit is for Research Use Only (RUO), not for use in diagnostic procedures without clinical validation in a CLIA lab.

XNA technology helps increase assay sensitivity and specificity

The QFusion™ RET Fusion Detection assay is based on xenonucleic acid (XNA) mediated PCR clamping technology. **XNA is a synthetic DNA analog in which the phosphodiester backbone has been replaced by a novel synthetic backbone chemistry.** XNAs hybridize tightly to complementary DNA target sequences only if the sequence is a complete match. Binding of XNA to its target sequence blocks strand elongation by DNA polymerase. When there is a fusion or a mutation in the target site, and therefore a mismatch such as RET fusion sequence, the XNA: DNA duplex is unstable, allowing strand elongation by DNA polymerase. Addition of an XNA, whose sequence is a complete match to wild-type RET DNA, into a PCR reaction blocks the amplification of wild-type DNA, allowing selective amplification of fusion DNA. XNA oligomers are not recognized by DNA polymerases and cannot be utilized as primers in subsequent real-time PCR reactions. Because XNA blocks the wildtype sequence amplification, both assay sensitivity and specificity have been increased.

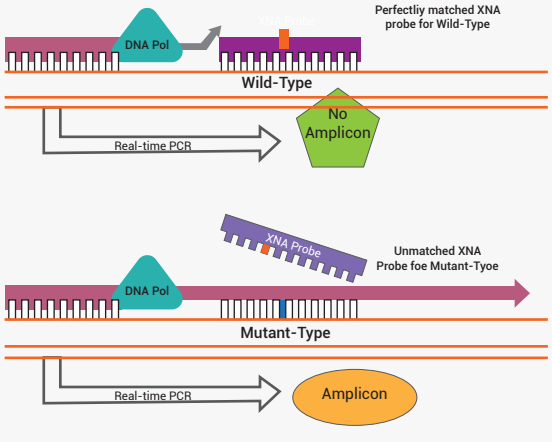

Figure 2. Principle of the QFusion RET Fusion Gene Detection by XNA

Product Name: QFusion™ RET Fusion Detection Kit

Catalog number	5 sample: DC-40-0001R	20 samples: DC-40-0002R