

## GenOnc Lung Cancer Panel

### Introduction

GenOnc Lung Cancer Panel is a collection of multiplexed PCR primer assays for targeted enrichment of the coding (exonic) regions of the 45 genes most commonly mutated in human lung cancer samples. Mutations in these oncogenes and tumor suppressor genes are often relevant for tumor classification, and warrant extensive investigation to enhance the understanding of carcinogenesis. The two major forms of lung cancer are small-cell lung carcinoma (SCLC) and non-small-cell lung carcinoma (NSCLC), although these classifications are no longer always used. One gene commonly mutated in both forms of lung cancer is the retinoic acid receptor RAR $\beta$  (RARB). Mutations in this gene can cause a loss of activity, upregulating oncogenic processes. There are multiple potential mutation sites in RARB. Therefore, sequencing analysis is an efficient method to examine a tumor sample. There are additional genes commonly mutated in lung cancer as well. This panel narrows the focus to the most relevant mutated genes in lung cancer, using a variety of resources such as recent whole genome/exome sequencing studies from scientific networks including the Cancer Genome Atlas. Curated databases such as the Cancer Gene Census and COSMIC (Catalogue of Somatic Mutations in Cancer) are also used.

## GenOnc Lung Cancer Panel Genes

### Carcinoid-Endocrine Tumor:

**Atypical:** KRAS, PIK3CA (p110 $\alpha$ ), TP53

**Typical:** PIK3CA (p110 $\alpha$ )

### Carcinoma:

**Non-Small Cell Lung Cancer:** ALK, APC, ATM, BAI3, BRAF, CDKN2A (p16INK4), EGFR, ERBB2 (HER2), GRM8, KRAS, MET, MUC16, NF1, NFE2L2, PDGFRA, PIK3CA (p110 $\alpha$ ), PIK3CG, PKHD1, PTEN, RB1, RET, SMARCA4, STK11 (LKB1), TP53

**Small Cell Lung Cancer:** ALK, ATM, BAI3, CDKN2A (p16INK4), EGFR, EPHA5, ERBB4, FBXW7, FGFR1, GRM8, KDR (VEGFR3), KIT (CD117), KRAS, LRP1B, MET, MLL2, MUC16, MYC, NF1, NOTCH1, PIK3CA (p110 $\alpha$ ), PIK3CG, PKHD1, PTEN, RARB, RB1, RET, ROS1, RUNX1T1, SMARCA4, TP53

**Squamous Cell Carcinoma:** AKT1, ALK, APC, ATM, BAI3, BRAF, CDKN2A (p16INK4), CDKN2B (p15INK4B), EGFR, EPHA5, ERBB2 (HER2), ERBB4, FBXW7, FGFR1, FGFR2, GRM8, KDR (VEGFR3), KEAP1, KIT (CD117), KRAS, LRP1B, MDM2, MET, MLH1, MLL2, MUC16, MYC, NF1, NFE2L2, NOTCH1, PDGFRA, PIK3CA (p110 $\alpha$ ), PIK3CG, PKHD1, PTEN, RARB, RB1, RET, ROS1, RUNX1T1, SMAD4, SMARCA4, STK11 (LKB1), TP53

**Acinar Adenocarcinoma:** BRAF, EGFR, KRAS

**Adenocarcinoma:** AKT1, ALK, APC, ATM, BAI3, BAP1, BRAF, CDKN2A (p16INK4), CDKN2B (p15INK4B), EGFR, EPHA5, ERBB2 (HER2), ERBB4, FBXW7, FGFR1, FGFR2, GRM8, KDR (VEGFR3), KEAP1, KIT (CD117), KRAS, LRP1B, MDM2, MET, MLH1, MLL2, MUC16, MYC, NF1, NFE2L2, NOTCH1, PDGFRA, PIK3CA (p110 $\alpha$ ), PIK3CG, PKHD1, PTEN, RARB, RB1, RET, ROS1, RUNX1T1, SMAD4, SMARCA4, SOX2, STK11 (LKB1), TP53

**Blastoma:** TP53

**Bronchioalveolar Adenocarcinoma:** CDKN2A (p16INK4), EGFR, ERBB2 (HER2), KRAS, NF1, STK11 (LKB1), TP53

**Carcinosarcoma:** EGFR

**Giant Cell:** EGFR

**Large Cell:** BRAF, CDKN2A (p16INK4), EGFR, EPHA5, FGFR1, KEAP1, KRAS, PIK3CA (p110 $\alpha$ ), STK11 (LKB1), TP53

**Lymphoepithelioma-like:** EGFR, TP53

**Micropapillary Adenocarcinoma:** BRAF, EGFR, KRAS

**Mixed Adenosquamous:** EGFR, KRAS, PIK3CA (p110 $\alpha$ ), STK11 (LKB1), TP53

**Mixed Small Cell Carcinoma-Adenocarcinoma:** EGFR, TP53

**Mucoepidermoid Carcinoma:** EGFR

**Oncocytic Adenocarcinoma:** EGFR, KRAS

**Pleomorphic Carcinoma:** EGFR, KIT (CD117), KRAS, TP53

**Sarcomatoid Carcinoma:** EGFR, KRAS

**Terminal Respiratory Unit Type Adenocarcinoma:** EGFR

**Undifferentiated Carcinoma:** EGFR, KRAS, MUC16, PKHD1, TP53

# GenOnc Lung Panel



**Other Cancer Subtypes:**

**Hyperplasia:** EGFR, KRAS

**Mucinous Proliferation:** KRAS

**Neoplasm:** EGFR, KRAS