

Diagnosis and genotype	# cases
Total # of clinical samples genotyped	56,240
Total # of non-small cell lung cancer cases	10,097
# of cases harboring EGFR L858R mutation	472
# of cases harboring EGFR exon 19 deletion	668
# of cases harboring EGFR G719X mutation	92
# of cases harboring EGFR L861Q mutation	36
# of cases harboring EGFR S768I mutation	36
# of cases harboring EGFR exon 20 insertion	193
# of cases harboring EGFR exon 19 insertion	4
# of cases harboring EGFR exon 18-25 kinase domain duplication	4
# of cases harboring EGFR fusions	5

Supplementary Table S1

Patient No.	Gender	Age	Fusion Detected	Event Coverage	5'gene breakpoint	3'gene breakpoint	Exons	Other EGFR alterations	Other alterations
1	Female	35	<i>EGFR-RAD51</i>	345	<i>EGFR</i> intron 24 (chr7:55268583)	<i>RAD51</i> intron 3 (chr15:40995548)	<i>EGFR</i> exons 1-24 <i>RAD51</i> exons 4-9	None	<i>CDKN2A</i> loss <i>CDKN2B</i> loss <i>MYC</i> amplification
2	Female	21	<i>EGFR-RAD51</i>	304	<i>EGFR</i> intron 24 (chr7:55268151)	<i>RAD51</i> intron 3 (chr15:40995888)	<i>EGFR</i> exons 1-24 <i>RAD51</i> exons 4-9	None	<i>CTNNB1</i> T41A <i>RANBP2</i> T951M <i>CDKN2B</i> loss <i>TP53</i> loss <i>CDKN2A</i> loss
3	Female	42	<i>EGFR-PURB</i>	21	<i>EGFR</i> exon 25 (chr7:55269019)	<i>PURB</i> 3' UTR (chr7:44919491)	<i>EGFR</i> exons 1-25 <i>PURB</i> 3' UTR	None	<i>CREBBP</i> S893L <i>ARID1A</i> Q1095*
4	Male	38	<i>EGFR-RAD51</i>	197	<i>EGFR</i> intron 24 (chr7:55268641)	<i>RAD51</i> intron 3 (chr15:40993432)	<i>EGFR</i> exons 1-24 <i>RAD51</i> exons 4-9	None	<i>RBM10</i> S570fs*133 <i>CHD4</i> D316H <i>MYC</i> amplification <i>MCL1</i> amplification <i>IKBKE</i> amplification <i>PIK3C2B</i> amplification <i>MDM4</i> amplification
5	Female	60	<i>EGFR-RAD51</i>	223	<i>EGFR</i> intron 24 (chr7:55268412)	<i>RAD51</i> intron 3 (chr15:40995404)	<i>EGFR</i> exons 1-24 <i>RAD51</i> exons 4-9	<i>EGFR</i> amplification	<i>GRIN2A</i> R1318W <i>ATR</i> Q2408* <i>ARID1A</i> P1484fs*10 <i>FGF3</i> amplification <i>FGF4</i> amplification <i>CDKN2A</i> loss <i>PDCD1LG2</i> amplification <i>CCND1</i> amplification <i>CD274</i> amplification <i>FGF19</i> amplification <i>EMSY</i> amplification <i>HGF</i> amplification <i>JAK2</i> amplification <i>CDKN2B</i> loss

Supplementary Table S2

BA/F3 - EGFR-L858R

	erlotinib	afatinib	osimertinib
IC50 (nM)	26.9 ± 12.4	≤ 1.5	12.53 ± 3.35
Goodness of fit (R²)	0.91	0.67	0.85

BA/F3 - EGFR-RAD51

	erlotinib	afatinib	osimertinib
IC50 (nM)	2.96 ± 10.46	≤ 1.5	13.36 ± 10.2
Goodness of fit (R²)	0.88	0.77	0.84