康誠生技
Genconn Biotech

GUARDANT™

Guardant360
基因檢測服務報告

醫師姓名：	廖映庭
受檢者姓名：	KONG SANG
送檢編號：	A1168951
檢測次數：	第一次

提醒

基因數據乃屬個人隱私，切勿輕易向任何個人、團體或非您的授權者透漏本報告內容。若您有任何疑慮，歡迎來電洽詢，我們很樂意為您提供更詳細的諮詢服務。若因郵遞錯誤收此檔，請予銷毀，多謝合作。

詳細資訊

康誠生技股份有限公司 客戶服務中心

諮詢時間｜週一～週五 9:00～17:00 （國定假日除外）

諮詢專線｜02-55696099

客服信箱｜service.gb@healthconn.com

REPORTING

Report Date:	OCT-09-2024
Receipt Date:	OCT-05-2024
Collection Date:	OCT-04-2024
Specimen:	Blood
Status:	FINAL

PHYSICIAN

Ying Ting Liao
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Additional Recipient: N/A

Complete Tumor Response Map on page 2

Summary of Detected Somatic Alterations, Immunotherapy Biomarkers & Associated Treatment Options

KEY ✓ Approved in indication ~ Approved in other indication ✗ Lack of response

Detected Alteration(s) / Biomarker(s)	Associated FDA-approved therapies	Clinical trial availability (see page 3)	% cfDNA or Amplification
EGFR E746_A750del (Exon 19 deletion)	✓ Afatinib, Amivantamab, Amivantamab+lazertinib, Dacomitinib, Erlotinib, Erlotinib+ramucirumab, Gefitinib, Osimertinib	Yes	0.7%
TP53 P151S	None	No	0.3%

Comments

Reported by: JV4

Additional Biomarkers

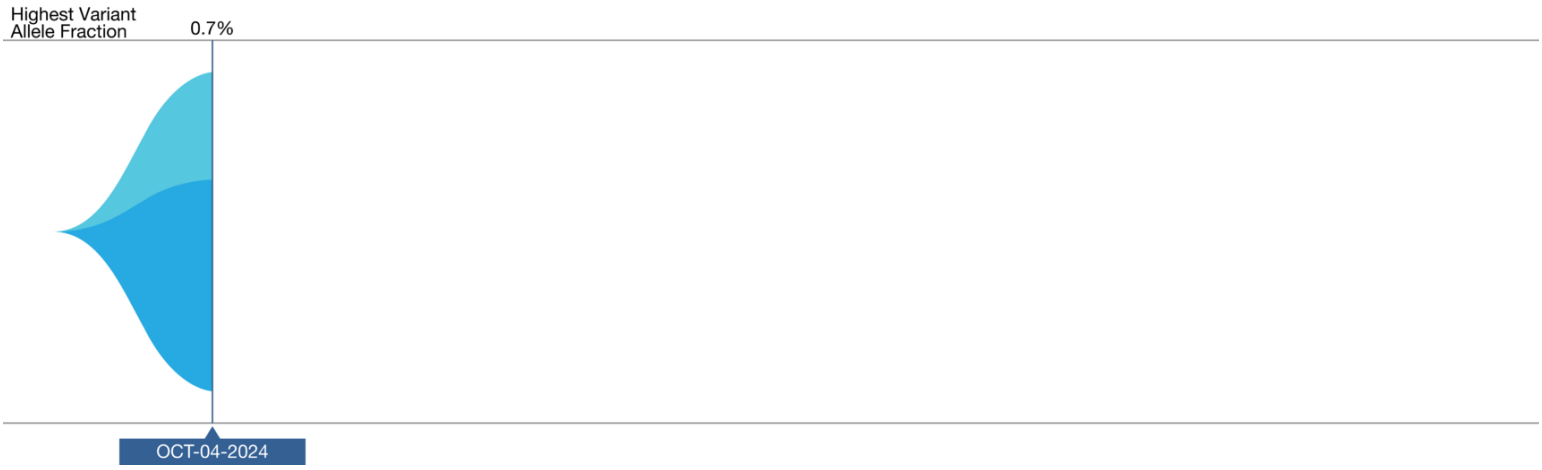
Biomarker	Additional Details
MSI-High	NOT DETECTED

We evaluated this sample for 74 genes, including the following guideline-recommended genes for NSCLC

EGFR(T790M and others) | *ALK* | *ROS1* | *BRAF* | *MET* | *ERBB2*(HER2) | *RET* | *NTRK* | *KRAS*

Guardant360 Tumor Response Map

The Guardant360 Tumor Response Map illustrates the variant allele fraction (% cfDNA) of observed somatic variants at each sample submission. Amplifications are not plotted, and only the first and last five test dates are plotted. Please see the Physician Portal (portal.guardanthealth.com) for the Tumor Response Map with all test dates.



Detected Alteration(s) / Biomarker(s)	% cfDNA or Amp
EGFR E746_A750del (Exon 19 deletion)	0.7%
TP53 P151S	0.3%

The table above annotates the variant allele fraction (% cfDNA) detected in this sample, listed in descending order.
§ See definitions section for more detail

Available Clinical Trials (within the same state as the ordering physician)

There may be additional trials not listed here. Visit: **portal.guardanthealth.com** or email **clientservices@guardanthealth.com** with A1168951 in the subject line of the email, for additional trials.

Alteration	Trial ID / Contact	Title	Phase	Site(s)
EGFR E746_A750del	NCT04077463 Study Contact,Participate-In-This-Study@its.jnj.com,844-434-4210	A Study of Lazertinib as Monotherapy or in Combination With Amivantamab in Participants With Advanced Non-small Cell Lung Cancer	Phase 1	Kaohsiung, Taiwan Taipei City, Taiwan Tainan, Taiwan Taichung, Taiwan
	NCT05215548 Jin-Shing Chen, M.D., Ph.D.,chenjs@ntu.edu.tw,886-2-2322-0322	Primary Tumor Resection With EGFR TKI for Stage IV NSCLC	Phase 2	Taipei, Taiwan (2)
	NCT05442060 Anna Hu,annahu@obipharma.com,886-2-27866589 x104	To Evaluate OBI-833/OBI-821 in Combination With First-Line Erlotinib in Patients With EGFR-Mutated, Globo H-Positive, Locally Advanced or Metastatic Non-Small Cell Lung Cancer	Phase 2	New Taipei City, Taiwan Taoyuan, Taiwan Taichung, Taiwan Taipei, Taiwan (4)
	NCT05801029 AstraZeneca Clinical Study Information Center,information.center@astrazeneca.com,1-877-240-9479	A Study to Investigate Safety and Efficacy of Osimertinib and Amivantamab in Participants With Non-small Cell Lung Cancer With Common Epidermal Growth Factor Receptor Mutations	Phase 2	Yunlin, Taiwan Taipei City, Taiwan Kaohsiung, Taiwan (2) Taipei, Taiwan (2) Additional trial sites available
	NCT06120140 Study Contact,Participate-In-This-Study@its.jnj.com,844-434-4210	Enhanced Dermatological Care to Reduce Rash and Paronychia in Epidermal Growth Factor Receptor (EGRF)-Mutated Non-Small Cell Lung Cancer (NSCLC) Treated First-line With Amivantamab Plus Lazertinib	Phase 2	Kaohsiung City, Taiwan Taipei, Taiwan Taoyuan City, Taiwan Taichung City, Taiwan Additional trial sites available
	Visit **portal.guardanthealth.com** for trials not within the same state as the physician's office			

More clinical trial options available at **portal.guardanthealth.com**

Definitions

Deletion (Del): The following alteration was detected in this patient: *EGFR* E746_A750del. Guardant360 detects short deletions in exons of certain genes (see Table 1), including potential splice site-disrupting events.

Interpretation

Somatic alterations were detected in the circulating cell-free DNA isolated from this patient's blood specimen. These genomic alterations are cancer-associated somatic variants, some of which have been associated with either increased or reduced clinical response to specific treatments. The percentage of altered cell-free DNA circulating (% cfDNA) in blood is related to the unique tumor biology of each patient. Factors that may affect the % cfDNA of detected somatic alterations include tumor growth, turn over, size, heterogeneity, vascularization, disease progression, and treatment.

Method and Limitations

Guardant360 sequences 74 cancer-associated genes to identify somatic alterations. Cell-free DNA (cfDNA) is extracted from plasma, enriched for targeted regions, and sequenced using the Illumina platform and hg19 as the reference genome. All exons are sequenced in some genes; only clinically significant exons are sequenced in other genes. The types of genomic alterations detected by Guardant360 include single nucleotide variants, gene amplifications, fusions, short insertions/deletions (longest detected, 70 base pairs), and splice site disrupting events (see Table 1). Microsatellite Instability (MSI) is assessed for all cancer types by evaluating somatic changes in the length of repetitive sequences on the Guardant360 panel. A "Not Detected" result in samples where the highest % cfDNA is < 0.2% is an inconclusive result because it does not preclude MSI-High status in tissue. MSI status is currently not reported for earlier panel versions. This version of the Guardant360 test is not validated for the detection of other types of genomic alterations, such as complex rearrangements or gene deletions. Certain sample or variant characteristics, such as low cfDNA concentration, may result in reduced analytic sensitivity. Guardant360 cannot discern the source of circulating cfDNA, and for some variants in the range of ~40 to 60% cfDNA, the test cannot easily distinguish germline variants from somatic alterations. Guardant360 is not validated for the detection of germline or de novo variants that are associated with hereditary cancer risk. Tissue genotyping should be considered when plasma genotyping is negative, if clinically appropriate.

Table 1: Genes on the Guardant360 Panel

Guardant360 reports single nucleotide variants, splice site mutations, and insertion and deletion variants (indels) in all clinically relevant exons in 74 genes and reports other variant types in select genes as indicated below.

AKT1	*ALK* #	*APC*	*AR* †	*ARAF*	*ARID1A*	*ATM*	*BRAF* †	*BRCA1*
BRCA2	*CCND1* †	*CCND2* †	*CCNE1* †	*CDH1*	*CDK12*	*CDK4* †	*CDK6* †	*CDKN2A*
CTNNB1	*DDR2*	*EGFR* †	*ERBB2* †	*ESR1*	*EZH2*	*FBXW7*	*FGFR1* †	*FGFR2* † #
FGFR3 #	*GATA3*	*GNA11*	*GNAQ*	*GNAS*	*HNF1A*	*HRAS*	*IDH1*	*IDH2*
JAK2	*JAK3*	*KIT* †	*KRAS* †	*MAP2K1*	*MAP2K2*	*MAPK1*	*MAPK3*	*MET* †
MLH1	*MPL*	*MTOR*	*MYC* †	*NF1*	*NFE2L2*	*NOTCH1*	*NPM1*	*NRAS*
NTRK1 #	*NTRK3*	*PDGFRA* †	*PIK3CA* †	*PTEN*	*PTPN11*	*RAF1* †	*RB1*	*RET* #
RHEB	*RHOA*	*RIT1*	*ROS1* #	*SMAD4*	*SMO*	*STK11*	*TERT* ‡	*TP53*
TSC1	*VHL*							

‡ Guardant360 reports alterations in the promoter region of this gene.

† Guardant360 reports amplifications of this gene.

Guardant360 reports fusion events involving this gene.

About the Test

The Guardant360 assay was developed and its performance characteristics were determined by Guardant Health, Inc. This test has not been cleared or approved by the U.S. Food and Drug Administration (FDA). The FDA has determined that such clearance or approval is not necessary. This test may be used for clinical purposes and should not be regarded as investigational or for research only. Guardant Health's clinical reference laboratory is certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA) as qualified to perform high complexity clinical laboratory testing. The laboratory report should be interpreted in the context of other clinical information and laboratory, pathology, and imaging studies by a qualified medical professional prior to initiating or changing a patient's treatment plan. The selection of any, all, or none of the drugs associated with potential clinical benefit (or potential lack of clinical benefit) is entirely at the discretion of the treating medical professional. Drug and trial information are based on the diagnosis written on the submitted test request form; this information is not based on any supplemental information provided by the requesting medical professional, including pathology reports or other molecular studies. Some drugs listed in this report may not be approved or cleared by the FDA for the indicated use. Guardant Health makes no endorsement, express or implied, of any product, physician, or procedure contained in this report. This report makes no promises or guarantees that a particular medication will affect (or not affect) the clinical outcome of any patient.

Testing Performed at: Guardant Health

Laboratory Director: Martina Lefterova, MD PhD | CLIA ID: 05D2070300 | CAP #: 8765297 | 505 Penobscot Drive, Redwood City, CA, 94063, USA

Additional information is available

Any therapeutic annotations are based on publicly available information. This information is described in the "Detailed Therapy Results" and "Relevance of Detected Alterations" sections.

Visit **portal.guardanthealth.com** or email **clientservices@guardanthealth.com** with A1168951 in the subject line of the email for:

- Additional clinical trials
- Detailed Therapy Results
- Relevance of Detected Alterations
- References

If you would like to receive this additional information with every Guardant360 report, please call client services at **855.698.8887** to opt-in.

Additional information begins on the next page.

List of Available Clinical Trials

Alteration	Trial ID / Contact	Title	Phase	Site (number in parenthesis is count of trial sites)
EGFR E746_A750del	NCT03574402 Yi-Long Wu, Professor,syylwu@live.cn, 862083827812	Phase II Umbrella Study Directed by Next Generation Sequencing	Phase 2	China
	NCT04077463 Study Contact,Participate-In-This-Study@its.jnj.com,844-434-4210	A Study of Lazertinib as Monotherapy or in Combination With Amivantamab in Participants With Advanced Non-small Cell Lung Cancer	Phase 1	Seattle, WA; Detroit, MI; Saint Louis, MO; Philadelphia, PA; Portland, OR; Salt Lake City, UT; Tampa, FL; Fairfax, VA; Boston, MA (2); New York, NY (2); CA (5); Puerto Rico; Japan (7); China (9); Taiwan (4); Korea, Republic of (4); Italy (5); France (7); Germany (8); Spain (8)
	NCT04841811 Yi-Long Wu, doctor,syylwu@live.cn,86-13544561166	MRD Guiding Treatment After Almonertinib Induction Therapy for EGFRm+ Stage III NSCLC in the MDT Diagnostic Model.	Phase 3	China
	NCT04922138 Baohui Han, doctor,18930858216@163.com,18930858216	Aumolertinib Adjuvant Therapy of Resectable Stage I EGFRm+ NSCLC With High-grade Patterns	Phase 2	China (2)
	NCT05215548 Jin-Shing Chen, M.D., Ph.D.,chenjs@ntu.edu.tw,886-2-2322-0322	Primary Tumor Resection With EGFR TKI for Stage IV NSCLC	Phase 2	Taiwan (2)
	NCT05442060 Anna Hu,annahu@obipharma.com,886-2-27866589 x104	To Evaluate OBI-833/OBI-821 in Combination With First-Line Erlotinib in Patients With EGFR-Mutated, Globo H-Positive, Locally Advanced or Metastatic Non-Small Cell Lung Cancer	Phase 2	Taiwan (7)
	NCT05801029 AstraZeneca Clinical Study Information Center,information.center@astrazeneca.com,1-877-240-9479	A Study to Investigate Safety and Efficacy of Osimertinib and Amivantamab in Participants With Non-small Cell Lung Cancer With Common Epidermal Growth Factor Receptor Mutations	Phase 2	Glendale, CA; New York, NY; Washington, DC; Sacramento, CA; Beverly Hills, CA; Fairfax, VA; Canada (2); Singapore (3); Hong Kong (4); Taiwan (9); Korea, Republic of (7); Malaysia (6); Thailand (5)
	NCT06041776 Shun Lu, M.D.,shunlu@sjtu.edu.cn,+86 21 2220 0000	Adjuvant Befotertinib in Stage IB-IIIB Non-small Cell Lung Cancer With Positive EGFR Sensitive Mutations	Phase 3	China (3)
	NCT06043973 Degan Lu, Professor,deganlu@126.com, 18753157623	Almonertinib Combined With Anlotinib as First-line Treatment for Advanced Non-small Cell Lung Cance	Phase 3	China
	NCT06120140 Study Contact,Participate-In-This-Study@its.jnj.com,844-434-4210	Enhanced Dermatological Care to Reduce Rash and Paronychia in Epidermal Growth Factor Receptor (EGRF)-Mutated Non-Small Cell Lung Cancer (NSCLC) Treated First-line With Amivantamab Plus Lazertinib	Phase 2	Renton, WA; Hinsdale, IL; Westbury, NY; Cleveland, OH; W. Salem, WI; Reno, NV; Springfield, MO; Fairfax, VA; Flemington, NJ; Wilson, NC; CA (15); Argentina (5); Turkey (8); China (11); Taiwan (5); Korea, Republic of (3); Brazil (11); Malaysia (4); France (3); Germany (6); Spain (9)

Detailed Therapy Results

Alteration	Drug	Trade Name	Target	Current Status
EGFR E746_A750del (Exon 19 deletion)	ABT-101		Egfr/Her2 inhibitor.	Phase 1 (Non-small cell lung carcinoma (NSCLC)) Phase 1 (Head and neck squamous cell carcinoma (HNSCC))
	Afatinib	Gilotrif	Irreversible pan-ErbB kinase inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) FDA Approved in other indications (Lung squamous cell carcinoma, EGFR-mutant NSCLC)
	Amivantamab	Rybrevant	Bispecific anti-Met/Egfr antibody.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) FDA Approved in other indications (NSCLC with EGFR exon 20 insertion, NSCLC with EGFR exon 19 del /L858R)
	Amivantamab+lazertinib	Rybrevant+Lazcluze	Bispecific anti-Met/Egfr antibody+Egfr tyrosine kinase inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) FDA Approved in other indications (NSCLC with EGFR exon 19 del/L858R)
	Aumolertinib		Egfr T790M inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC))
	Avitinib		Irreversible mutation-specific Egfr kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC)) Phase 1 (Non-Hodgkin lymphoma (NHL))
	BAY2927088		Egfr/Her2 kinase inhibitor.	Phase 1 (Non-small cell lung carcinoma (NSCLC))
	BBP-398		Shp-2 inhibitor.	Phase 1 (Non-small cell lung carcinoma (NSCLC)) Phase 1 (Solid Tumor)
	BDTX-1535		Irreversible brain-penetrant fourth generation Egfr inhibitor.	Phase 1 (Non-small cell lung carcinoma (NSCLC)) Phase 1 (Glioma)
	Befotertinib		Third generation mutation-specific (T790M, L858R, exon 19 deletion) Egfr tyrosine kinase inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC))
	BLU-945		Fourth generation Egfr inhibitor targeting T790M and T790M/C797S mutations.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	BPI-361175		Fourth generation Egfr inhibitor targeting T790M and T790M/C797S mutations.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	CLN-081		Covalent mutation-specific (L858R, T790M, exon 19 deletion, exon 20 insertion) Egfr tyrosine kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	CM93		Third generation mutation-specific (T790M, L858R, exon 19 deletion) Egfr tyrosine kinase inhibitor.	Phase 1 (Glioblastoma)
	Dacomitinib	Vizimpro	Pan-ErbB family tyrosine kinase inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) FDA Approved in other indications (EGFR-mutant lung carcinoid, EGFR-mutant lung large cell neuroendocrine carcinoma, EGFR-mutant NSCLC)

Detailed Therapy Results

Alteration	Drug	Trade Name	Target	Current Status
	ERAS-601		Shp-2 inhibitor.	Phase 2 (Solid Tumor)
	Erlotinib	Tarceva	Egfr tyrosine kinase inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) FDA Approved in other indications (EGFR-mutant lung carcinoid, EGFR-mutant lung large cell neuroendocrine carcinoma, NSCLC with EGFR exon 19 del/L858R, Pancreatic carcinoma, EGFR-mutant NSCLC)
	Erlotinib+bevacizumab	Tarceva+Avastin	Egfr tyrosine kinase inhibitor + anti-VEGF-A monoclonal antibody combination.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) Phase 3 (Lung cancer)
	Erlotinib+ramucirumab	Tarceva+Cyramza	Egfr tyrosine kinase inhibitor + anti-VEGFR-2 monoclonal antibody combination.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) FDA Approved in other indications (NSCLC with EGFR exon 19 del/L858R)
	ET0038		Shp-2 inhibitor.	Phase 1 (Solid Tumor)
	Furmonertinib		Third generation mutation-specific (T790M, L858R, exon 19 deletion) Egfr tyrosine kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	FWD1509		Egfr/Her2 kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	Gefitinib	Iressa	Egfr tyrosine kinase inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) FDA Approved in other indications (EGFR-mutant lung carcinoid, EGFR-mutant lung large cell neuroendocrine carcinoma, EGFR-mutant NSCLC)
	H002		Fourth generation Egfr inhibitor targeting exon 19del /L858R, T790M, and C797S mutations.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	HBI-2376		Shp-2 inhibitor.	Phase 1 (Solid Tumor)
	Hemay022		Egfr tyrosine kinase inhibitor.	Phase 1 (Breast carcinoma (HER2+))
	Icotinib	Conmana	Egfr inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) Phase 2 (Esophageal carcinoma)
	JIN-A02		Fourth generation Egfr inhibitor targeting T790M and T790M/C797S mutations.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	Lazertinib	Lazcluze	Third generation mutation-specific Egfr tyrosine kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	Lifirafenib		Dual Braf/Egfr inhibitor.	Phase 1 (Non-small cell lung carcinoma (NSCLC)) Phase 1 (Solid Tumor, Brain and Central Nervous System Tumors)
	MCLA-129		Anti-EGFR/c-Met bispecific antibody.	Phase 2 (Non-small cell lung carcinoma (NSCLC)) Phase 2 (Gastric carcinoma, Head and neck squamous cell carcinoma (HNSCC), Esophageal squamous cell carcinoma)

Detailed Therapy Results

Alteration	Drug	Trade Name	Target	Current Status	
	Mobocertinib	Exkivity		Mutation-specific Egfr/Her2 inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) Phase 3 (NSCLC with EGFR exon 20 insertion, Lung cancer)
	Modotuximab			Anti-EGFR antibody.	Phase 1 (Gastric carcinoma, Colorectal carcinoma (CRC))
	Nazartinib			Third generation EGFR mutant-specific (T790M, L858R, exon 19 deletion) tyrosine kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	Neratinib	Nerlynx		Egfr/Her2/ErbB4 inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC)) FDA Approved in other indications (Breast carcinoma (HER2+))
	NX-019			Egfr inhibitor.	Phase 1 (Solid Tumor)
	Olafertinib			Third generation mutation-specific (T790M, L858R, exon 19 deletion) Egfr tyrosine kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC)) Phase 1 (Solid Tumor)
	Osimertinib	Tagrisso		Egfr T790M inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC)) FDA Approved in other indications (EGFR-mutant lung carcinoid, EGFR-mutant lung large cell neuroendocrine carcinoma, EGFR-mutant NSCLC)
	Pirotinib			ErbB family inhibitor.	Phase 1 (Solid Tumor)
	Poziotinib			Egfr/Her2/ErbB4 kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC)) Phase 2 (Gastric carcinoma, Head and neck squamous cell carcinoma (HNSCC), Breast carcinoma, Esophageal squamous cell carcinoma, Colorectal carcinoma (CRC))
	Pyrotinib			Egfr/Her2 kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC)) Phase 3 (Breast carcinoma)
	Rezivertinib			Egfr T790M inhibitor.	Phase 3 (Non-small cell lung carcinoma (NSCLC))
	SKLB1028			Egfr/Flt3/c-Abl inhibitor.	Phase 2 (Acute myeloid leukemia (AML))
	Sunvozertinib			Bispecific anti-Egfr/Her2 monoclonal antibody.	Phase 2 (Non-small cell lung carcinoma (NSCLC)) Phase 2 (Non-Hodgkin lymphoma (NHL))
	TAS2940			Egfr/Her2 kinase inhibitor.	Phase 1 (Solid Tumor)
	TAS3351			Fourth generation Egfr inhibitor targeting T790M and T790M/C797S mutations.	Phase 2 (Non-small cell lung carcinoma (NSCLC))
	TAVO412			Anti-c-Met/anti-EGFR/anti-VEGF trispecific antibody.	Phase 1 (Solid Tumor)
	Varlitinib			Egfr/Her2 kinase inhibitor.	Phase 2 (Gastric carcinoma, Hepatocellular carcinoma (HCC), Pancreatic carcinoma, Cholangiocarcinoma)
	WSD0922-FU			Blood-brain barrier penetrable EGFR/EGFRvIII	Phase 1 (Non-small cell lung carcinoma (NSCLC)) Phase 1 (Glioblastoma,

Detailed Therapy Results

Alteration	Drug	Trade Name	Target		Current Status
				inhibitor.	Anaplastic astrocytoma)
	ZN-e4			Egfr T790M inhibitor.	Phase 1 (Non-small cell lung carcinoma (NSCLC))
	Zorifertinib			Egfr tyrosine kinase inhibitor.	Phase 2 (Non-small cell lung carcinoma (NSCLC))

Relevance of Detected Alterations

Alteration	Role in Disease	Effect on Drug Sensitivity	Effect on Drug Resistance
EGFR E746_A750del	The presence of an EGFR abnormality (mutation, amplification, or overexpression) can result in an overabundance or overactivity of Egfr protein, which can lead to excessive proliferation. (1).	The presence of a sensitizing EGFR mutation in a tumor is the strongest biological predictor of sensitivity to an Egfr tyrosine kinase inhibitor (TKI). Compared with conventional chemotherapy, Egfr TKIs have been shown to improve progression-free survival in non-small cell lung cancer patients whose tumors harbor EGFR mutations. (2-5). The Egfr TKIs erlotinib, afatinib, gefitinib, osimertinib, and dacomitinib, as well as the combination of amivantamab plus lazertinib, have been approved by the FDA for the treatment of non-small cell lung cancer (NSCLC) with exon 19 deletion or L858R EGFR mutations; osimertinib has additionally been approved for the treatment of NSCLC with EGFR T790M. (2,5-14). Afatinib has additionally been FDA-approved for the treatment of NSCLC with S768I, L861Q, and/or G719X mutations. (15). The combination of erlotinib and ramucirumab as well as osimertinib plus platinum-based chemotherapy have been FDA-approved for the treatment of metastatic NSCLC patients with tumors harboring an EGFR exon 19 deletion or the exon 21 L858R mutation. (16-18). Amivantamab in combination with carboplatin and pemetrexed has been FDA-approved for the treatment of adult patients with locally advanced or metastatic NSCLC harboring EGFR Exon 19 deletions or Exon 21 L858R substitution mutations whose disease has progressed on or after treatment with an EGFR TKI. (12,19). Amivantamab has also been approved by the FDA for NSCLC patients with EGFR exon 20 insertions, whose disease has progressed on or after platinum-based chemotherapy and as frontline therapy in combination with carboplatin and pemetrexed. The accelerated FDA approval of mobocertinib for NSCLC patients with EGFR exon 20 insertions has been withdrawn due to lack of progression-free survival benefit in the confirmatory Phase 3 trial. (20-23). Studies have reported non-squamous NSCLC patients with metastatic disease and tumors harboring an EGFR exon 19 deletion or L858R mutation to be sensitive to osimertinib, erlotinib, afatinib, gefitinib, dacomitinib, and the combination of erlotinib plus ramucirumab. (2,5-7,11,16,24). Less	Some patients with EGFR-mutant NSCLC exhibit resistance to Egfr inhibition; resistance has been associated with insertions in EGFR exon 20, the T790M mutation in EGFR, and amplification of either MET or ERBB2. (26-30). Third generation irreversible Egfr TKIs that target the EGFR T790M mutation have shown efficacy in T790M-mutant NSCLC, including osimertinib, which has received approval by the FDA, EMA, and PMDA for the treatment of EGFR T790M-mutant metastatic NSCLC. (31-35). Several studies have reported that resistance to Egfr TKIs in NSCLC is mediated by the transformation of NSCLC cell types to those of SCLC with neuroendocrine features. (36-39).

Relevance of Detected Alterations

Alteration	Role in Disease	Effect on Drug Sensitivity	Effect on Drug Resistance
		common activating EGFR mutations have variable sensitivity to EGFR tyrosine kinase inhibitors. [25].	
TP53 P151S	Loss of tumor suppressor p53, which is encoded by the TP53 gene, is common in aggressive advanced cancers. [40]. Carriers of a germline mutation in TP53 have Li-Fraumeni Syndrome, an inherited cancer syndrome resulting in multiple tumors in early adulthood, including breast cancer, brain tumors, and leukemias. [41-43]. Expression of p53 in normal cells is low; however, TP53 alterations, including those that result in loss of p53 tumor suppressor function, may lead to stabilization and increased expression of p53, particularly in the nucleus, and several studies have shown that it may have oncogenic gain-of-function effects. [44-48]. TP53 alterations are believed to be early events in NSCLC, preceding lymph node metastasis. [49]. TP53 mutation and expression of p53 have been correlated with the lung squamous cell carcinoma subtype, and p53 expression in lung squamous cell carcinoma has also been associated with disease stage and higher grade tumors. [50-53]. TP53 mutation has been associated with PD-L1 expression and T-cell infiltration in lung adenocarcinoma samples. [54-58]. TP53 mutations have been significantly associated with the development of distant metastases after diagnosis in early-stage NSCLC in a cohort of 759 patients. [59].	At present, there are no approved therapies targeting TP53 alterations, despite their high prevalence in cancer. Therapeutic approaches under investigation include gene therapy for TP53 and (dendritic cell-based) TP53 vaccines. [60-62]. Inhibition of components of the DNA damage checkpoint, including Wee1, has been reported to enhance the activity of DNA-damaging agents in preclinical cancer models with deficiency of p53 function. [63-65]. Clinical trials of the Wee1 inhibitor adavosertib (MK-1775) are currently underway for patients with solid tumors and hematologic malignancies. Studies have reported Aurora kinase A to be activated in cells harboring TP53 mutation, and Aurora kinase A and B inhibitors have been reported to activate wild-type p53 in cellular assays; thus, tumors retaining a wild-type TP53 allele may benefit from Aurora kinase inhibitors. [66-71].	Mutations in TP53 may increase resistance to ionizing radiation therapy. [72,73].

References

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