2022/2/5

第31回抗悪性腫瘍薬開発フォーラム

プレシジョンメディシン時代の

臨床開発とその体制

稀少フラクションの臨床開発

LC-SCRUM-Asiaに基づいた臨床開発

国立がん研究センター東病院

呼吸器内科　後藤 功一

希少頻度の肺癌における治療開発の難しさ

治療開発とは、薬剤の有効性、安全性を科学的に証明し、国の承認を得て、一般臨床で治療が行えるようにすること

- 対象が少ない
- 沢山の症例を集める臨床試験の実施が困難（症例数が多い方が科学的に確かな結果が得られる）
- 少数例の臨床試験では、科学的な有効性（承認申請のための有効性）を示すのが困難
- 基礎研究で有効性を示す薬剤は存在するが、儲けが少ない治療薬の開発（治験）に製薬企業が興味を示さない
- 医師主導治験の資金確保、実施の困難性

LC-SCRUM-Asiaの活動目的
（2013/2月～）

- **有効な治療薬を患者さんへ届けること**
  - 希少がんの遺伝子スクリーニング
  - 遺伝子解析の結果に基づいた治療開発
  - コンパニオン診断薬の開発のサポート

- **マルチ診断薬を患者さんへ届けること**
  - マルチ診断薬の性能評価
  - マルチ診断薬の承認申請

Lung Cancer Genomic Screening Project for Individualized Medicine in Japan (LC-SCRUM-Japan)

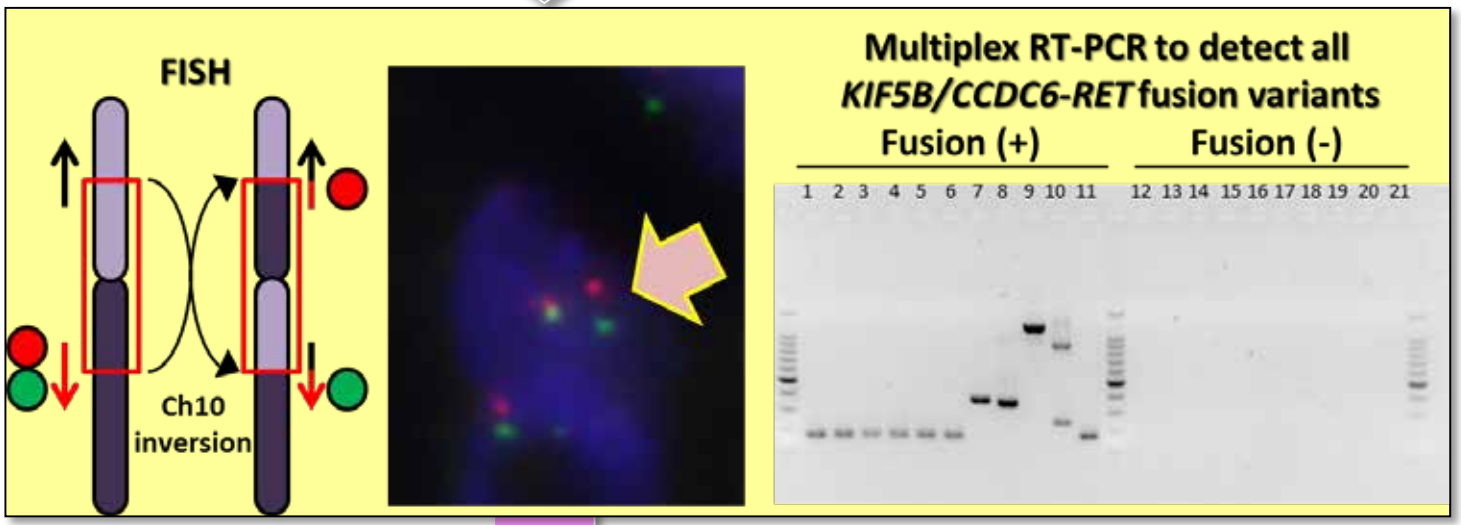
A prospective observational study to determine the pathological and molecular characteristics of RET fusion positive lung cancer

- Non-Sq NSCLC, EGFR mutation (-)
- Sample: 1) Fresh Frozen + FFPE or 2) Pleural Effusion

Submit to SRL, Inc.

3 Fusion Genes

- RET
- ROS1
- ALK



RET fusion gene double positive by RT-PCR & FISH

- Phase II Study of Vandetanib for RET Positive NSCLC (LURET study)
- Phase II Study of Crizotinib for ROS1 Positive NSCLC (OO12-01 study)

Phase II Study of Vandetanib (ZD6474) in Patients with RET Fusion-positive Locally Advanced or Metastatic Non-Small Cell Lung Cancer (LURET study)

- Advanced NSCLC
- RET Fusion-positive
  Fresh frozen (RT-PCR)
  and FFPE (FISH)
- Age ≥ 20 years, PS 0-2
- At least one prior chemo

Entry

Vandetanib
300 mg/day
orally, once daily, until PD or unacceptable toxicity

Primary endpoint : ORR
Secondary endpoints: DCR, PFS, DR, Toxicity
Number of ITT sites : 7 institutes in Japan
Enrollment: 2 years **Follow-up**: 1 year
Research fund: Health Labour Sciences Research Grant

Vandetanib for RET-rearranged Lung Cancer (LURET Study)

Vandetanib in patients with previously treated *RET*-rearranged advanced non-small-cell lung cancer (LURET): an open-label, multicentre phase 2 trial

Kiyotaka Yoh, Takashi Seto, Miyako Satouchi, Makoto Nishio, Noboru Yamamoto, Haruyasu Murakami, Naoyuki Nogami, Shingo Matsumoto, Takashi Kohno, Koji Tsuta, Katsuya Tsuchihara, Genichiro Ishii, Shogo Nomura, Akihiro Sato, Atsushi Ohtsu, Yuichiro Ohe, Koichi Goto

Summary

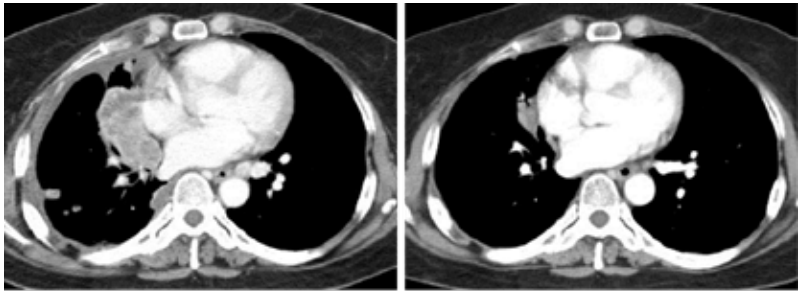
Background *RET* rearrangements are rare oncogenic alterations in non-small-cell lung cancer (NSCLC). Vandetanib is a multitargeted tyrosine kinase inhibitor exhibiting RET kinase activity. We aimed to assess the efficacy and safety of vandetanib in patients with advanced *RET*-rearranged NSCLC.

Methods In this open-label, multicentre, phase 2 trial (LURET), patients with advanced *RET*-rearranged NSCLC continuously received 300 mg of oral vandetanib daily. *RET*-positive patients were screened using a nationwide genomic screening network of about 200 participating institutions. Primary endpoint was the independently assessed objective response in eligible patients. This study is registered with UMIN-CTR, number UMIN000010095.

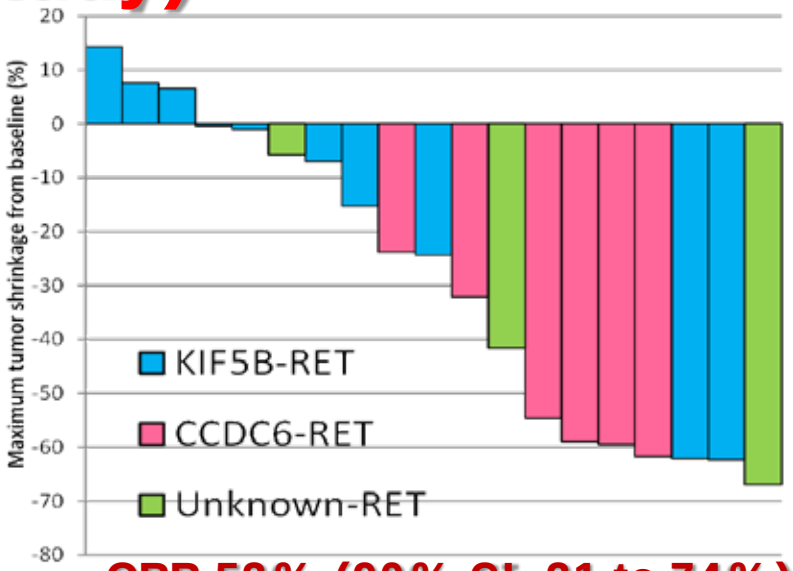
Findings Between Feb 7, 2013, and March 19, 2015, 1536 patients with *EGFR* mutation-negative NSCLC were screened, of whom 34 were *RET*-positive (2%) and 19 were enrolled. Among 17 eligible patients included in primary analysis, nine (53% [95% CI 28–77]) achieved an objective response, which met the primary endpoint. In the intention-to-treat population of all 19 patients treated with vandetanib, nine (47% [95% CI 24–71]) achieved an objective response. At the data cutoff, median progression-free survival was 4·7 months (95% CI 2·8–8·5). The most common grade 3 or 4 adverse events were hypertension (11 [58%]), diarrhoea (two [11%]), rash (three [16%]), dry skin (one [5%]), and QT prolongation (two [11%]).

Interpretation Vandetanib showed clinical antitumour activity and a manageable safety profile in patients with advanced *RET*-rearranged NSCLC. Our results define *RET* rearrangement as a new molecular subgroup of NSCLC suitable for targeted therapy.

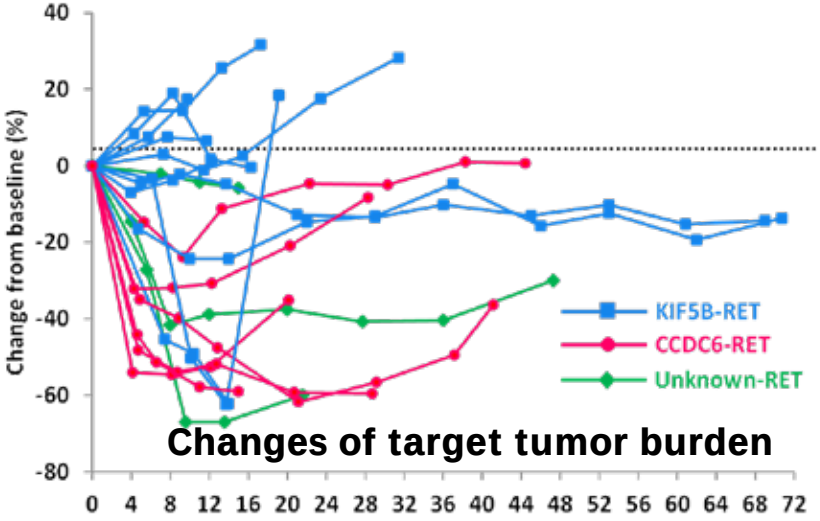
Funding The Ministry of Health, Labour and Welfare of Japan and the Practical Research for Innovation Cancer Control from the Japan Agency for Medical Research and Development, AMED.



Baseline　　After 20 Weeks



ORR 53% (90% CI, 31 to 74%)
in 17 eligible patients



Changes of target tumor burden

Lancet Respir Med. 2017 Jan;5(1):42-50

Cabozantinib for RET-rearranged Lung Cancer

Cabozantinib in patients with advanced *RET*-rearranged non-small-cell lung cancer: an open-label, single-centre, phase 2, single-arm trial

Alexander Drilon, Natasha Rekhtman, Maria Arcila, Lu Wang, Andy Ni, Melanie Albano, Martine Van Voorthuysen, Romel Somwar, Roger S Smith, Joseph Montecalvo, Andrew Plodkowski, Michelle S Ginsberg, Gregory J Riely, Charles M Rudin, Marc Ladanyi, Mark G Kris

Summary

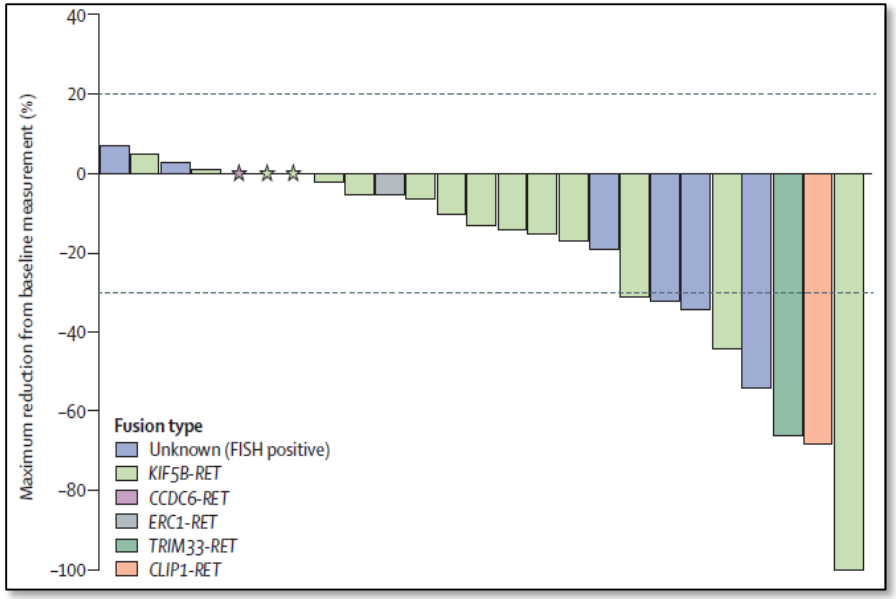
Background *RET* rearrangements are found in 1–2% of non-small-cell lung cancers. Cabozantinib is a multikinase inhibitor with activity against RET that produced a 10% overall response in unselected patients with lung cancers. To assess the activity of cabozantinib in patients with *RET*-rearranged lung cancers, we did a prospective phase 2 trial in this molecular subgroup.

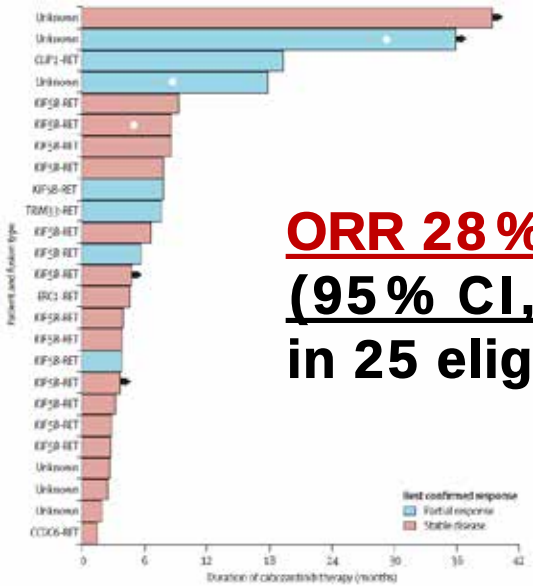
Methods We enrolled patients in this open-label, Simon two-stage, single-centre, phase 2, single-arm trial in the USA if they met the following criteria: metastatic or unresectable lung cancer harbouring a *RET* rearrangement, Karnofsky performance status higher than 70, and measurable disease. Patients were given 60 mg of cabozantinib orally per day. The primary objective was to determine the overall response (Response Criteria Evaluation in Solid Tumors version 1.1) in assessable patients; those who received at least one dose of cabozantinib, and had been given CT imaging at baseline and at least one protocol-specified follow-up timepoint. We did safety analyses in the modified intention-to-treat population who received at least one dose of cabozantinib. The accrual of patients with *RET*-rearranged lung cancer to this protocol has been completed but the trial is still ongoing because several patients remain on active treatment. This study was registered with ClinicalTrials.gov, number NCT01639508.

Findings Between July 13, 2012, and April 30, 2016, 26 patients with *RET*-rearranged lung adenocarcinomas were enrolled and given cabozantinib; 25 patients were assessable for a response. *KIF5B-RET* was the predominant fusion type identified in 16 (62%) patients. The study met its primary endpoint, with confirmed partial responses seen in seven of 25 response-assessable patients (overall response 28%, 95% CI 12–49). Of the 26 patients given cabozantinib, the most common grade 3 treatment-related adverse events were lipase elevation in four (15%) patients, increased alanine aminotransferase in two (8%) patients, increased aspartate aminotransferase in two (8%) patients, decreased platelet count in two (8%) patients, and hypophosphataemia in two (8%) patients. No drug-related deaths were recorded but 16 (62%) patients died during the course of follow-up. 19 (73%) patients required dose reductions due to drug-related adverse events.

Interpretation The reported activity of cabozantinib in patients with *RET*-rearranged lung cancers defines *RET* rearrangements as actionable drivers in patients with lung cancers. An improved understanding of tumour biology and novel therapeutic approaches will be needed to improve outcomes with RET-directed targeted treatment.

Funding Exelixis, National Institutes of Health and National Cancer Institute Cancer Center Support Grant P30 CA008748.





ORR 28%
(95% CI, 12 to 49%)
in 25 eligible patients

Lancet Oncol **2016; 17: 1653–60**

LC-SCRUM-Asia

Contract

SCRUM-Japan Participation fee

Data Sharing

Business fee
- Pt enrollment
- Pt identification
- Therapy & Dx development

East-Asian Institutions

Contract

LC-SCRUM-Asia

Contract

Datacenter fee

Pt screening fee

Data sharing fee

PREMIA PRECISION MEDICINE ASIA

- LC-SCRUM data center
- Database construction
- Clinical Trials
- Companion diagnostics

Enrollment

Data Sharing

Enrollment

Data Sharing

Contract

Test Fee

Analysis Data

Contract

Contract

Clinical data

Sample Submission

Analysis Report

SRL Inc.

Genomic analysis

Genomic Data

Company of Temporal LDM

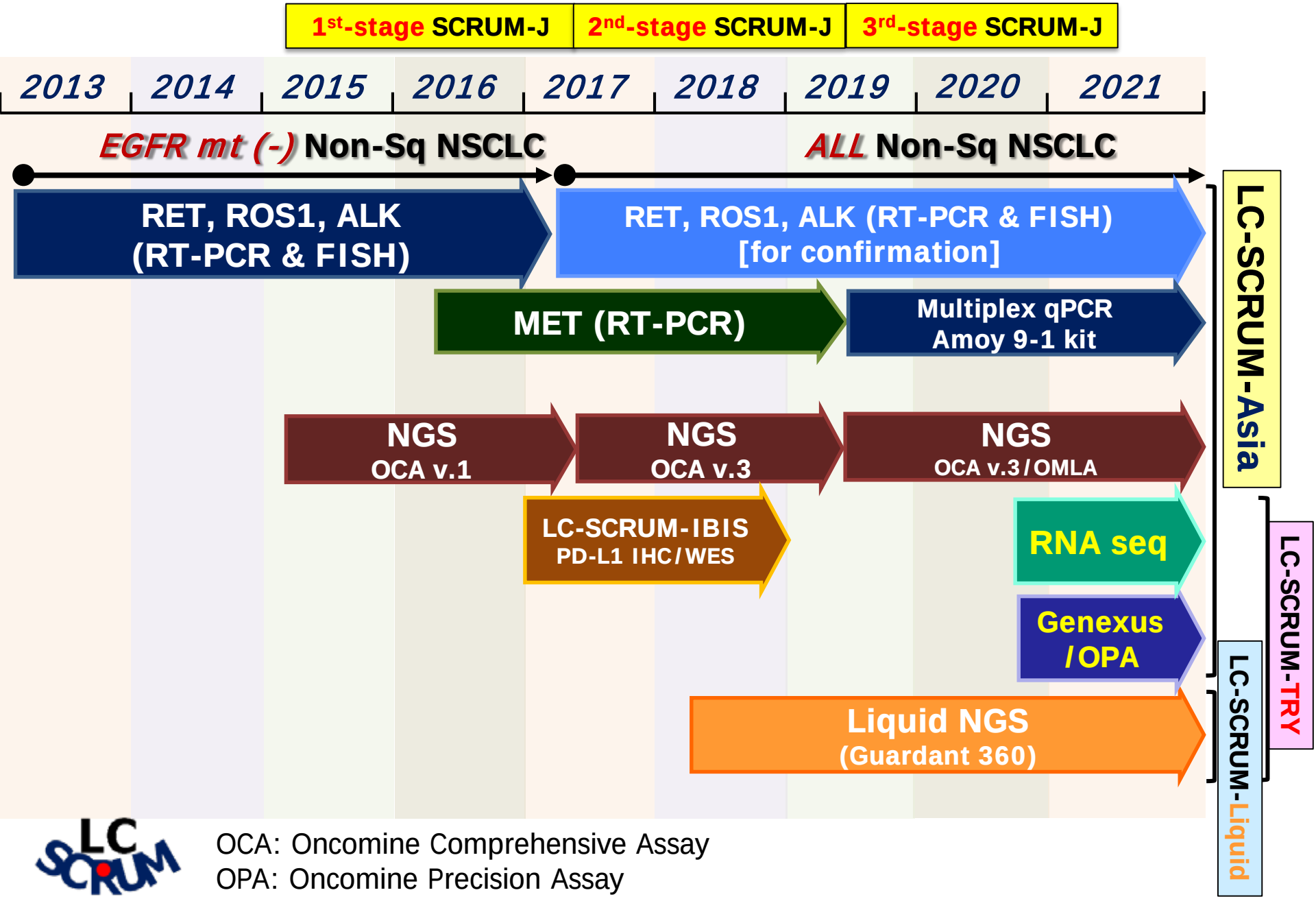
ACCERISE·SITE

Clinical data collecting

Contract

Clinical data

Molecular Tests in LC-SCRUM-Japan/Asia (NSCLC)



OCA: Oncomine Comprehensive Assay
OPA: Oncomine Precision Assay

4th-stage LC-SCRUM-Asia (Jun/2021-)

LC SCRUM

Amoy MASTER Panel

DNA assay (571 genes)
& RNA assay (2660 genes)
Comprehensive genome and transcriptome profiling from both DNA and RNA
(Tissue NGS)

Large NGS panel

Small NGS panel

Genexus/OPA
(Tissue and/or Liquid NGS)

Amoy 9-1 kit
(Tissue PCR)

Negative for 20 target genes or Mucinous Ad

Whole-RNA Seq
(Tissue NGS)

LC-SCRUM-Support

LC-SCRUM-TRY

Genexus/OPA
(Tissue or Liquid NGS)

MET FISH
for EGFR-TKI failure or MET amp by NGS

1st-line Tx → PD → 2nd-line Tx → PD → 3rd-line Tx

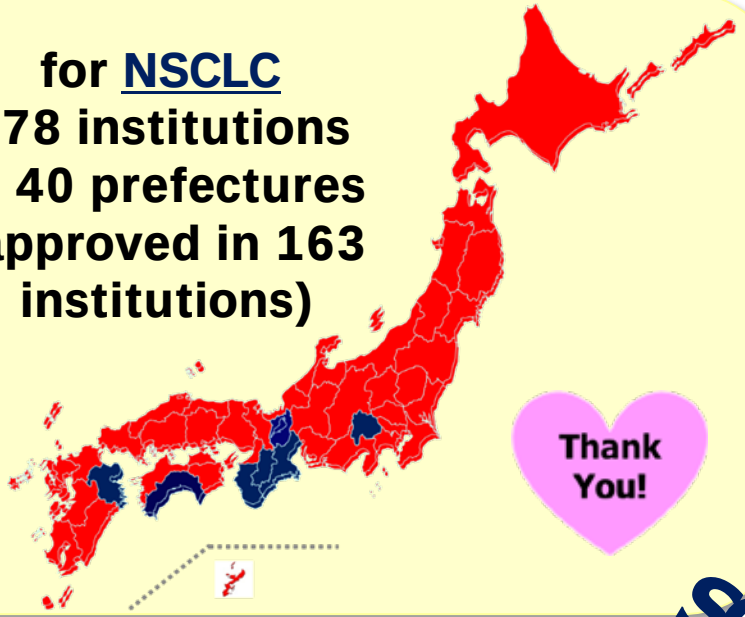
3rd-stage⇒4th-stage

- Ø OCA, OMLAなし
- Ø AMP (large panel) 導入
- Ø 血液提出 必須
  （Germline引き算用）
- Ø OPA-Liquid導入
- Ø LC-SCRUM-Support開始

LC-SCRUM-Asia (4th Stage)

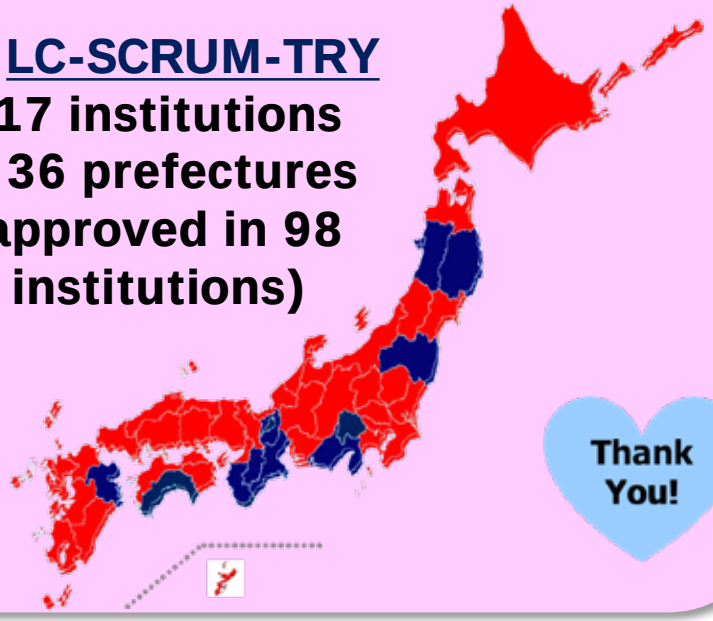
178 institutions in 40prefectures participating (2020/9/3-2021/12/3)

for NSCLC
178 institutions
in 40 prefectures
(approved in 163
institutions)



Thank You!

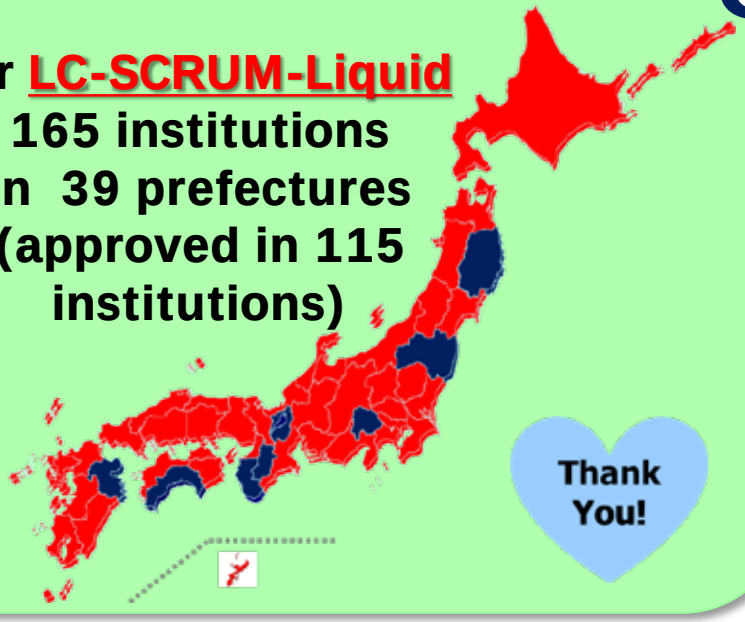
for LC-SCRUM-TRY
117 institutions
in 36 prefectures
(approved in 98
institutions)



Thank You!

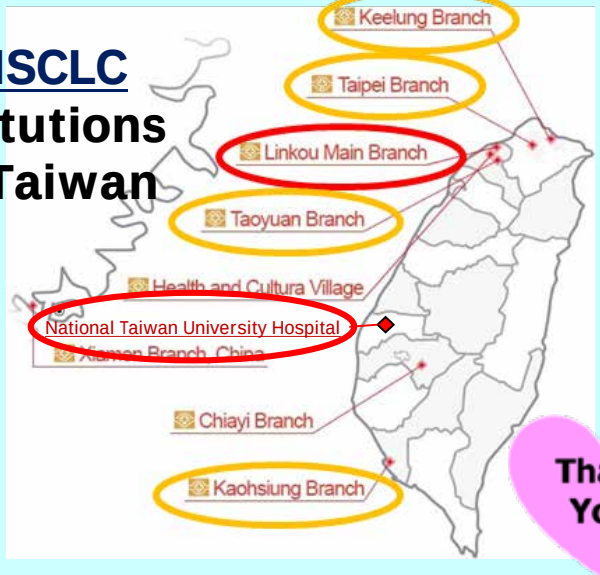
LC SCRUM

for LC-SCRUM-Liquid
165 institutions
in 39 prefectures
(approved in 115
institutions)



Thank You!

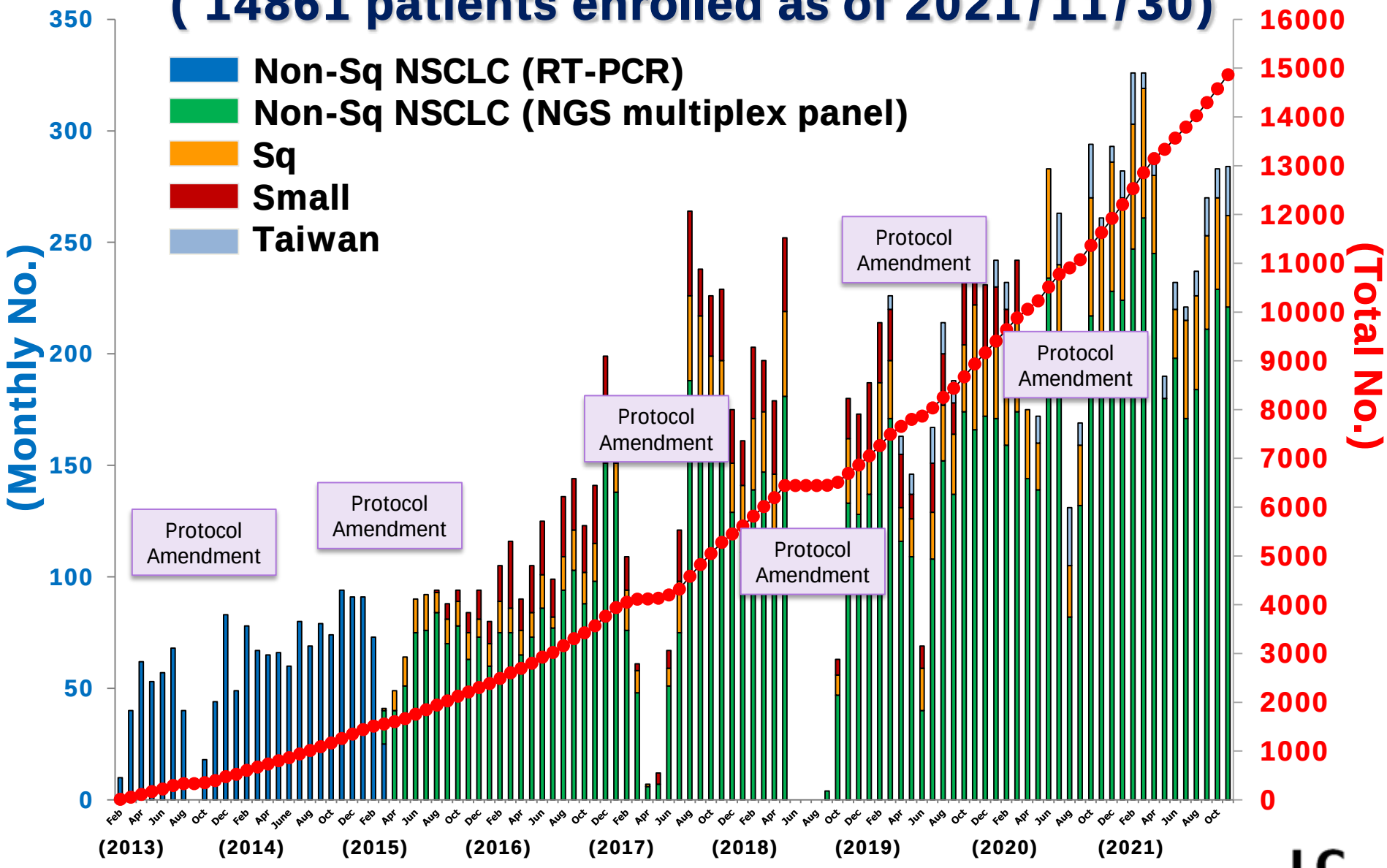
for NSCLC
6 institutions
from Taiwan



Thank You!

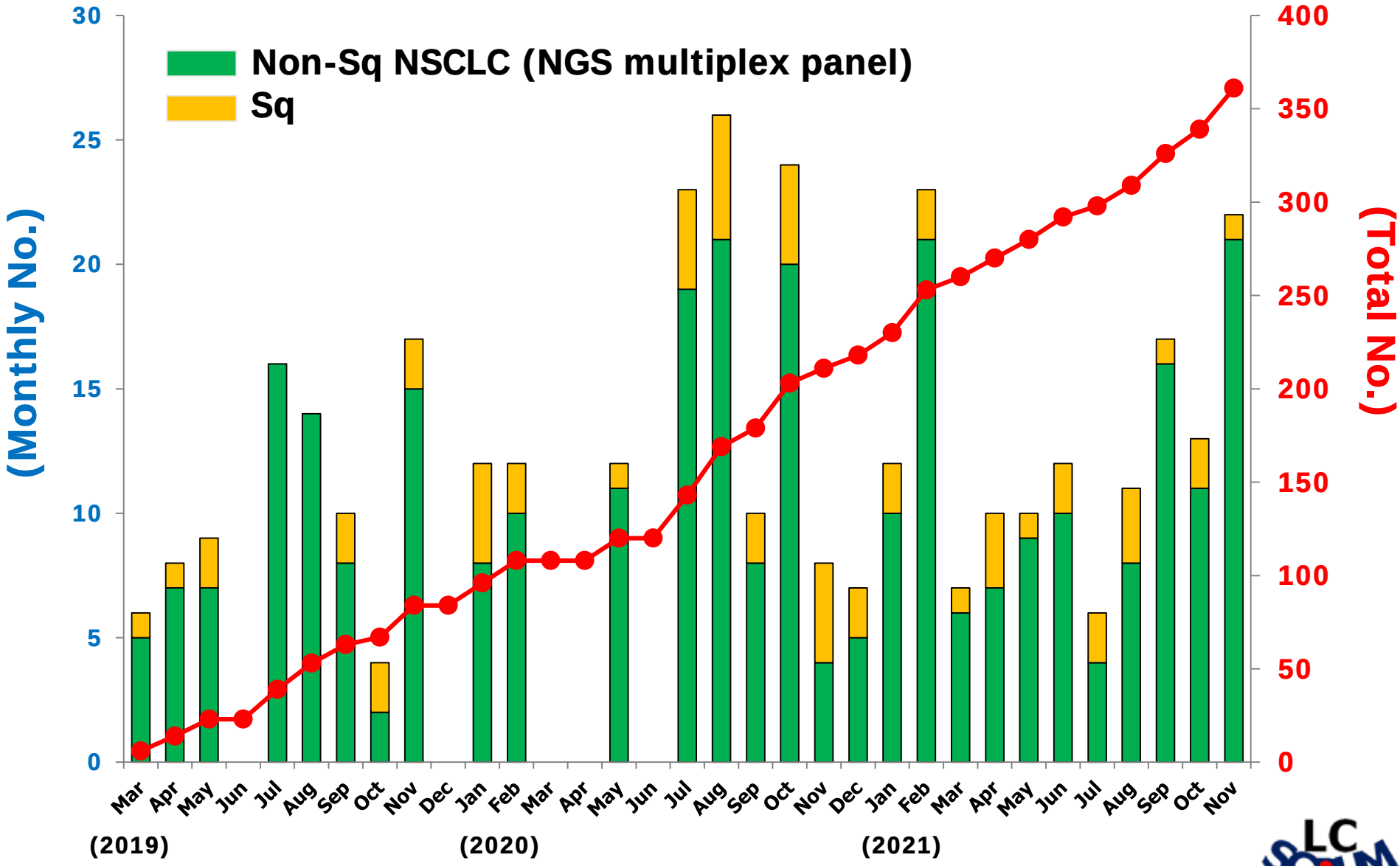
Patient Enrollment in LC-SCRUM-Asia

(14861 patients enrolled as of 2021/11/30)



Patient Enrollment in LC-SCRUM-Asia (Taiwan)

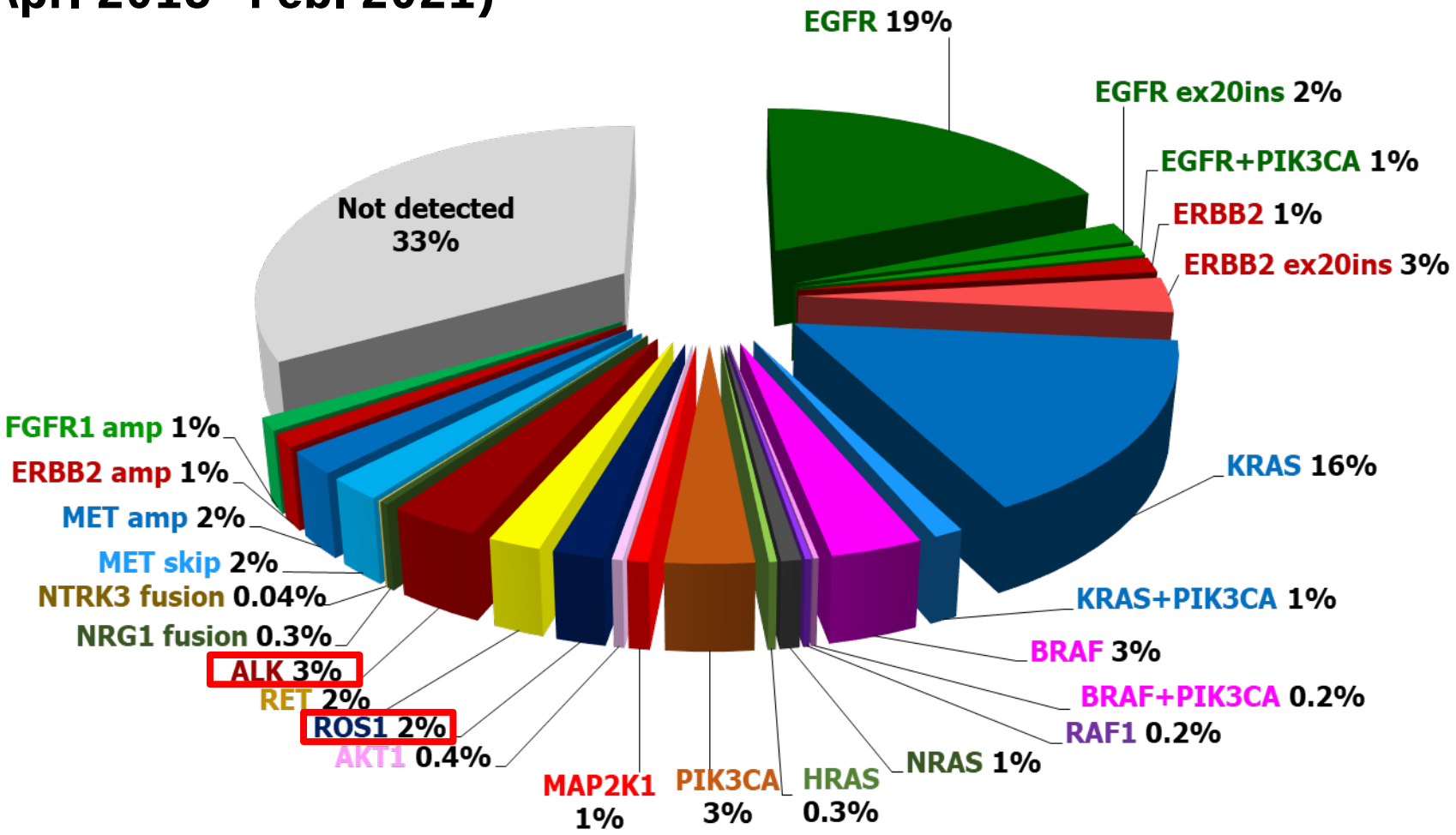
(361 patients enrolled as of 2021/11/30)



Screened Results in LC-SCRUM-Japan :

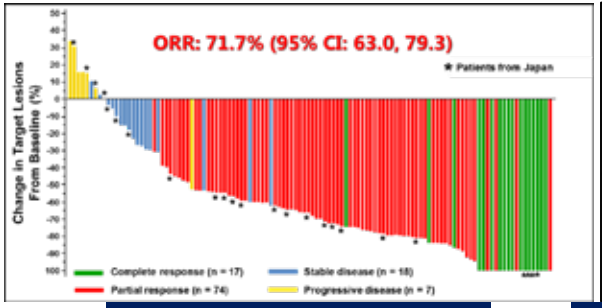
(7173 Non-Sq. NSCLC samples)

OCA
(Apr. 2015~Feb. 2021)



Clinical Development of Targeted Therapy Based on LC-SCRUM-Asia Genomic Dcreening

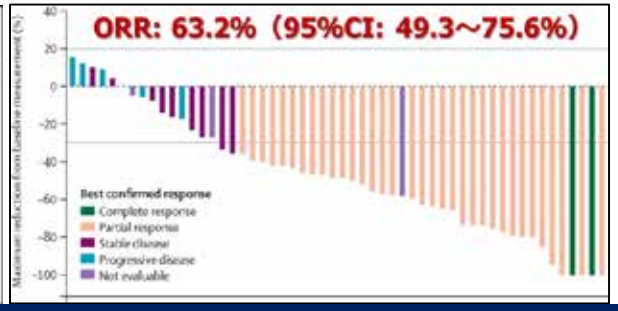
ROS1 fusion



Crizotinib (2017)

(approval on May 18, 2017)

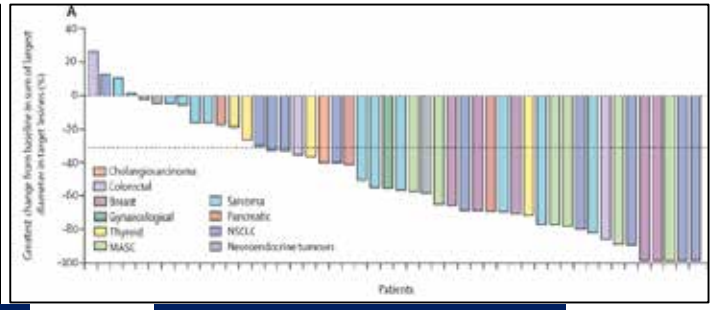
BRAF V600E



Dabrafenib/Trametinib (2018)

(approval on Mar. 23, 2018)

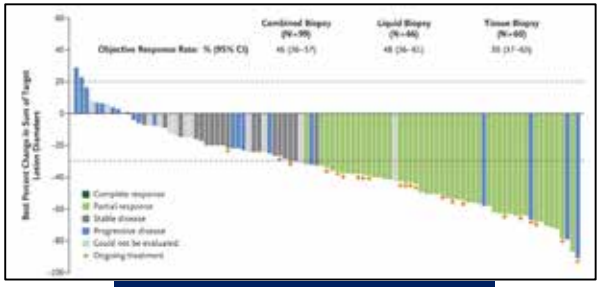
NTRK1-3 fusion



Entrectinib (2019)

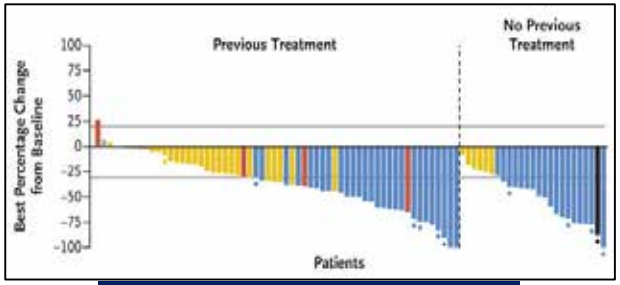
(approval on Jun. 18, 2019)

MET ex14 skipping



Tepotinib (2020)

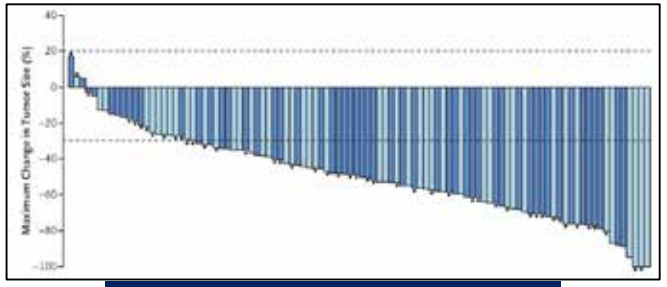
(approval on Mar. 25, 2020)



Capmatinib (2020)

(approval on Jun 29, 2020)

RET fusion

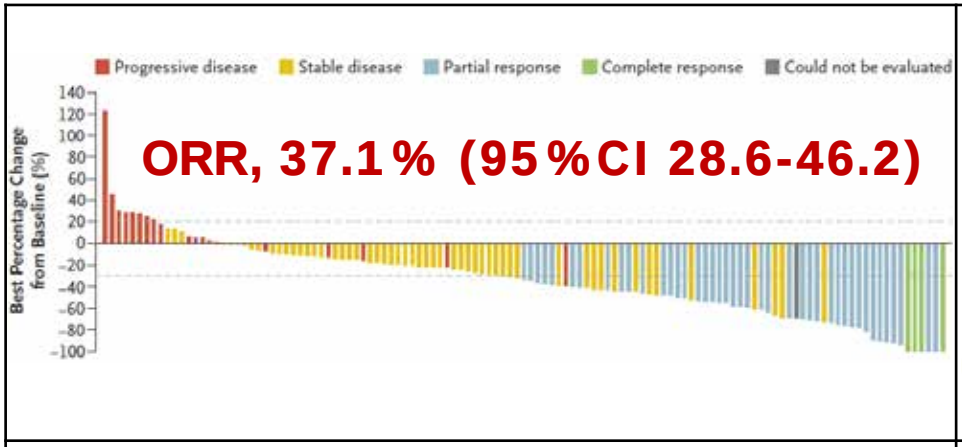


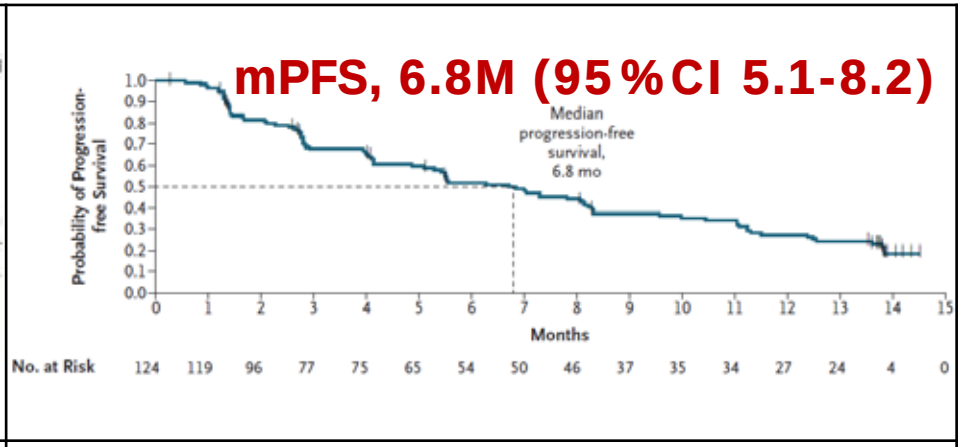
Selpercatinib (2021)

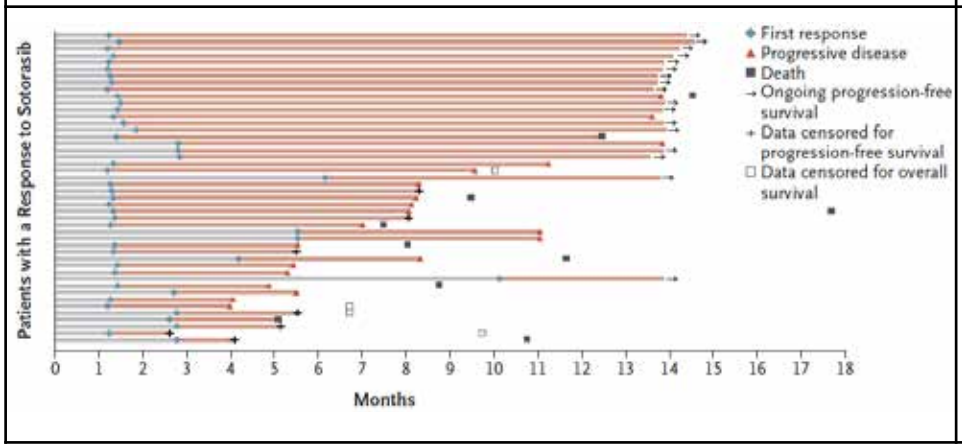
(approval on Sep. 27, 2021)

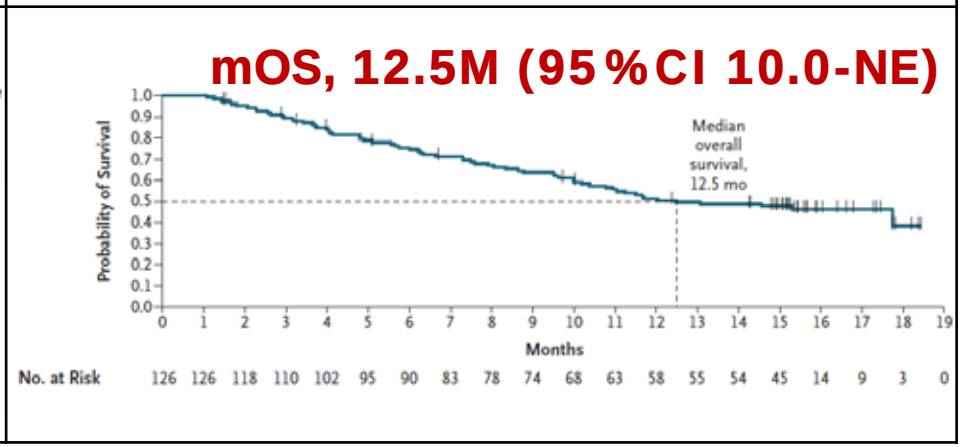
Wu YL et al. J Clin Oncol, 2018; Planchard D et al. Lancet Oncol, 2016; Doebele RC et al. Lancet Oncol, 2020
Paik PK et al. N Engl J Med, 2020; J Wolf et al. N Engl J Med, 2020; Drilon A et al. N Engl J Med, 2020

Sotorasib (AMG510) for NSCLC with *KRAS* G12C









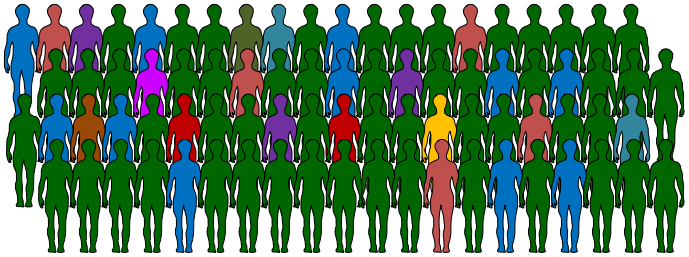
N Engl J Med. 2021;384:2371-81

Just approved on Jun 20, 2022!

Molecular Targeted Agents for Lung Cancer with Rare Driver Oncogenes Approved by PMDA

Drug	Target	Journal	Year	N0. of Pt	ORR (%)	PFS (mo)	PMDA Approval
Crizotinib	ROS1	JCO	2018	127	72	15.9	May 2017
Dabrafenib/Trametinib	BRAF	Lancet Oncol	2016	59	63	9.7	Mar 2018
			2017	Naïve 36	64	14.6	
Entrectinib	NTRK	Lancet Oncol	2020	54	57	11.2	Jun 2019
Entrectinib	ROS1	Lancet Oncol	2020	53	77	19.0	Feb 2020
Tepotinib	MET	NEJM	2020	152	46	8.5	Mar 2020
Capmatinib	MET	NEJM	2020	69	41	5.4	Jun 2020
				Naïve 28	68	12.4	
Selpercatinib	RET	NEJM	2020	105	64	16.5	Sep 2021
				Naïve 39	85	NE	
Sotorasib	KRAS	NEJM	2020	126	37	6.8	Coming soon

ドライバー遺伝子に基づく肺癌ゲノム医療



非小細胞肺癌（肺腺癌）

EGFR	ALK	ROS1	BRAF	NTRK	MET	RET	HER2	KRAS	EGFR Ex20ins
Gefitinib Erlotinib Afatinib Osimertinib	Alectinib Crizotinib Ceritinib	Crizotinib	Dabrafenib + Trametinib	Entrectinib	Tepotinib Capmatinib	Selpercatinib	阻害薬	阻害薬	阻害薬
2007	2012	2017	2018	2019	2020	2021			

（診断薬承認）

オンコマインDx Target Test マルチCDx システム

EGFR/ALK/ROS1/BRAFのCDxとして承認（2019/6/1）

●CDx対象遺伝子と治療薬

遺伝子	遺伝子変異等	関連する医薬品
EGFR	EGFR 遺伝子変異	ゲフィチニブ、 エルロチニブ塩酸塩、 アファチニブマレイン酸塩、 オシメルチニブメシル酸塩
ALK	ALK 融合遺伝子	クリゾチニブ、 アレクチニブ塩酸塩
ROS1	ROS1 融合遺伝子	クリゾチニブ
BRAF	BRAF V600E	ダブラフェニブメシル酸塩 及び トラメチニブ ジメチルスルホキシド付加物 の併用投与

Ion PGM Dx System

●その他の解析遺伝子（46遺伝子：参考情報。現時点ではCGP対象ではない。）

Mutation (DNA)					Fusion (RNA)		
AKT1	EGFR	GNA11	JAK3	NRAS	ABL1	ETV4	NTRK2
ALK	ERBB2	GNAQ	KIT	PDGFRA	ALK	ETV5	NTRK3
AR	ERBB3	HRAS	KRAS	PIK3CA	AXL	FGFR1	PDGFRA
BRAF	ERBB4	IDH1	MAP2K1	RAF1	BRAF	FGFR2	PPARG
CDK4	ESR1	IDH2	MAP2K2	RET	ERBB2	FGFR3	RAF1
CTNNB1	FGFR2	JAK1	MET	ROS1	ERG	MET	RET
DDR2	FGFR3	JAK2	MTOR	SMO	ETV1	NTRK1	ROS1

オンコマインDx Target Test CDxシステム 添付文書より引用

Lung Cancer PCR Panels

9-in-1 (V1, Chinese version)

AmoyDx® Multi-Gene Mutations Detection Kit: 118 variations

Gene	*ALK*	*ROS1*	*RET*	*EGFR*	*HER2*	*BRAF-V600*	*KRAS*	*PIK3CA*	*NRAS*
Variation #	21	*13*	*6*	47	12	6	7	2	4
Coverage	95%	97%	95%	97%	91%	100%	96%	72%	57%

- *EGFR* 20ins: 15 types, 58.2 % of all known types (70.8% of Asian population)
- *HER2* 20ins: 12 types, 91.3% of all known types (96.6% of Asian population)

9-in-1 (V2, Japanese version)

AmoyDx® Pan Lung Cancer PCR Panel: 167 variations

Gene	*ALK*	*NTRK*			*ROS1*	*RET*	*cMET*	*EGFR*	*HER2*	*BRAF-V600E*	*KRAS*
		1	*2*	*3*							
Variation #	21	*18*	*5*	*8*	13	16	1	63	14	1	7
Coverage	95%	95%	95%	95%	98%	97%	100%	98%	94%	100%	96%

- *EGFR* 20ins: 29 types, 78.1% of all known types (88.2% of Asian population)
- *HER2* 20ins: 14 types, 93.5% of all known types (98.9% of Asian population)

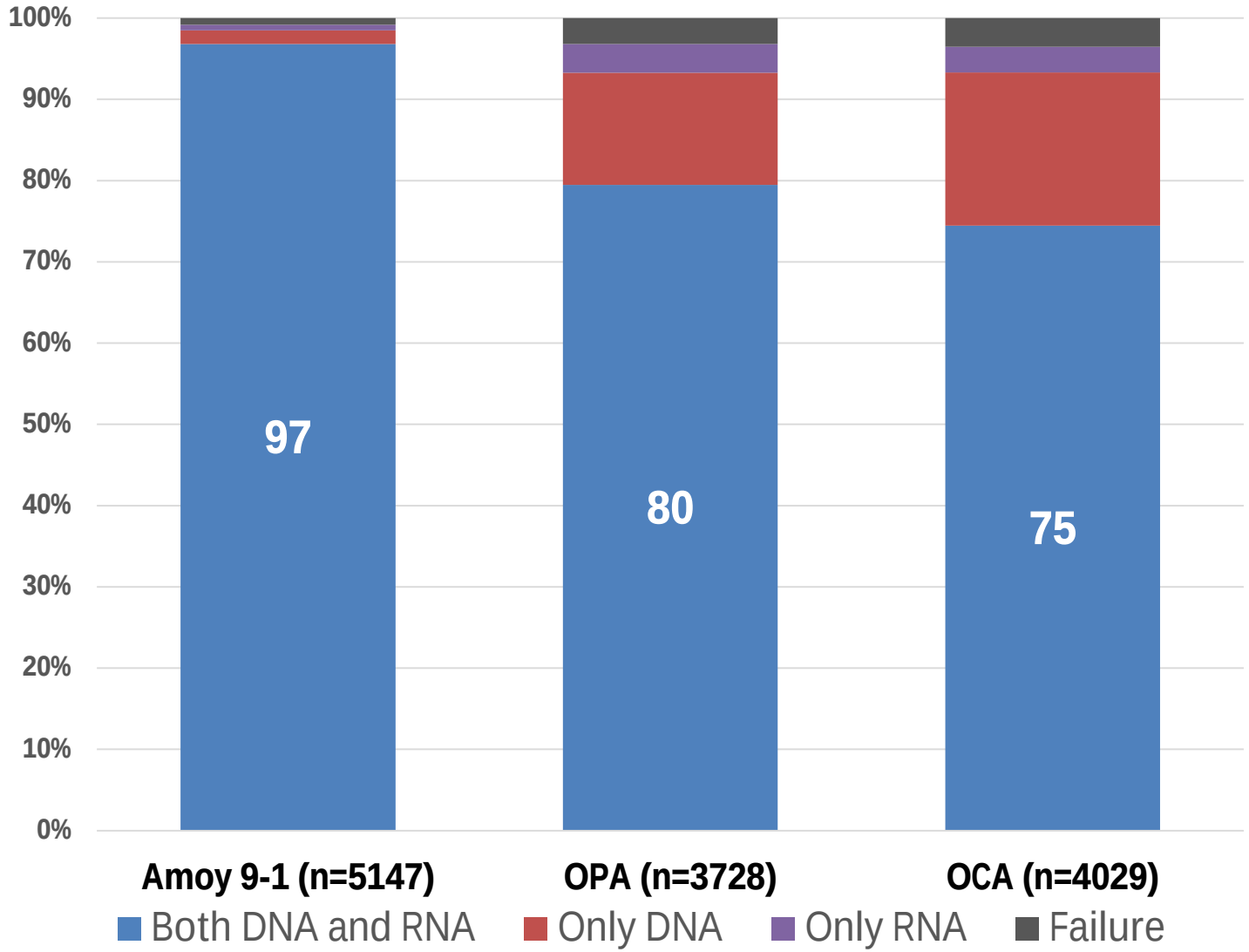
Oncomine Precision Assay (OPA) Gene Content

DNA hotspots		CNV	Inter-genetic fusions	Intra-genetic fusions
AKT1	GNAS	ALK	**ALK**	AR
AKT2	HRAS	AR	BRAF	EGFR
AKT3	IDH1	CD274	ESR1	MET
ALK	IDH2	CDKN2A	**FGFR1**	
AR	KIT	EGFR	**FGFR2**	
ARAF	KRAS	ERBB2	**FGFR3**	
BRAF	MAP2K1	ERBB3	MET	
CDK4	MAP2K2	FGFR1	NRG1	
CDKN2A	MET	FGFR2	**NTRK1**	
CHEK2	MTOR	FGFR3	**NTRK2**	
CTNNB1	NRAS	KRAS	**NTRK3**	
EGFR	NTRK1	MET	NUTM1	
ERBB2	NTRK2	PIK3CA	**RET**	
ERBB3	NTRK3	PTEN	ROS1	
ERBB4	PDGFRA		RSPO2	
ESR1	PIK3CA		RSPO3	
FGFR1	PTEN		**Bold** genes indicate inclusion of non-targeted fusion detection	
FGFR2	RAF1			
FGFR3	RET		**50**	**Total genes**
FGFR4	ROS1		**45**	DNA hotspot genes
FLT3	SMO		**14**	CNV genes
GNA11	TP53		**16**	Inter-genetic fusions
GNAQ			**3**	Intra-genetic fusions

For Research Use Only. Not for use in diagnostics procedures.

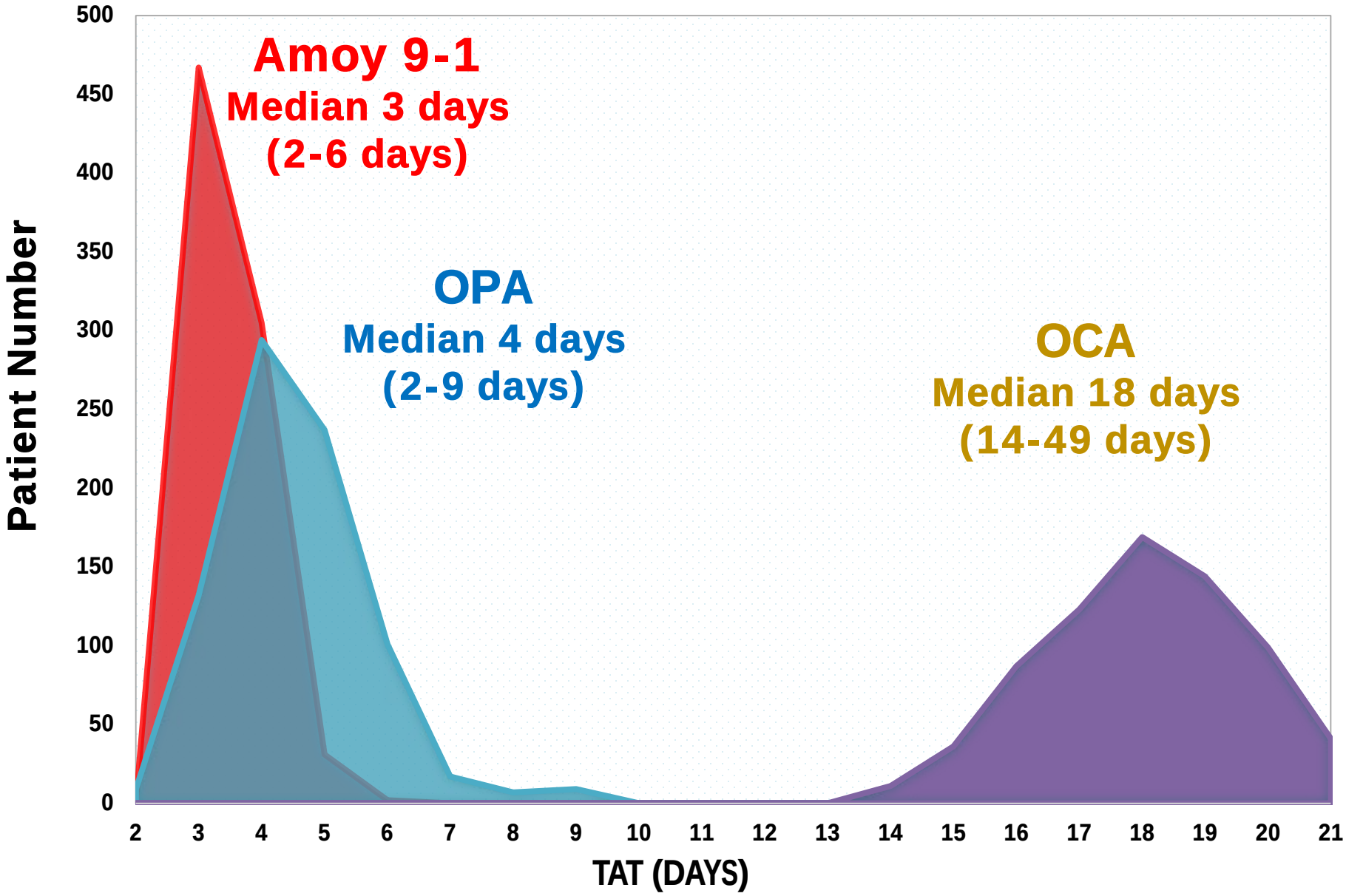
By courtesy of Thermo Fisher

Success Rate of Amoy 9-1, OPA and OCA
(2019/Jun-2021/Nov)



Turn Around Time of Amoy 9-1, OPA and OCA

2020/10/2-2021/3/31: 806 patients with every 3 tests completed



Approval of AmoyDx® Pan Lung Cancer PCR Panel

- 2021/6/25 approved as CDx for EGFR/ALK/ROS1/BRAF
- 2021/8/12 approved as CDx for MET Ex14 skipping
- 2021/9/3 approved as integrated CDx for EGFR/ALK/ROS1/BRAF/MET Ex14 skipping

2021/6/25 PMDA approval

PREMIA PRECISION MEDICINE ASIA

AmoyDx Better life with AmoyDx

rikengenesis

AmoyDx® Pan Lung Cancer PCR Panel
Receives MHLW Approval as Companion Diagnostic for 9 Targeted Therapies for Use in Patients with Advanced Non-Small Cell Lung Cancer

TOKYO and XIAMEN, June 30, 2021 (GLOBE NEWSWIRE) -- Riken Genesis Co., Ltd., Amoy Diagnostics Co., Ltd., ("AmoyDx") and Precision Medicine Asia Co., Ltd. ("PREMIA") today announced that the AmoyDx® Pan Lung Cancer PCR Panel (the "AmoyDx PLC Panel"), an in vitro diagnostic reagent developed as a companion diagnostic for multiple anti-cancer agents, was approved by Ministry of Health, Labour and Welfare (MHLW) for production and marketing in Japan on June 25, 2021.

https://www.premia-inc.com/blog

Gene alteration	Targeted drug
EGFR mutations	Gefitinib, Erlotinib, Afatinib, Osimertinib
ALK fusions	Crizotinib, Alectinib, Brigatinib
ROS1 fusions	Crizotinib
BRAF V600E	Dabrafenib+Trametinib
MET ex14 skipping	Tepotinib

2021/8/12 PMDA approval

LC-SCRUM-Asiaの研究結果に基づいて新規遺伝子診断薬「AmoyDx肺癌マルチ遺伝子PCRパネル」承認 ～5つの治療標的遺伝子を迅速に診断可能～

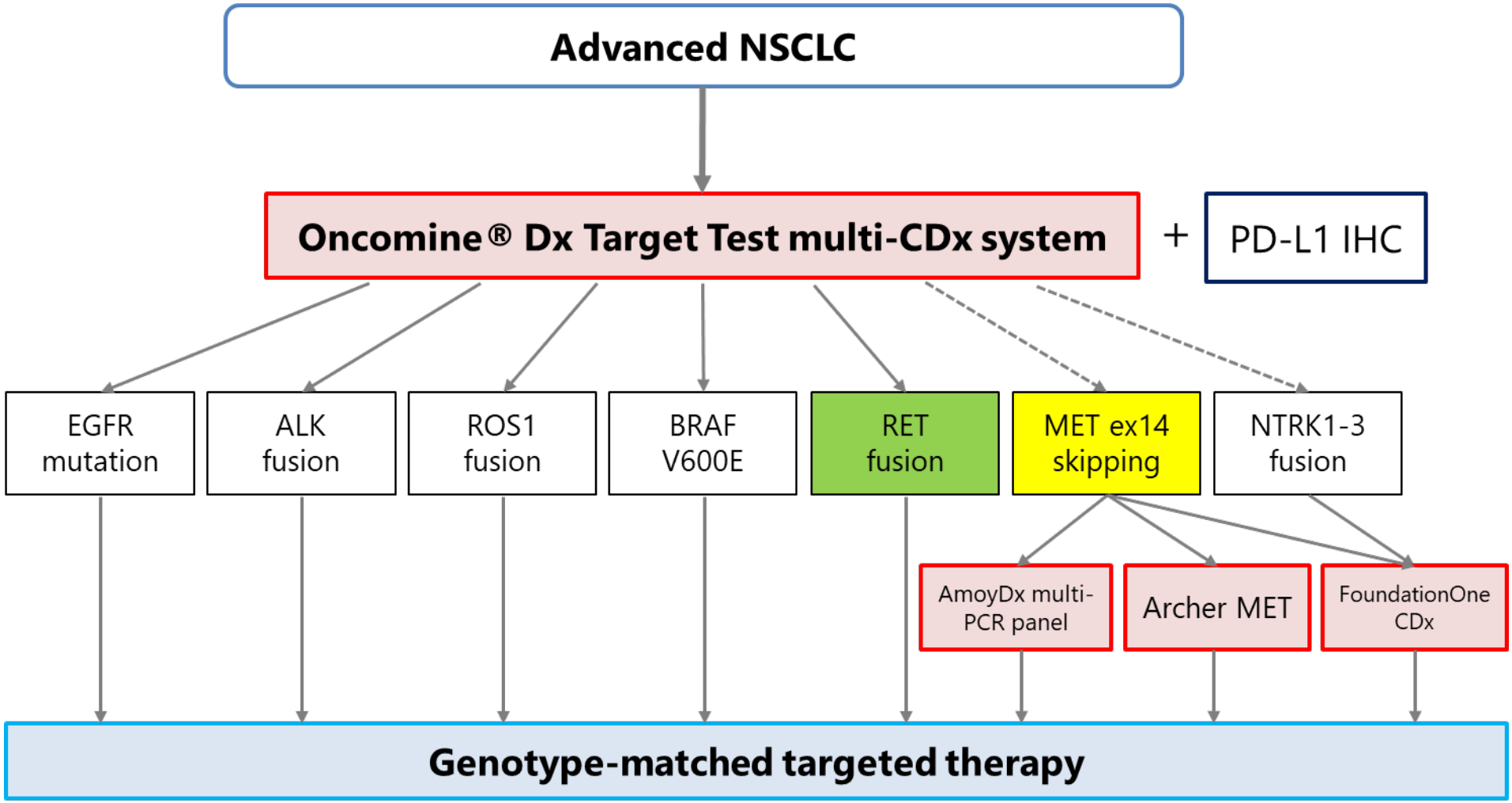
2021年8月17日
国立研究開発法人国立がん研究センター

発表のポイント

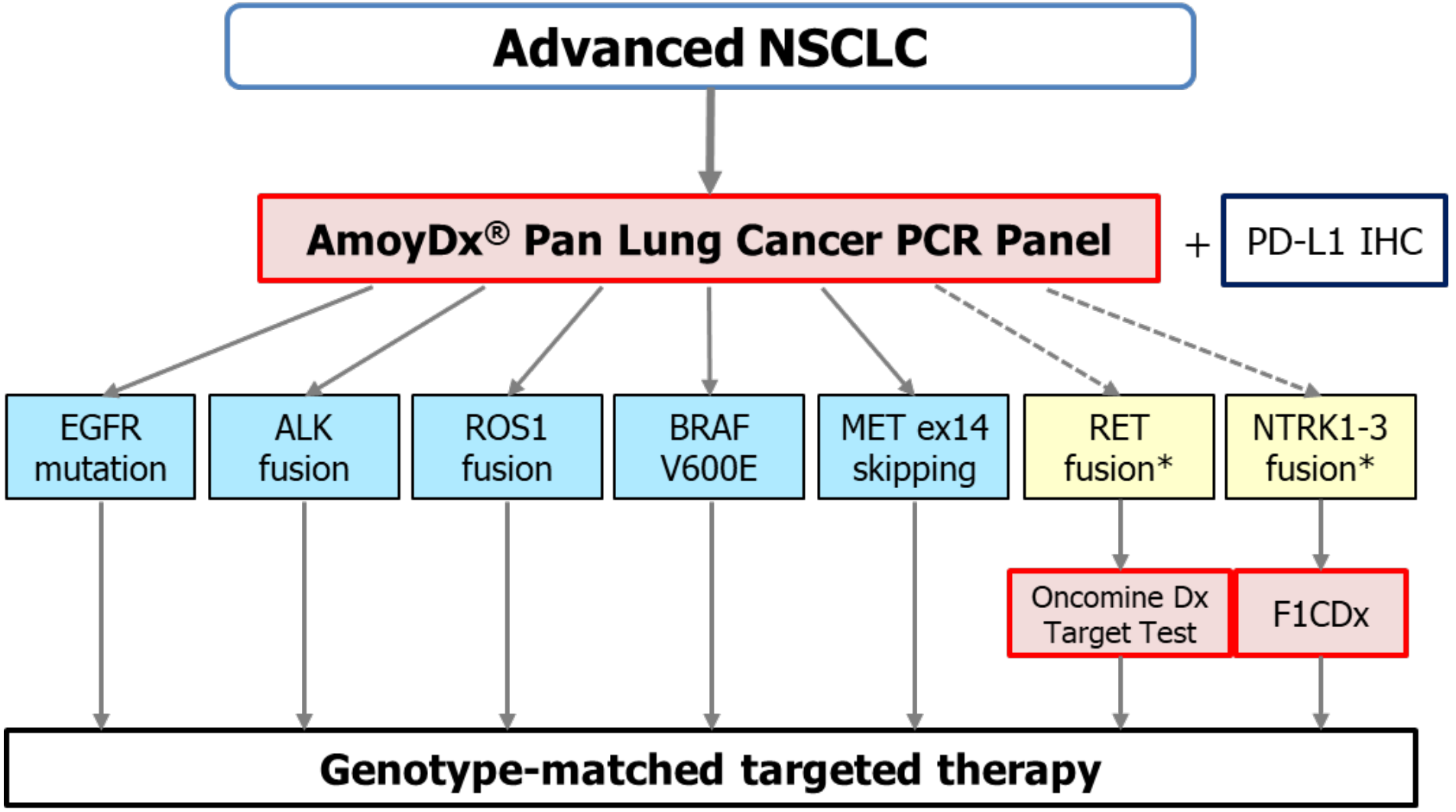
- 肺がん遺伝子スクリーニングネットワーク「LC-SCRUM-Asia」では、Amoy Diagnostics社が開発した新規遺伝子診断薬「AmoyDx肺癌マルチ遺伝子PCRパネル」の臨床性能評価を行いました。
- LC-SCRUM-Asiaの研究結果に基づき、2021年6月25日に肺がん治療における4つの標的遺伝子（*EGFR*、*ALK*、*ROS1*、*BRAF*）の診断薬として、更に2021年8月12日には*MET*遺伝子の診断薬として、「AmoyDx肺癌マルチ遺伝子PCRパネル」の国内製造販売が承認されました。
- 今回の承認によって、肺癌診療ガイドラインで推奨されている5つの標的遺伝子を迅速に診断して、適切な初回治療薬を選択することが可能となります。

National Cancer Center HP, https://www.ncc.go.jp/jp/information/pr_release/2021/0817_1/index.html

Biomarker Testing for Advanced NSCLC in Clinical Practice in Japan (1)



Biomarker Testing for Advanced NSCLC in Clinical Practice in Japan (2)



*Not approved as CDx

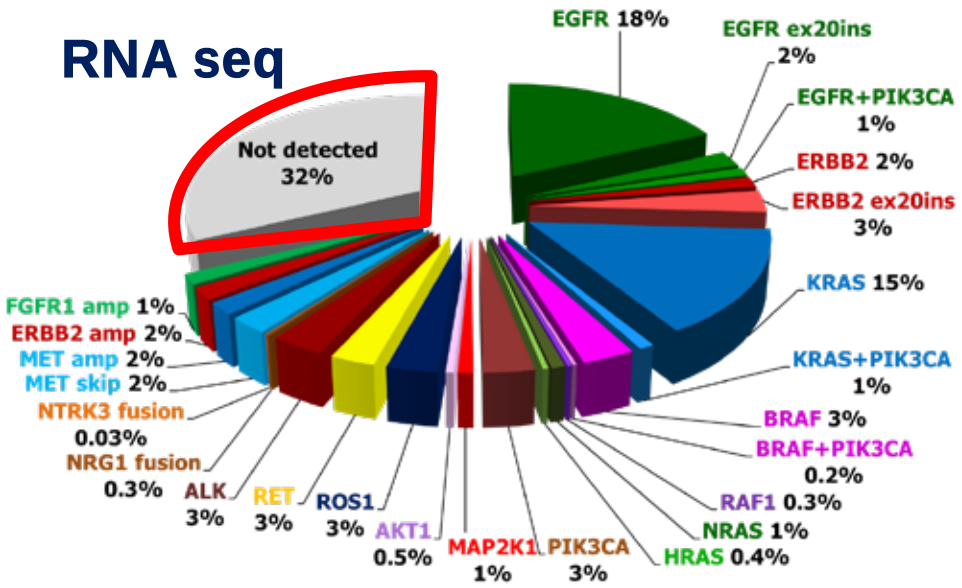
Whole-RNA Sequencing (20/Oct/2020~)

Non-sq NSCLC
(Mainly mucinous adenoca.)

Negative for targetable genes
by Amoy 9-1/OCA v3

RNA>100ng

RNA seq（RIKEN genesis）



Target sample size：300

Reporting to LC-SCRUM-Asia management office

Reporting to sites (druggable gene alterations)

NRG1 fusion陽性

Other gene fusions（NTRK1-3, FGFR2/3 etc.）

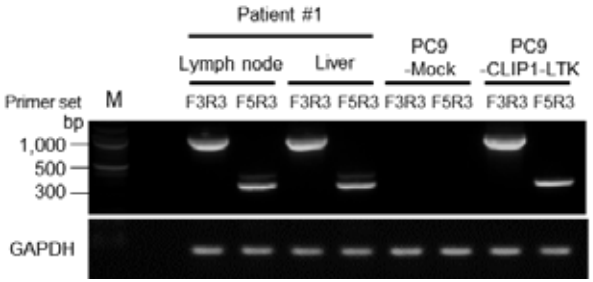
Clinical trial for NRG1 fusion+ solid tumors
MCLA-128-CL01

LC SCRUM

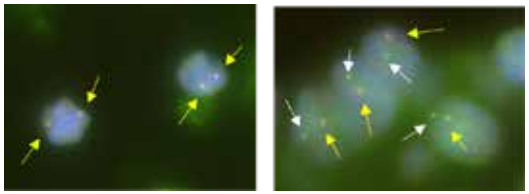
CLIP1-LTK newly identified as a oncogenic driver

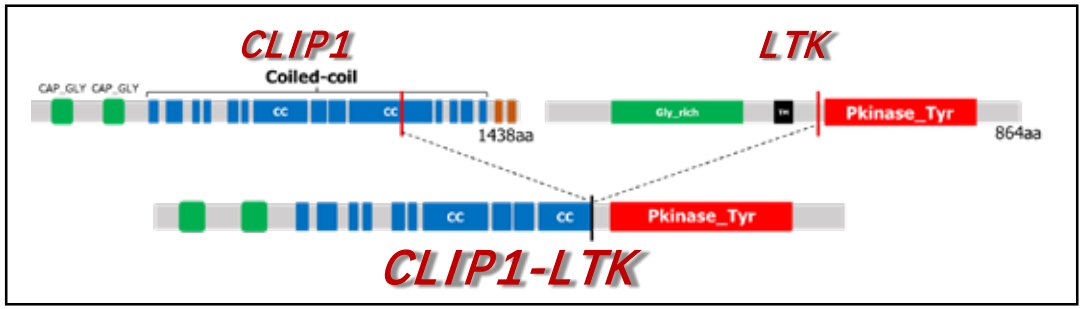
Whole-transcriptome seq

RT-PCR

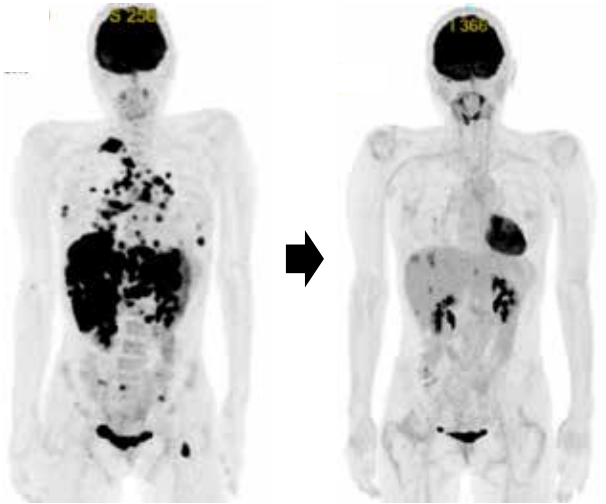


Break-apart FISH

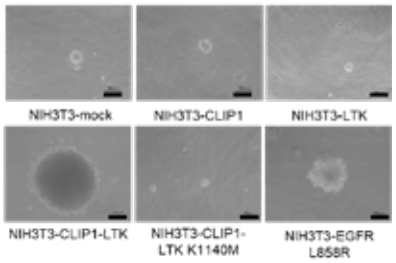




Baseline **Lorlatinib 3 months**



Soft agar colony formation



Tumor formation in nude mice

Izumi H and Matsumoto S et al. Nature, 2021

LC-SCRUM-Advantage (Apr./2022-)

LC SCRUM

Diagnosis

Neoadjuvant Molecular Targeted Therapy

Surgery

Adjuvant Molecular Targeted Therapy

Fresh frozen & FFPE (5 slides) + or FFPE (15-20 slides)

Blood 40ml +

AmoyDx® Pan Lung Cancer PCR Panel (Tissue PCR)

NGS (Liquid)

Matched clinical trials

EGFR	EGFR inhibitor
ALK	ALK inhibitor
ROS1	ROS1 inhibitor
BRAF	BRAF inhibitor
MET	MET inhibitor
RET	RET inhibitor
HER2	HER2 inhibitor
KRAS	KRAS inhibitor
Others	Others inhibitor

Fresh frozen + FFPE (20 slides) + Blood 40ml

AmoyDx® Pan Lung Cancer PCR Panel (Tissue PCR)

NGS (Tissue)

collaborative

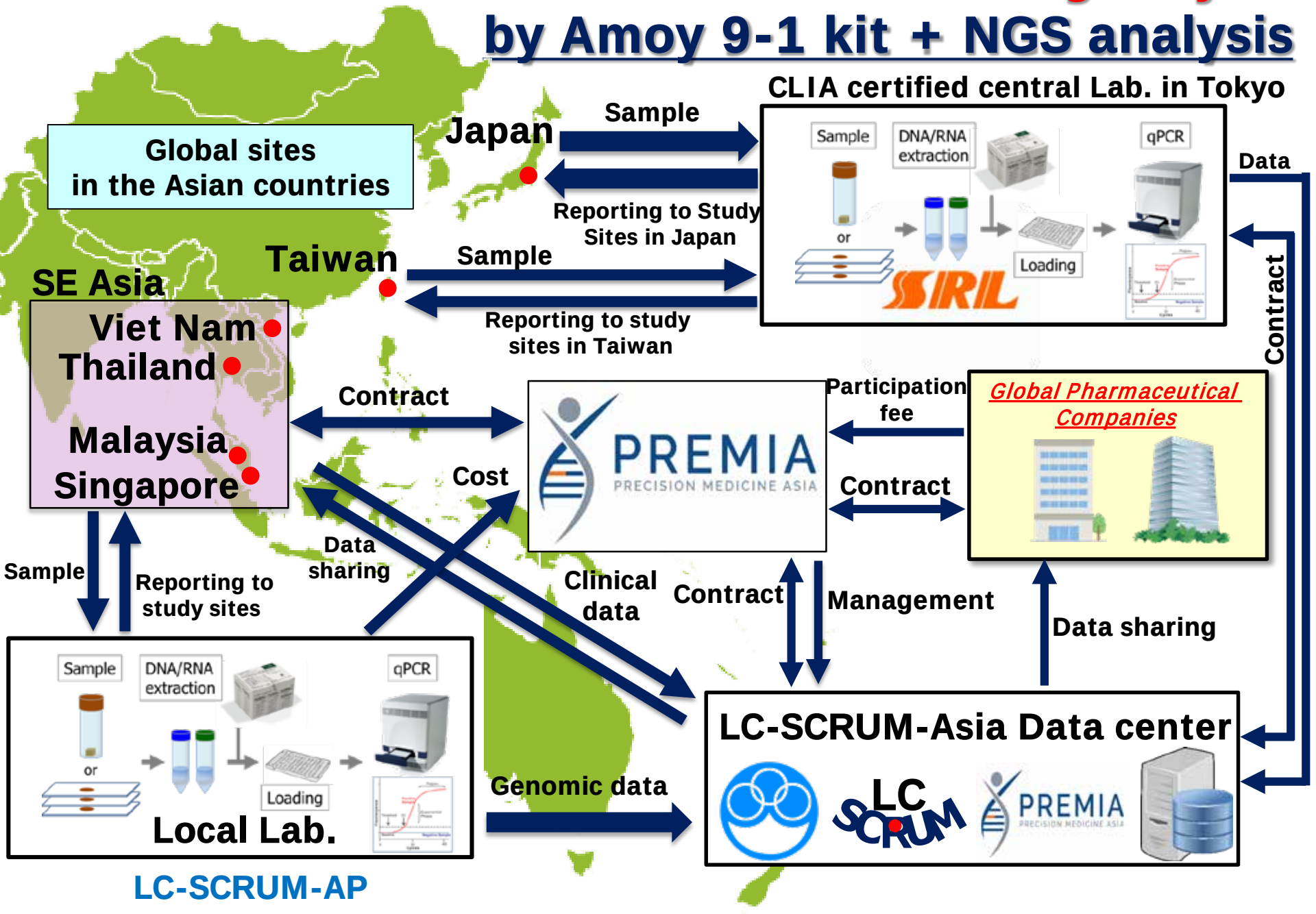
MRD analysis (Tissue and/or Liquid) → **LC-SCRUM-MRD**

Matched clinical trials

EGFR	EGFR inhibitor
ALK	ALK inhibitor
ROS1	ROS1 inhibitor
BRAF	BRAF inhibitor
MET	MET inhibitor
RET	RET inhibitor
HER2	HER2 inhibitor
KRAS	KRAS inhibitor
Others	Others inhibitor

- Target population: Early stage NSCLC
- Sample Size: 10,000 patients
- Registration period: 5 years
- Observation period: 5 years

LC-SCRUM-Asia: Genomic Screening Project by Amoy 9-1 kit + NGS analysis



Conclusions

- Approximately 15,000 lung cancer patients were enrolled into LC-SCRUM-Asia for 9 years.
- Various actionable gene mutations, fusions and amplifications were detected in our genomic screening.
- Through the genome screening, LC-SCRUM-Asia has contributed to the development of lung cancer precision medicine in Asia.
- LC-SCRUM-Advantage, a genomic screening platform for early-stage NSCLC who are candidates for targeted therapy in neoadjuvant and adjuvant setting will be initiated from April 2022.
- The screening platform of LC-SCRUM-Asia are now expanding to Asian countries.