

Lung Cancer School 2026

Biomarker Testing in Lung Cancer

Eun Hye Lee

Division of Pulmonology, Yongin Severance Hospital, Yonsei University College of Medicine





WE WILL MISS YOU

함께 할 수 있어서
행복했습니다
그동안 수고하셨습니다

객담유도
채취실

Dowoo
Dowoo
Dowoo

Agenda

01

Introduction

Lung cancer incidence
& mortality

Why Biomarkers Matter:
Guiding Every Treatment
Decision

02

EGFR

The most common driver
in Asian NSCLC

03

ALK · ROS1 · PD-L1

Less common but critical
drivers, all with
reimbursed drugs

Immunotherapy gate:
PD-L1 SP263 and the 50%
threshold

04

NGS & rare mutation

Rare actionable targets,
mostly non-reimbursed

NGS testing in Korean
practice

Chapter 01

Introduction

01. Introduction

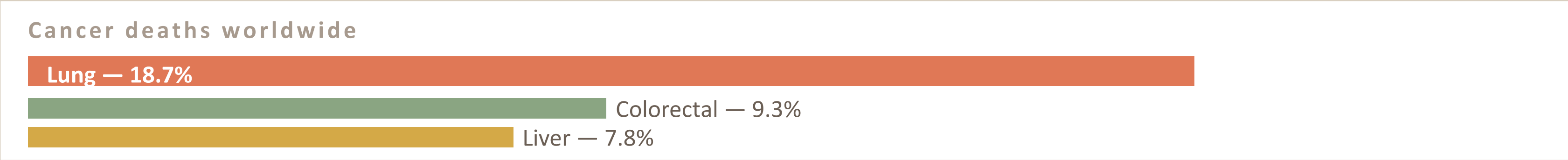
Lung cancer — the world's *#1 cancer killer*

2.48_M

new lung cancer cases in 2022
12.4% of all cancers worldwide — the **most commonly diagnosed cancer**

1.8_M

deaths from lung cancer in 2022
18.7% of all cancer deaths — **more than colorectal + liver combined**



01. Introduction

In Korea — *the #1 cancer killer* too

2023 · Projected

33,413

new lung cancer diagnoses

18,536

deaths — **#1** in both men & women

Lung is the *most common cancer site* in Korea for 2023

In men

22,225 cases

2nd most common (after prostate)

In women

11,188 cases

3rd most common (after breast & thyroid)

Key takeaway

Every year in Korea, more patients die of lung cancer than of stomach and liver cancer combined.

01. Introduction

Biomarker testing lives in *NSCLC*

NSCLC ~85%

SCLC ~15%

Non-small cell (NSCLC)

ADENOCARCINOMA · SQUAMOUS · LARGE CELL

Adenocarcinoma is where **almost every actionable driver mutation** (EGFR, ALK, ROS1, KRAS, BRAF, HER2, MET, RET, NTRK) is found

→ **This is where biomarker testing matters.**

Small cell (SCLC)

STRONGLY LINKED TO SMOKING

Treated with **chemotherapy** ± **immunotherapy** (atezolizumab, durvalumab)

No routine driver-mutation testing today.

01. Introduction

Why biomarkers *changed everything*

A single blood or tissue test now decides whether a patient gets a pill or a drip

The old world (before 2010)

Platinum-doublet chemo

10-12 mo

median overall survival in advanced NSCLC

Nausea, hair loss, hospital visits every 3 weeks.



Today · EGFR-positive patient

One pill a day — osimertinib

38.6 mo

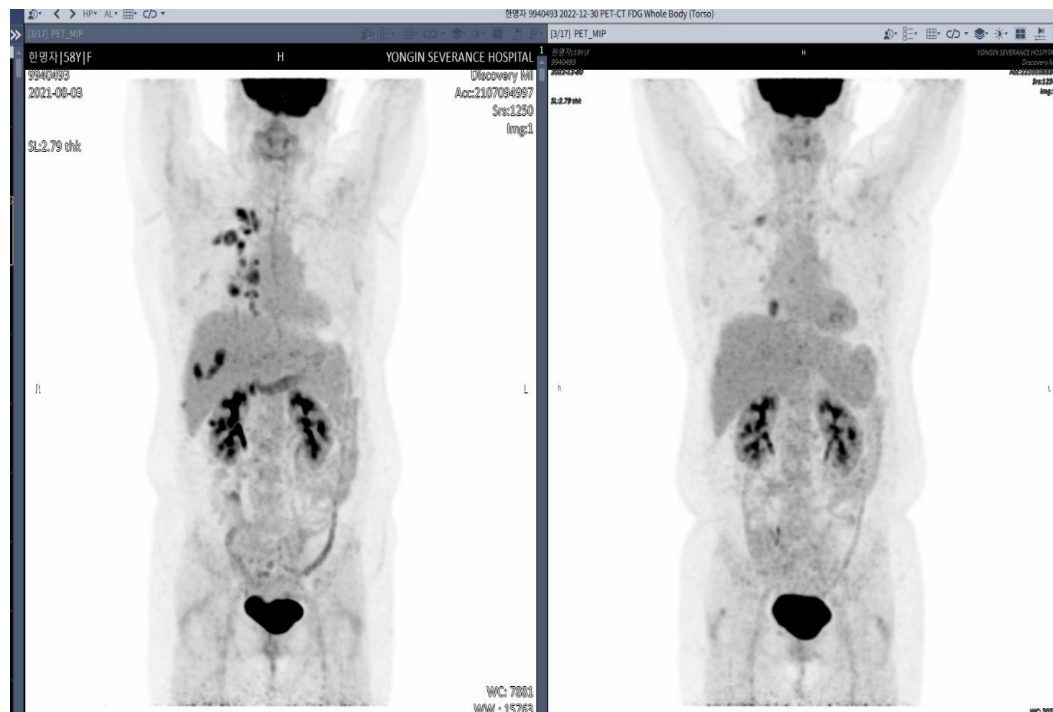
median overall survival (FLAURA)

Oral, once daily, low toxicity.

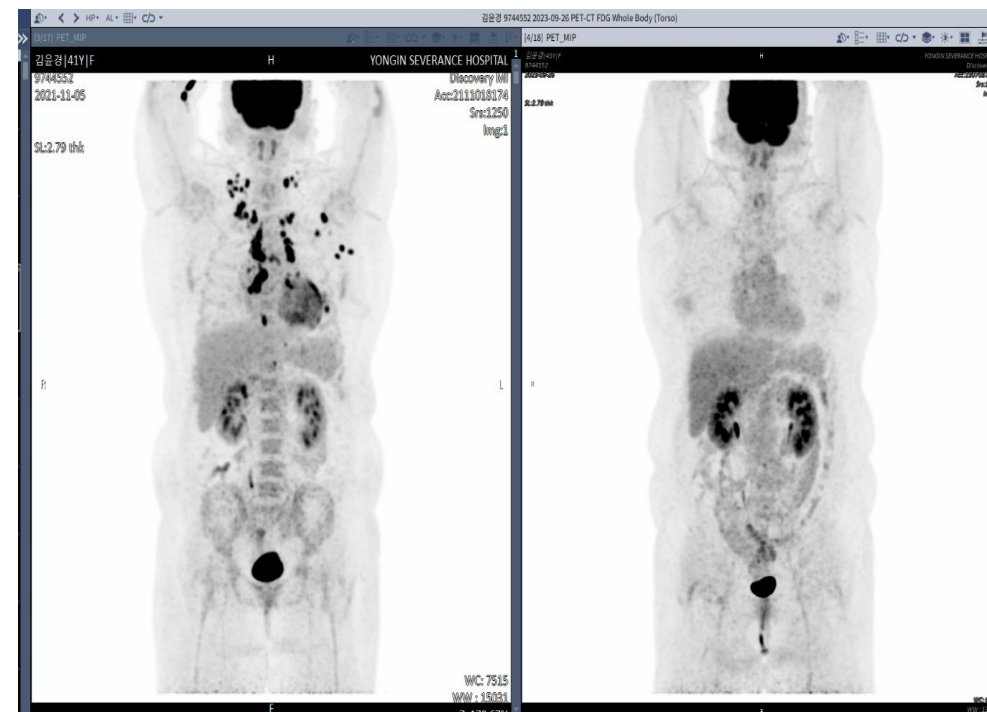
01. Introduction

Why biomarkers *changed everything*

The Same Stage, Different Outcomes—Depending on Biomarker Status



2021.8 stage IV NSCLC(adenoca)
➔ EGFR
➔ 2026.8 현재 생존



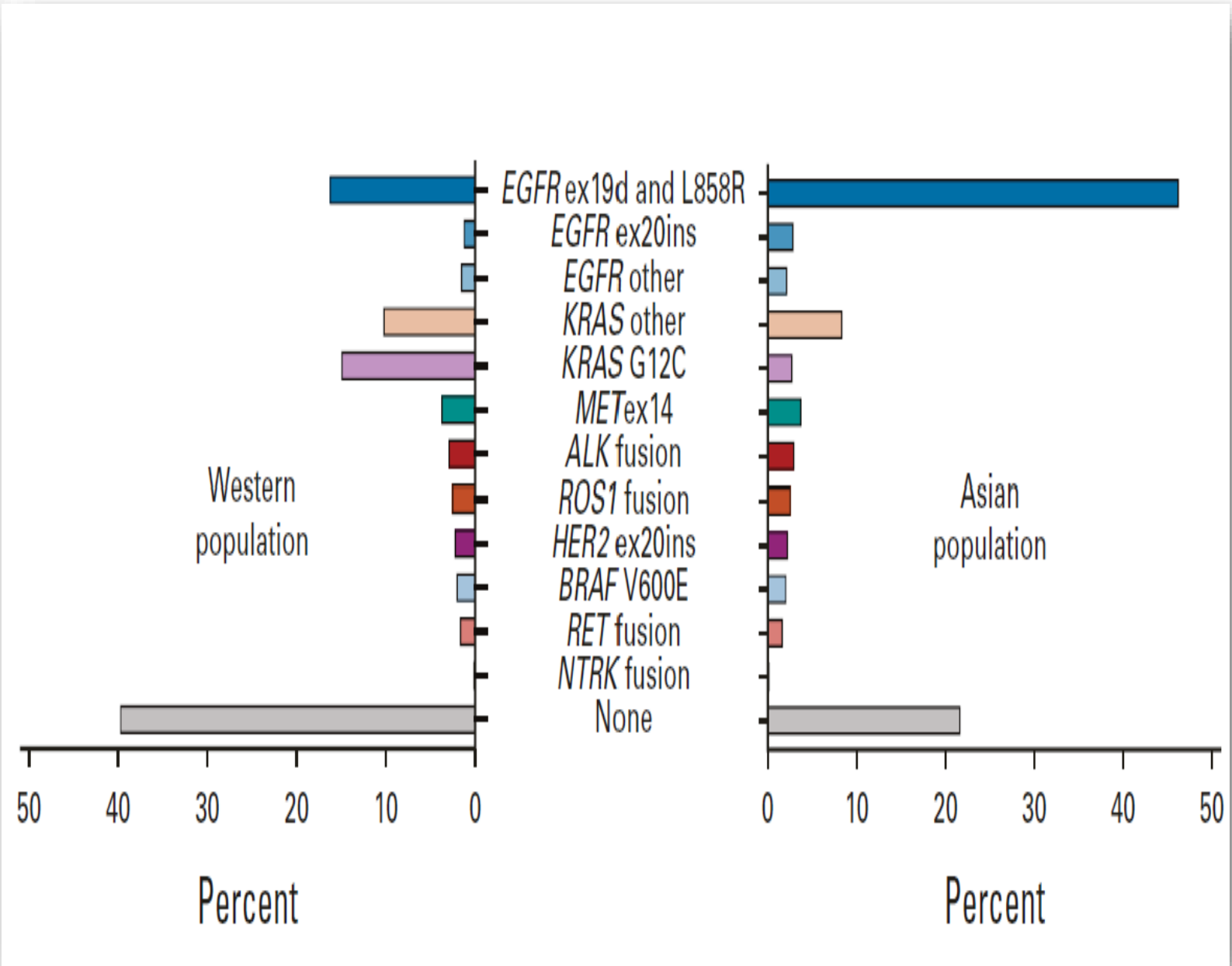
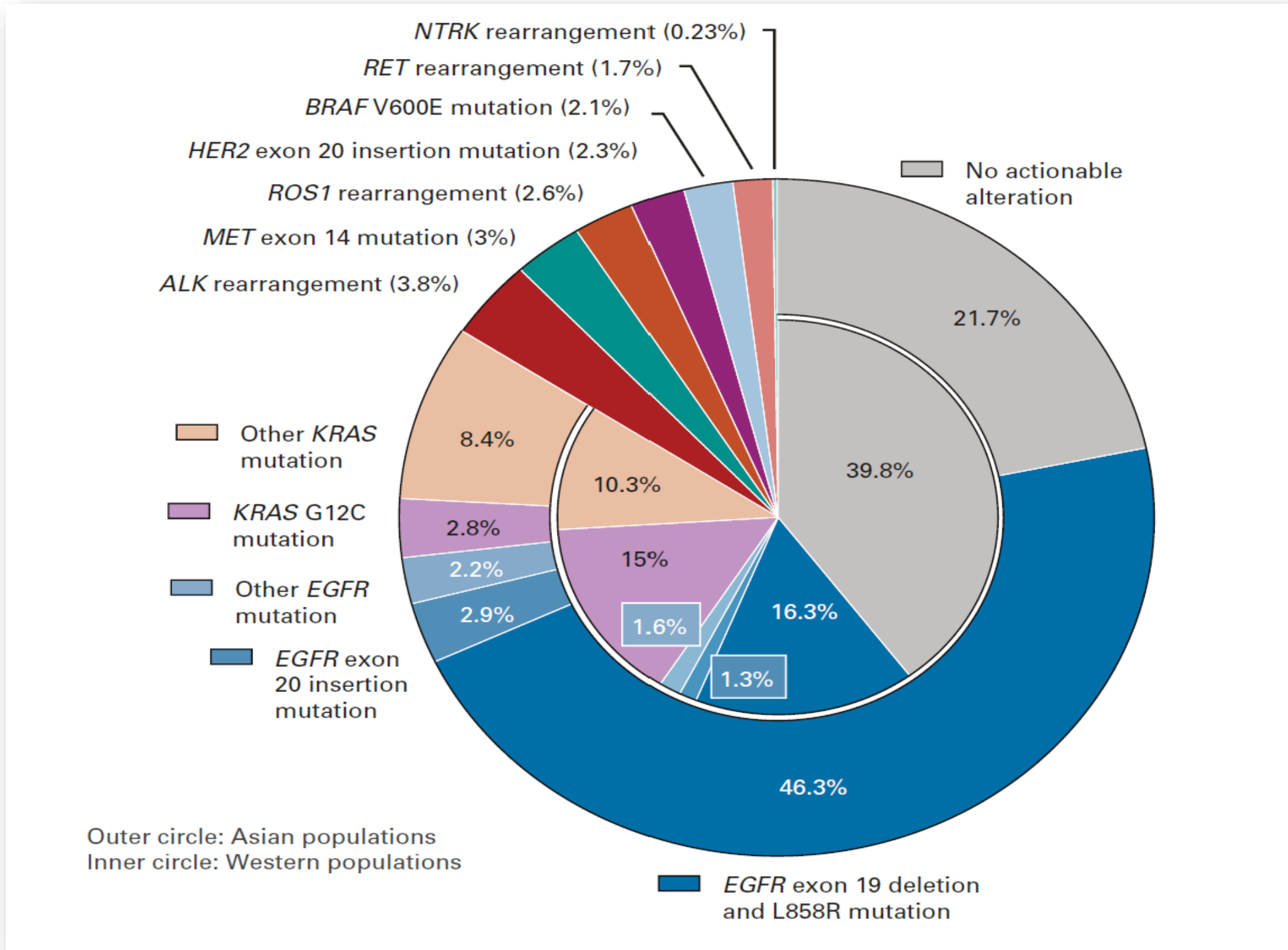
2021.11 stage IV NSCLC(adenoca)
➔ ALK 양성
➔ 2026.8 현재 생존



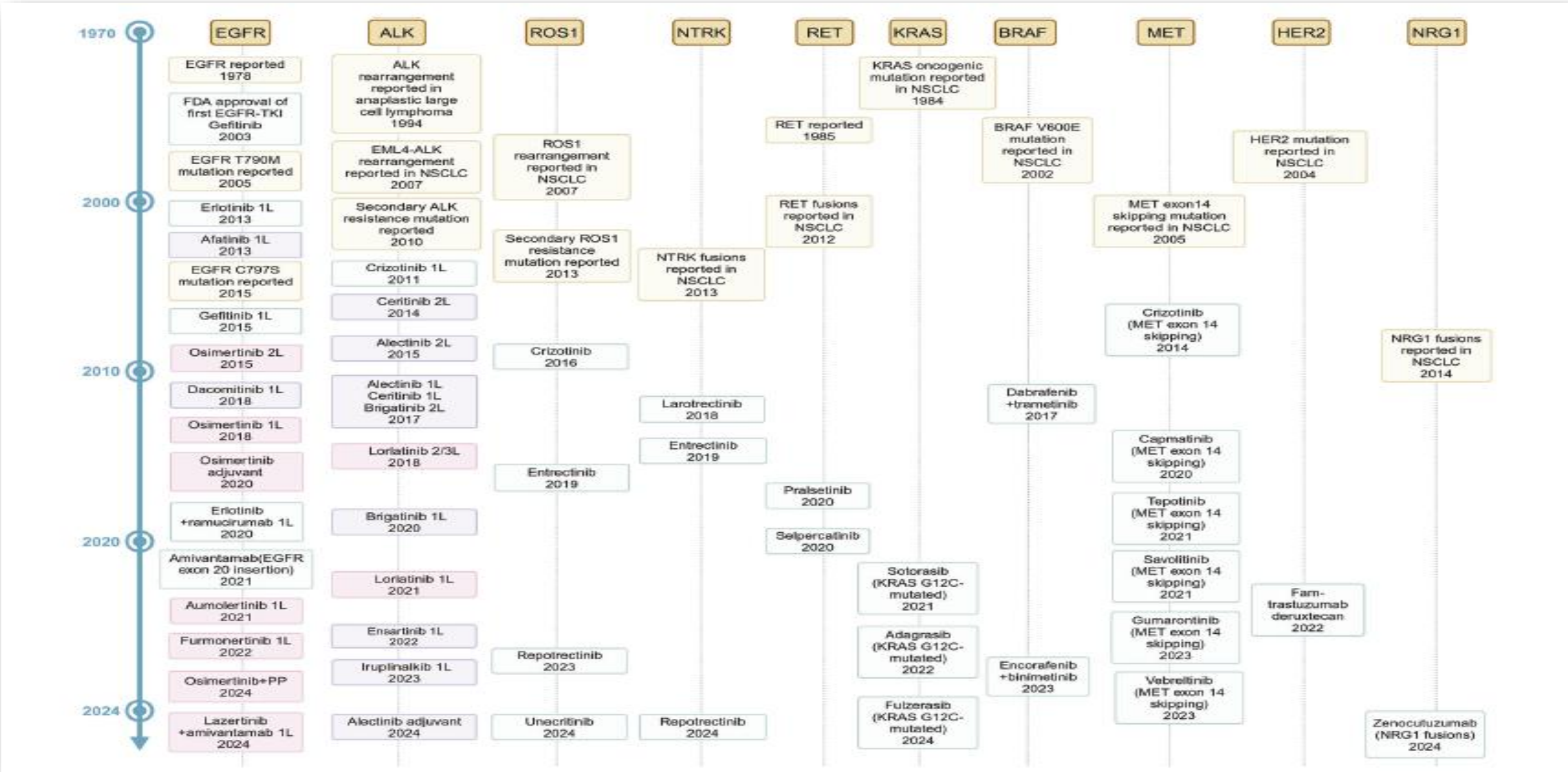
2020.10 SCLC (ED)
➔ 2021.11 Expire

01. Introduction

Frequency of targetable oncogenic driver molecular alterations in NSCLC (adenocarcinoma)



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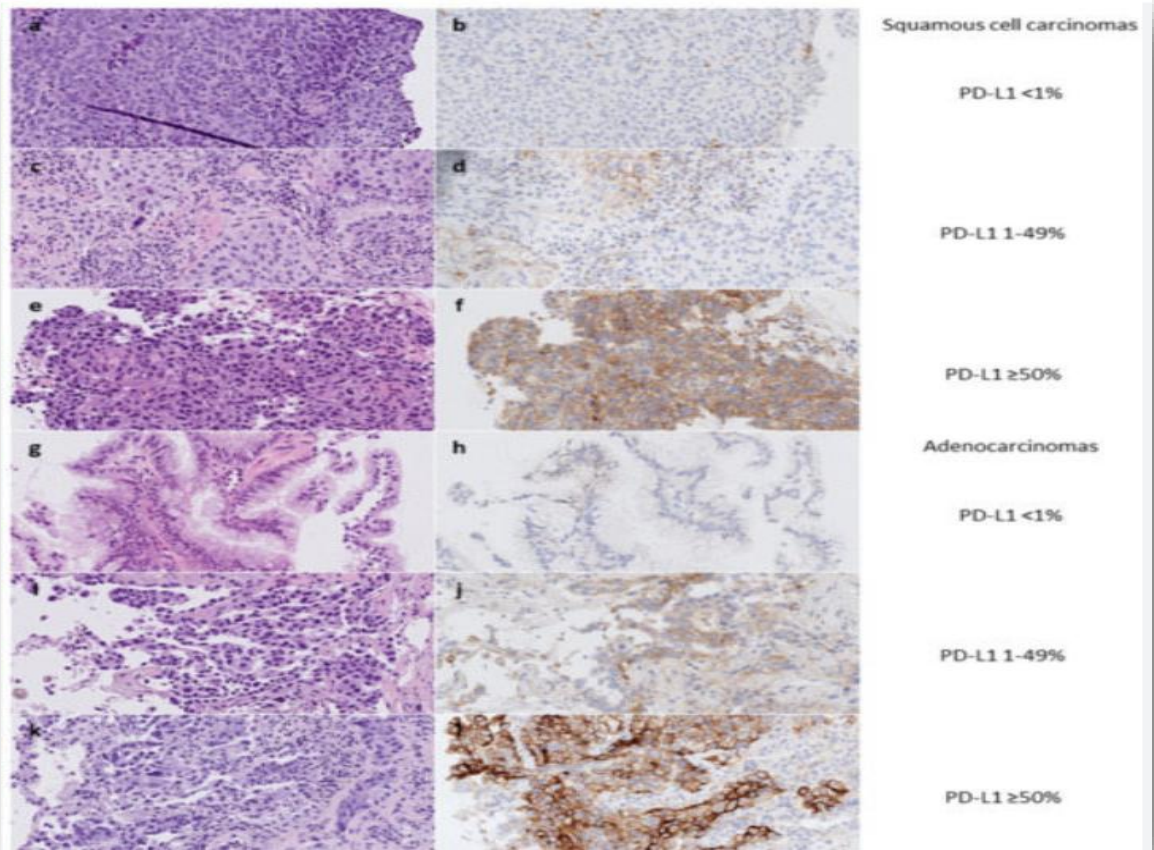
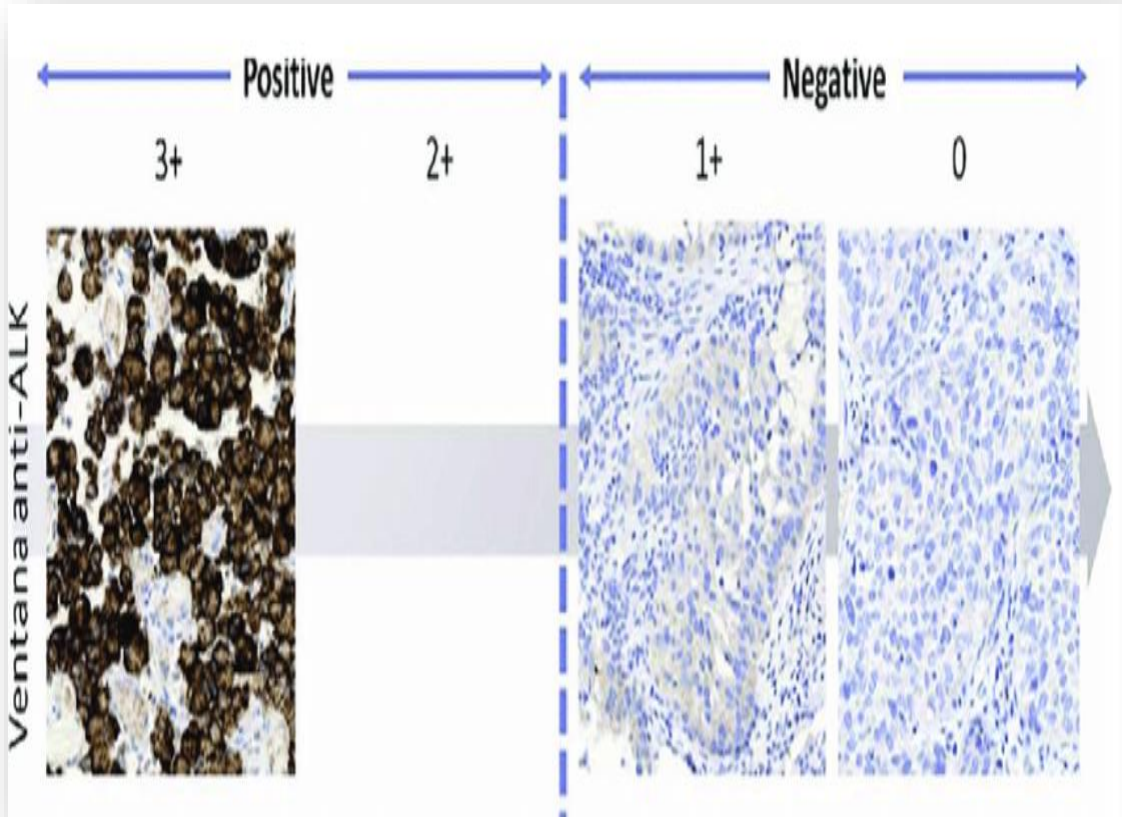


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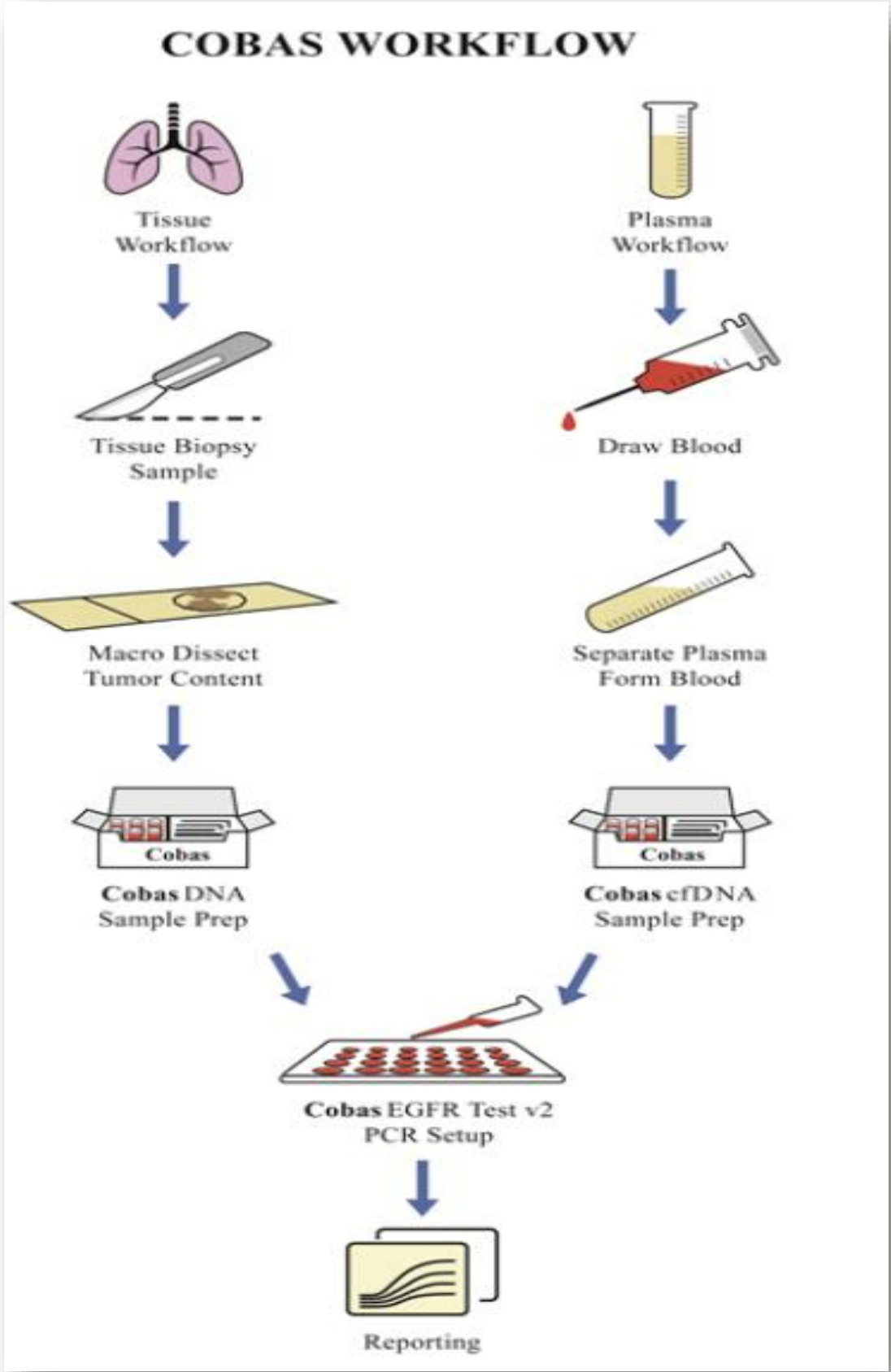
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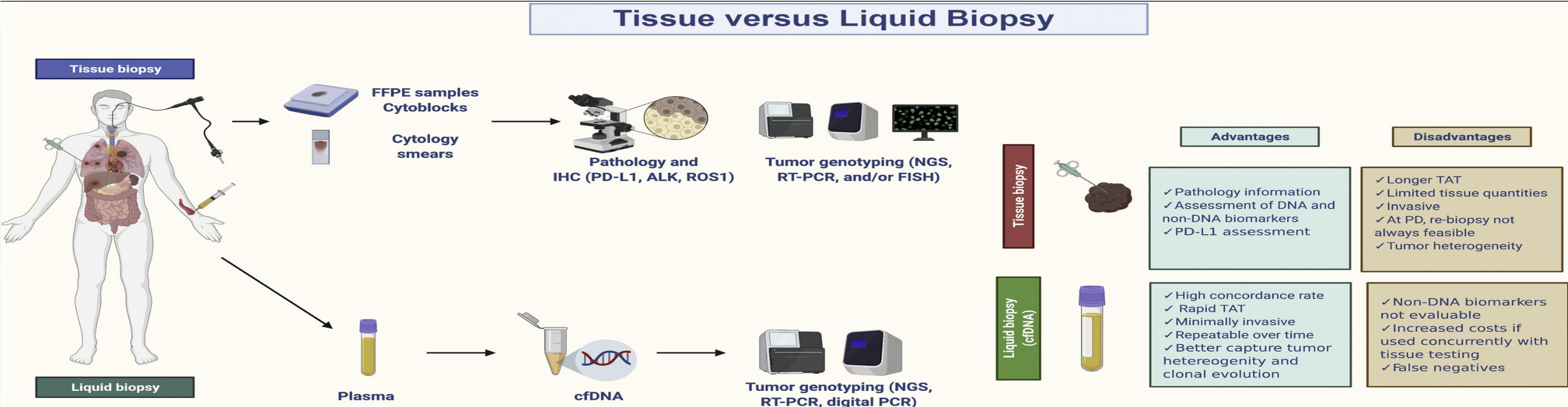
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Chapter 02

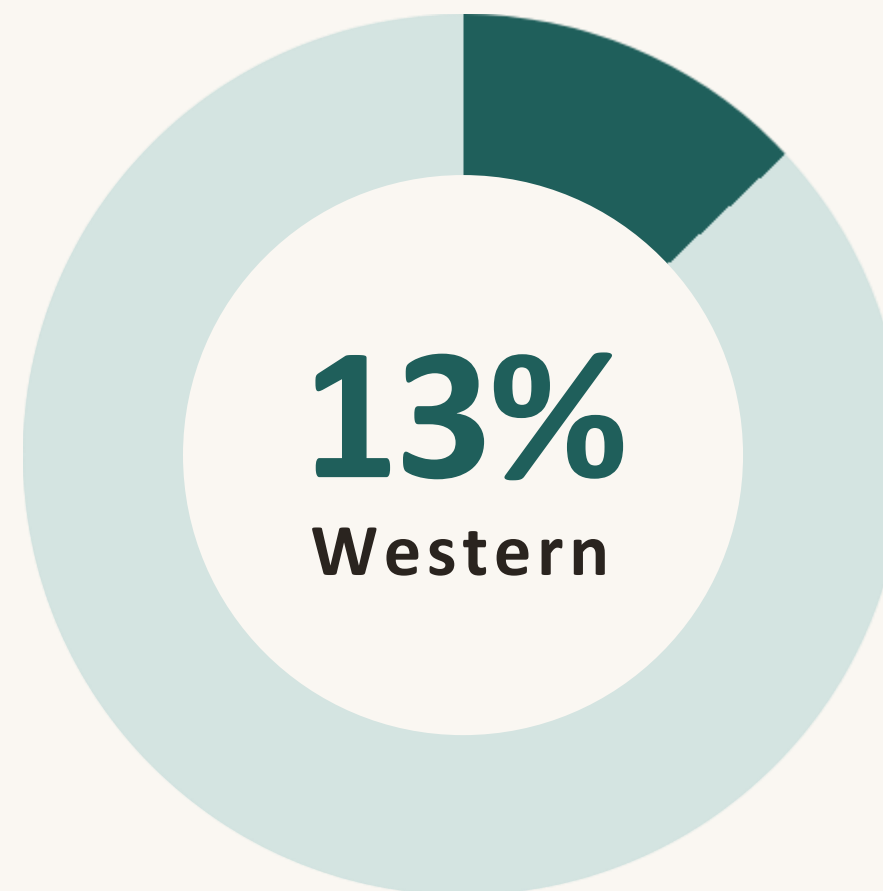
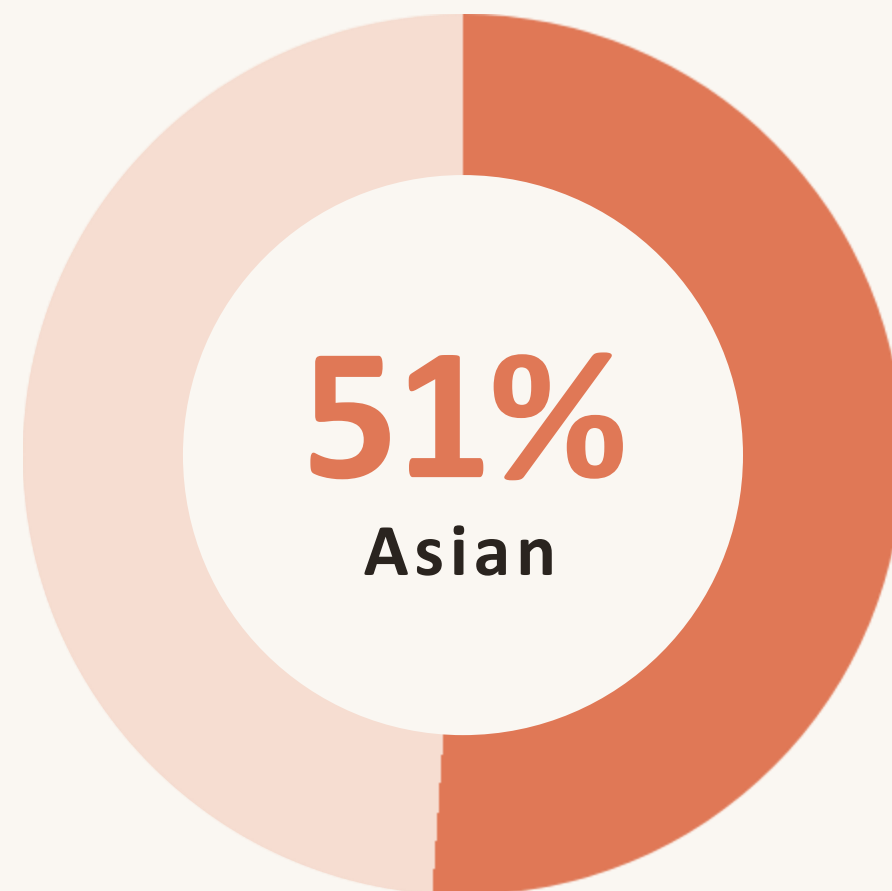
EGFR

The most common actionable driver in NSCLC

02. EGFR

One in two Asian patients — *EGFR-positive*

EGFR mutation frequency in NSCLC adenocarcinoma



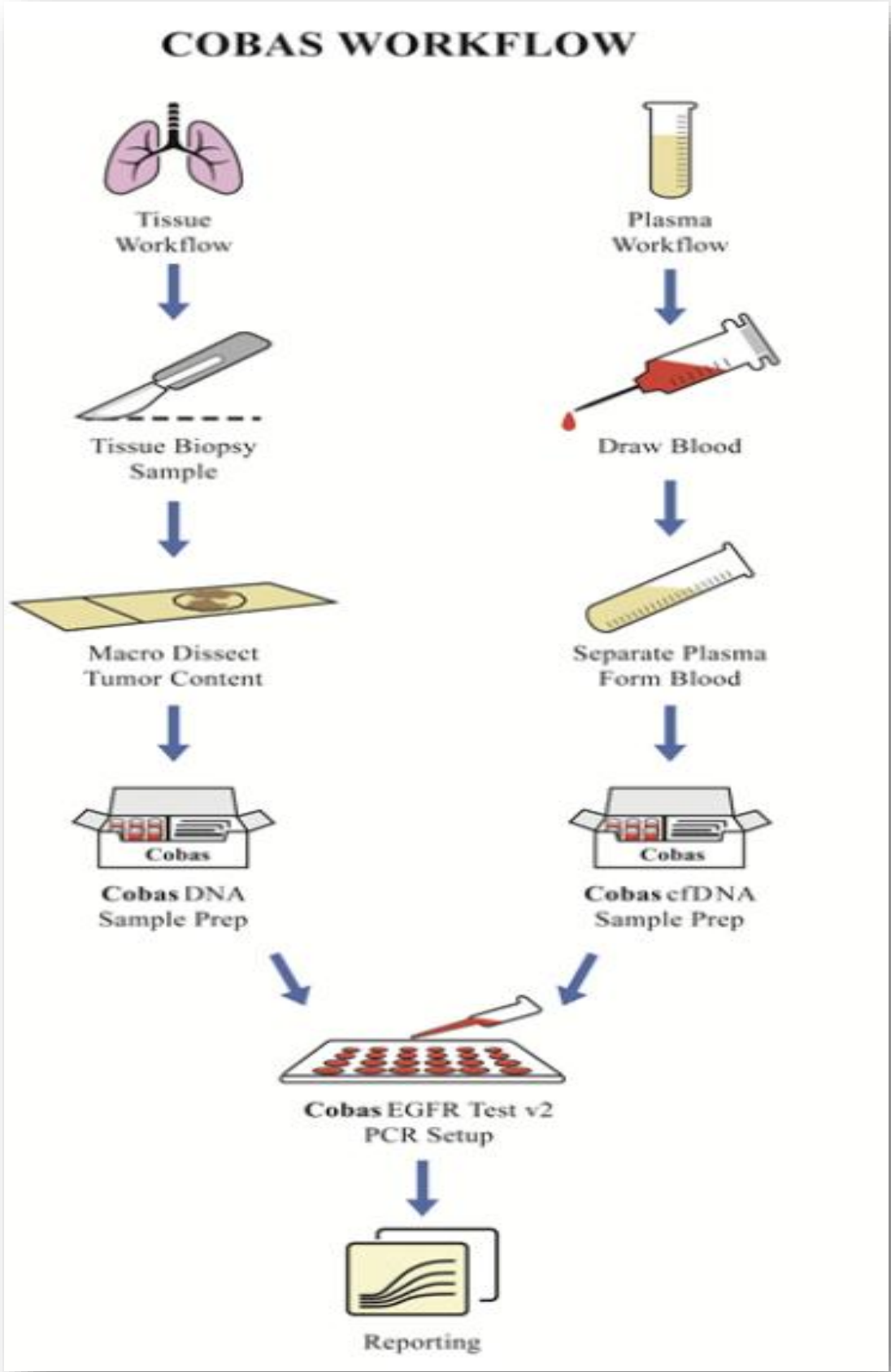
Higher in:

- **Female** patients (~61%)
- **Never-smokers** (~61%)
- **Adenocarcinoma** histology
- **East Asian** ancestry

*In Korea, this means roughly **1 in 2 lung adenocarcinoma patients** is a candidate for EGFR-targeted therapy*

02. EGFR

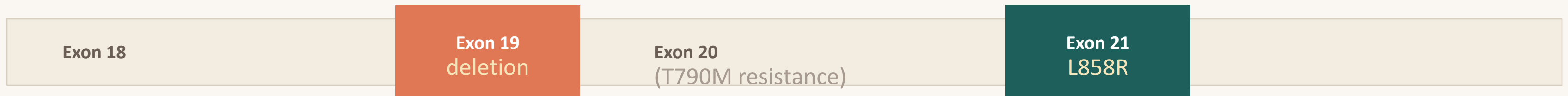
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02. EGFR

Two mutations you'll see *again and again*

EGFR gene — tyrosine kinase domain



Exon 19 deletion

~45%

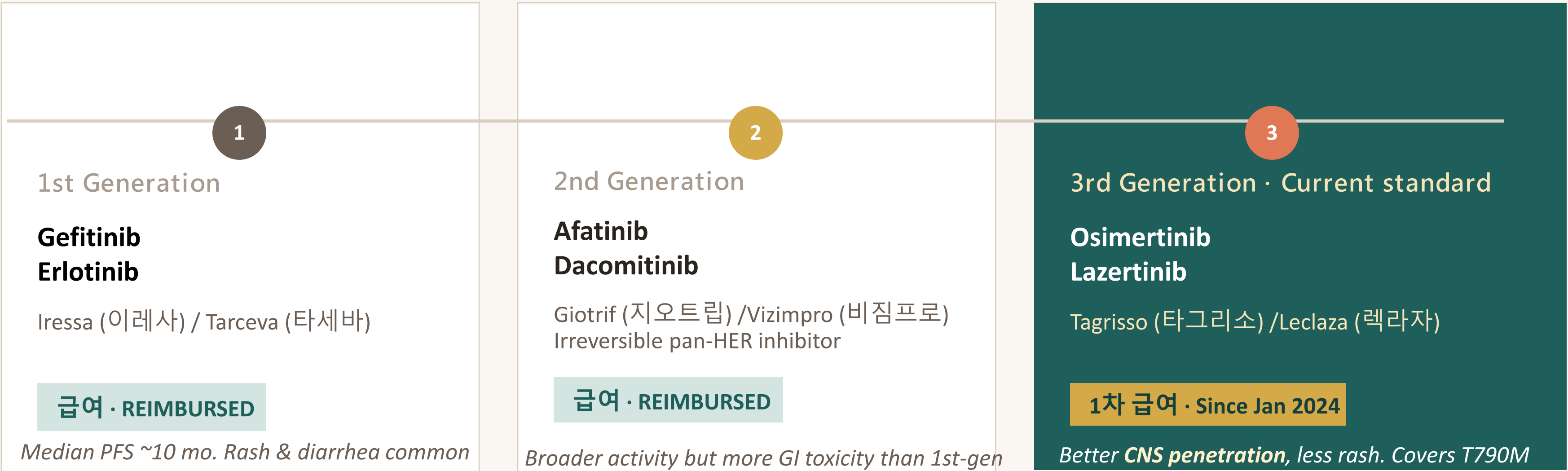
of all EGFR mutations. Often called "**del19**" in your reports. Slightly **better response** to TKIs than L858R.

Exon 21 L858R

~40%

Point mutation. Together with del19, covers **~85–90%** of "classical" EGFR-sensitizing mutations.

Three *generations* of EGFR-TKI



Osimertinib — *the current standard* in 1st line

FLAURA / Laser 301 trial · Osimertinib/Lasertinib vs 1st-gen EGFR-TKI in untreated EGFR-mutant advanced NSCLC

Median PFS



Median Overall Survival



Bottom line
Longer survival + fewer side effects than older TKIs.

In practice · Korea

Osimertinib/Lazertinib
: 1st-line choice for EGFR+
EGFR+ stage IV NSCLC

- Oral
- Best CNS activity of any EGFR-TKI
- Reimbursed since Jan 2024

02. EGFR : combination

FLAURA2 — *osimertinib + chemo*

Adding platinum-pemetrexed chemo on top of osimertinib in 1st line

Regimen

Osimertinib
80 mg PO daily

+

Platinum + Pemetrexed
IV, 4 cycles → maintenance

국내 요양급여

Osimertinib portion is *reimbursed*.

Chemo add-on portion is currently *비급여*

Results — final analysis

Median PFS
29.8 mo
vs 19.8 mo (mono) · HR 0.62

Median OS
47.5 mo
vs 37.6 mo (mono)

Trade-off

Better disease control — but more myelosuppression, fatigue, and IV visits.
Consider for younger, fit patients with high tumor burden or CNS disease.

MARIPOSA — *amivantamab + lazertinib*

A "chemo-free" combination that outperformed osimertinib monotherapy

Regimen

Amivantamab
IV bispecific antibody

+

Lazertinib
Korean 3rd-gen TKI

국내요양급여

Lazertinib monotherapy — 급여.
Amivantamab combination portion — 비급여

Vs osimertinib — head-to-head

Median PFS

23.7 mo

vs 16.6 mo · HR 0.70

Death risk reduction

-25%

OS analysis (2024)

What to warn patients about

Amivantamab infusion reactions, VTE risk, EGFR-related rash.
More clinic time than a pill-only regimen.

02. EGFR : Adjuvant

EGFR-TKI is no longer only for *stage IV*

ADAURA — adjuvant osimertinib after complete resection



Key results

- 89% reduction in disease recurrence (DFS HR 0.17, stage II–IIIA)
- 51% reduction in death (OS HR 0.49, stage II–IIIA)
- Major reduction in CNS relapse

Practice point · Korea

Adjuvant osimertinib is the international **standard of care** (비급여)
Explain cost expectations to families before EGFR testing at surgery.

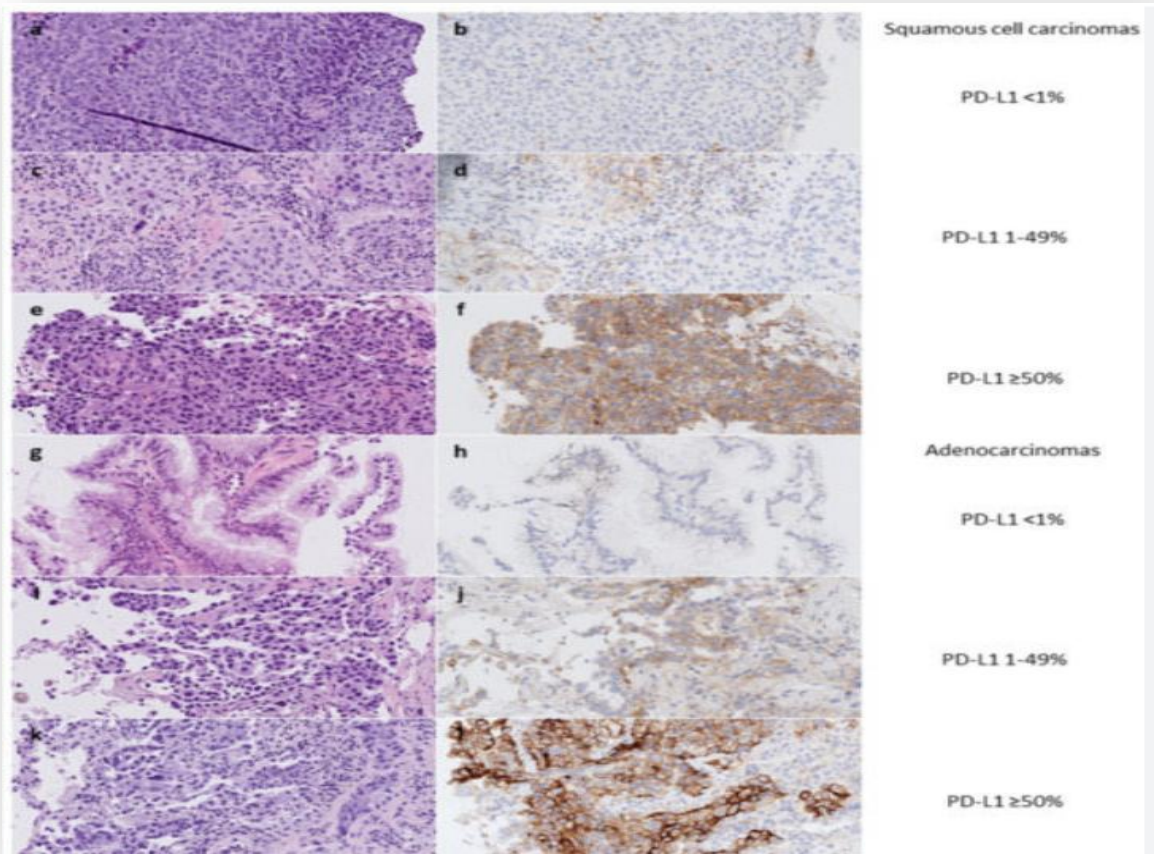
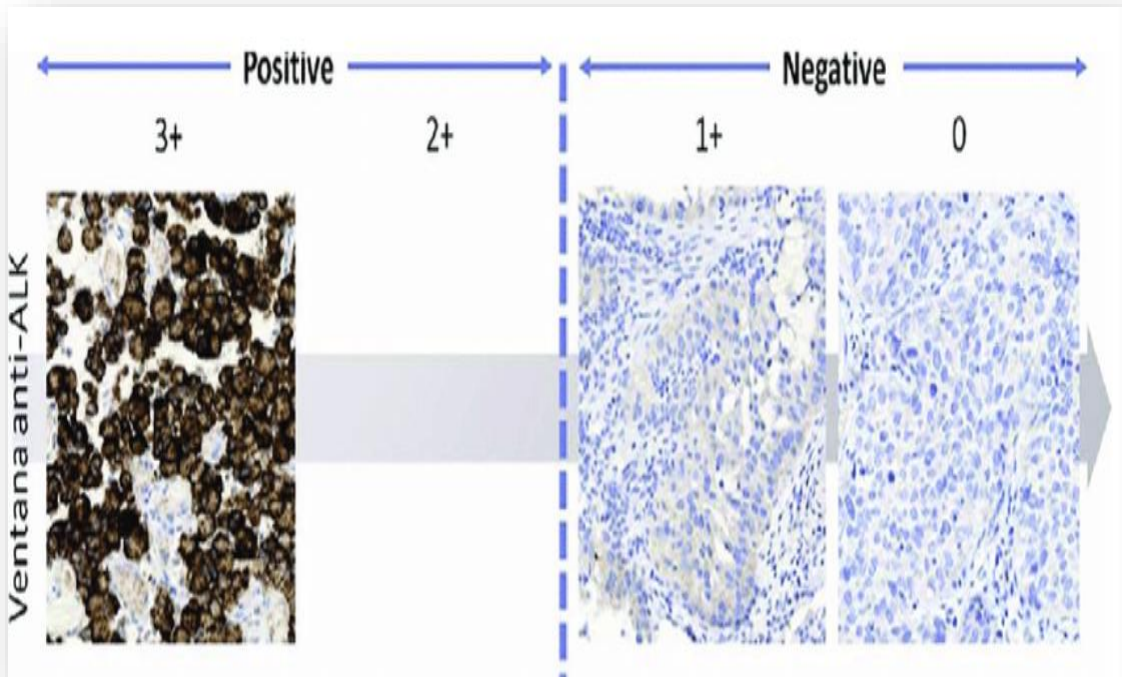
Chapter 03

ALK • ROS1 • PD-L1

Reimbursed drivers — and the immunotherapy gate.

03. ALK & PD-L1

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ALK — small in number, *huge in response*

Prevalence

3 – 5%

of NSCLC adenocarcinoma

Typical patient profile:

- Younger (often <50)
- Never-smoker
- Adenocarcinoma
- Higher risk of brain mets

Available ALK-TKIs in Korea — all 1st-line 급여

Alectinib Alecensa · 알레센자 ALEX trial	Median PFS 34.8 mo vs 10.9 mo crizotinib	급여
Brigatinib Alunbrig · 알룬브릭 ALTA-1L trial	3-year PFS 43% vs 19% crizotinib · HR 0.48	급여
Lorlatinib Lorbrena · 로비큐아 CROWN trial · 5-yr update	Median PFS Not reached at 5 yrs · HR 0.28	급여

ROS1 — rare, but *don't miss it*

Prevalence

1–2%

of NSCLC adenocarcinoma

Like ALK: young, never-smokers, high response to targeted therapy.

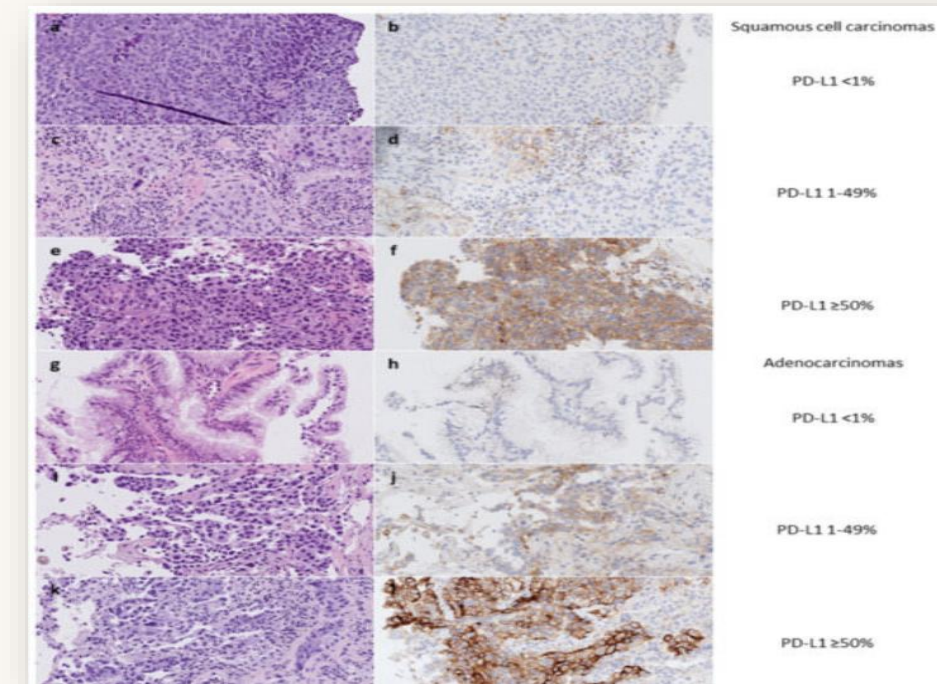
Testing is **routine reflex** alongside EGFR and ALK.

Approved ROS1-TKIs	
Crizotinib Xalkori · 잼코리 PROFILE 1001 · ORR 72%	급여
Entrectinib Rozlytrek · 로즐리텍 CNS-active · ORR ~67%	MFDS 허가
Repotrectinib Augtyro · 옥타이로 TRIDENT-1 · covers G2032R resistance	비급여

03. PD-L1

PD-L1 — the *immunotherapy gate*

Reported as TPS% (Tumor Proportion Score) by IHC — **SP263** or 22C3



TPS < 50%
Low / negative expression

50%

TPS ≥ 50%
High expression

If TPS < 50%

Platinum-doublet + Pembrolizumab

- **KEYNOTE-189** (non-squamous): pembro+pemetrexed+carboplatin
- **KEYNOTE-407** (squamous): pembro+taxol+carboplatin
- Chemo + IO combo reimbursed in Korea

If TPS ≥ 50%

Pembrolizumab monotherapy

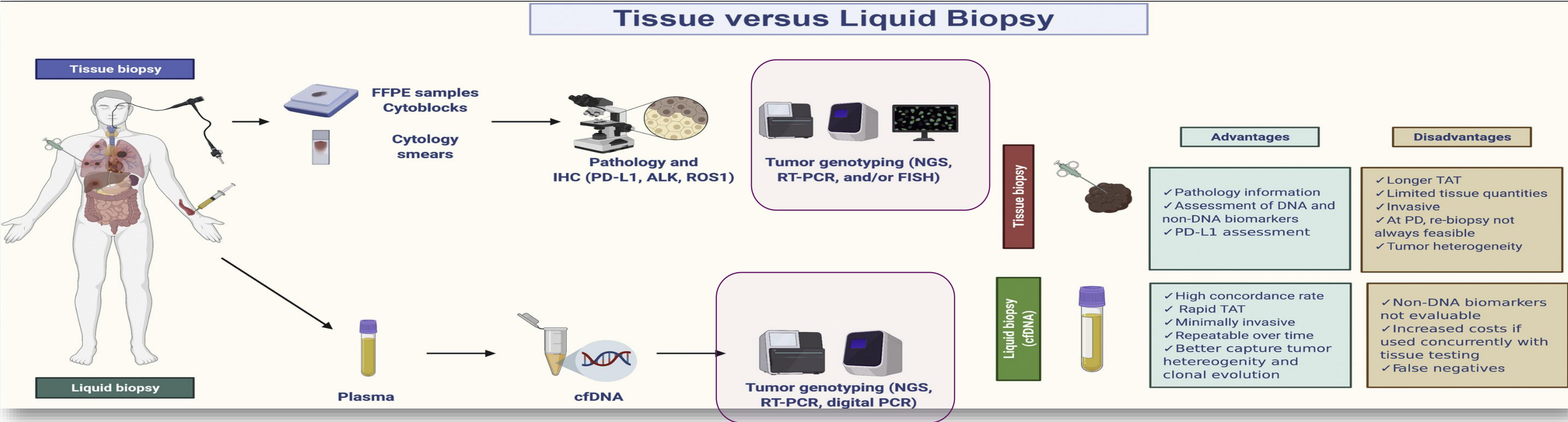
- **KEYNOTE-024** · 5-yr OS 31.9% vs 16.3% chemo
- **Keytruda mono** reimbursed in Korea for TPS ≥ 50%
- No IV cytotoxic chemo needed

Chapter 04

NGS & Rare mutations

04. NGS & Rare mutations

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KRAS G12C — once "undruggable", *now targetable*

Prevalence

~13%

of lung adenocarcinoma
(KRAS G12C subtype)

Patient profile:

- **Smokers** — most common driver in Western smokers
- Adenocarcinoma

• Poorer response to IO alone

Available drugs — 2nd line after chemo/IO

Sotorasib

Lumakras · 루마크라스

CodeBreak 100 · ORR 37%, median OS 12.5 mo

비급여

Median OS
12.5_{mo}



Adagrasib

Krazati · 크라자티

KRYSTAL-1 · ORR 43%, CNS-active

비급여

ORR
43%

04. BRAF V600E

BRAF V600E — *rare but 급여*



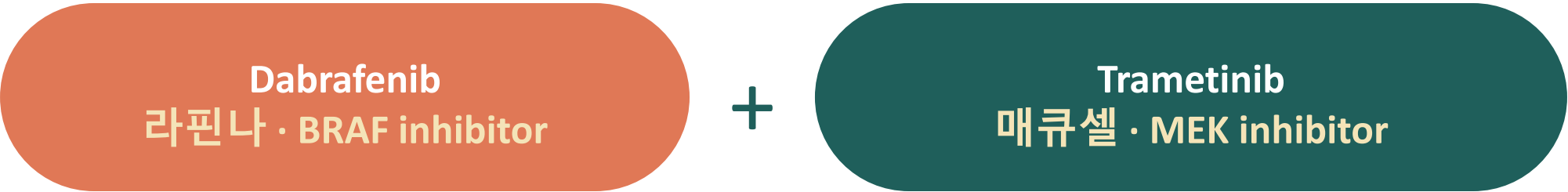
Prevalence

1–3%

of NSCLC adenocarcinoma
(V600E subtype)

Shared with melanoma & thyroid —
same drug
combo works in lung too.

Combination therapy



ORR
~64%

Median PFS
~10.9 mo

Korea 급여
Reimbursed for BRAF V600E NSCLC — the only 급여 targeted therapy in this "rare drivers" cluster.

04. Rare mutations

The rare drivers — *know they exist*

HER2

2–4% of NSCLC

Trastuzumab
deruxtecan

(Enhertu · 엔허투)
DESTINY-Lung01/02
ORR ~55%

비급여



MET

~3% · exon 14 skip

Capmatinib
Tepotinib

(Tabrecta · Tepmetko)
GEOMETRY, VISION
ORR ~40–70%

텡메코 급여



RET

1–2% · fusion

Selpercatinib
Pralsetinib

(Retevmo · Gavreto)
LIBRETTO-001, ARROW
ORR ~60–85%

비급여



NTRK

<1% · fusion

Larotrectinib
Entrectinib

Vitrakvi · Rozlytrek
Tumor-agnostic
ORR ~75%

비급여



NGS — *one test, many answers*

Sample type 1

Tissue biopsy

Gold standard · from tumor block or cell-block

- TAT ~10–14 working days (28 days)
- Best for initial diagnosis
- Requires adequate tumor cellularity

Sample type 2

Liquid biopsy (ctDNA)

Blood draw · Guardant360, others

- TAT ~7 days (10-14 days)
- Use when tissue is insufficient or re-biopsy risky
- Also used at progression (PD) to catch resistance

Korean 선별급여 · Since Dec 2023

50%

본인부담 · adenocarcinoma

80%

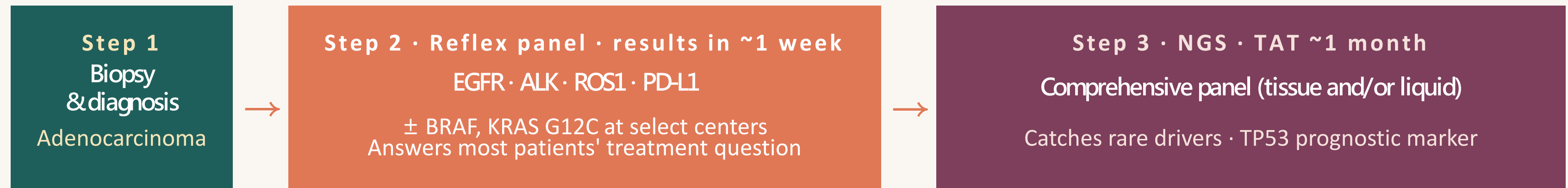
본인부담 · Squamous cell

₩70–80만

typical patient out-of-pocket

The Korean reflex-testing *workflow*

What we do at diagnosis of stage IV NSCLC adenocarcinoma



On progression (PD) ↓

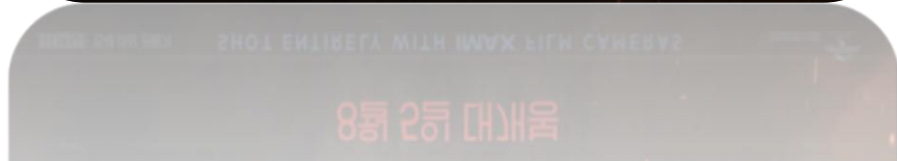
At progression on targeted therapy

Re-biopsy (tissue preferred) **or liquid biopsy** → repeat NGS to find **T790M, MET amp, C797S**, or histologic transformation.

Set expectations on TAT · coordinate specimen stewardship · explain cost of NGS & combination regimens

Take-Home Messages

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- 01** Lung cancer is the leading cause of cancer death in both men and women
 - 02** In stage IV NSCLC, prognosis and treatment strategies differ according to **biomarker and driver mutation status**
 - 03** **EGFR** is the most common actionable driver in lung adenocarcinoma in Korea, with multiple reimbursed EGFR-TKI options available.
 - 04** Less common but actionable drivers—including **ALK, ROS1, MET exon 14 skipping, and BRAF V600E**—also have reimbursed targeted therapies in Korea.
 - 05** **Tissue- and liquid-based NGS** enables comprehensive detection of actionable alterations, paving the way for personalized treatment.
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Thank you for your attention!



YONGIN SEVERANCE HOSPITAL

