

Breakout session

LIVING BEYOND
BREAST CANCER®

Understanding the role of personalized medicine in your cancer journey

Speaker: Seth Wander, MD, PhD





Mass General Brigham
Mass General Cancer Center

Understanding the Role of Personalized Medicine in Your Cancer Journey

Evolving Biomarker-Based Treatment Options

Living Beyond Breast Cancer: 2026 Conference on Metastatic Breast Cancer
April 19th, 2026

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Disclosures

Consulting/Advisory Board: Foundation Medicine, Veracyte, Hologic, Eli Lilly, Biovica, Pfizer, Arvinas, Puma Biotechnology, Novartis, AstraZeneca, Genentech, Regor Therapeutics, Stemline/Menarini, Gilead, Celcuity, Precede Biosciences, Halda Therapeutics, Boundless Bio

Education/Speaking: Eli Lilly, Guardant Health, 2ndMD

Institutional Research Support: Genentech, Eli Lilly, Pfizer, Arvinas, Nuvation Bio, Regor Therapeutics, Sermonix, Puma Biotechnology, Stemline/Menarini, Phoenix Molecular Designs



ASCO 2025: “Optimizing Targeted Therapies with Molecular Markers”

Delivering upon the promise of **personalized medicine** and **precision oncology**...

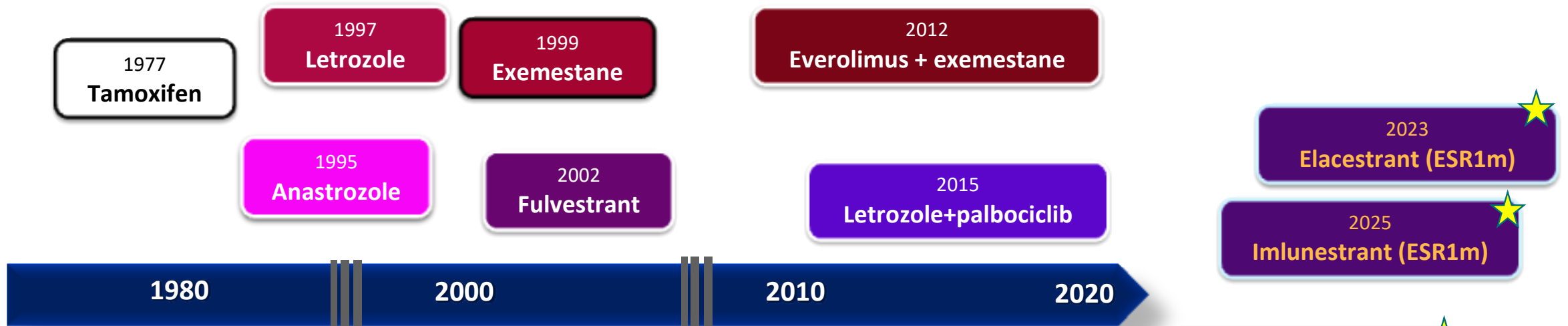
Finding the **right drug**, for the **right patient**, at the **right time**...



In 2014, for HR+/HER2- MBC....



HR+/HER2- MBC: The Road to Personalized Therapy



Hormonal Therapies:

- Selective ER Modulators - Tamoxifen
- Aromatase Inhibitors – Letrozole, Anastrozole, Exemestane
- Selective ER Degraders – Fulvestrant >> **Elacestrant**

Targeted Therapies:

- CDK4/6 inhibitors – Palbociclib, Ribociclib, Abemaciclib
- PI3K, mTOR, AKT inhibitors – Everolimus, **Alpelisib**, **Capivasertib**, **Inavolisib**



Evolving Biomarkers for Precision Medicine in Metastatic Breast Cancer

- BRCA mutations and PARP inhibition
- Targeting endocrine resistance via ESR1 mutations (HR+/HER2-)
- Emerging strategies to target PI3K signaling
- HER2-low disease as a new dimension of therapy selection
- Summary, key questions, future directions

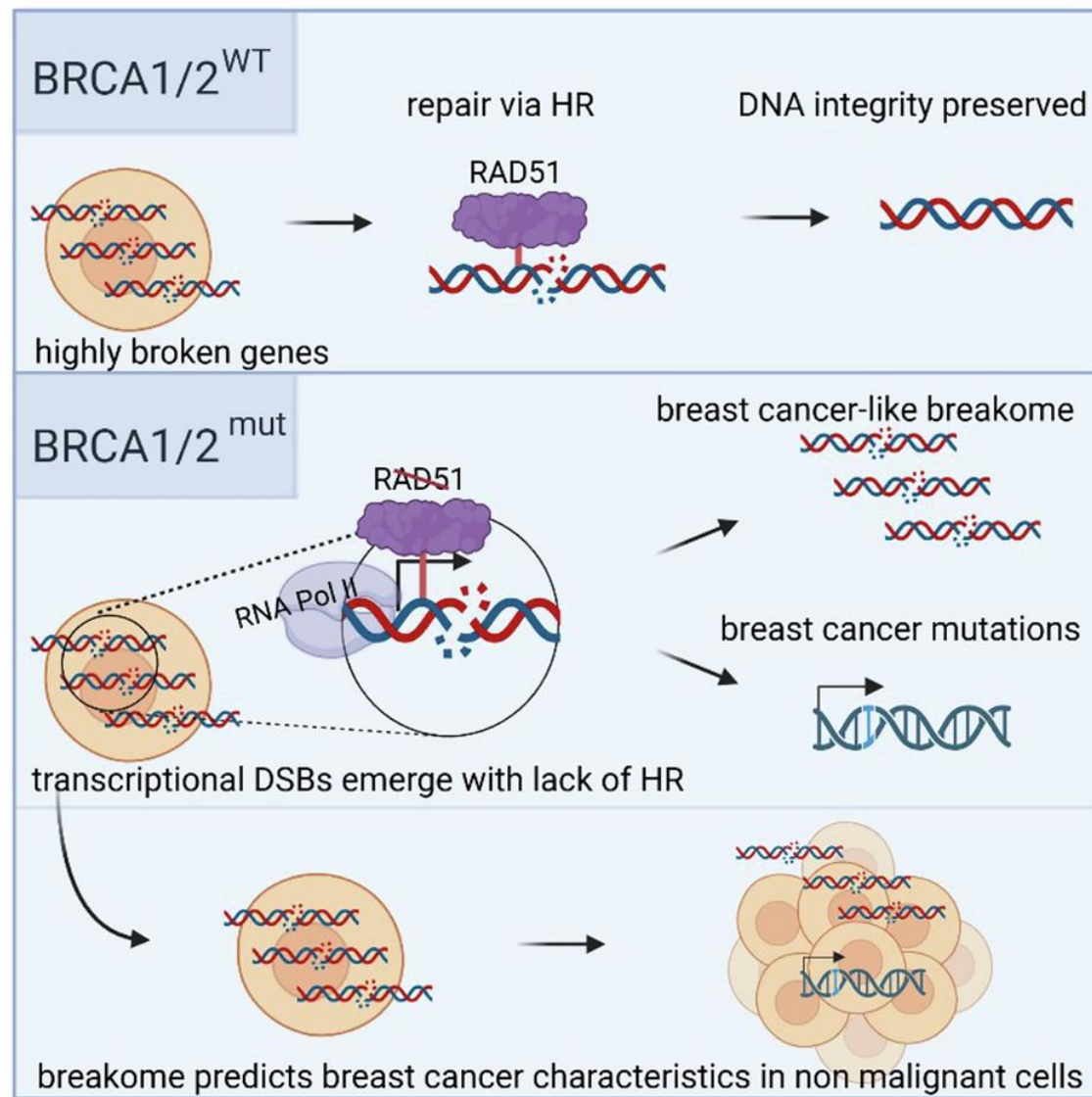
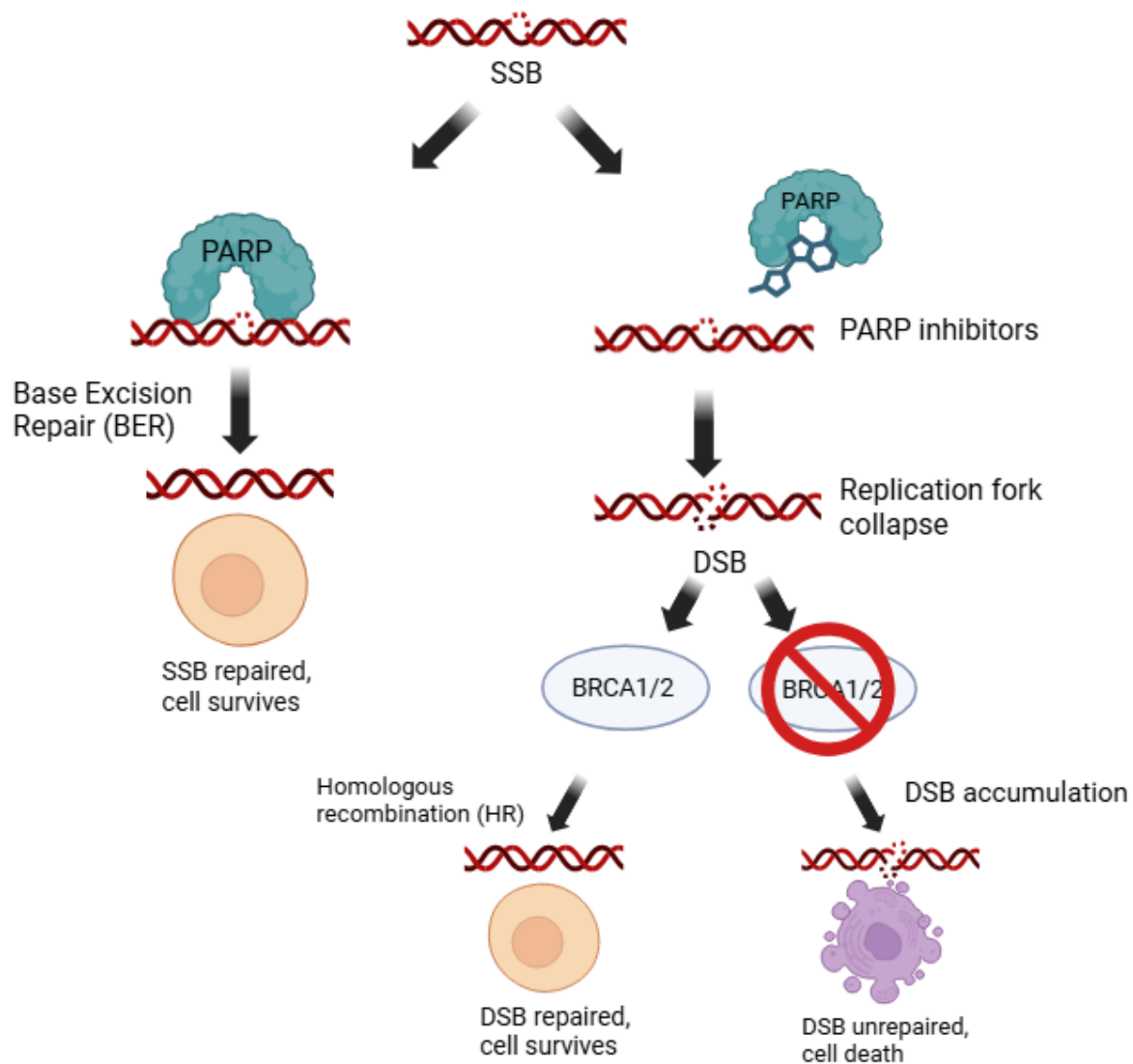


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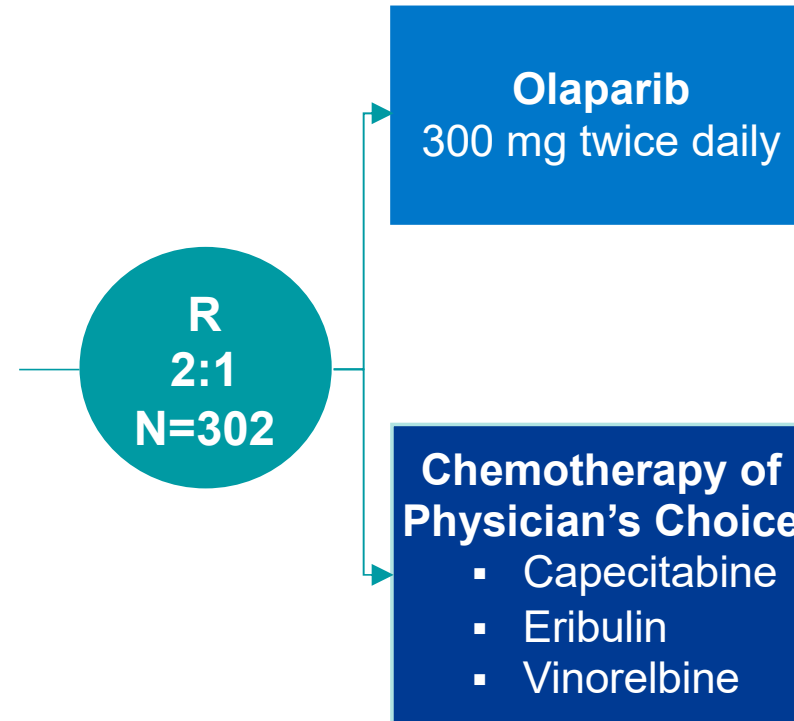


BRCA: Inherited Impact on DNA Damage Repair

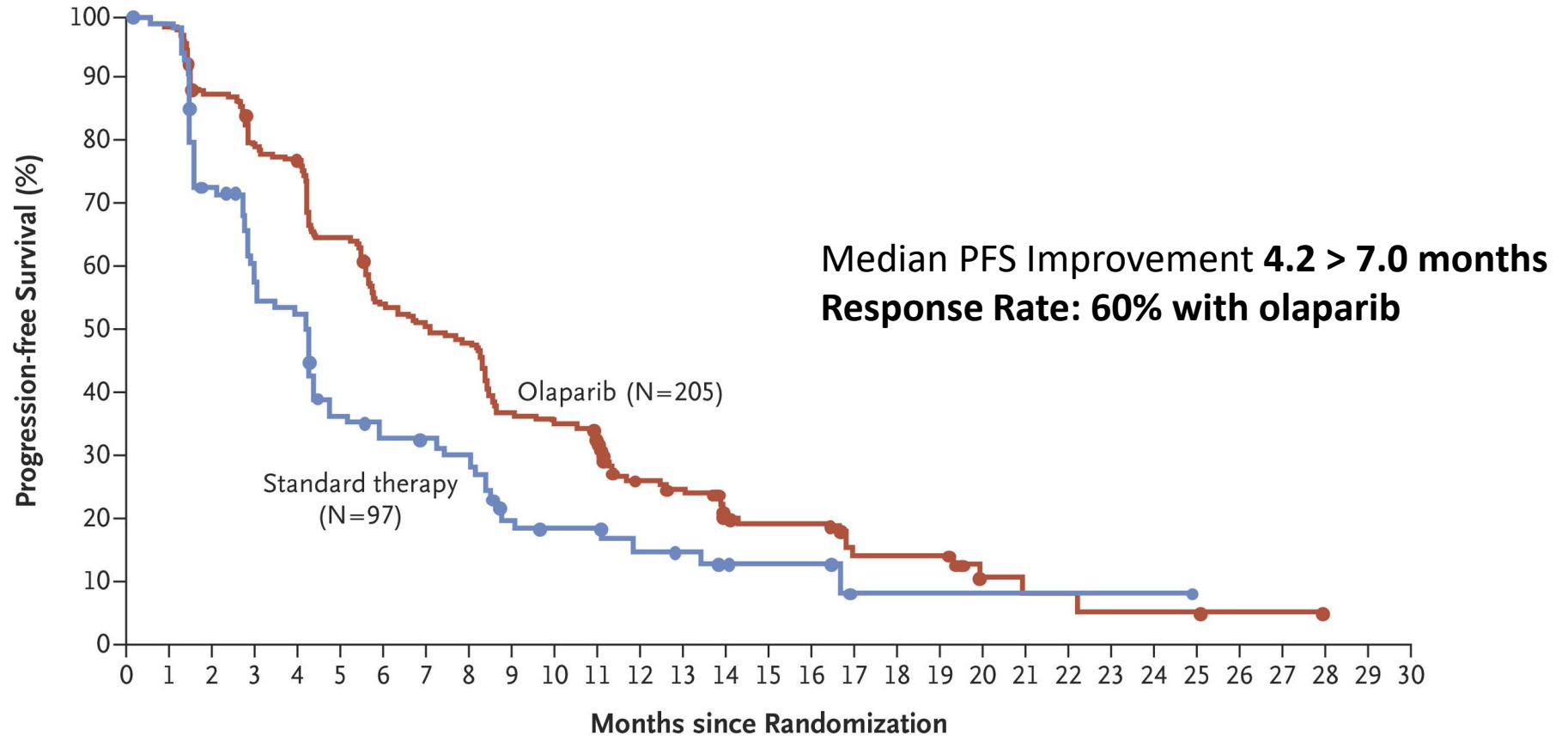


OlympiAD: PARP Inhibition Improves Outcomes for BRCAm MBC

- HER2– metastatic breast cancer (HR+ or TNBC^a)
- Germline pathogenic or likely pathogenic *BRCA1/2* mutation^b
- ≤2 prior lines of chemotherapy in the metastatic setting
- HR+ disease progressed on ≥1 endocrine therapy, or not suitable
- Prior platinum use allowed if:
 - No evidence of progression during treatment in advanced setting
 - ≥12 months since (neo)adjuvant Tx



OlympiAD: PARP Inhibition Improves Outcomes for BRCAm MBC



No. at Risk

Olaparib	205	201	177	159	154	129	107	100	94	73	69	61	40	36	23	21	21	11	11	11	4	3	3	2	2	1	1	1	0
Standard therapy	97	88	63	46	44	29	25	24	21	13	11	11	8	7	4	4	4	1	1	1	1	1	1	1	1	0	0	0	0

OlympiAD: PARP Inhibition Improves Outcomes for BRCAm MBC

Table 2. Summary of Adverse Events.*

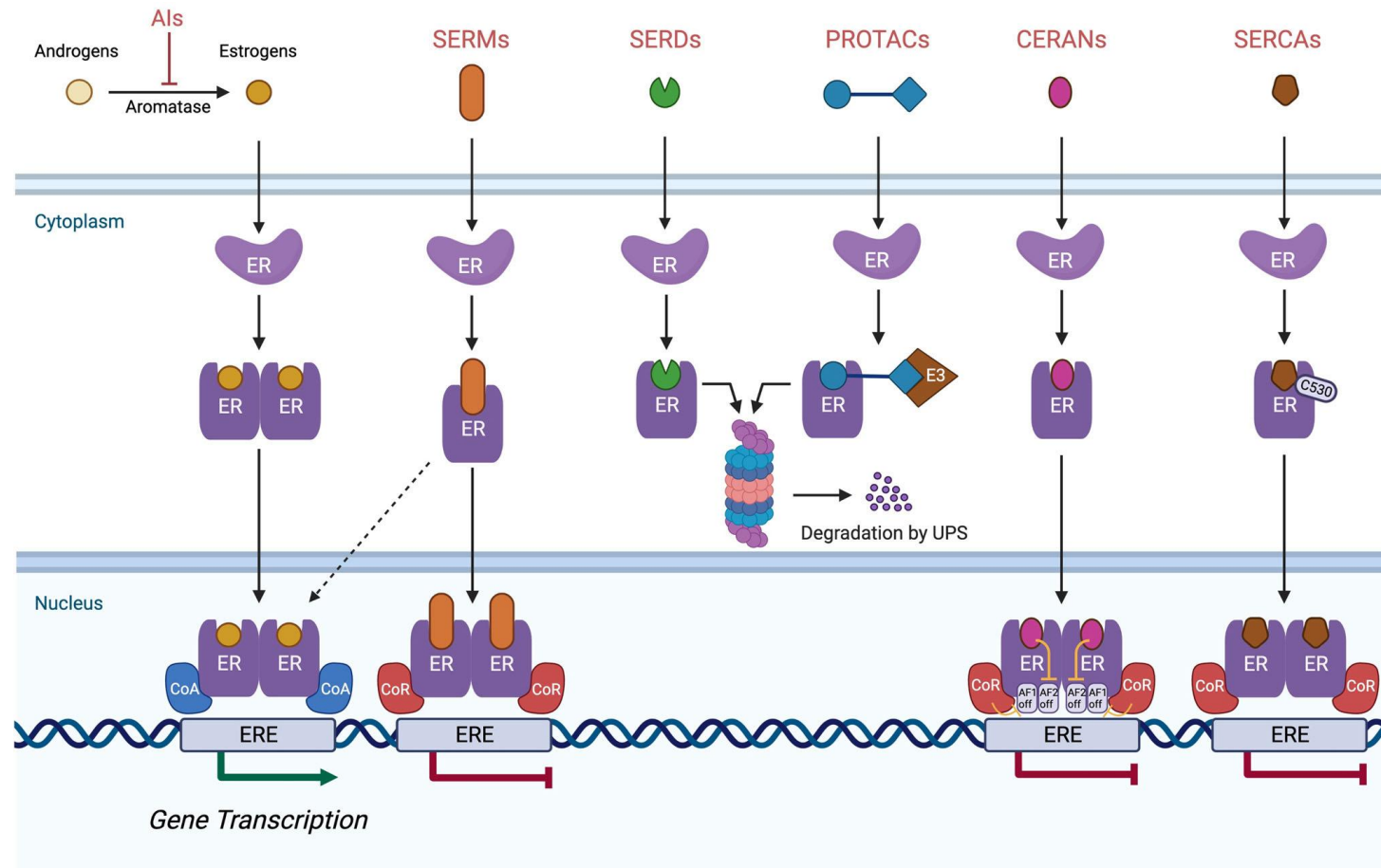
Variable	Olaparib Group (N = 205)		Standard-Therapy Group (N = 91)	
	Any Grade	Grade ≥3	Any Grade	Grade ≥3
	<i>number (percent)</i>			
Adverse event				
Any	199 (97.1)	75 (36.6)	88 (96.7)	46 (50.5)
Anemia†	82 (40.0)	33 (16.1)	24 (26.4)	4 (4.4)
Neutropenia‡	56 (27.3)	19 (9.3)	45 (49.5)	24 (26.4)
Decreased white-cell count	33 (16.1)	7 (3.4)	19 (20.9)	9 (9.9)
Nausea	119 (58.0)	0	32 (35.2)	1 (1.1)
Vomiting	61 (29.8)	0	14 (15.4)	1 (1.1)
Diarrhea	42 (20.5)	1 (0.5)	20 (22.0)	0
Decreased appetite	33 (16.1)	0	11 (12.1)	0
Fatigue	59 (28.8)	6 (2.9)	21 (23.1)	1 (1.1)
Headache	41 (20.0)	2 (1.0)	14 (15.4)	2 (2.2)
Pyrexia	29 (14.1)	0	16 (17.6)	0
Cough	35 (17.1)	0	6 (6.6)	0
Increased alanine aminotransferase level	23 (11.2)	3 (1.5)	16 (17.6)	1 (1.1)
Increased aspartate aminotransferase level	19 (9.3)	5 (2.4)	15 (16.5)	0
Palmar–plantar erythrodysesthesia	1 (0.5)	0	19 (20.9)	2 (2.2)
Dose reduction owing to adverse event	52 (25.4)	NA	28 (30.8)	NA
Treatment interruption or delay owing to adverse event	72 (35.1)	NA	25 (27.5)	NA
Treatment discontinuation owing to adverse event	10 (4.9)	NA	7 (7.7)	NA

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Emerging Antiestrogen Agents with Novel Mechanisms



AI: Aromatase Inhibitor

SERM: Selective ER Modulator

SERD: Selective ER Degradator

PROTAC: Proteolysis Targeting Chimeric

CERAN: Complete ER Antagonist

SERCA: Selective ER Covalent Antagonist

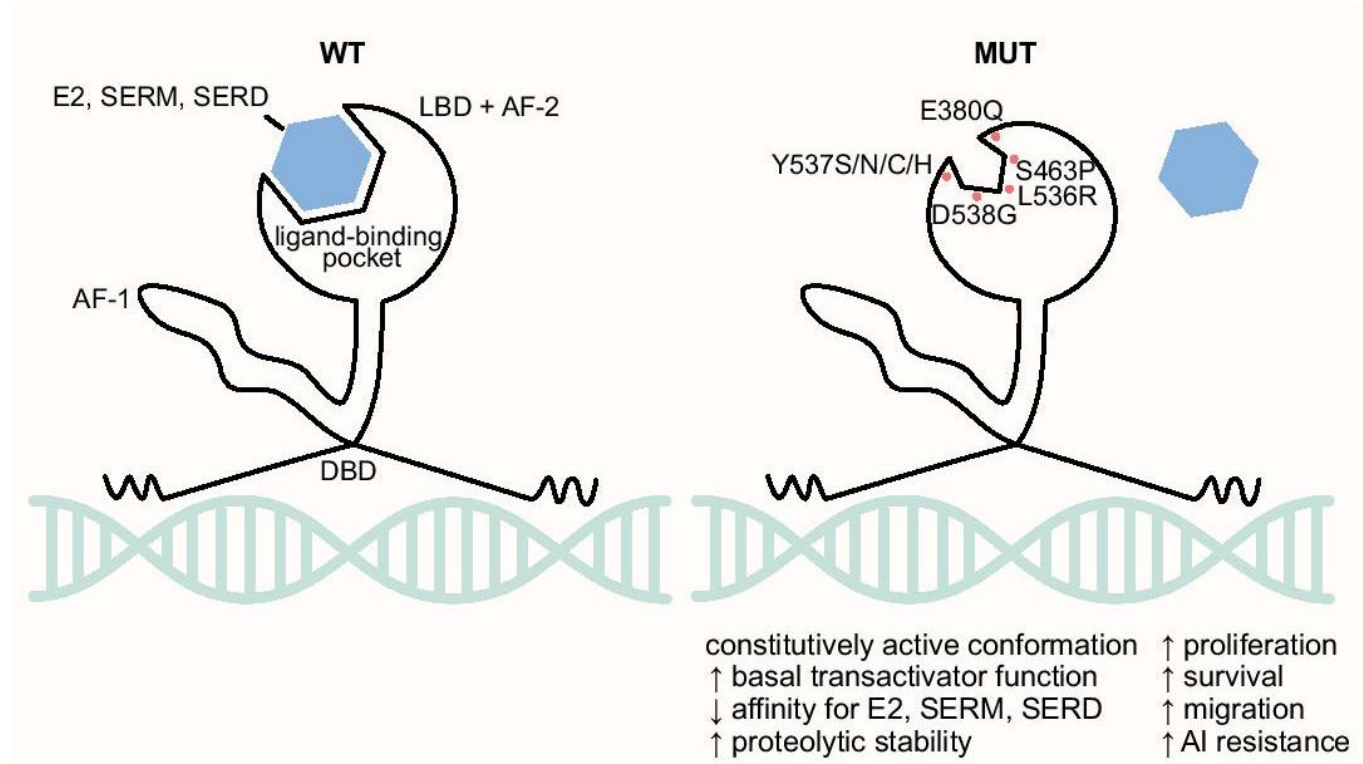
ESR1 Mutations Promote Ligand-Independent Signaling

ESR1 = Estrogen receptor 1 (ERalpha)
Present in breast, ovary, uterus
Hormone-dependent transcription factor

After estrogen binding, complex genomic regulation of breast cell growth, survival, metabolism

Mutations tend to occur in the ligand binding domain

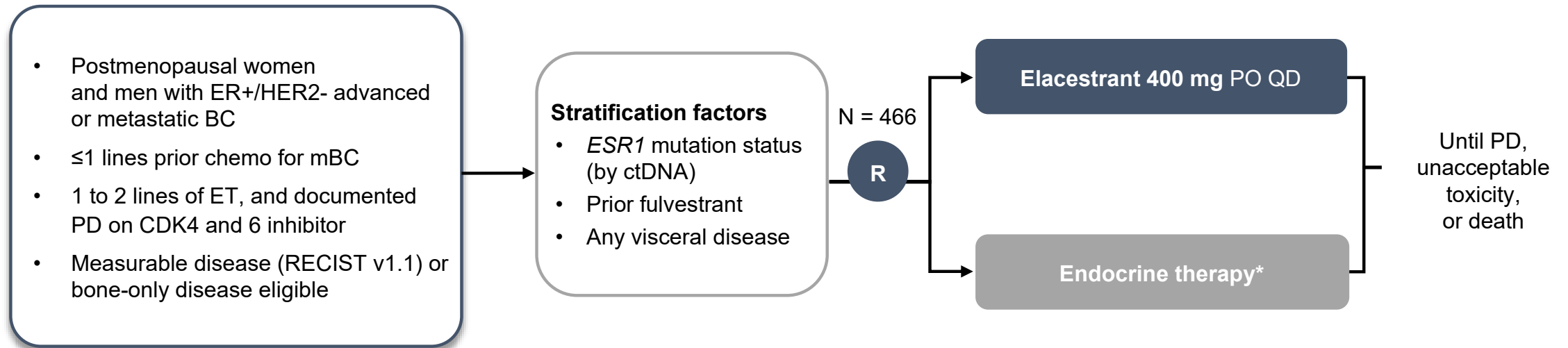
- Promote ligand (estrogen)-independent receptor activity and cell survival/growth



EMERALD: Elacestrant Phase III

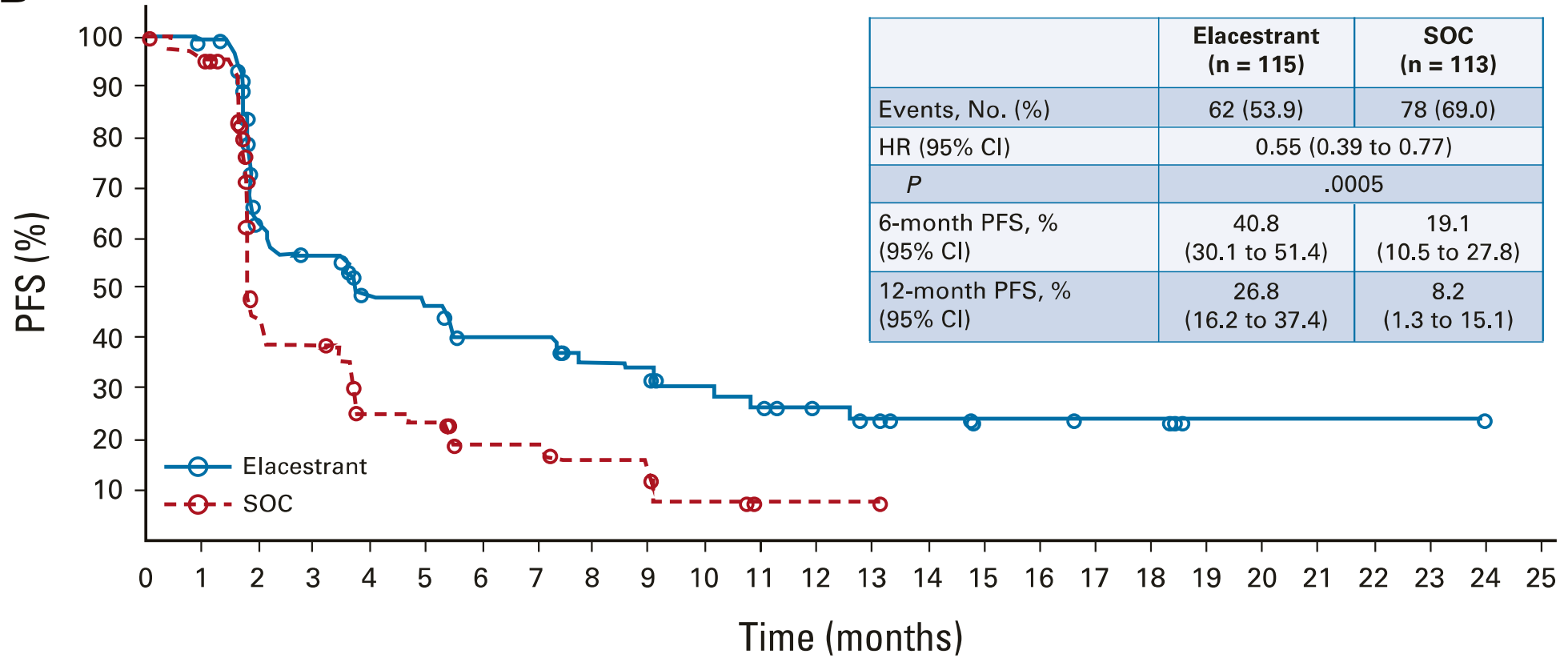
Patient Characteristics: Elacestrant vs. Control

- Prior Chemotherapy: 20% vs 24%
- ESR1m: 48% vs 47%
- Two prior lines of ET: 46% vs 41%



EMERALD: Elacestrant Phase III

B

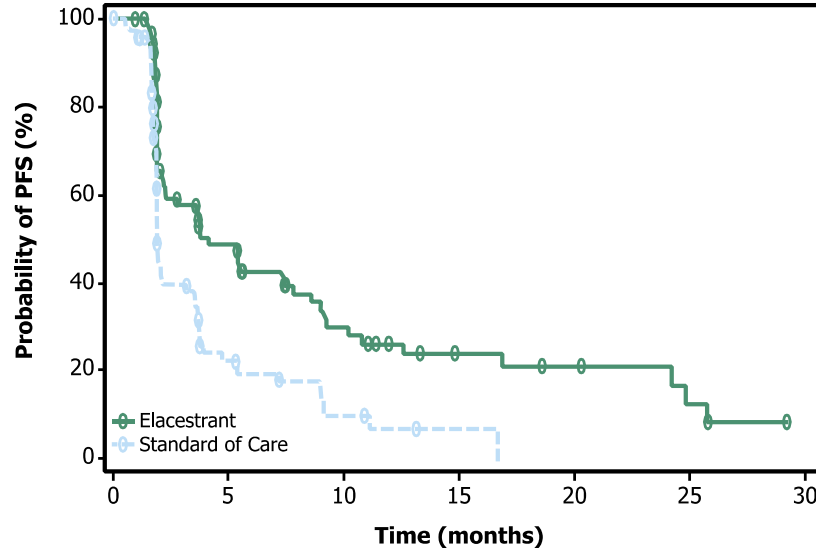


No. at risk:

Elacestrant	115	105	54	46	35	33	26	26	21	20	16	14	11	9	7	5	5	4	4	1	1	1	1	1	0
SOC	113	99	39	34	19	18	12	12	9	9	4	1	1	1	0										

EMERALD: Efficacy Subgroups

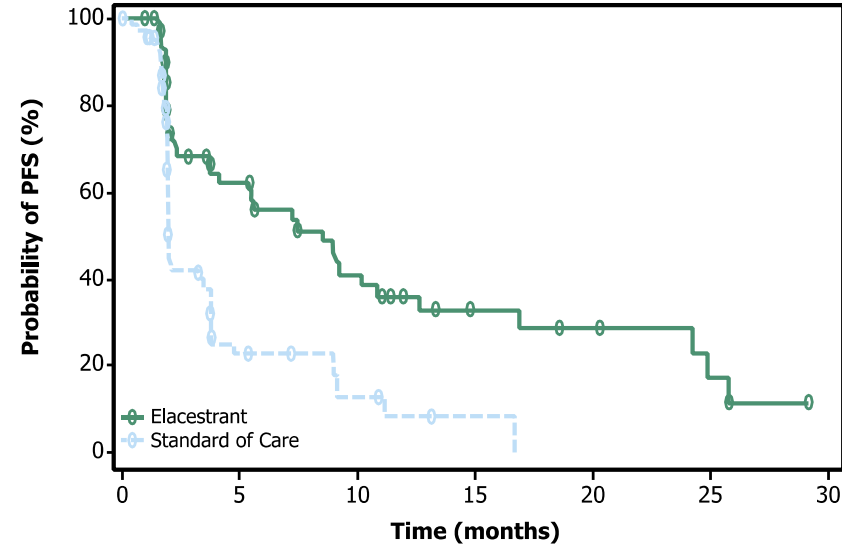
At least 6 mo CDK4/6i



Elacestrant 103 50 33 25 20 16 11 9 8 7 6 5 5 1 1 0
 SOC 102 34 16 11 9 5 2 1 1 0

	Elacestrant	SOC Hormonal Therapy
Median PFS, months (95% CI)	4.14 (2.20 - 7.79)	1.87 (1.87 - 3.29)
PFS rate at 12 months, % (95% CI)	26.02 (15.12 - 36.92)	6.45 (0.00 - 13.65)
Hazard ratio (95% CI)	0.517 (0.361 - 0.738)	

At least 12 mo CDK4/6i



Elacestrant 78 42 31 24 20 16 11 9 8 7 6 5 5 1 1 0
 SOC 81 26 12 10 9 5 2 1 1 0

	Elacestrant	SOC Hormonal Therapy
Median PFS, months (95% CI)	8.61 (4.14 - 10.84)	1.91 (1.87 - 3.68)
PFS rate at 12 months, % (95% CI)	35.81 (21.84 - 49.78)	8.39 (0.00 - 17.66)
Hazard ratio (95% CI)	0.410 (0.262 - 0.634)	

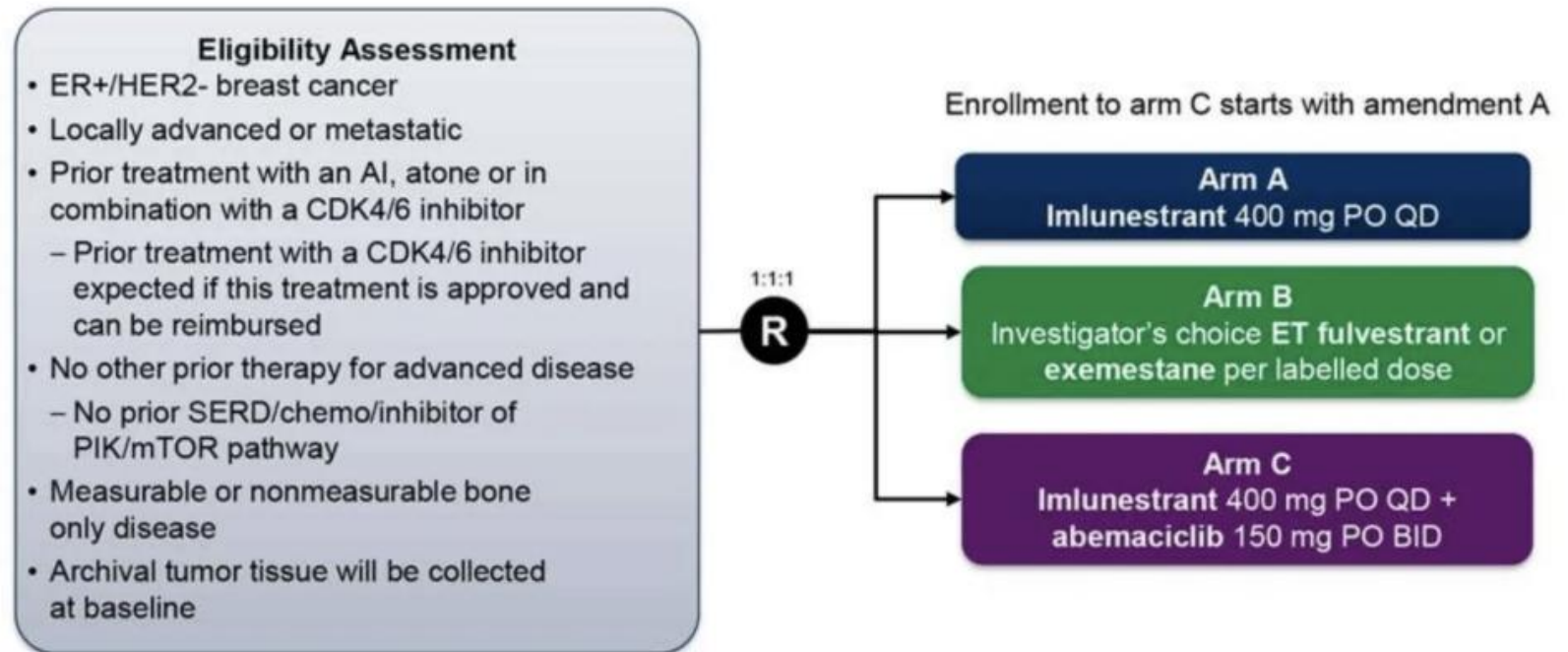
Oral SERDs are Well Tolerated

AEs ^c Occurring in ≥ 10% of Patients in Any Arm	Elacestrant		Total	
	All Grades	Grade 3/4	All Grades	Grade 3/4
Nausea	83 (35.0) ^d	6 (2.5)	43 (18.8)	2 (0.9)
Fatigue	45 (19.0)	2 (0.8)	43 (18.8)	2 (0.9)
Vomiting	45 (19.0) ^e	2 (0.8)	19 (8.3)	0
Decreased appetite	35 (14.8)	2 (0.8)	21 (9.2)	1 (0.4)
Arthralgia	34 (14.3)	2 (0.8)	37 (16.2)	0
Diarrhea	33 (13.9)	0	23 (10.0)	2 (0.9)
Back pain	33 (13.9)	6 (2.5)	22 (9.6)	1 (0.4)
AST increased	31 (13.1)	4 (1.7)	28 (12.2)	2 (0.9)
Headache	29 (12.2)	4 (1.7)	26 (11.4)	0
Constipation	29 (12.2)	0	15 (6.6)	0
Hot flush	27 (11.4)	0	19 (8.3)	0
Dyspepsia	24 (10.1)	0	6 (2.6)	0
ALT increased	22 (9.3)	5 (2.1)	23 (10.0)	1 (0.4)

EMBER₃: Imlunestrant Phase III

Patient Characteristics: Imlunestrant vs. Control

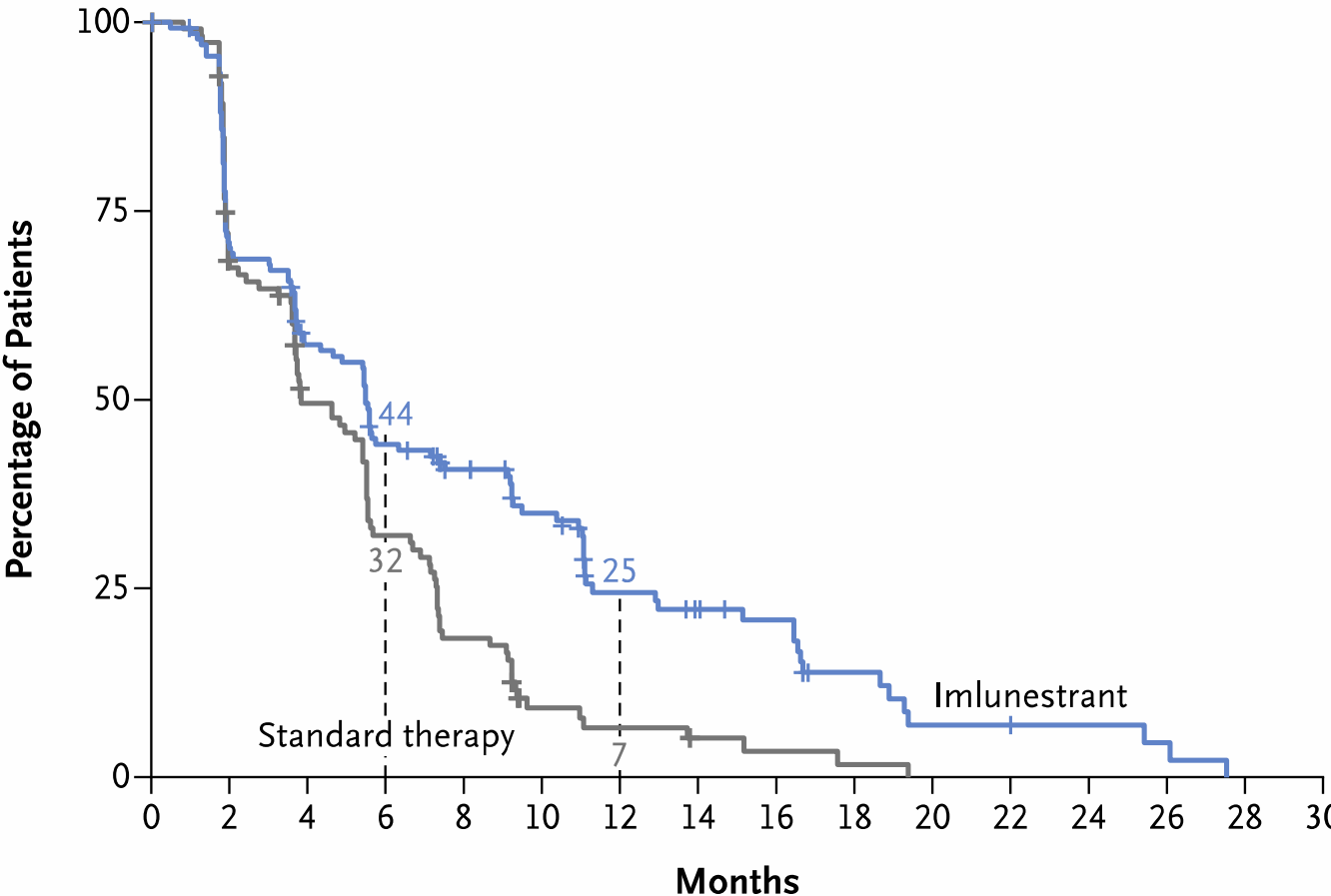
- No prior chemotherapy, 1 prior line of ET
- ~40% of patients were CDK4/6i-naive
- ESR1m: 41.7% vs 35.8



EMBER3: Imlunestrant Phase III

Median PFS Improvements:
ESR1m: 3.8 > 5.5 months

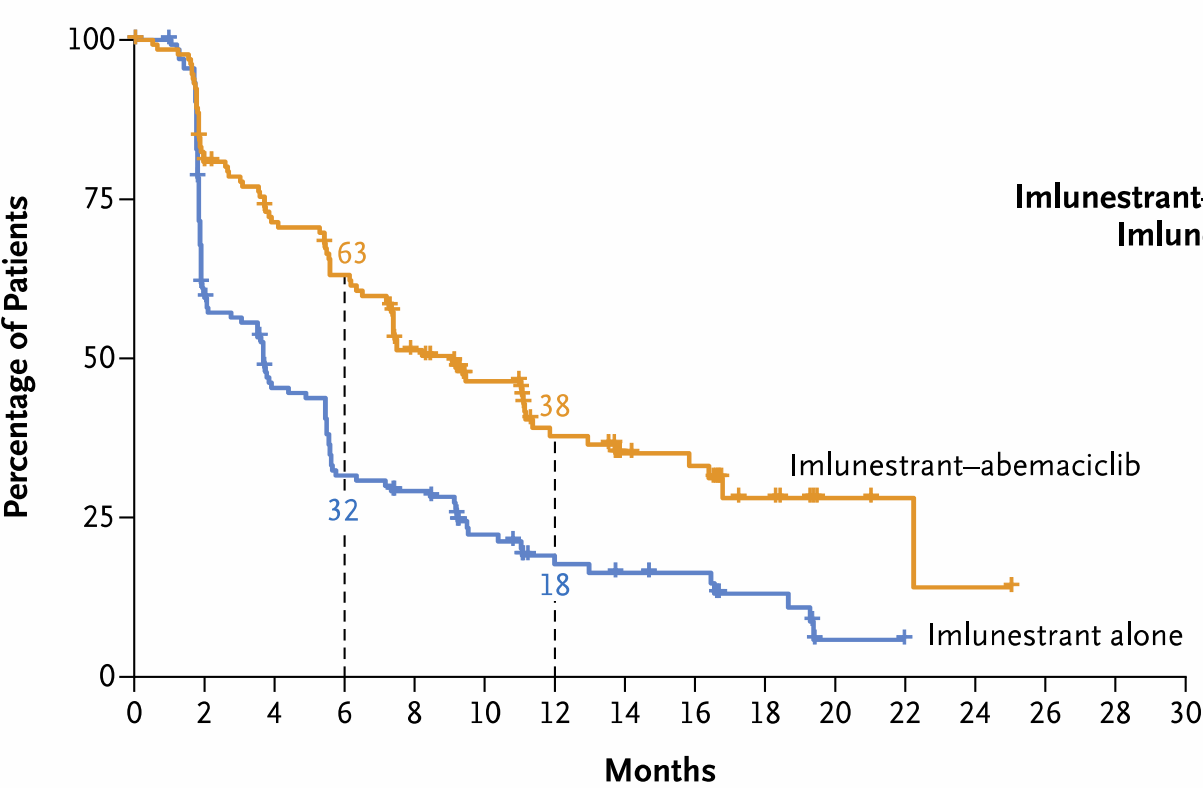
A Progression-free Survival among Patients with *ESR1* Mutations, Imlunestrant vs. Standard



No. at Risk		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Imlunestrant	138	95	74	56	45	35	22	18	15	8	4	4	3	2	0	0	0
Standard therapy	118	74	51	33	19	7	5	3	2	1	0	0	0	0	0	0	0

EMBER3: Imlunestrant + Abemaciclib Efficacy

B Progression-free Survival among Patients with Previous CDK4/6 Inhibitor Treatment, Imlunestrant–Abemaciclib vs. Imlunestrant Alone

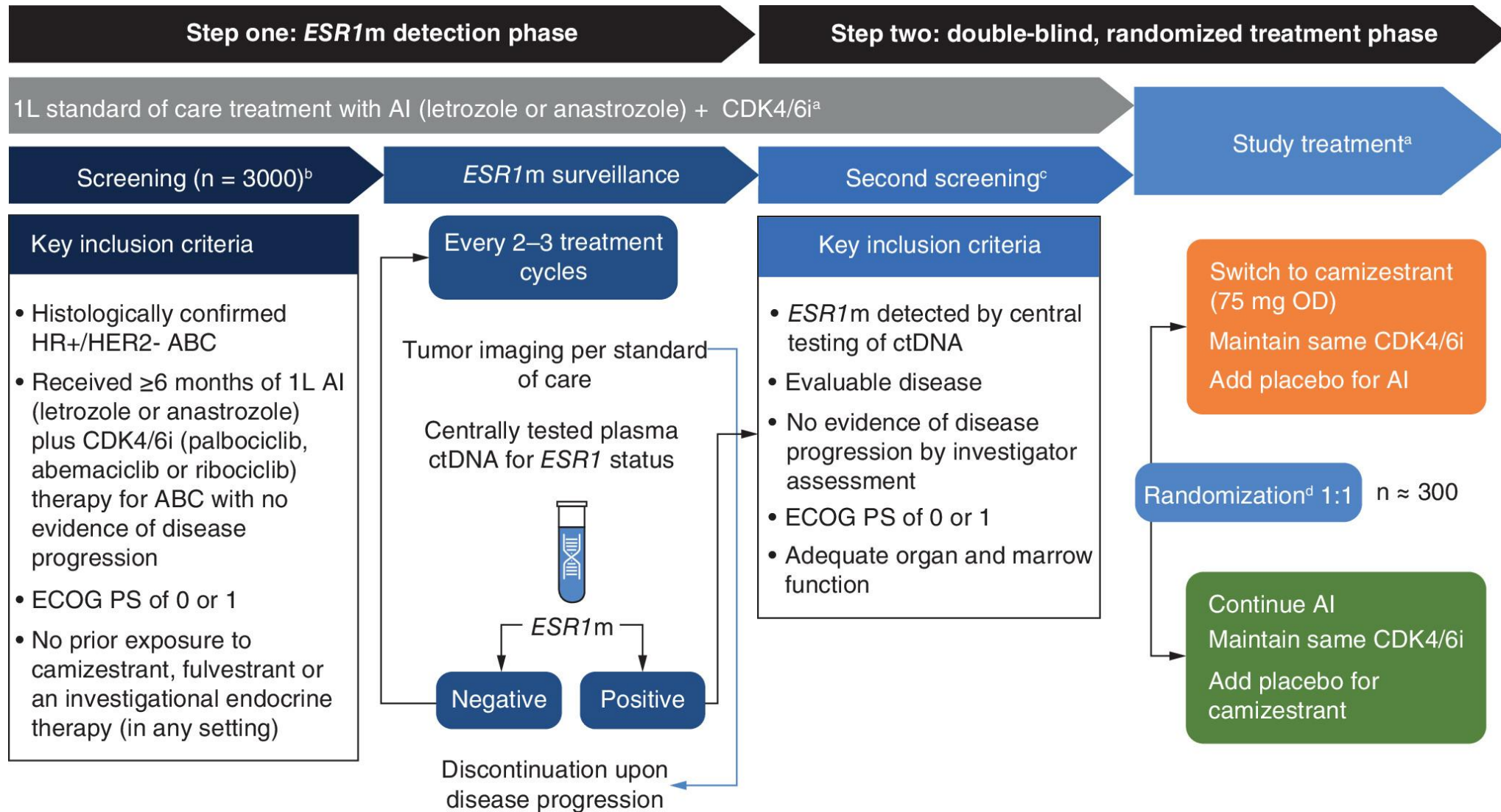


	No. of Patients	No. of Events	Median Progression-free Survival (95% CI) <i>mo</i>
Imlunestrant–Abemaciclib	139	79	9.1 (7.2–11.2)
Imlunestrant Alone	140	109	3.7 (2.1–5.5)

Hazard ratio for disease progression or death, 0.51 (95% CI, 0.38–0.68)

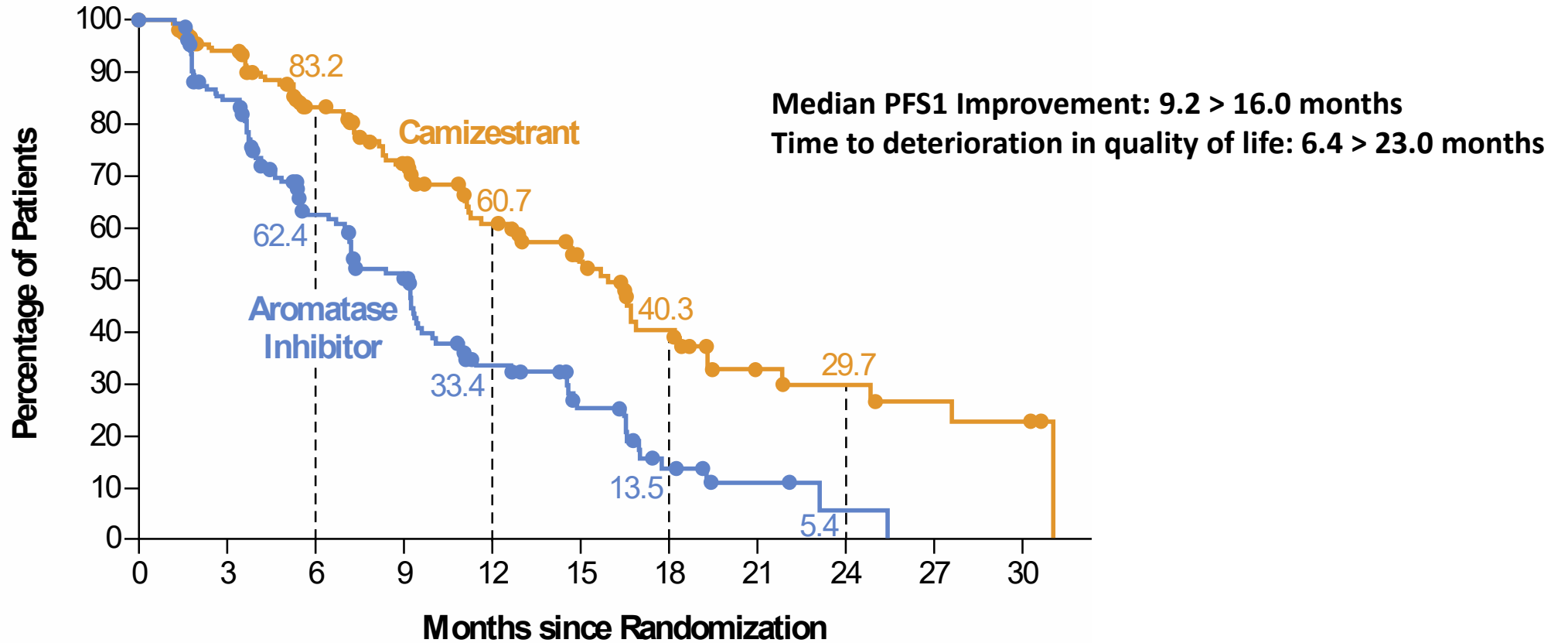
No. at Risk	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Imlunestrant–abemaciclib	139	105	87	76	58	43	29	19	17	8	3	2	1	0	0	0
Imlunestrant alone	140	79	56	39	32	21	13	11	10	6	1	0	0	0	0	0

SERENA-6: Phase III, Camizestrant via ctDNA ESR1 Dynamics



SERENA-6: Dynamic ctDNA Switch Outcomes

A Progression-free Survival among All Patients

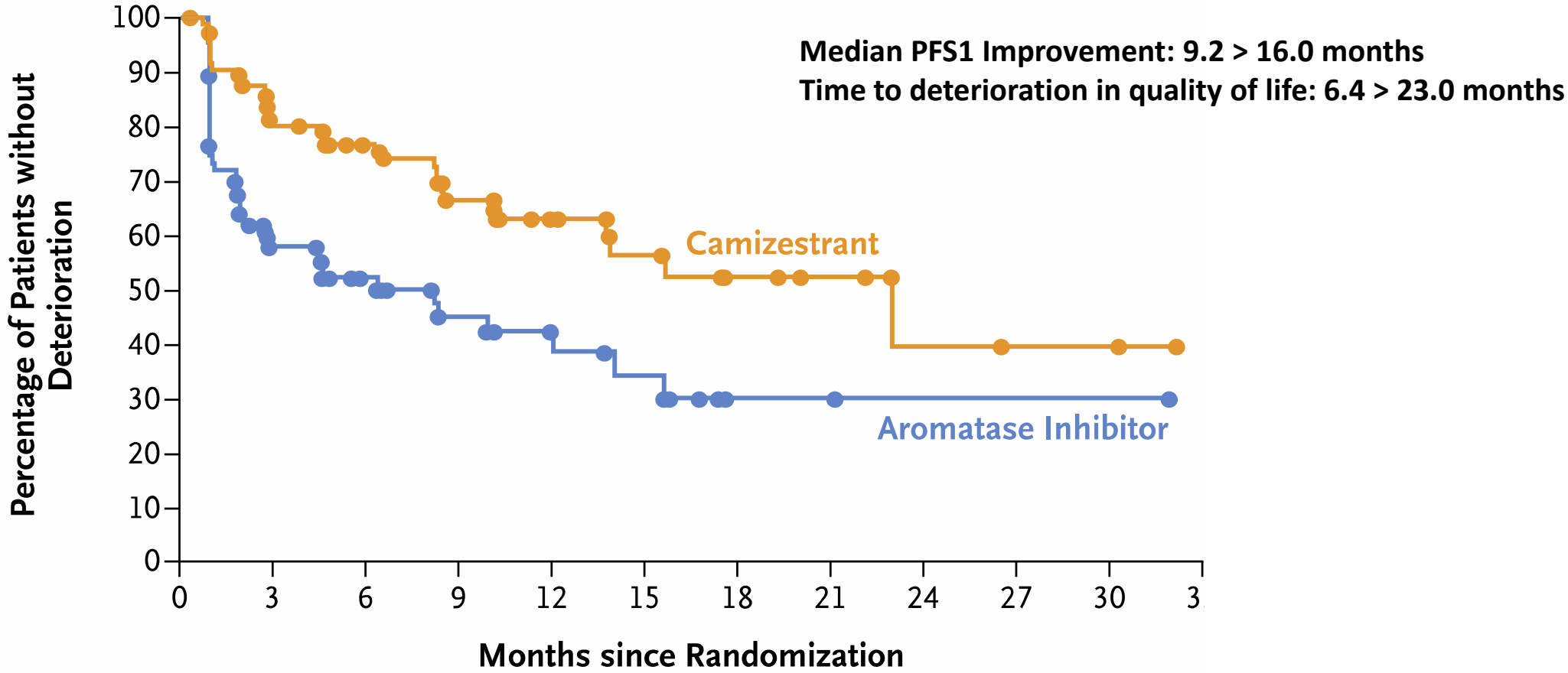


No. at Risk

Camizestrant	157	138	105	82	55	41	26	11	9	7	6
Aromatase inhibitor	158	124	73	55	29	17	7	3	1	0	0



SERENA-6: Dynamic ctDNA Switch Outcomes



No. at Risk

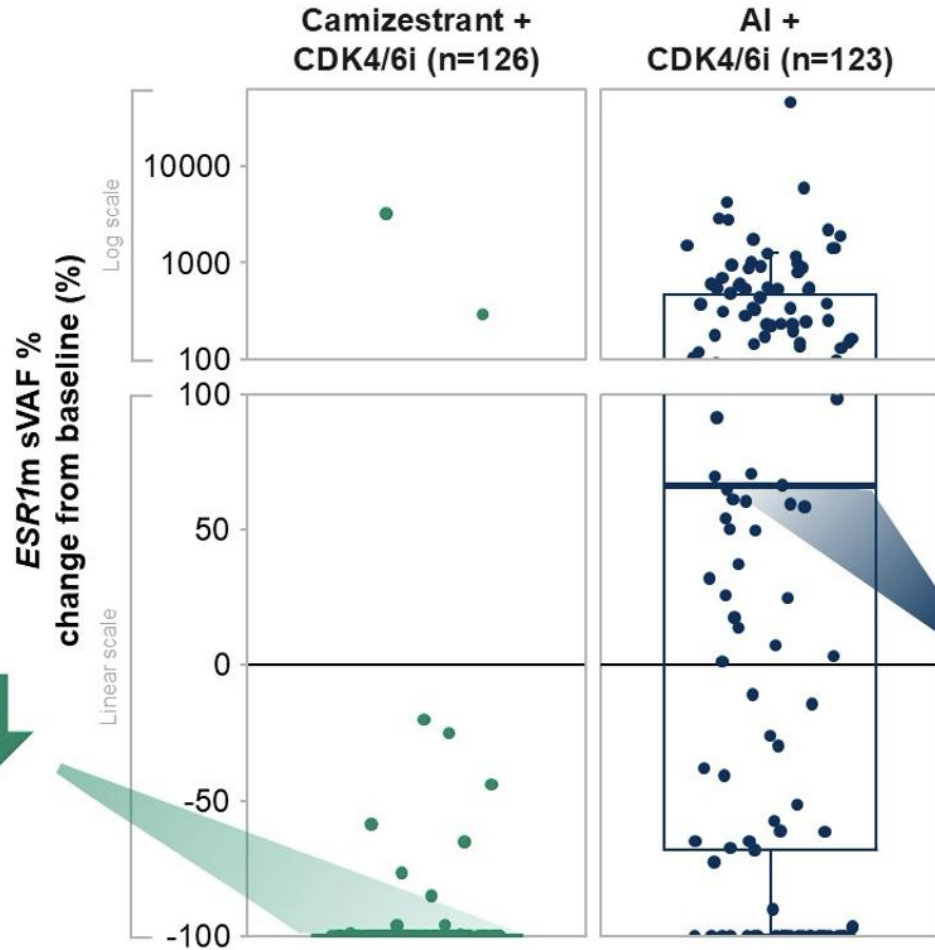
Camizestrant	107	72	59	40	24	16	9	6	3	2	2	0
Aromatase inhibitor	95	42	26	16	11	8	2	2	1	1	1	0



SERENA-6: Dynamic ESR1 VAF on Treatment

ESR1m allele frequency was **profoundly reduced** in the camizestrant + CDK4/6i arm vs the AI + CDK4/6i arm (Wilcoxon nominal $P < 0.00001$)

Median change from baseline at C3D1 (8 weeks):
-100% (IQR: -100 to -100)



In the AI + CDK4/6i arm, *ESR1m* allele frequency increased >500% from baseline in **24.4%** of patients vs **0.8%** of patients in the camizestrant + CDK4/6i arm

Median change from baseline at C3D1 (8 weeks):
+66.7% (IQR: -67.9 to +465.0)

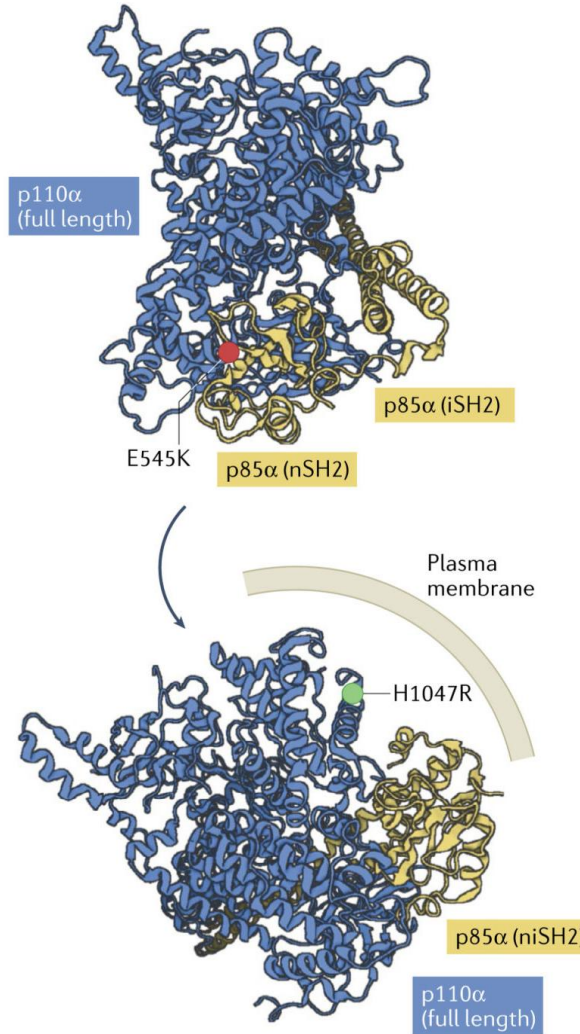
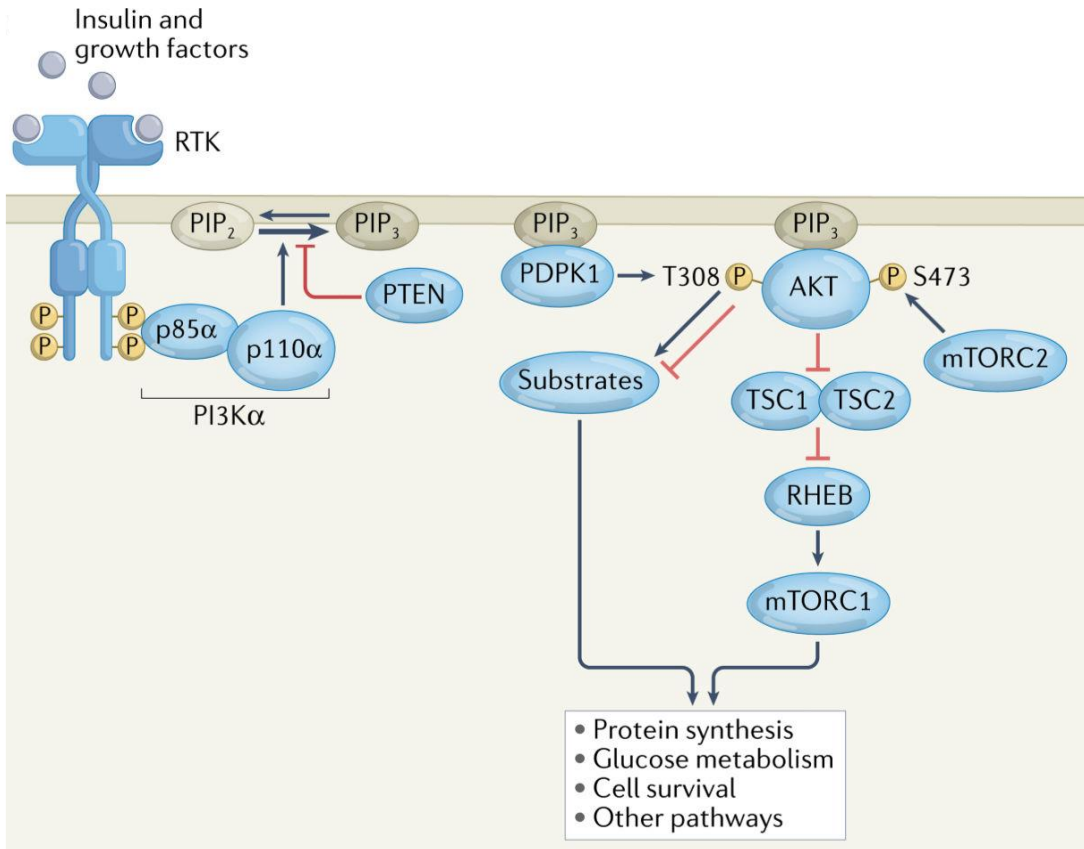


Evolving Biomarkers for Precision Medicine in Metastatic Breast Cancer

- BRCA mutations and PARP inhibition
- Targeting endocrine resistance via ESR1 mutations (HR+/HER2-)
- **Emerging strategies to target PI3K signaling**
- HER2-low disease as a new dimension of therapy selection
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Oncogenic PI3K Signaling and Structure



PI3K = Phosphoinositide 3-kinase
 PIK3CA = p110α, key catalytic subunit of PI3K

Key cancer progression driver

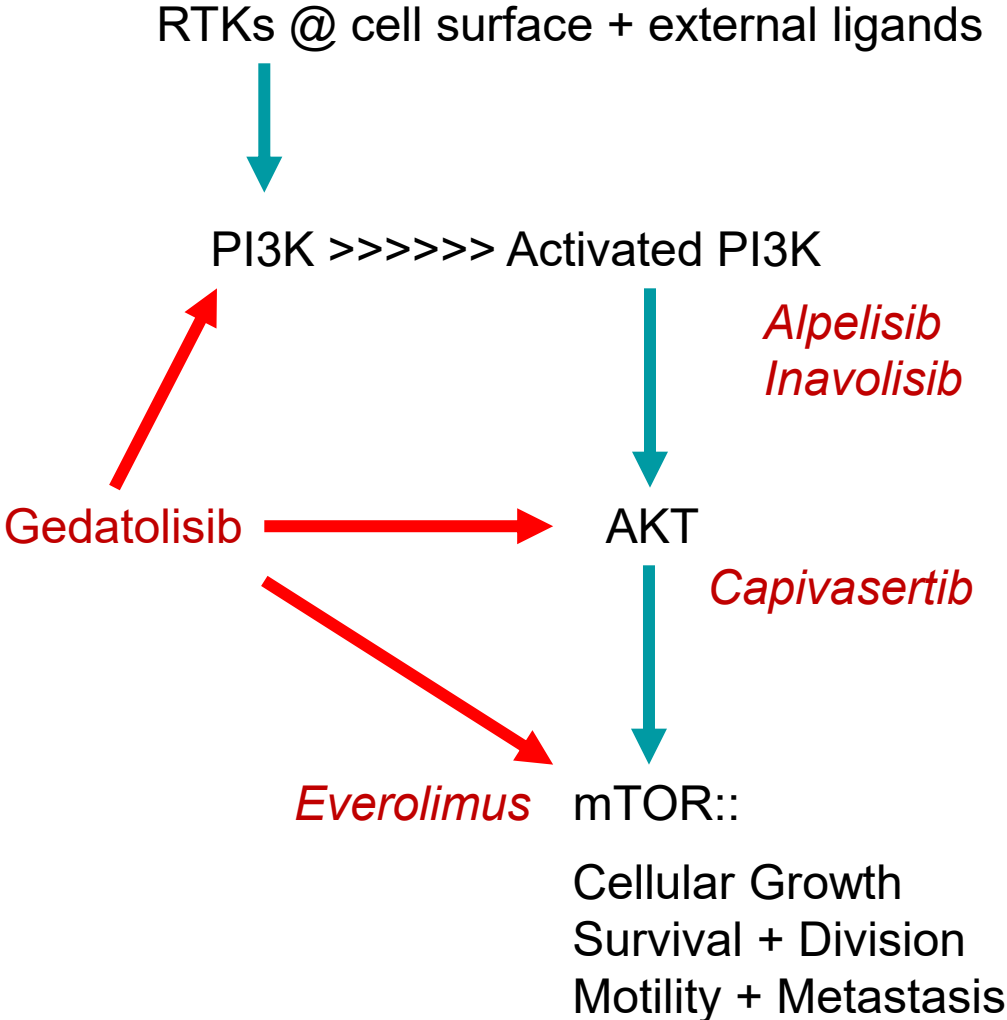
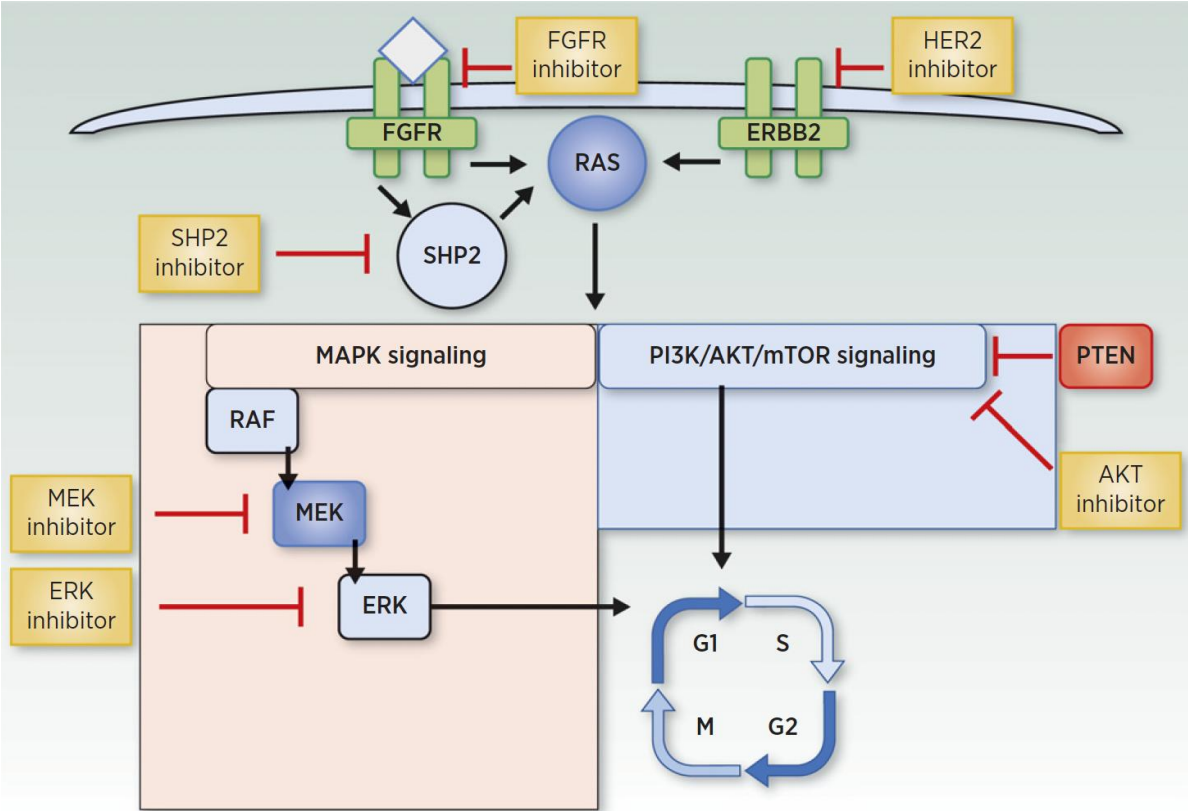
Translates signals outside the cell to nucleus, impacts:

- Cell survival
- Cell growth
- Metabolism
- Motility and metastasis

Resistance Drivers Define New Therapeutic Targets

Oncogenic growth signaling mediators

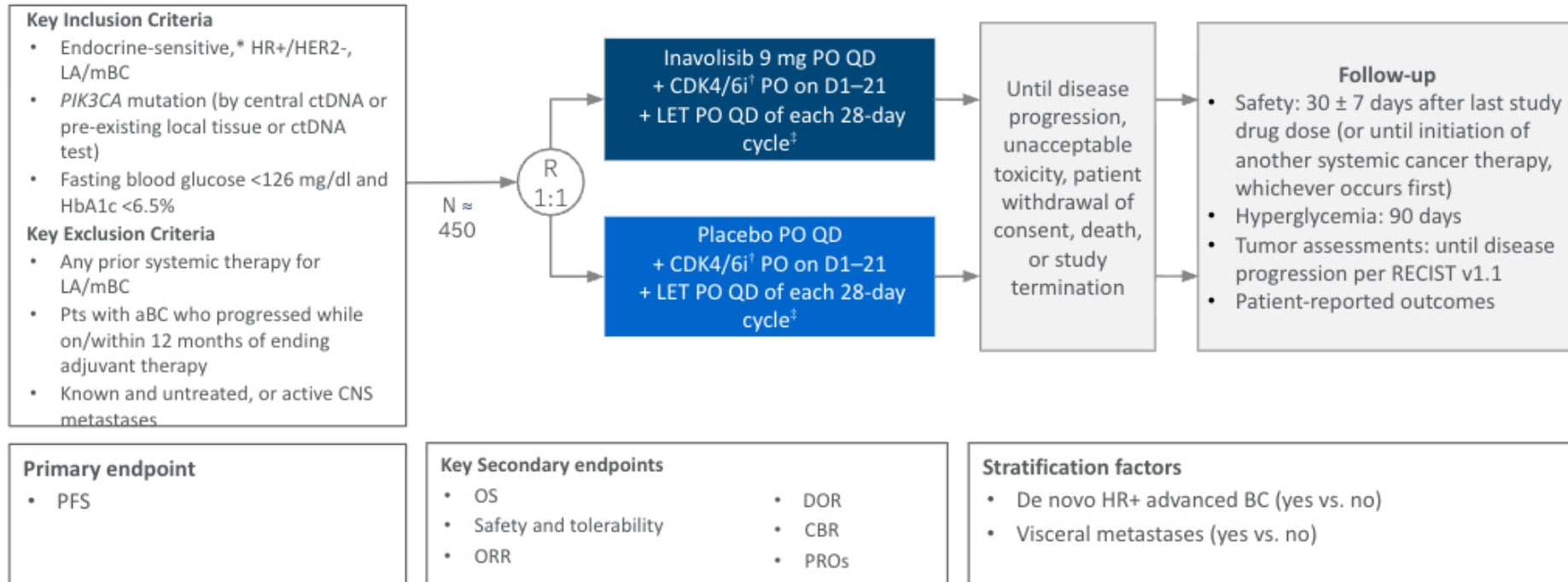
- Receptor tyrosine kinases
- RAS / MAPK pathway
- PI3K/AKT/mTOR pathway



INAVO123: Triplet Therapy in the 1L Metastatic Setting

Phase 3 Study of 1L Inavolisib or Placebo + CDK4/6 inhibitor + Letrozole in endocrine-sensitive, HR+/HER2-, *PIK3CA*-mut Advanced BC

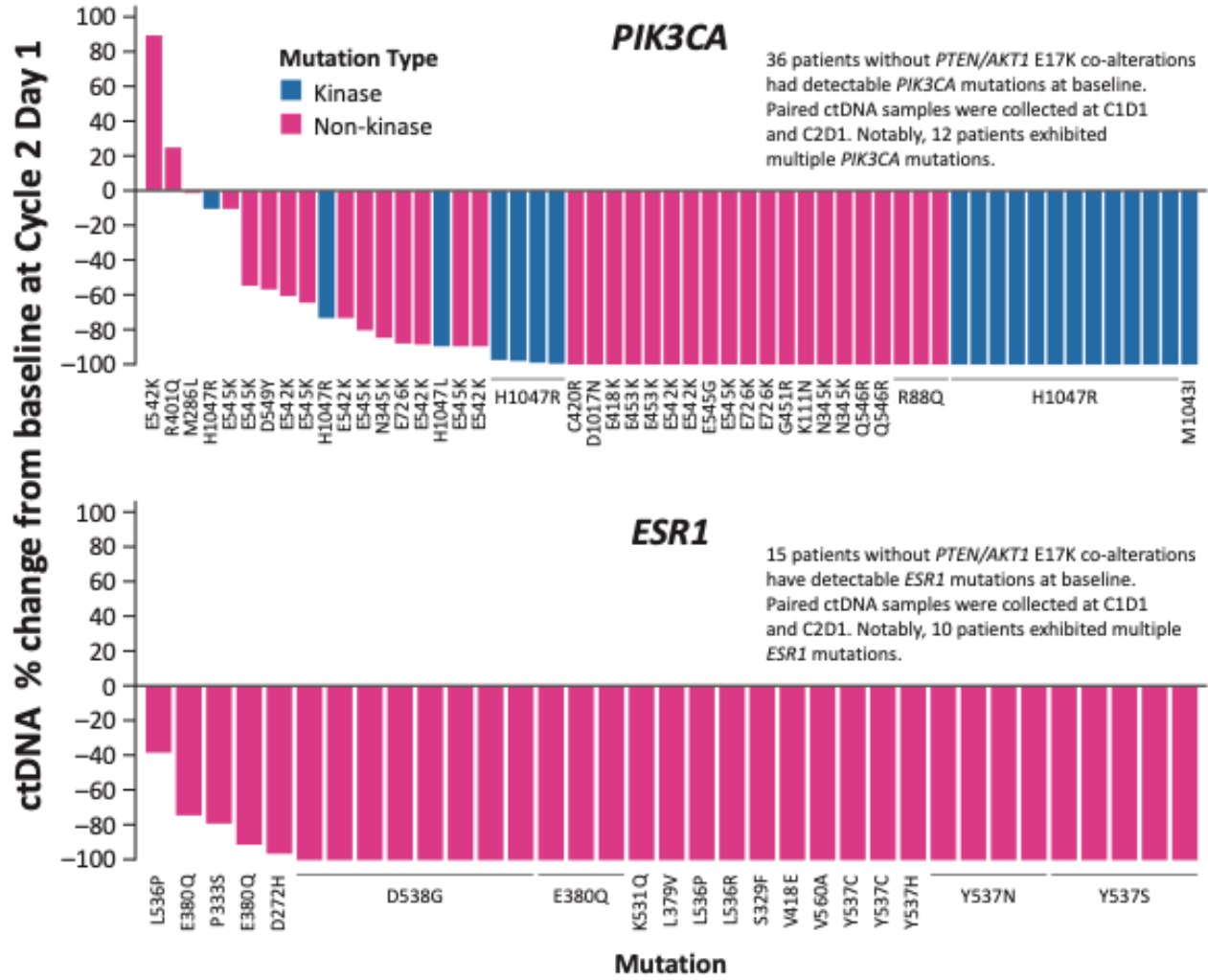
INAVO123 STUDY DESIGN



* De novo or relapsed after at least 2 years of standard neoadjuvant/adjuvant endocrine therapy. [†] Palbociclib is the only option currently. Additional CDK4/6i options may be available in the future. [‡] Pre- and perimenopausal women, and men will receive an LHRH agonist for the duration of the study treatment. aBC, advanced breast cancer; CBR, clinical benefit rate; CDK4/6i, cyclin-dependent kinase 4/6 inhibitor; D, day; DOR, duration of response; HR, hormone receptor; IM, intramuscularly; LA, locally advanced; LET, letrozole; mBC, metastatic breast cancer; mut, mutated; ORR, objective response rate; OS, overall survival; PFS, progression-free survival; PO, orally; PRO, patient-reported outcome; QD, once daily; R, randomized; RECIST, Response Evaluation Criteria in Solid Tumors; RECIST v1.1. 1. Cortés J et al. Presented at the European Society for Medical Oncology (ESMO) Breast Cancer Annual Congress. Munich, Germany. May 14-17, 2025. #408TiP. 2. NIH. Available at: [NCT06790693](https://clinicaltrials.gov/ct2/show/study/NCT06790693). Accessed on August 28, 2025.

Pan-Mutant Selective, Next-Generation PI3Ki: RLY-2608

Rapid decline in mutant ctDNA at RP2D across mutations



- Next generation PI3K inhibitor with on-target reductions in PIK3CA mutation load
- ESR1 reductions also noted in patients with dual-mutant disease

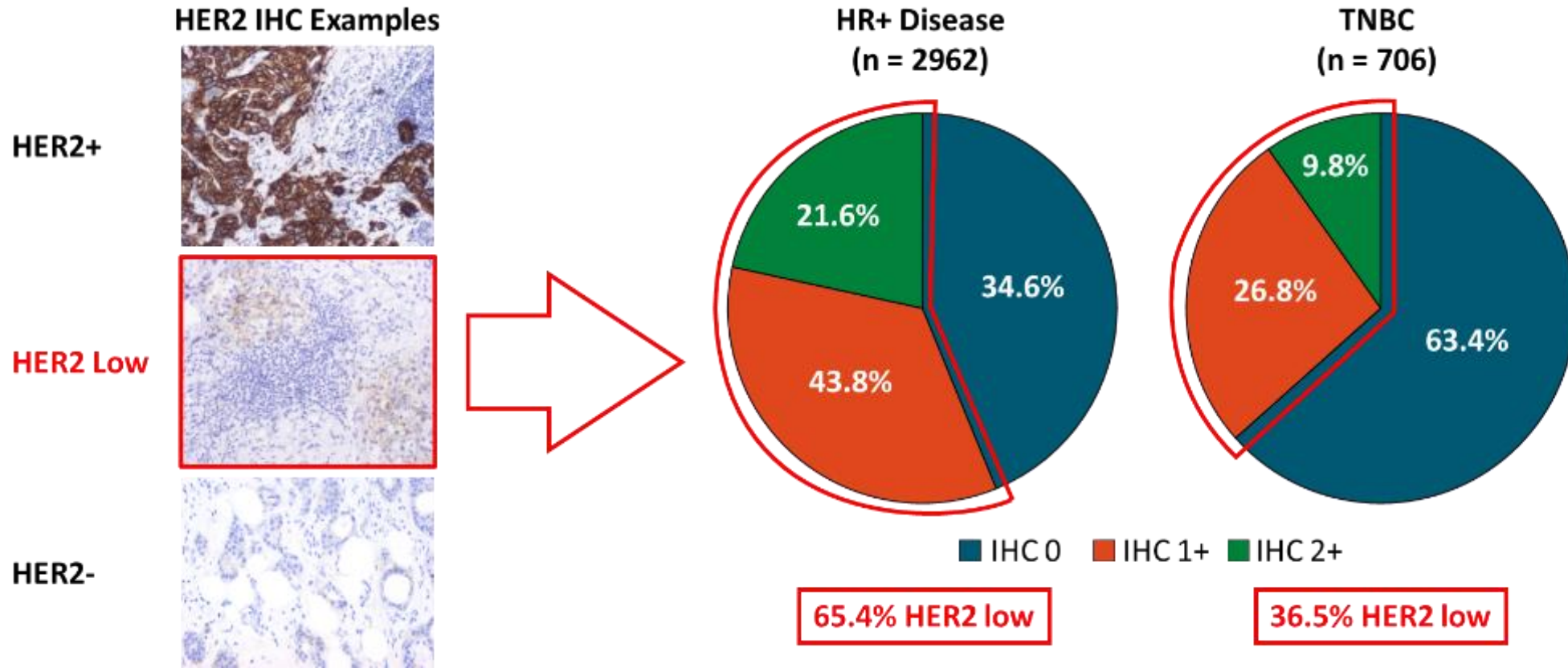


Evolving Biomarkers for Precision Medicine in Metastatic Breast Cancer

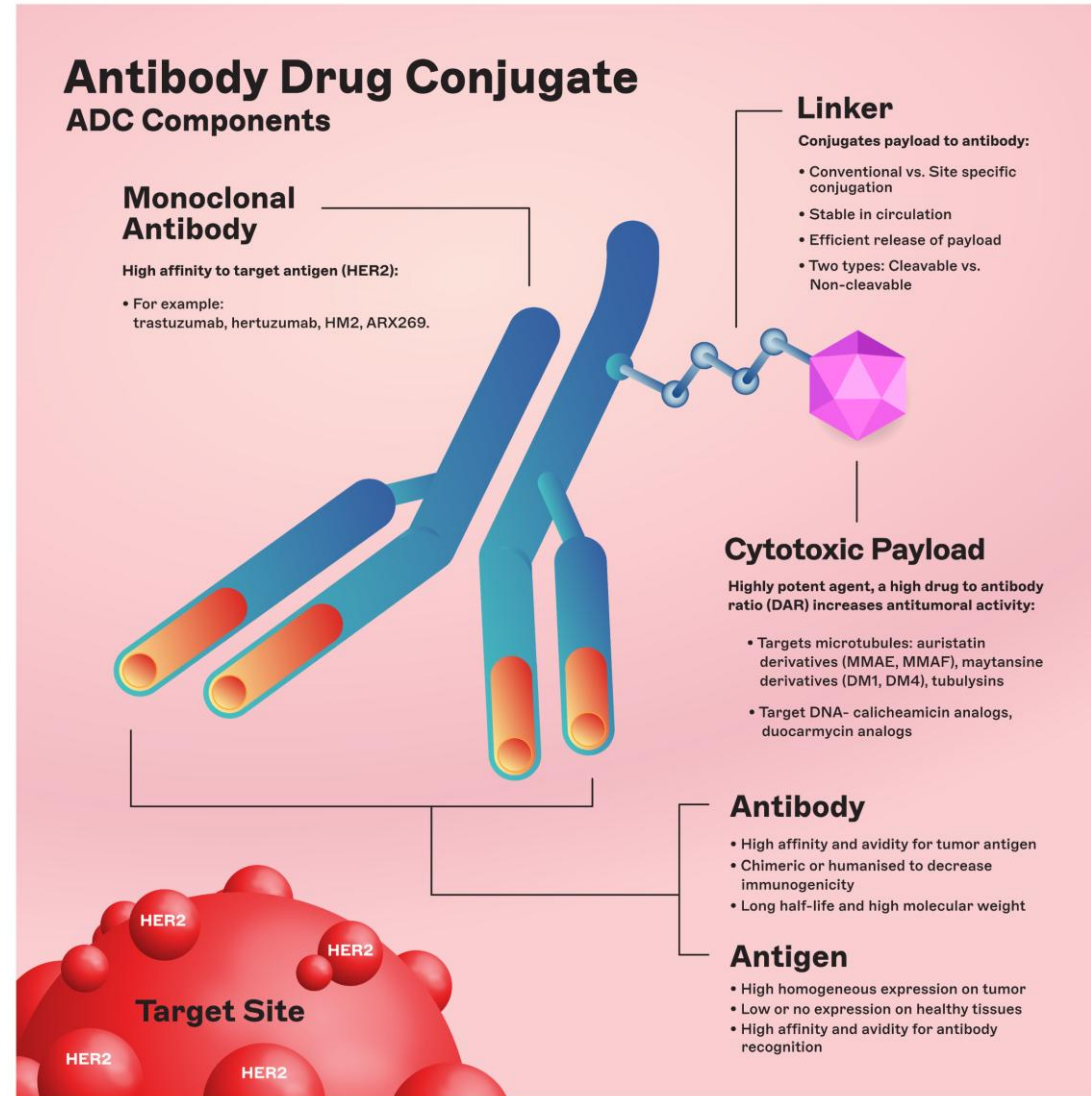
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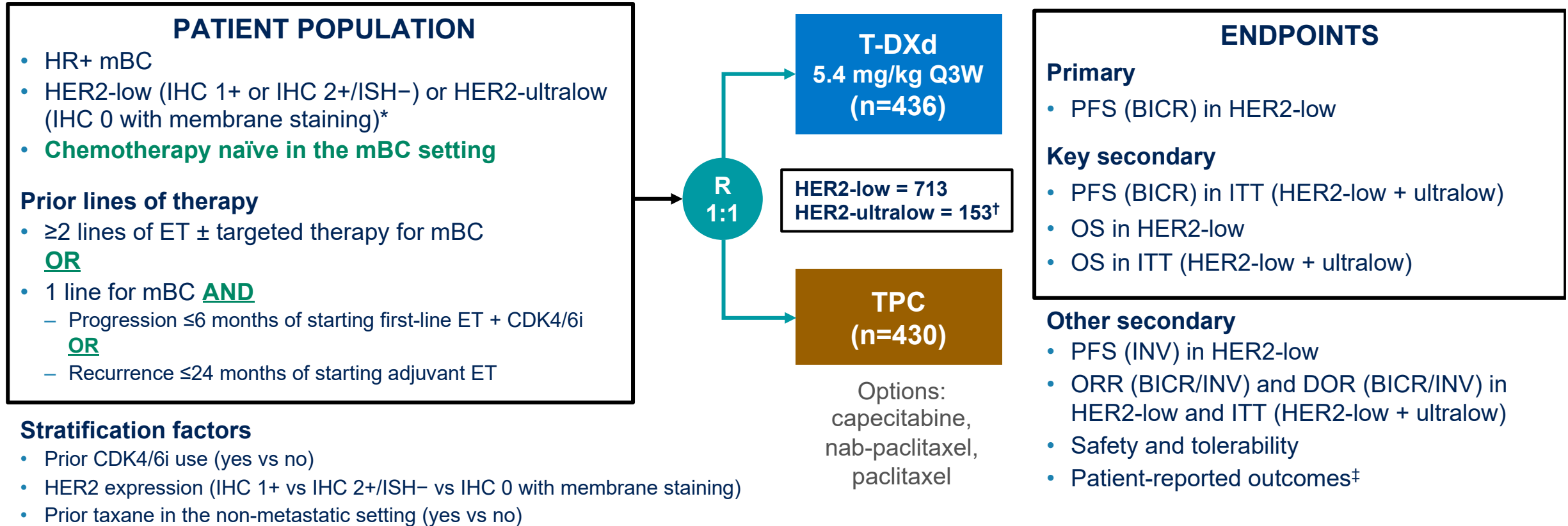
High Prevalence of HER2-Low by HR Status



Trastuzumab Deruxtecan: Antibody Drug Conjugate Biology

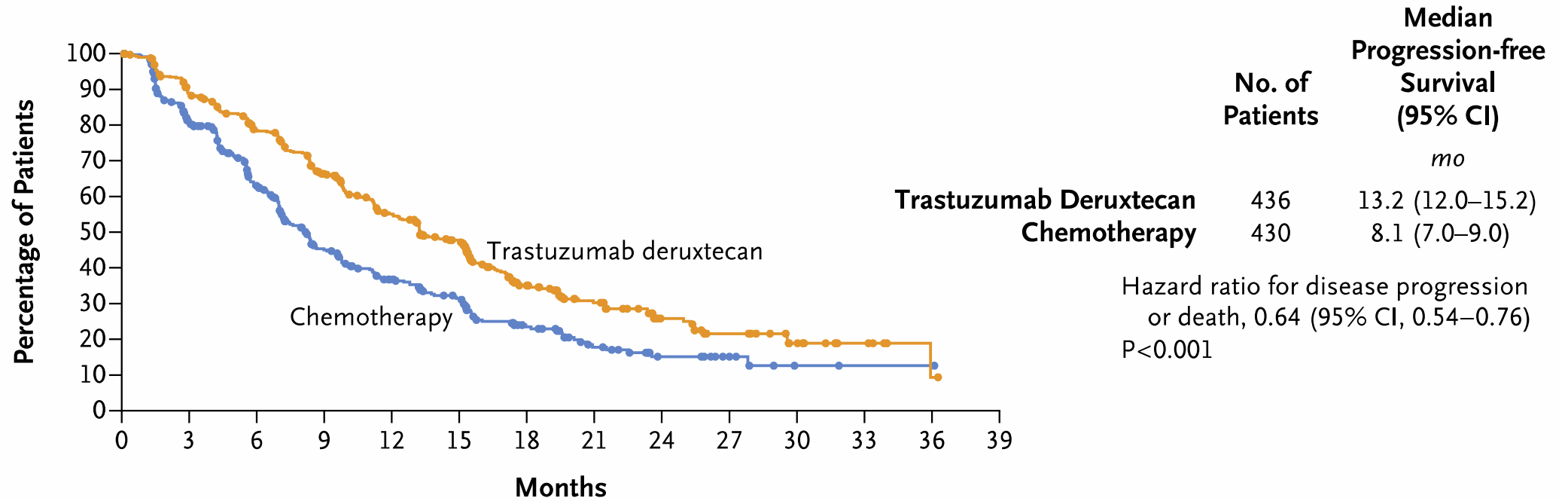


Destiny-Breast06: Trastuzumab Deruxtecan for Chemo-Naïve HR+/HER2- Breast Cancer



Destiny-Breast06: TDxD for Chemo-Naïve HR+/HER2- Breast Cancer

B Progression-free Survival in the Intention-to-Treat Population



No. at Risk

Trastuzumab deruxtecan	436	375	319	258	199	156	82	56	32	21	11	6	1	0
Chemotherapy	430	306	224	142	103	79	44	25	13	7	2	1	1	0

Destiny-Breast06: TDxD for Chemo-Naïve HR+/HER2- Breast Cancer, Toxicity

Event	Trastuzumab Deruxtecan (N = 434)		Chemotherapy (N = 417)	
	All Grades	Grade ≥3	All Grades	Grade ≥3
	<i>number of patients (percent)</i>			
Nausea	286 (65.9)	7 (1.6)	98 (23.5)	1 (0.2)
Fatigue†	203 (46.8)	16 (3.7)	143 (34.3)	6 (1.4)
Alopecia‡	197 (45.4)	0	81 (19.4)	1 (0.2)
Neutropenia§	163 (37.6)	90 (20.7)	115 (27.6)	69 (16.5)
Transaminase increased¶	128 (29.5)	10 (2.3)	49 (11.8)	0
Anemia	122 (28.1)	25 (5.8)	81 (19.4)	10 (2.4)
Vomiting	118 (27.2)	6 (1.4)	39 (9.4)	0
Diarrhea	103 (23.7)	8 (1.8)	94 (22.5)	10 (2.4)
Decreased appetite	102 (23.5)	6 (1.4)	39 (9.4)	2 (0.5)
Leukopenia**	101 (23.3)	30 (6.9)	61 (14.6)	23 (5.5)
Palmar–plantar erythrodysesthesia syndrome	2 (0.5)	0	135 (32.4)	28 (6.7)

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Current and Evolving Therapeutic Landscape: ER+ MBC

1st Line::

AI/OS + CDK4/6i
(Ribociclib)

Fulvestrant + Palbo
+ Inavolisib
(*PIK3CAm*,
ET refractory)

NGS
Biopsy/ctDNA @
baseline
ctDNA @
progression



Current and Evolving Therapeutic Landscape: ER+ MBC

1st Line::

AI/OS + CDK4/6i
(Ribociclib)

Fulvestrant + Palbo
+ Inavolisib
(*PIK3CAm*,
ET refractory)



2nd Line::

Fulvestrant +/- Abemaciclib
Antiestrogen + Everolimus
(*NGS Negative*)

Fulvestrant + Alpelisib
(*PIK3CAm*)

Fulvestrant + Capivasertib
(*PIK3CAm, AKTm, PTENm*)

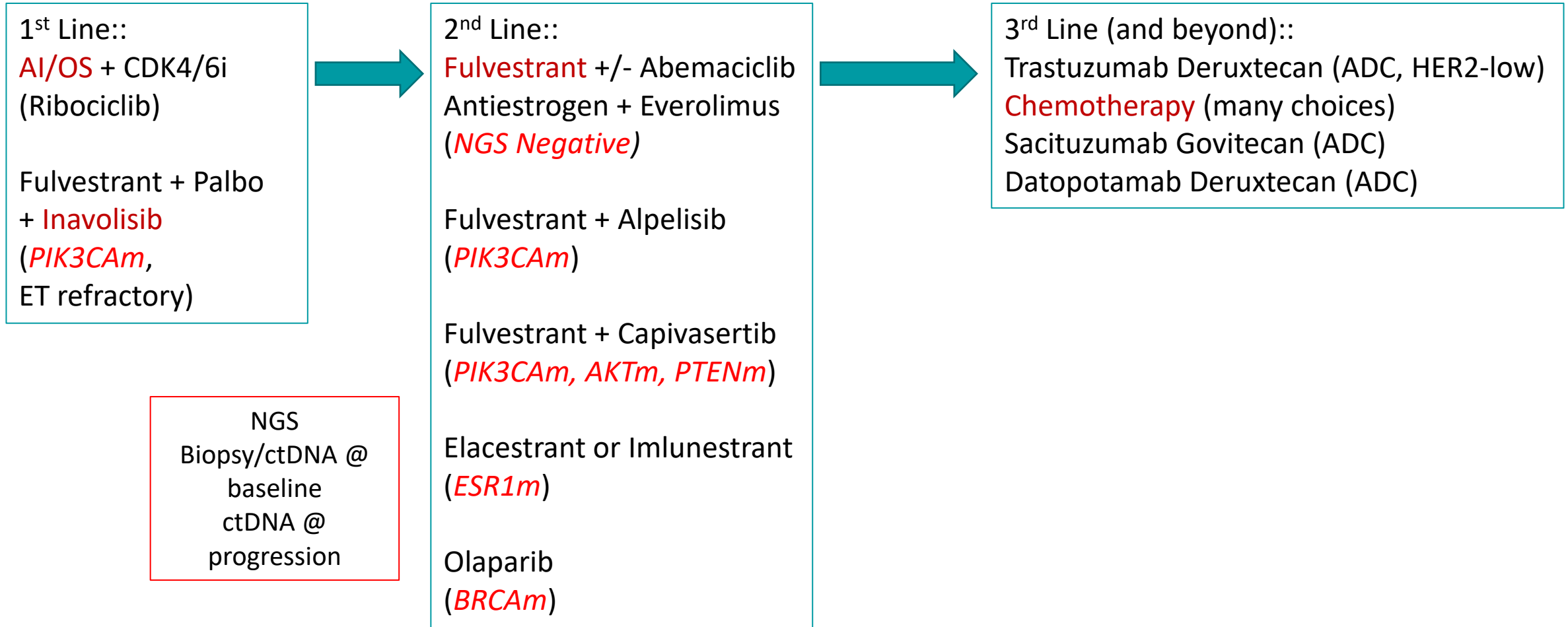
Elacestrant or Imlunestrant
(*ESR1m*)

Olaparib
(*BRCAm*)

NGS
Biopsy/ctDNA @
baseline
ctDNA @
progression

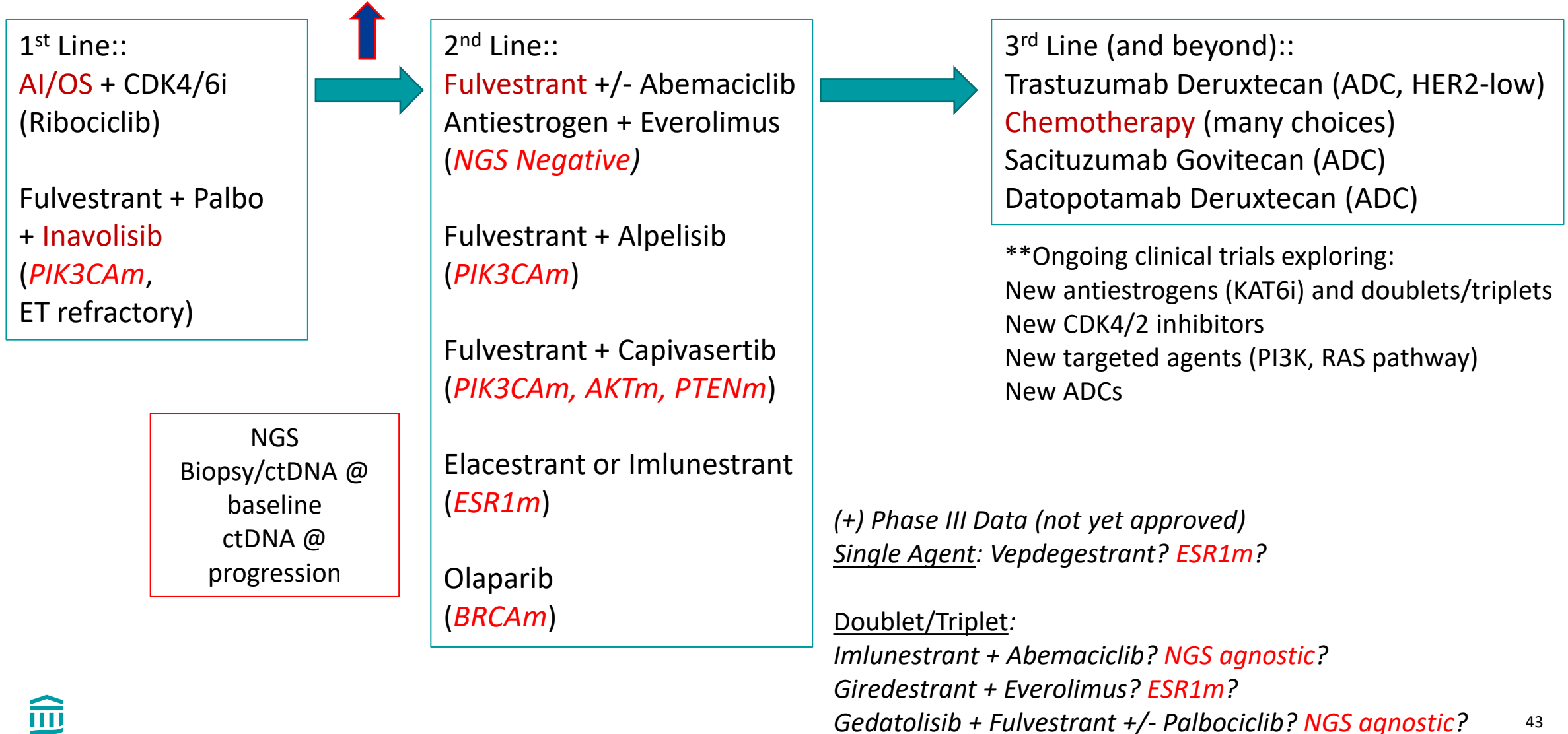


Current and Evolving Therapeutic Landscape: ER+ MBC

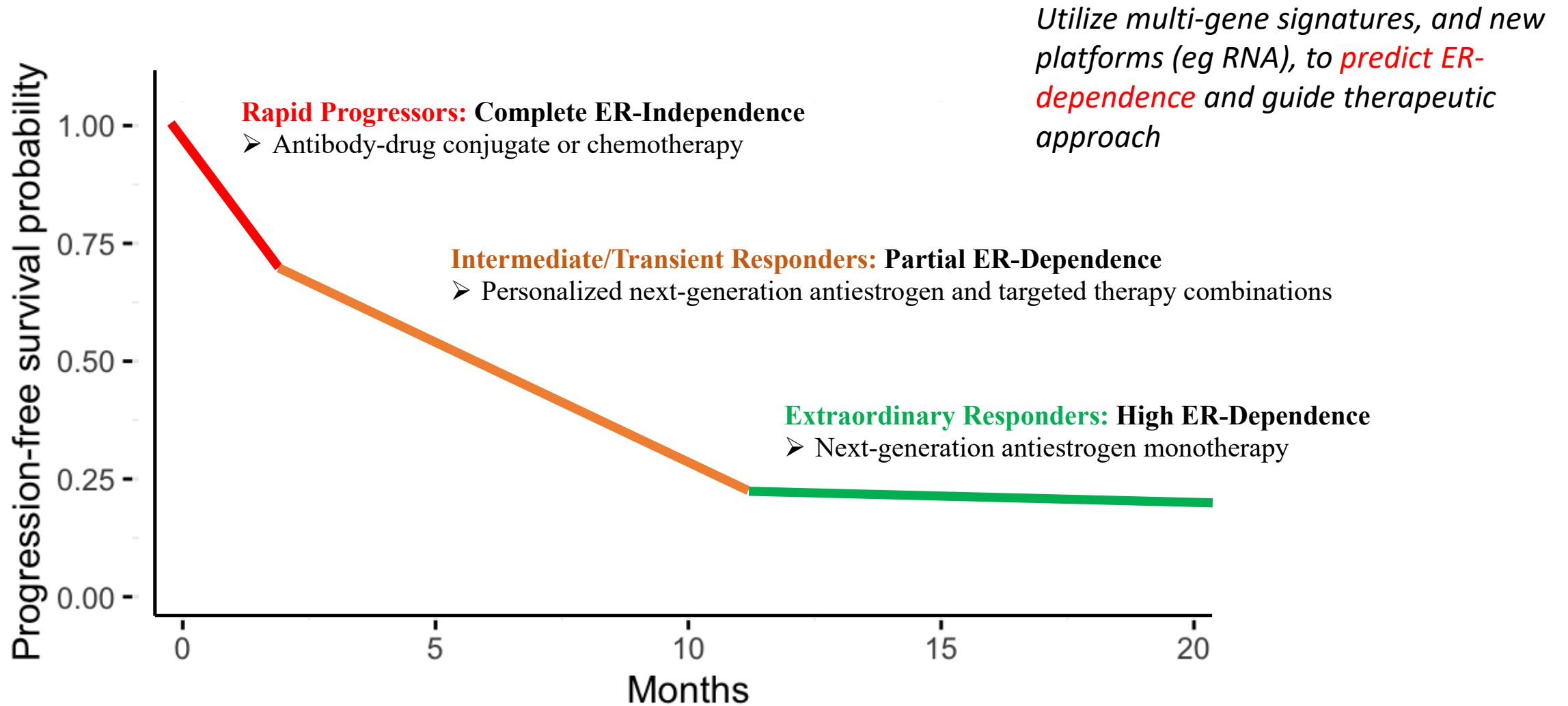


Current and Evolving Therapeutic Landscape: ER+ MBC

(+) Phase III Data (not yet approved)
Camizestrant Switch via ESR1 ctDNA?



Defining Relevant Patient Populations for Precision Therapeutics



Summary, Key Questions, Future Directions

- BRCA mutations impact DNA repair and convey sensitivity to well-tolerated PARP inhibitor therapy
- PI3K pathway elements drive cell growth, survival, motility/metastasis: **PIK3CA** alterations often present at baseline/truncal
- **ESR1** mutations are rare in untreated disease, acquired after AI therapy
- Next-generation antiestrogen agents are well tolerated, active in patients with ESR1 mutations, and under development in new combinations
 - *Should we be testing ctDNA on 1st line treatment for emergence of ESR1? Will this approach be more broadly deployed for other targetable alterations in the future?*
 - *What causes resistance to next-generation antiestrogen therapy?*
- PI3K pathway inhibitors are widely utilized in clinic with well-established activity and toxicity risks
 - *What are the resistance mechanisms to PI3K/AKT inhibitors? How will emerging agents be integrated into clinical practice?*
- *How do we personalize therapy and use dynamic blood-based monitoring in this rapidly evolving landscape of treatment options?*



Thank You!

