

## QUESITO CLINICO 1:

**In pazienti con carcinoma mammario HR-positivo/HER2-negativo, metastatico, con mutazione ESR1, dopo almeno una linea di ormonoterapia (comprendente CDK 4/6i), è raccomandabile elacestrant?**

***Quale impatto nella pratica clinica?***

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# Disclosure Information

Luisa Carbognin, MD PhD

I have the following relevant financial relationships to disclose:

- Honoraria from: Novartis, Eli Lilly, Astrazeneca
- Grant/Research support from: AIRC

# Topics

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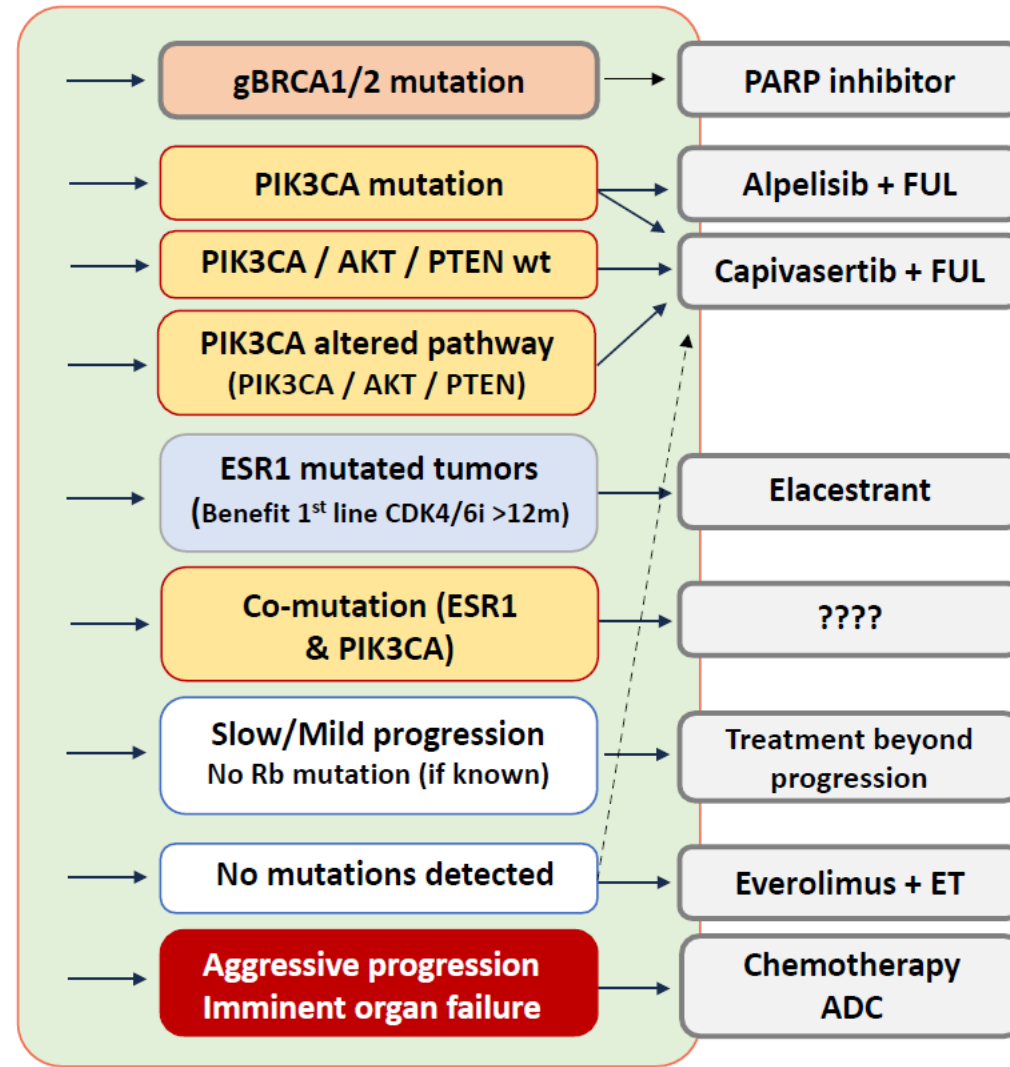
- **Background**
- **Elacestrant Approval**
- ***mESR1* & Companion Diagnostic**
- **Conclusions & Future perspectives**

# What to do at the time of CDK4/6i Progression?

## Post-progression on CDK4/6i: defining the playing field

**First line  
AI +  
CDK4/6i**

- Prior ET, response duration, Disease Free Interval (ET sensitivity)
- Somatic mutations - ESR1, PIK3CA, AKT, PTEN, others...
- Germline mutations - BRCA1/2, others...
- Biology of the disease (rapid vs. slow progression, oligoprogression)
- Clinical factors, toxicity, comorbidities, patient preferences



Potential Strategy:





**Novel ER-targeting Agent?**

**CDK4/6i beyond progression?**

**Combinations?**

**CT/ADC?**

# The four oral SERD (monotherapy) Phase II/III Trials

EMERALD	SERENA-2	AMEERA-3	aceIERA
<b>ELACESTRANT*</b>	<b>CAMIZESTRANT*</b>	<b>AMCENESTRANT</b>	<b>GIREDESTRANT</b>
vs Fulvestrant/AI	vs Fulvestrant	vs Fulvestrant/AI/tam	vs Fulvestrant/AI
Phase III (478)	Phase II (240)	Phase II (367)	Phase II (303)
Primary: PFS in ITT/ESR1+	Primary: PFS in ITT	Primary: PFS in ITT	Primary: PFS in ITT
<b>Prior CDK4/6i 100%</b>	<b>Prior CDK4/6i 46.6%</b>	<b>Prior CDK4/6i 78.9%</b>	<b>Prior CDK4/6i 42%</b>
Prior Fulvestrant 30.3%	Prior Fulvestrant 0%	Prior Fulvestrant 9.6%	Prior Fulvestrant 19%
Prior CT (≤1) 22.3%	Prior CT (≤1) 19.2%	Prior CT (≤1) 11.4%	Prior CT (≤1) 32%
Visceral 69.7%	Visceral 58.3%**	Visceral 63.8%	Visceral 68%
<b>ESR1mut**: 47.7%</b>	<b>ESR1mut***: 36.7%</b>	<b>ESR1mut*: 41.4%</b>	<b>ESR1mut: 39%</b>
 <b>POSITIVE</b> (median PFS: 2.8 vs 1.9 mos)	 <b>POSITIVE</b> (median PFS: 7.2-7.7 vs 3.7 mos)	 <b>NEGATIVE</b> (median PFS: 3.6 vs 3.7 mos)	 <b>NEGATIVE</b> (median PFS: 5.6 vs 5.4 mos)
*Elacestrant is both a ER degrader and inhibitor of estradiol-dependent ER-directed gene transcription **Gaudant 360	*The dose of 75 mg will go forward **lung and/or liver disease ***GuardantOMNI™	*digital PCR <b>AMCENESTRANT DEVELOPMENT: STOPPED</b>	*FoundationOne liquid CDx

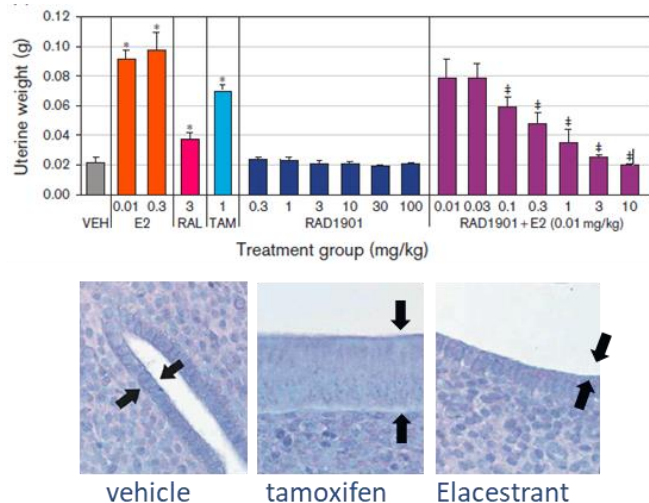


Bidard et al, JCO 2022; Bardia et al, SABCS2022; Oliveira et al, SABCS2022; Tolaney et al, ESMO 2022; Martin et al, ESMO 2022

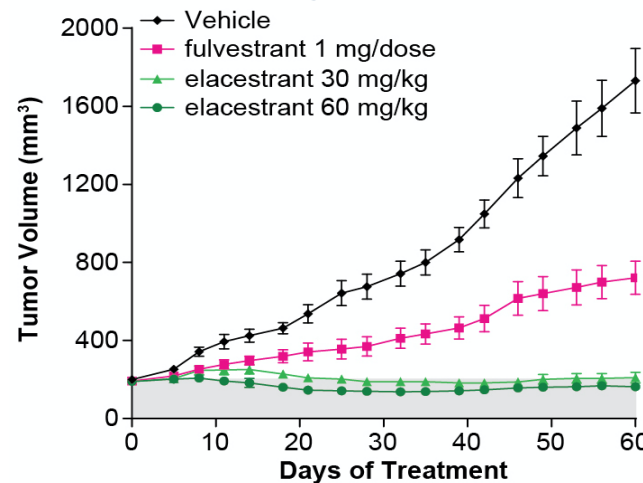
# Elacestrant

- Elacestrant is a nonsteroidal, **oral SERD and ER antagonist** that in preclinical studies induced the **degradation of ER** and prevented bone loss in a osteopenic rat model with negligible SERM-like activity detected at the uterine level in *in vitro* and *in vivo* models of BC.<sup>1,2,3</sup>
- In preclinical studies, elacestrant **degraded ER alpha in a dose-dependent manner and disrupted ER signaling**, significantly inhibiting proliferation of BC cells in vitro and in vivo BC models, including those harboring ESR1 mutations.<sup>2,3,4</sup>
- Elacestrant demonstrated antitumor activity and tolerability in a **phase I** trial of heavily pretreated patients with advanced ER+/HER2- BC, including patients with ESR1-mutated tumors<sup>5</sup>

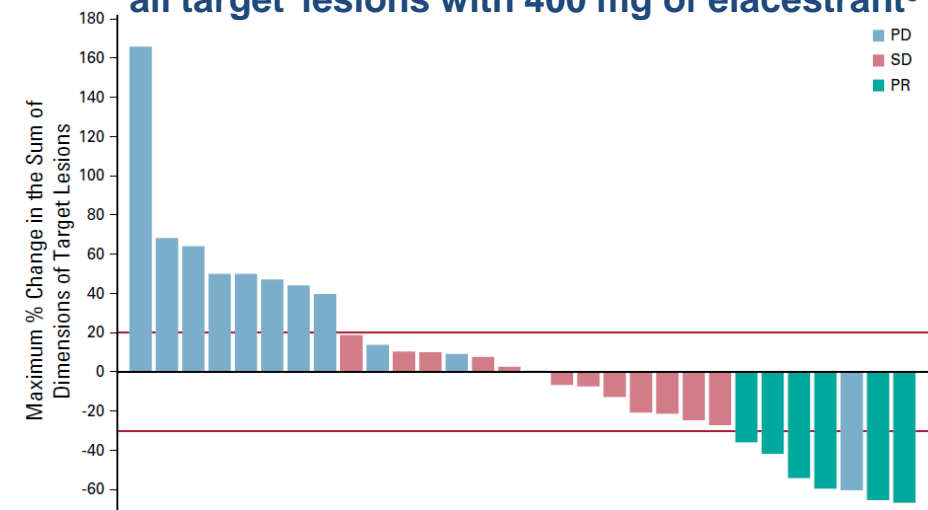
## No stimulation in the immature rat model<sup>2</sup>



## *In vivo* efficacy of elacestrant in tumors expressing ESR1 mutations<sup>1</sup>



## Maximum percent change in sum of diameters of all target lesions with 400 mg of elacestrant<sup>5</sup>



1. Bihani T, et al. *Clin Cancer Res.* 2017; 2. Wardell SE, et al. *Endocr Relat Cancer.* 2015; 3. Patel HK, et al. *Pharmacol Ther.* 2018; 4. Garner F, et al. *Anticancer Drugs.* 2015; 5. Patel HK, et al. *Breast Cancer Res.* 2019; 5. Bardia A, et al. *J Clin Oncol.* 2021

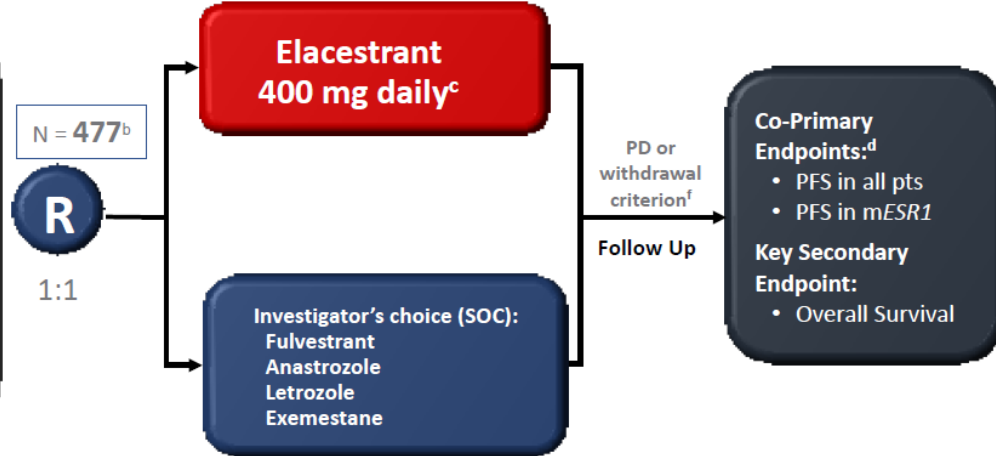
# EMERALD Trial

## Inclusion Criteria

- Men and postmenopausal women with advanced/metastatic breast cancer
- ER-positive,<sup>a</sup> HER2-negative
- Progressed or relapsed on or after 1 or 2 lines of endocrine therapy for advanced disease, one of which was given in combination with a CDK4/6i
- ≤1 line of chemotherapy for advanced disease
- ECOG PS 0 or 1

## Stratification Factors:

- *ESR1*-mutation status<sup>e</sup>
- Prior treatment with fulvestrant
- Presence of visceral metastases



Prior Adjuvant Therapy: ~ 65%

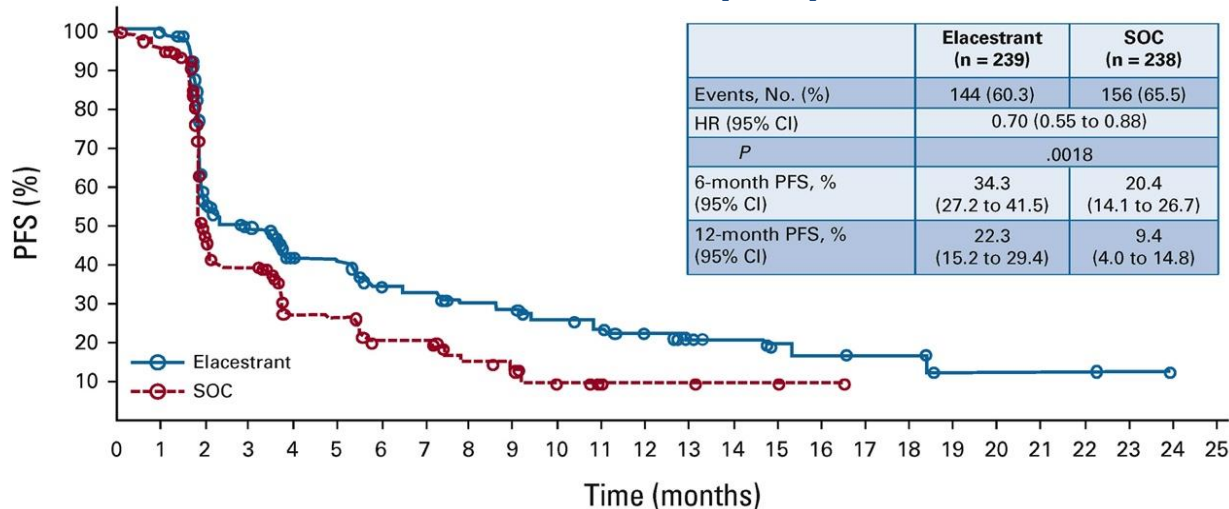
Prior CT for ABC: ~ 20%

Visceral metastasis: ~ 70%

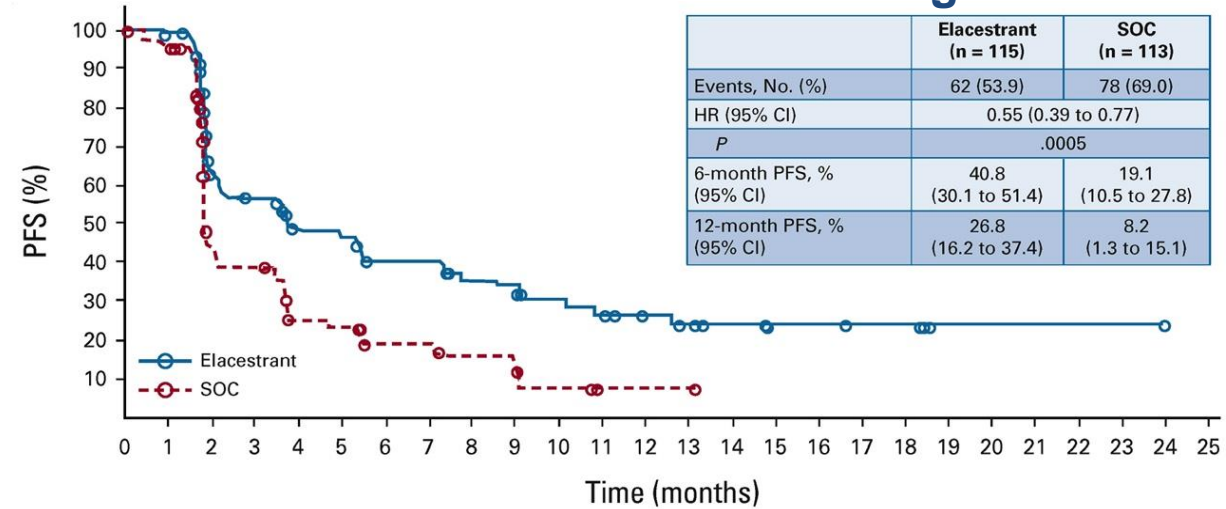
Prior Target Therapy for ABC: ~ 4%  
mTOR inhibitor; ~ 1% PI3K inhibitor

2 prior endocrine therapies in  
Fulvestrant-treated patients (27.3%)

## All Patients (ITT)



## Patients with Tumors Harboring mESR1



No. at risk:

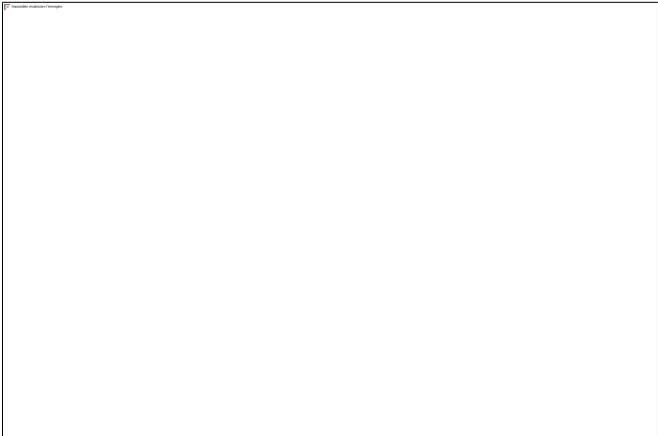
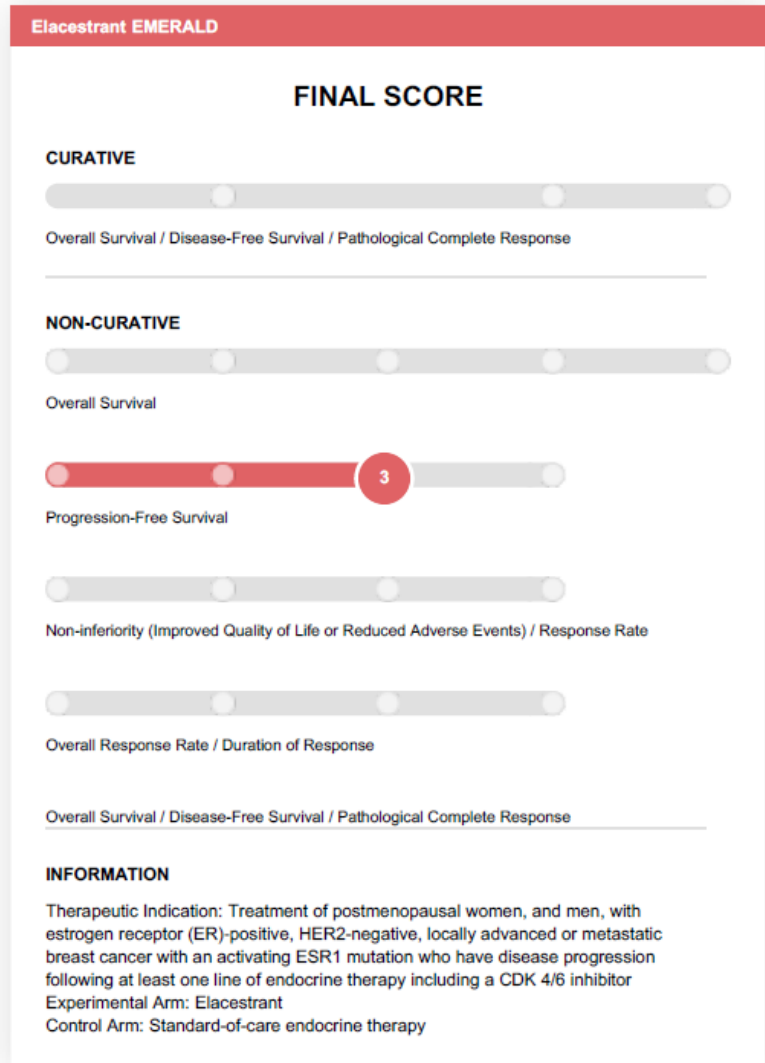
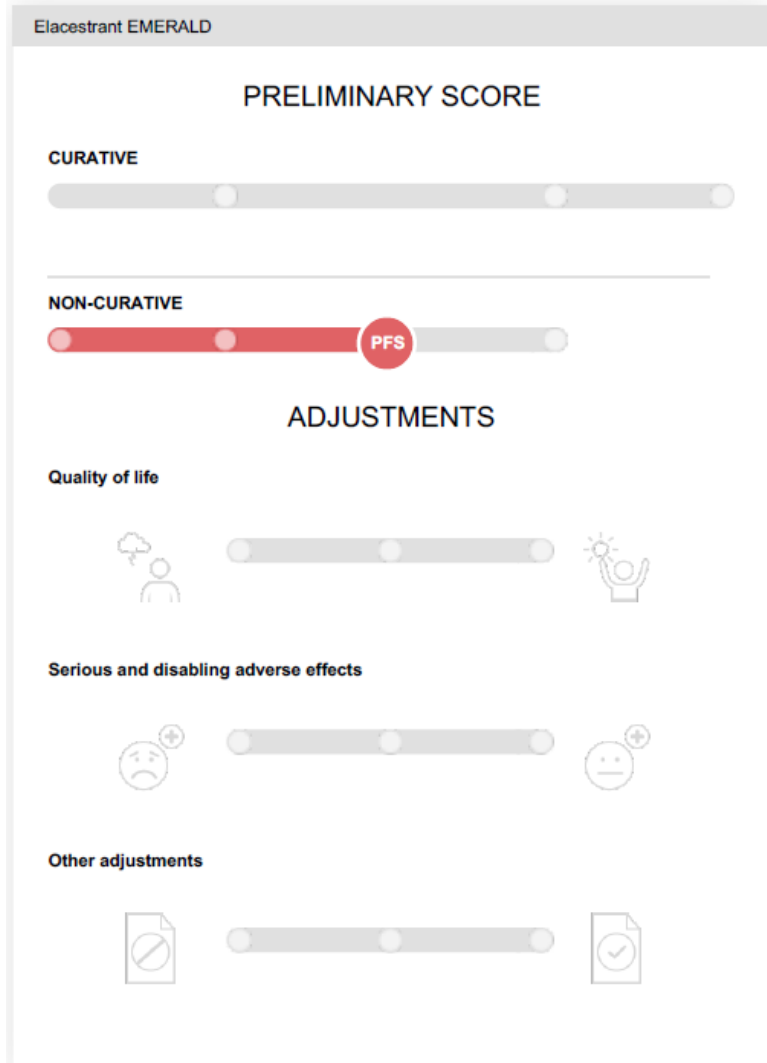
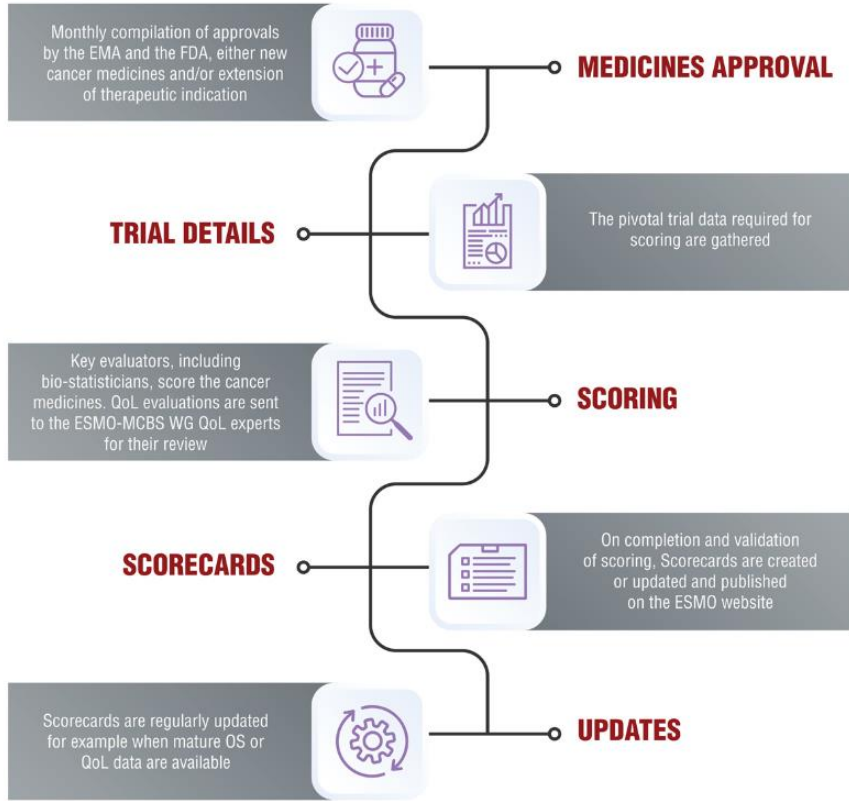
	239	223	106	89	60	57	42	40	34	33	27	24	19	13	11	8	7	6	6	2	2	2	2	1	0	
Elacestrant	239	223	106	89	60	57	42	40	34	33	27	24	19	13	11	8	7	6	6	2	2	2	2	1	0	
SOC	238	206	84	68	39	38	25	16	15	7	4	3	2	2	1	0										

No. at risk:

	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
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										



# Elacestrant: ESMO-Magnitude of Clinical Benefit Scale





# Topics

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- **Background**
- **Elacestrant Approval**
- *mESR1* & Companion Diagnostic
- Conclusions & Future perspectives

# Elacestrant Approval

- On January 27, 2023, the **FDA** approved Elacestrant for postmenopausal women or adult men with ER-positive, HER2-negative, ESR1-mutated advanced or metastatic breast cancer with disease progression following at least one line of endocrine therapy.
- FDA also approved the Guardant360 CDx assay as a companion diagnostic device to identify patients with breast cancer for treatment with Elacestrant.
- On September 2023, the **EMA** Commission approved Elacestrant for the treatment of postmenopausal women and men with ER-positive, HER2-negative, locally advanced, or metastatic breast cancer with an activating ESR1 mutation who have disease progression following at least one line of endocrine therapy including a CDK4/6 inhibitor.
- On December 2023, the **AIFA** approved Elacestrant with the same indication of EMA.



# European EAP - Elacestrant

## Inclusion Criteria

Subject must have a histologically- or cytologically proven diagnosis of adenocarcinoma of ER+ and HER2- ABC and must be appropriate candidates for endocrine monotherapy.

Post-menopausal women or man  $\geq 18$  years of age.

Disease progression following at least one but no more than two lines of endocrine therapy, including CDK4/6 inhibitors.

Activating mutations of the estrogen receptor 1 (ESR1) gene

Adequate organ function and ECOG 0-1

All toxic effects of prior therapies or surgical procedures resolved to Grade  $\leq 1$  (except alopecia and peripheral neuropathy).

Ability to understand the protocol and provide informed consent



Active contraception (male subjects)

Countries:

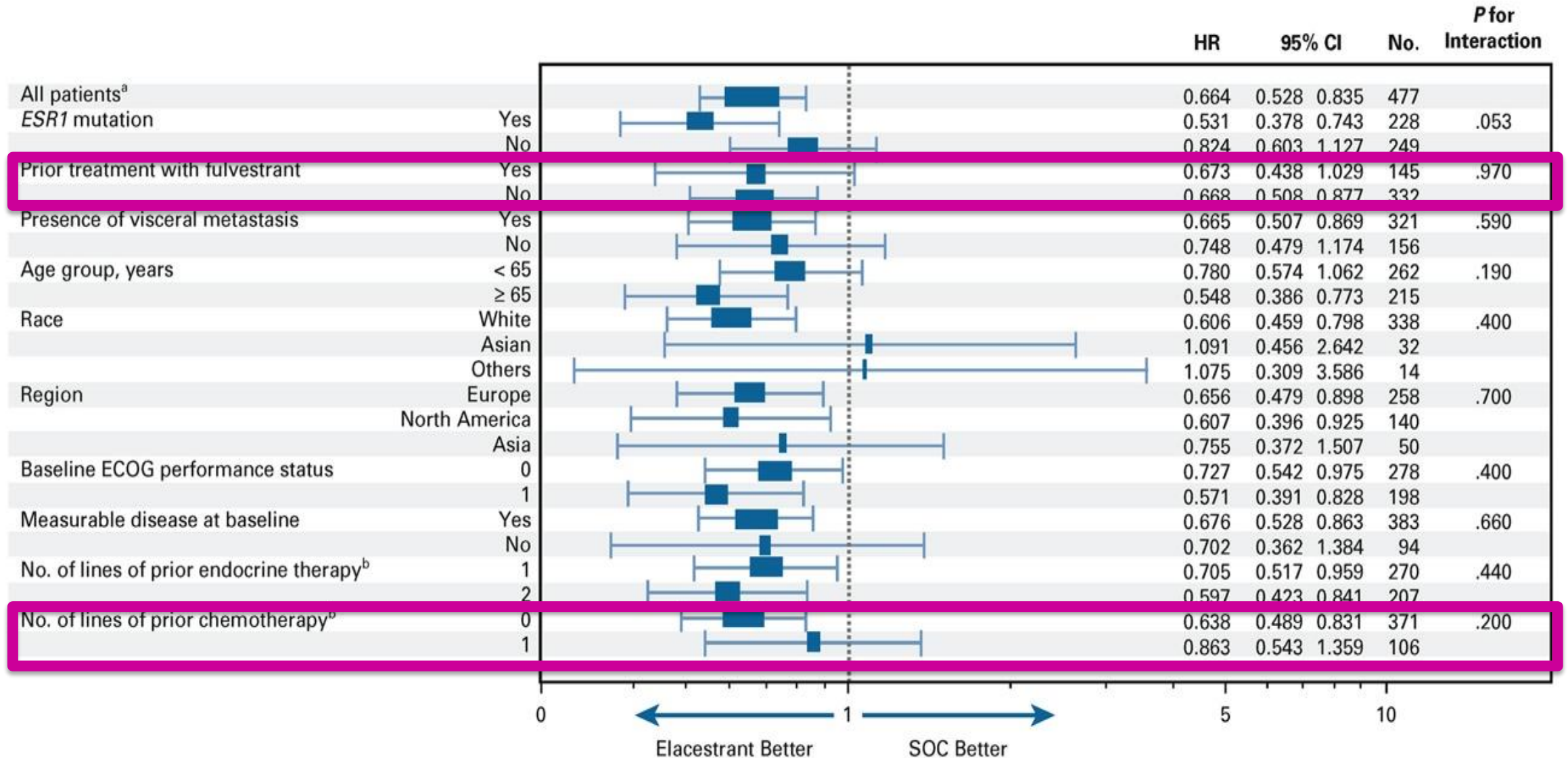


# European EAP - Elacestrant

## Exclusion Criteria

	Prior treatment with elacestrant or other SERD or ER antagonist (e.g. in clinical trials)
	Fulvestrant treatment (last injection) < 28 days before first dose of drug.
	Any other endocrine therapy < 14 days before first dose of drug.
	Radiation therapy within 14 days before the first dose of elacestrant
	Chemotherapy-based regimens (including ADCs) in metastatic or advanced setting.
	Any investigational anti-cancer drug therapy < 28 days or 5 half-lives (whichever is shorter) before first dose of drug.
	Major surgery < 28 days before the first dose of elacestrant
	Presence of symptomatic metastatic visceral disease, including but not limited to, extensive hepatic involvement, untreated or progressive central nervous system (CNS) metastases, or symptomatic pulmonary lymphangitic spread.
	Intact uterus with a history of <b>endometrial intraepithelial neoplasia</b> ( <u>atypical endometrial hyperplasia</u> or higher-grade lesion).
	Major Cardiovascular conditions/events
	Child-Pugh Score greater than Class A (ie, score >6).
	Coagulopathy or any <b>history of coagulopathy within the past 6 months</b> , including history of deep <u>vein thrombosis</u> or <u>pulmonary embolism</u> .
	<b>Known difficulty in tolerating oral medications</b> or conditions which would <b>impair absorption of oral medications</b> such as: <u>uncontrolled nausea or vomiting</u> (ie, CTCAE ≥ Grade 3 despite antiemetic therapy), ongoing <u>gastrointestinal obstruction/motility disorder</u> , malabsorption syndrome, or prior <u>gastric bypass</u>
	Unable or unwilling to avoid other medications/supplements
	Known <b>hypersensitivity reaction</b> to drugs chemically related to <b>elacestrant or their excipients</b>

# EMERALD - Subgroup Analysis of PFS (all patients)





# European EAP - Elacestrant

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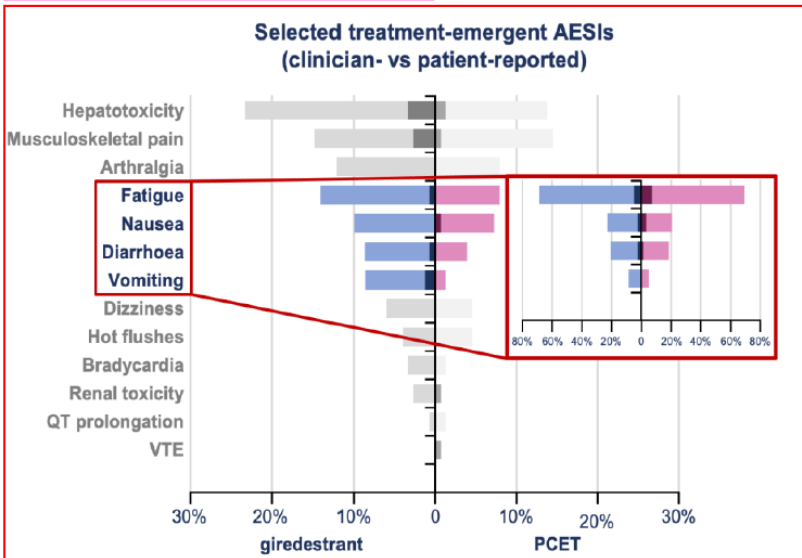
# Safety of Oral SERD

## Elacestrant

Adverse events, n (%)	Elacestrant N=237	SOC		
		All N=229	Fulvestrant N=161	AI N=68
Any treatment-emergent AE	218 (92.0)	197 (86.0)	144 (89.4)	53 (77.9)
Treatment-emergent Grade 3 AE	64 (27.0)	47 (20.5)	33 (20.5)	14 (20.6)
Any treatment-related AE	150 (63.3)	100 (43.7)	72 (44.7)	28 (41.2)
Treatment-related Grade 3 AE	17 (7.2)	7 (3.1)	5 (3.1)	2 (2.9)
Any treatment-related serious AE	3 (1.3)	0	0	0
AE leading to discontinuation of therapy	15 (6.3)	10 (4.4)	6 (3.7)	4 (5.9)
Treatment-emergent AE occurring in >15% of patients <sup>a</sup>				
Nausea	83 (35.0)	43 (18.8)	26 (16.1)	17 (25.0)
Fatigue	45 (19.0)	43 (18.8)	35 (21.7)	8 (11.8)
Vomiting	45 (19.0)	19 (8.3)	12 (7.5)	7 (10.3)
Arthralgia	34 (14.3)	37 (16.2)	28 (17.4)	9 (13.2)

## Giredestrant

Bidard FC, JCO 2022



## Camizestrant

AE, n (%)	C 75 (n=74)		C 150 (n=73)		C 300 (n=20)		F 500 (n=73)	
	All grades	Grade ≥3	All grades	Grade ≥3	All grades	Grade ≥3	All grades	Grade ≥3
Any AE	57 (77.0)	9 (12.2)	66 (90.4)	16 (21.9)	19 (95.0)	3 (15)	50 (68.5)	10 (13.7)
Photopsia	9 (12.2)	0	18 (24.7)	0	7 (35.0)	0	0	0
(Sinus) bradycardia	4 (5.4)	0	19 (26.0)	0	8 (40.0)	0	0	0
Fatigue	4 (5.4)	0	13 (17.8)	1 (1.4)	4 (20.0)	0	3 (4.1)	0
Anemia	8 (10.8)	0	11 (15.1)	1 (1.4)	1 (5.0)	0	5 (6.8)	2 (2.7)
Asthenia	6 (8.1)	0	11 (15.1)	0	2 (10.0)	0	4 (5.5)	0
Arthralgia	3 (4.1)	0	9 (12.3)	1 (1.4)	2 (10.0)	0	2 (2.7)	0

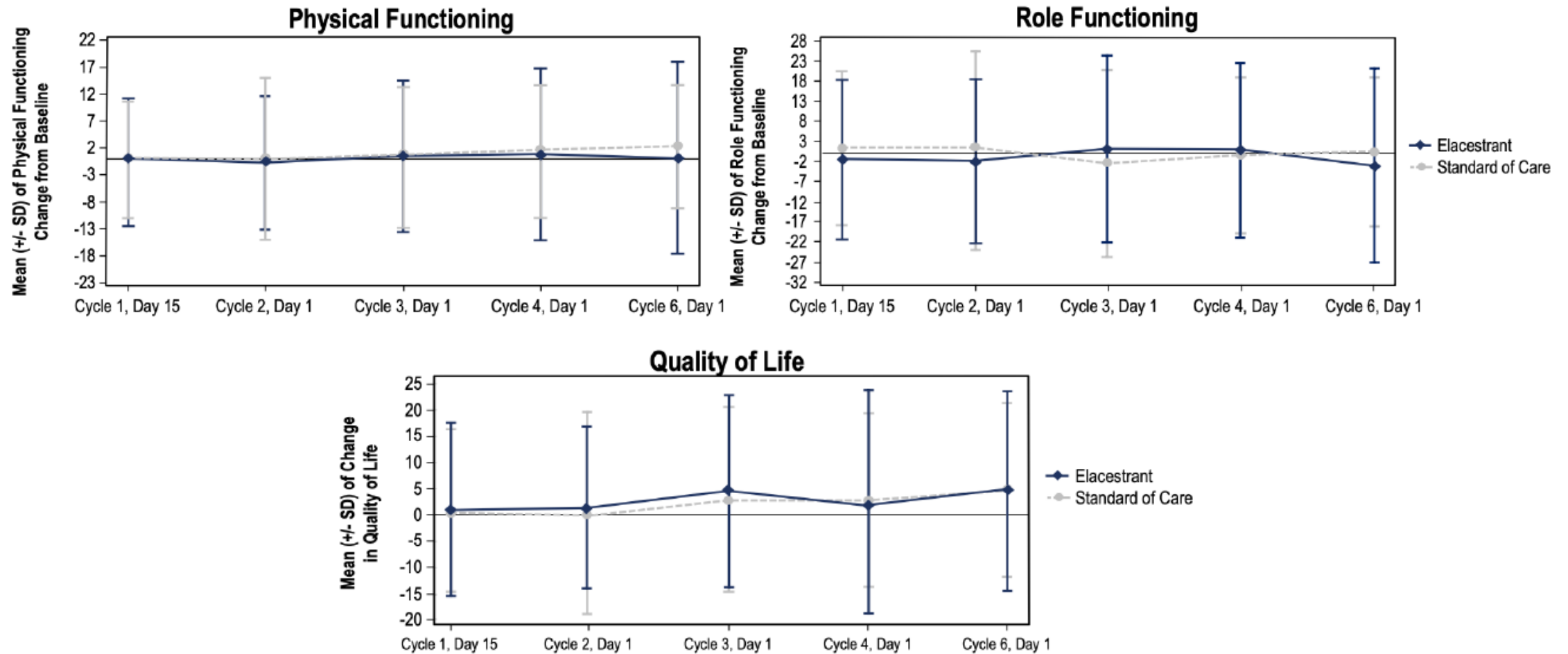
Martin M, ESMO 2022

Oliveira M, SABCS 2022

# EMERALD - Quality of Life Results

EORTC QLQ-C30 scores were similar for **elacestrant** and **SoC**, with no differences across all time points for functional, symptom, and global health status/QoL domains

There were no differences between subgroups (*ESR1*-mut and all patients)

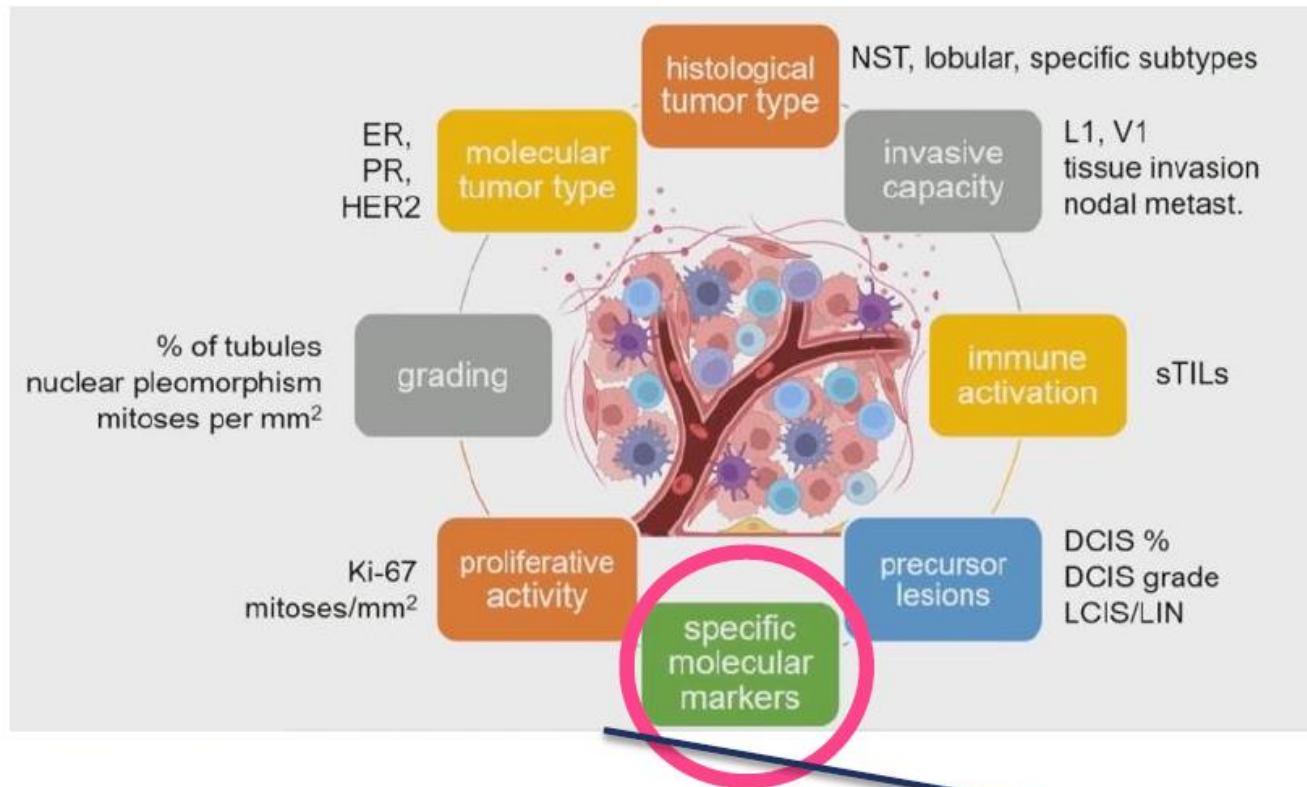


# Topics

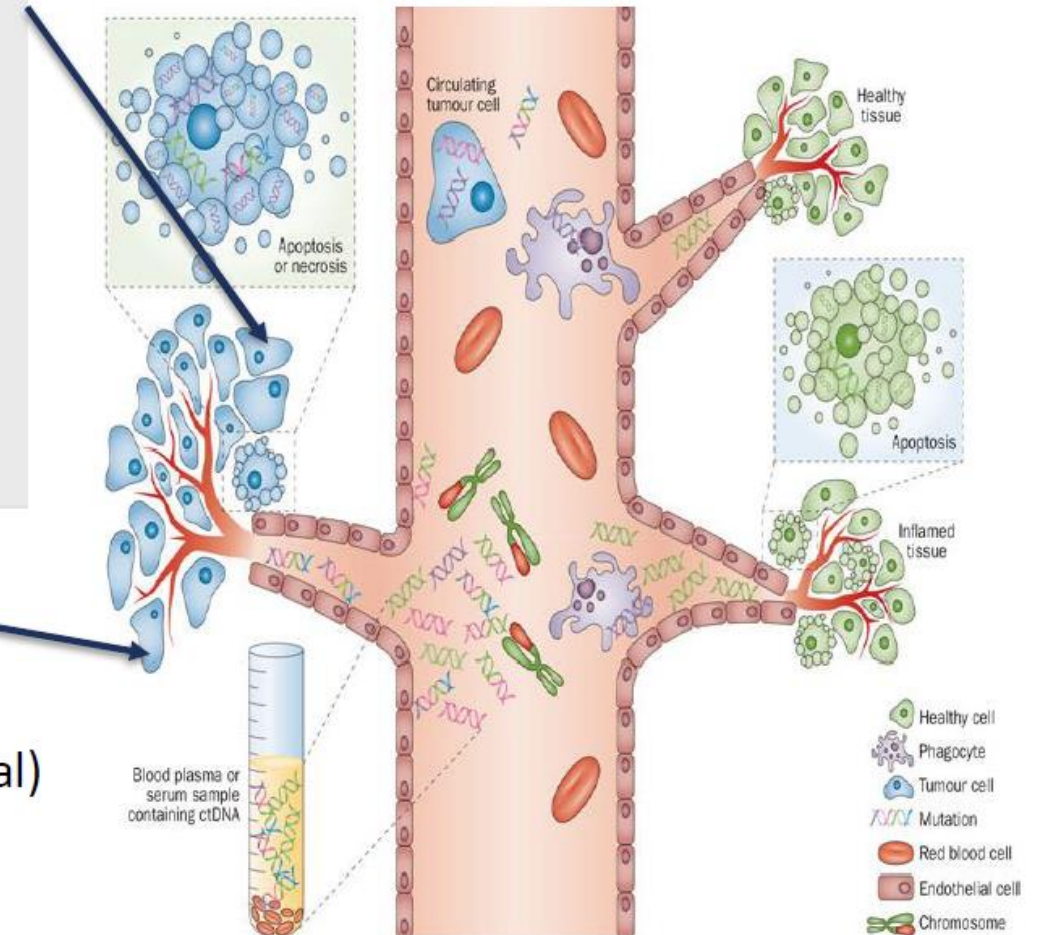
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- **Background**
- **Elacestrant Approval**
- ***mESR1* & Companion Diagnostic**
- **Conclusions & Future perspectives**

# Which Factors are relevant for Clinical Decisions?



## TUMOR → LIQUID



### Liquid biopsy, shed from tumors

- Non-invasive, serial assessment
- May overcome heterogeneity (spatial, temporal)
- Lack spatial analyses, unable to visualize
- Molecular profiling (ctDNA, CTC)

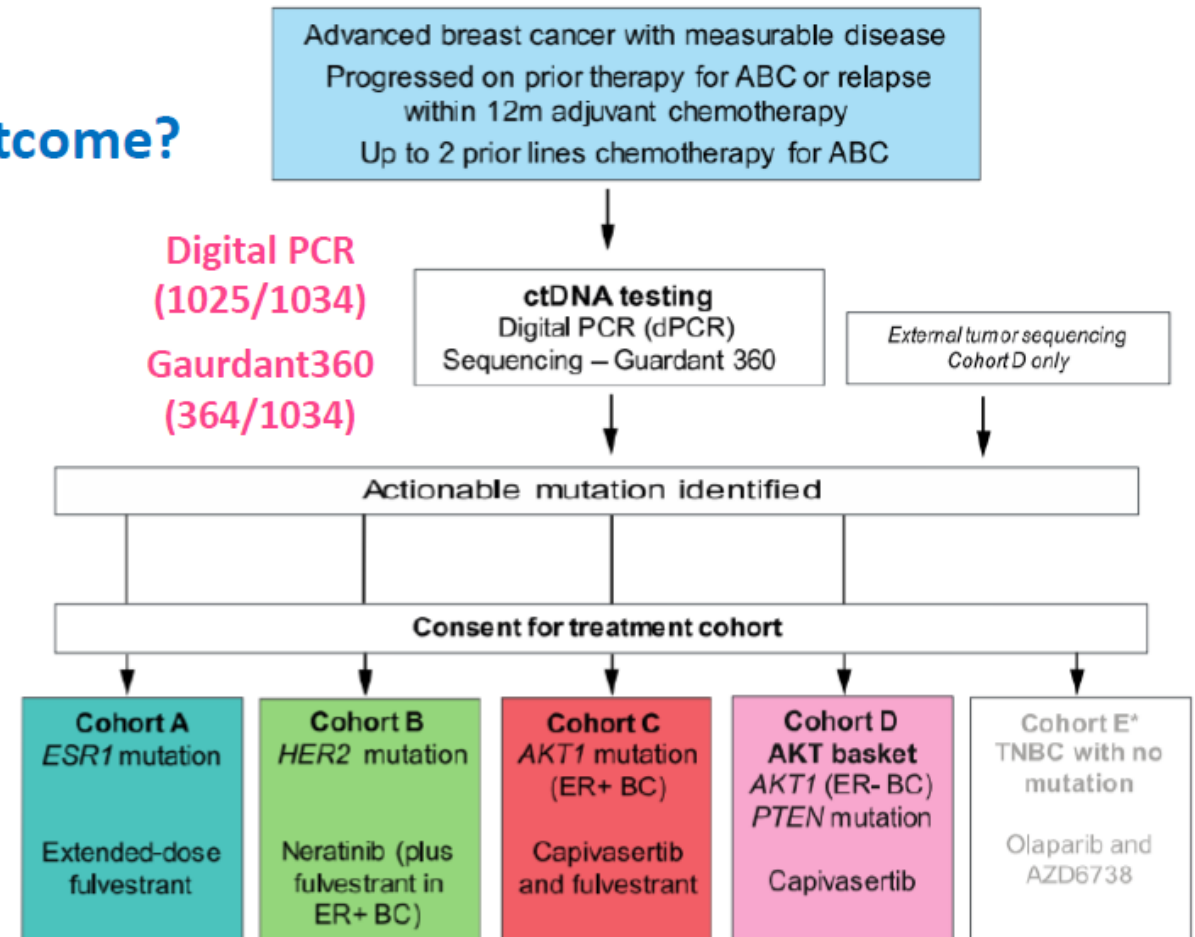


# Plasma-MATCH Trial: Liquid Biopsy

## Plasma-MATCH

Does ctDNA guided therapy lead to better outcome?

- ctDNA genomic alteration driven BASKET trial
- Primary endpoint
  - Objective response rate
- 2ndary endpoints
  - Duration of response
  - Clinical benefit rate
  - Accuracy of ctDNA testing by agreement btw ctDNA and tissue mutation



N Turner et al. Lancet Oncol 2020

Modified from Kim J, ESMO BC 2023

# CONCORDANCE BETWEEN TISSUE AND LIQUID

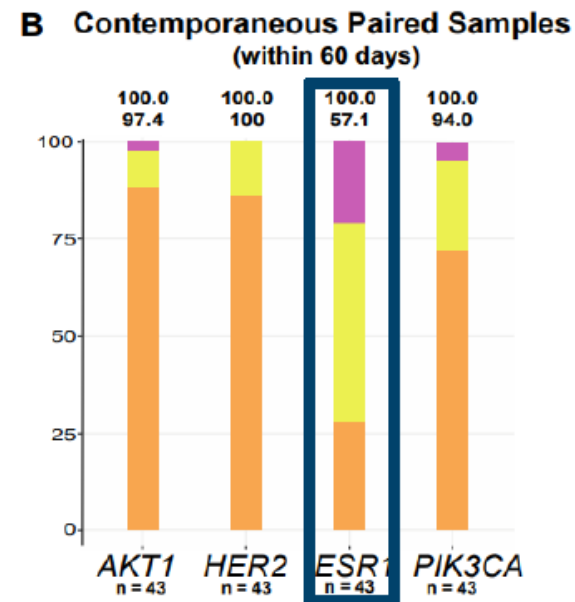
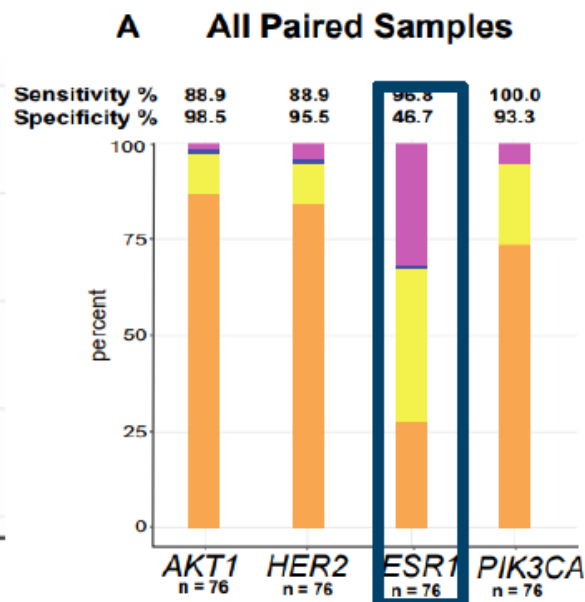
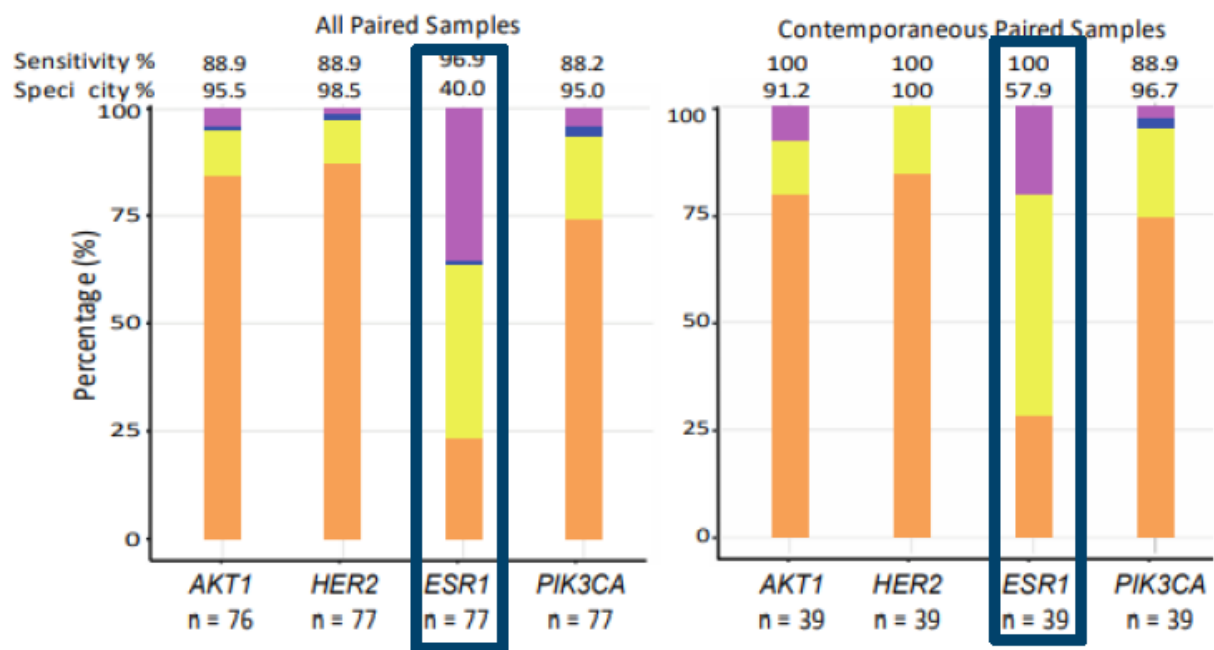
## Plasma-MATCH

96-99% Gene-level agreement for mutation identification between ctDNA digital PCR and targeted sequencing (n=800)

*AKT1* kappa 0.93 (95% CI 0.87–0.99), *HER2* kappa 0.89 (0.79–0.98), *ESR1* kappa 0.90 (0.86–0.93), *PIK3CA* kappa 0.92 (0.89–0.95).

### Tissue vs cfDNA digital PCR (n=77)

### Tissue vs cfDNA NGS (n=77)



■ Concordant positive    ■ Discordant ctDNA sequencing positive, tissue sequencing negative  
■ Concordant negative    ■ Discordant ctDNA sequencing negative, tissue sequencing positive

→ cfDNA only positive

# Advantage of combined testing

- All ESR1 variants more likely to be detected in cfDNA than tissue (cf. PIK3CA H1047X, ts>>)

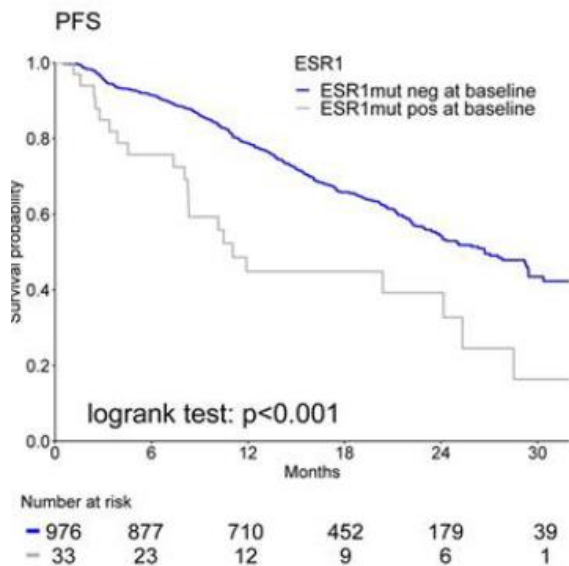
NC Turner et al. Lancet Oncol 2021



# ESR1m as a Prognostic Factor

## PADA-1 Trial

PFS by ESR1mut status (ddPCR) at baseline



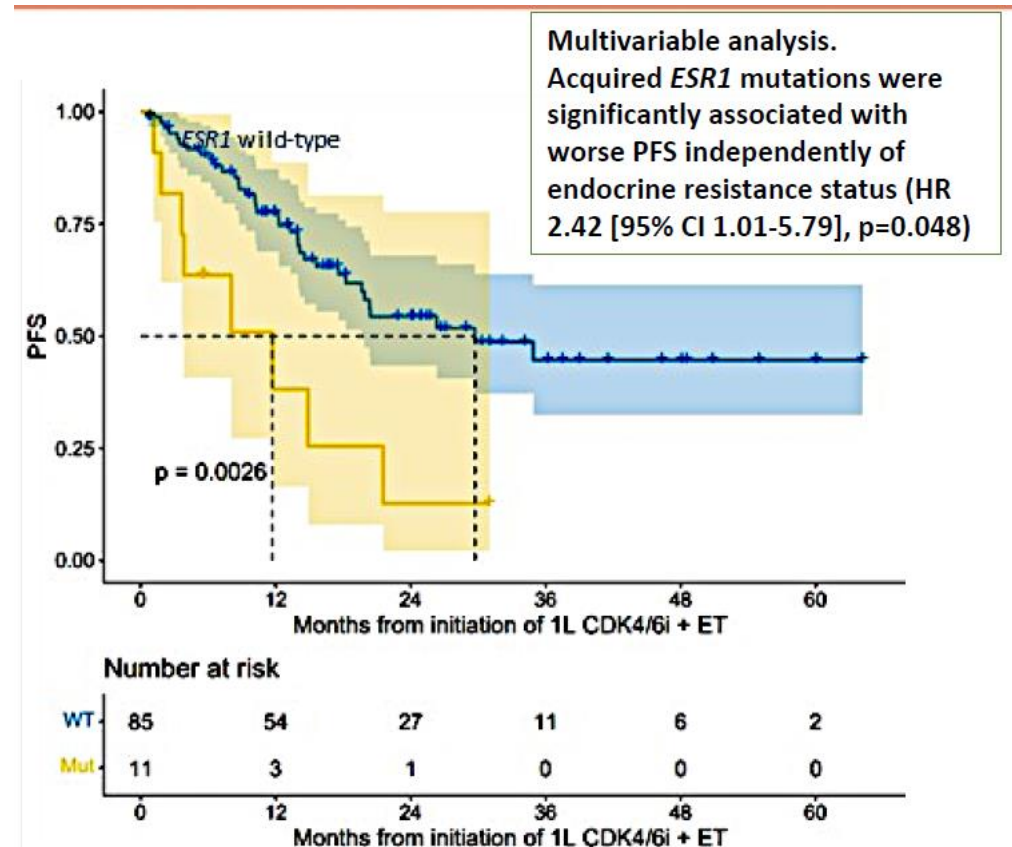
Median FU = 21.2 months (0-34.5)

Estimated PFS<sup>[1]</sup>:

*ESR1<sub>mut</sub>* (N=33 pts)  
Median PFS: **11.0 mo**, 95%CI=[8.3-NR]

*ESR1<sub>wt</sub>* (N=976 pts)  
Median PFS: **26.7 mo**, 95%CI=[24.1-29.4]

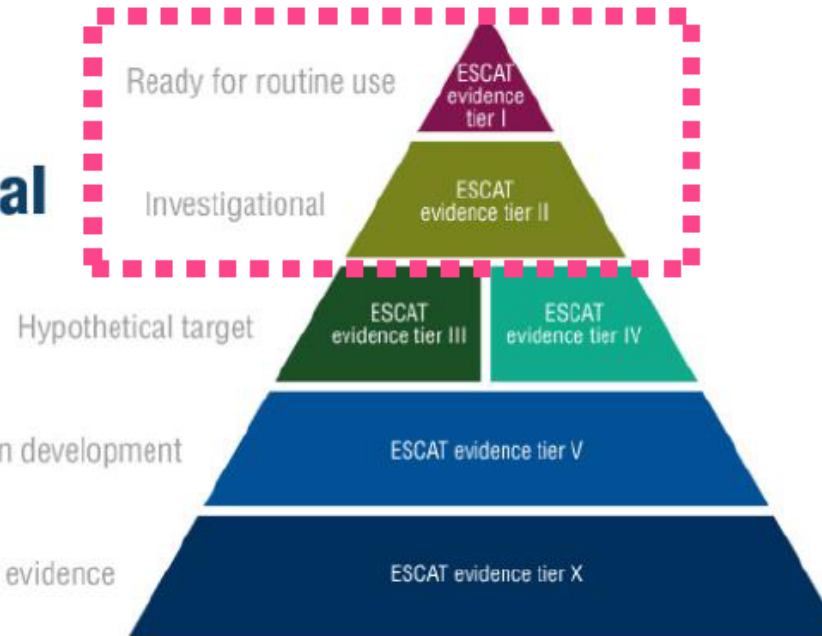
**HR= 2.3 95%CI=[1.5;3.6]**



# Genomic driven Therapy – Clinical Relevance in ABC

## ESCAT

### ESMO Scale for Clinical Actionability of Molecular Targets



ESMO recommendations on the use of circulating tumour DNA assays for patients with cancer: a report from the ESMO Precision Medicine Working

Tumour type	Indications	ESCAT tier and level of evidence	Recommendation
Breast cancer	PIK3CA mutations ERBB2 amplification BRCA1/2 mutations ESR1 mutations MSI-H NTRK 1/2/3 fusions	IA <sup>140</sup> IA <sup>141,142</sup> IA <sup>143,144</sup> IB <sup>145,146</sup> IC <sup>147</sup> IC <sup>134</sup>	ESR1 mutations should preferentially be tested in ctDNA. ERBB2 amplification and NTRK fusions only when advanced tissue biopsy not available.

# Ranking Genomic Alterations as Targets for Cancer Precision Medicine

**NOT Subject of MTBs**  
[Clinical Practice, Disease-TBs]

**Subject of MTBs**

ESCAT		JCR		OncoKB	
ESCAT I	Ready for routine use A: Prospective randomized trials B: Prospective nonrandomized trials C: Basket trials and trials across tumor types	Tier 1	Strong clinical impact A: FDA approved therapy/professional guidelines B: Well-powered studies with expert consensus	Level of actionability	
				Level 1	FDA approval FDA-recognized biomarker predictive of response to an FDA-approved drug in this indication
ESCAT II	Investigational therapeutic options A: Retrospective studies B: Retrospective studies trial; endpoints not currently available	Tier 2	Potential clinical impact C: FDA approval in different tumors/inclusion in clinical trial/multiple small studies with some consensus D: Preclinical trials/case reports	Level 2	Standard care biomarker predictive of response to approved drug <sup>a</sup> A: In this indication B: In another indication
ESCAT III	Hypothetical targets A: As ESCAT I but in other tumor types B: Alteration with predicted impact in same pathways			Level 3	Compelling clinical evidence supports the biomarker as being predictive of response to a drug A: In this indication B: In another indication
ESCAT IV	Preclinical evidences A: <i>In vivo</i> or <i>in vitro</i> evidences B: <i>In silico</i> evidences			Level 4	Compelling biological evidence supports the biomarker as being predictive of response to a drug
ESCAT V	Combination development Objective response but not improved outcomes	Tier 3	Unknown clinical significance		
ESCAT X	Benign variants	Tier 4	Benign variants	Level of resistance	
				Level R1	Standard care biomarker predictive of resistance to an FDA-approved drug in this indication
				Level R2	Compelling clinical evidence supports the biomarker as being predictive of resistance to a drug
				Level R3	Compelling biological evidence supports the biomarker as being predictive of resistance to a drug



# ASCO Guidelines for HR+ HER2- Metastatic Breast Cancer

Journal of Clinical Oncology®

ASCO special articles

## Endocrine Treatment and Targeted Therapy for Hormone Receptor–Positive, Human Epidermal Growth Factor Receptor 2–Negative Metastatic Breast Cancer: ASCO Guideline Update

Harold J. Burstein, MD, PhD<sup>1</sup>; Mark R. Somerfield, PhD<sup>2</sup>; Debra L. Barton, PhD, RN<sup>3</sup>; Ali Dorris, MBA, MFA<sup>4</sup>; Lesley J. Fallowfield, DPhil<sup>5</sup>; Dharamvir Jain, MD<sup>6</sup>; Stephen R. D. Johnston, MD, PhD<sup>7</sup>; Larissa A. Korde, MD<sup>8</sup>; Jennifer K. Litton, MD<sup>9</sup>; Erin R. Macrae, MD<sup>10</sup>; Lindsay L. Peterson, MD, MSCR<sup>11</sup>; Praveen Vikas, MBBS<sup>12</sup>; Rachel L. Yung, MD<sup>13</sup>; and Hope S. Rugo, MD<sup>14</sup>

abstract

**PURPOSE** To update recommendations of the ASCO systemic therapy for hormone receptor (HR)-positive metastatic breast cancer (MBC) guideline.

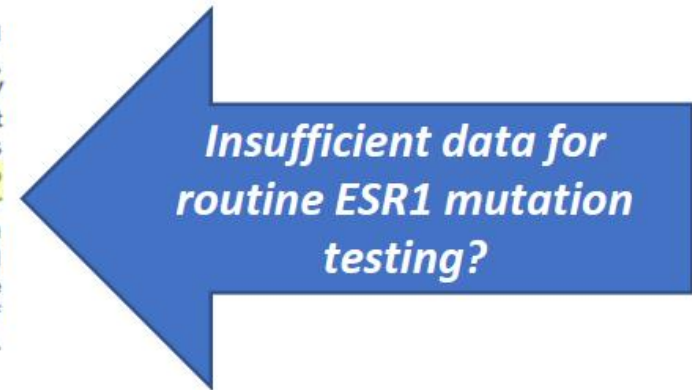
**METHODS** An Expert Panel conducted a systematic review to identify new, potentially practice-changing data.

**RESULTS** Fifty-one articles met eligibility criteria and form the evidentiary basis for the recommendations.

**RECOMMENDATIONS** Alpelisib in combination with endocrine therapy (ET) should be offered to postmenopausal patients, and to male patients, with HR-positive, human epidermal growth factor receptor 2 (HER2)-negative, *PIK3CA*-mutated, ABC, or MBC following prior endocrine therapy with or without a cyclin-dependent kinase (CDK) 4/6 inhibitor. Clinicians should use next-generation sequencing in tumor tissue or cell-free DNA in plasma to detect *PIK3CA* mutations. If no mutation is found in cell-free DNA, testing in tumor tissue, if available, should be used as this will detect a small number of additional patients with *PIK3CA* mutations. There are insufficient data at present to recommend routine testing for *ESR1* mutations to guide therapy for HR-positive, HER2-negative MBC. For *BRCA1* or *BRCA2* mutation carriers with metastatic HER2-negative breast cancer, olaparib or talazoparib should be offered in the 1st-line through 3rd-line setting. A nonsteroidal aromatase inhibitor (AI) and a CDK4/6 inhibitor should be offered to postmenopausal women with treatment-naïve HR-positive MBC. Fulvestrant and a CDK4/6 inhibitor should be offered to patients with progressive disease during treatment with AIs (or who develop a recurrence within 1 year of adjuvant AI therapy) with or without one line of prior chemotherapy for metastatic disease, or as first-line therapy. Treatment should be limited to those without prior exposure to CDK4/6 inhibitors in the metastatic setting.

Additional information can be found at [www.asco.org/breast-cancer-guidelines](http://www.asco.org/breast-cancer-guidelines).

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Insufficient data for routine *ESR1* mutation testing?

Burstein HJ et al, J. Clin. Oncol. 2021;39(35):3959-3977.

# Testing for *ESR1* Mutations to Guide Therapy for Hormone Receptor–Positive, Human Epidermal Growth Factor Receptor 2–Negative Metastatic Breast Cancer: ASCO Guideline Rapid Recommendation Update

## UPDATED RECOMMENDATIONS

- .... the Expert Panel recommends routine testing for emergence of *ESR1* mutations at recurrence or progression on ET (given with or without CDK4/6 inhibitor) in patients with ER+, HER2-MBC. Testing with a Clinical Laboratory Improvement Amendments–certified assay should be performed on blood or tissue obtained at the time of progression, as *ESR1* mutations develop in response to selection pressure during treatment and are typically undetectable in the primary tumor.
- **Blood-based ctDNA is preferred owing to greater sensitivity.** If not performed earlier, testing for *PIK3CA* mutations should also be performed to guide further therapy. Patients whose tumor or ctDNA tests remain *ESR1* wild-type may warrant retesting at subsequent progression(s) to determine if an *ESR1* mutation has arisen (*Type: Evidence-based, benefits outweigh harms; Evidence quality: High; Strength of recommendation: Strong*).

# Conclusions & Future Perspectives

- Elacestrant approval due to better efficacy compared to Fulvestrant (bioavailability)
  - No incidence of bradycardia or ocular toxicity
  - Dose: 345 mg/die (one dose reduction to 258 mg/die: 3x86 mg); hepatic metabolism (CYP3A4)
- How to identify patients with potential benefit to Elacestrant after CDK4/6i?
  - There are patients that remain sensible to ET and do derive benefit from single agent ET
  - Duration of CDK4/6i & *ESR1m* were associated with PFS
  - Nevertheless, a subset of patients with *mESR1* presents primary resistant to Elacestrant
  - Better setting?: 2<sup>nd</sup> line (after CDK4/6i progression and previous benefit from CDK5/6i), without previous CT or target agents
- Increase of *mESR1* during ET (+CDK4/6i) treatment up to 40%
  - Need to perform a real-time (ctDNA) test (NGS/ddPCR) to assess *mESR1*: possibility to perform the *ESR1* test in the EAP
- In patients with PIK3CA altered pathway? Capivasertib (plus Fulvestrant) is FDA approval
- Additional data with other SERDs & more potent ER-inhibitors are coming (EMBER3 - pre-treated ABC; SERENA-4 1<sup>st</sup> line) also including other settings (early BC). Also other genomic driven strategy are ongoing (SERENA-6)



*Thank you for your attention*

*THANK YOU FOR YOUR ATTENTION*