How I Treat Metastatic HER2+ and HER2-low BC

Denise A. Yardley, MD

Senior Investigator, Breast Cancer Research Program
Sarah Cannon Research Institute/ Tennessee Oncology
Nashville, TN

July 29, 2023



COI disclosures

RESEARCH FUNDING – ALL PAYMENTS TO INSTITUTION

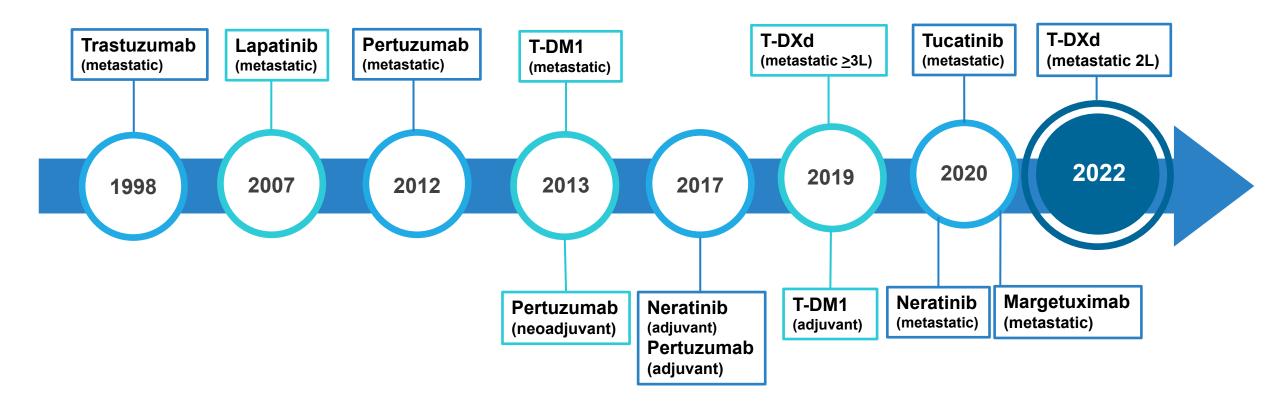
- Ambrx
- Amgen
- AstraZeneca
- BIOMARIN
- Biothera Pharmaceuticals
- · Clovis Pharma
- Dana Farber Cancer Institute
- Lilly
- Roche/Genentech
- G1 Therapeutics
- Gilead Sciences
- Incyte
- Innocrin Pharmaceuticals
- MacroGenics
- MedImmune
- Medivation
- Merck
- · Merrimack Pharmaceuticals
- Nektar Therapeutics
- Novartis
- NSABP
- Polyphor
- Stemline Therapeutics
- UT Southwestern

CONSULTING/ADVISORY ROLE – ALL PAYMENTS TO INSTITUTION

- AstraZeneca
- G1 Therapeutics
- Gilead Sciences
- Immunomedics
- Integra Connect
- Novartis
- Sanofi-Aventis
- Stemline Therapeutics



FDA Approved Therapies for HER2+ BC (2023)









Tucatinib: Mechanism of Action

Tucatinib is a HER2-specific TKI - 1000 fold more specific for HER2 vs EGFR

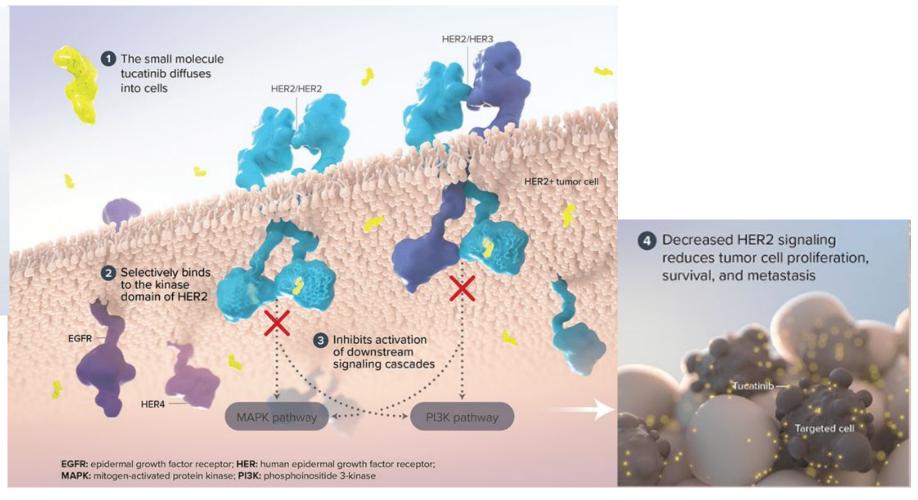
Tucatinib has been combined with other agents that target the extracellular domain of HER2 in clinical trials.

HER

Binding subdomain II

Binding subdomain IV

Kinase domain Tucatinib





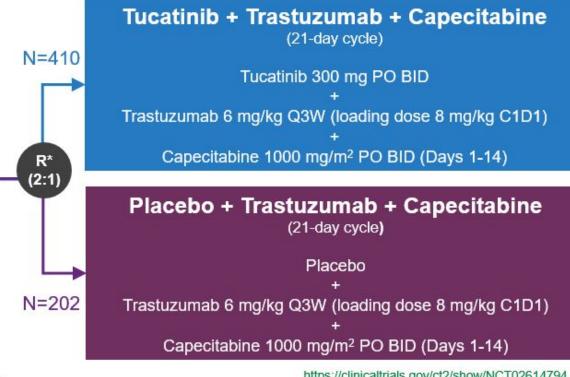
Tucatinib

Key Eligibility Criteria

illik gerine i ilado ili ikogioti atioliai iliai witii

- HER2+ metastatic breast cancer
- Prior treatment with trastuzumab, pertuzumab, and T-DM1
- ECOG performance status 0 or 1
- Brain MRI at baseline
 - Previously treated stable brain metastases
 - · Untreated brain metastases not needing immediate local therapy
 - Previously treated progressing brain metastases not needing immediate local therapy
 - · No evidence of brain metastases

^{*}Stratification factors: presence of brain metastases (yes/no), ECOG status (0 or 1), and region (US or Canada or rest of world)



https://clinicaltrials.gov/ct2/show/NCT02614794



HER2CLIMB: Results from Primary Analysis

HER2CLIMB met all primary and secondary endpoints

PFS by BICR N=480*

Risk of progression or death was reduced by 46%

95% CI: 0.42 to 0.71, P<0.001

Overall Survival N=612

Risk of death was reduced by 34% 95% CI: 0.50 to 0.88,

P=0.005

PFS by BICR in pts with brain mets

Risk of progression or death was reduced by 52%

95% CI: 0.34 to 0.69, P<0.001

PFS: progression-free survival; BICR: blinded independent central review

*The primary endpoint of PFS was assessed in the first 480 patients enrolled.



Murthy RK et al SABCS 2019,

HER2CLIMB: CNS Benefit in Patients with Brain Metastases

Pts with brain metastases

Pts with active brain metastases

Progression-free survival

```
Risk of CNS progression or death was reduced by 68% in patients with brain metastases

Median CNS-PFS (95% CI):

9.9 months
(8.0, 13.9)

4.2 months
(8.0, 13.9)

(3.6, 5.7)
```

Risk of CNS progression or death was reduced by 64% in patients with active brain metastases

Median CNS-PFS (95% CI):

9.5 months
(7.5, 11.1)

4.1 months
(2.9, 5.6)

Overall survival

```
Risk of death was reduced by
42% in patients with brain
metastases

Median OS (95% CI):

18.1 months
(15.5, NE)
(11.2, 15.2)

A 6.1
months
```

Risk of death was reduced by 51% in patients with active brain metastases

Median OS (95% CI):

20.7 months 11.6 months (15.1, NE) (10.5, 13.8)

A 9.1 months

Tucatinib in combination with trastuzumab+capecitabine was FDA approved on April 17, 2020 for treatment of HER2+ MBC pts (including those with brain mets)







T-DM1 vs T-DXd

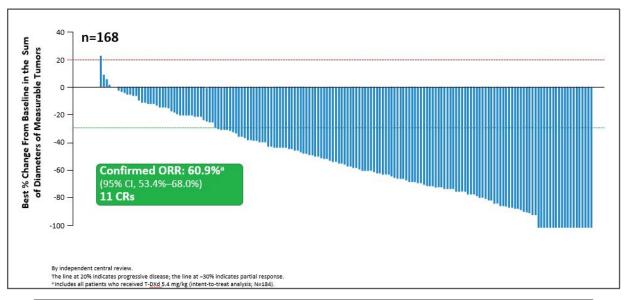
	Trastuzumab emtansine	Trastuzumab deruxtecan
Structure	****	
Antibody	Trastuzumab	Trastuzumab
Linker	Non-cleavable	Cleavable
Drug-antibody ratio	3.5:1	8:1
Cytotoxic moiety	Maytansine derivative	Exatecan derivative
MOA of cytotoxic moiety	Microtubule inhibitor	Topoisomerae 1 inhibitor
Diffusible cytotoxic moiety	No	Yes
Bystander killing effect	No Yes	
Targets HER2+ tumors	Yes	Yes
Targets HER2-low tumors	No	Yes



DESTINY Breast01: Efficacy and Safety

Phase 2 trial that evaluated T-DXd in HER2+ MBC previously treated with T-DM1

Change from baseline in tumor size



Confirmed ORR (by ICR):	60.9% (95% CI, 53.4%-68.0%)
Median DOR:	14.8 months (95% CI, 13.8-16.9)
Median PFS:	16.4 months (95% CI, 12.7-NE)
Most common TEAEs:	Gastrointestinal and hematologic, generally low grade and
Important identified risk:	Nausea Interstitial lung disease (ILD)

AE of special interest: ILD

	P	atients wl	no receive	d T-DXd 5	.4 mg/kg	(N=184)
Preferred Term, n (%)	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Any Grade/ Total
Interstitial lung disease	5 (2.7)	15 (8.2)	1 (0.5)	0	4 (2.2)	25 (13.6)

Drug related; ILD was determined by the Independent ILD Adjudication Committee based on 44 preferred terms

Among the 25 total events:

- Median time to investigator-reported onset was 193 days (range, 42-535 days)
- 17 of 20 patients with grade ≥2 ILD received corticosteroids
- 7 patients recovered, 2 were recovering, 12 were either outcome unknown or not followed until resolution, and 4 died
- Of the 4 fatal cases, onset was from 63-148 days, 3 received steroids as part of treatment, and death occurred 9-60 days after diagnosis

Recommendations: Monitor for symptoms. Hold T-DXd and start steroids as soon as ILD is suspected

Trastuzumab deruxtecan (T-DXd) was approved by the FDA on Dec 20, 2019 for treatment of HER2+ MBC after >2 prior anti-HER2 regimens

CONFIDENTIAL – Contains proprietary information.

Not intended for external distribution.



DESTINY Breast01: CNS Metastases Subgroup

Population

- ≥18 years of age
- · Unresectable and/or metastatic BC
- HER2 positive (centrally confirmed on archival tissue)
- Prior T-DM1
- Excluded patients with history of significant ILD
- Stable, treated brain metastases were allowed

Patients were included if:

- · They had brain metastases that were treated, asymptomatic, or did not require therapy to control symptoms
- They had radiation, surgery, or other therapy (including steroids or anticonvulsants) to control symptoms more than 60 days before randomization
- · Brain imaging was performed every 6 weeks for patients with a history of brain metastases

Endpoints

- · Primary: confirmed ORR by independent central review per RECIST v1.1
- Secondary: investigator-assessed ORR, DCR, DOR, CBR, PFS, OS, PK and

Data Cutoff: August 1, 2019

- · 24 patients (13.0%) had CNS metastases at baseline
- 11 (45.8%) ongoing
- 13 (54.2%) discontinued, primarily for progressive disease (6/24, 25.0%)

Efficacy in CNS mets subgroup

Intent-to-Treat Analysis	CNS Subgroup (n=24)	All Patients (N=184)	
Confirmed ORR by ICR	58.3% (n=14) (95% CI, 36.6%-77.9%)	60.9% (n=112) (95% CI, 53.4%-68.0%)	
CR	4.2% (n=1)	6.0% (n=11)	
PR	54.2% (n=13)	54.9% (n=101)	
SD	33.3% (n=8)	36.4% (n=67)	
PD	4.2% (n=1)	1.6% (n=3)	
Not evaluable	4.2% (n=1)	1.1% (n=2)	
DCR	91.7% (n=22)	97.3% (n=179)	
Duration of response (CR or PR), median	16.9 months (95% CI, 5.7-16.9)	14.8 months (95% CI, 13.8-16.9)	
Progression-free survival, median	18.1 months (95% CI: 6.7-18.1)	16.4 months (95% CI:	

T-DXd demonstrated encouraging activity in pts With HER2+ MBC and CNS mets

· Median time to response was 2.8 months (95% CI, 1.3-4.1 months) for the CNS subgroup and 1.6 months (95% CI, 1.4-2.6 months) for all patients

7-NE) CONFIDENTIAL – Contains proprietary information. Not intended for external distribution.



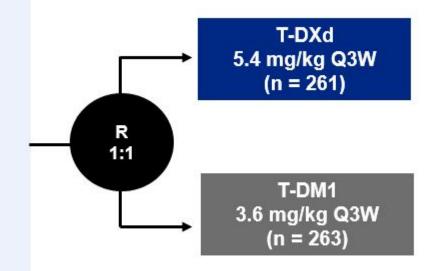
DESTINY Breast03: Ph 3 Trial of T-DXd vs T-DM1 in 2L HER2+ MBC

Patients

- Unresectable or metastatic HER2-positive^a breast cancer
- Previously treated with trastuzumab and taxane in advanced/metastatic setting^b
- Could have clinically stable, treated brain metastases

Stratification factors

- Hormone receptor status
- Prior treatment with pertuzumab
- History of visceral disease



Primary endpoint

PFS (BICR)

Key secondary endpoint

OS

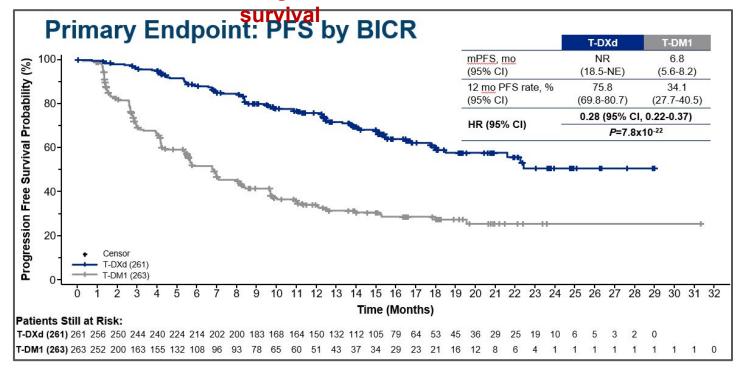
Secondary endpoints

- ORR (BICR and investigator)
- DOR (BICR)
- PFS (investigator)
- Safety

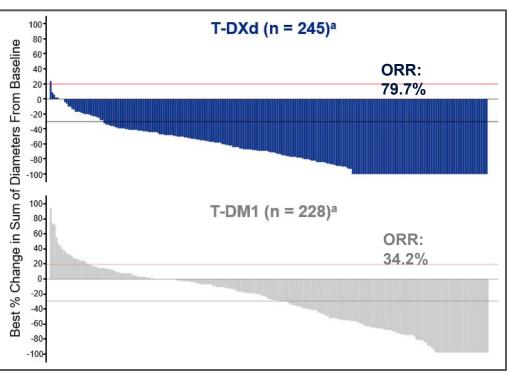


DESTINY Breast03: Efficacy Data with T-DXd vs T-DM1

Progression-free



Best overall response



Statistically significant and clinically meaningful improvement in mPFS with T-DXd (not reached) compared to T-DM1 (6.8 months)



DESTINY Breast03: Drug Related TEAEs

Drug related TEAEs reported in ≥20% of patients

	T-D n =		T-DM1 n = 261	
n (%)	Any Grade	Grade ≥3	Any Grade	Grade ≥3
Nausea	189 (73.5)	17 (6.6)	72 (27.6)	1 (0.4)
Fatigue	118 (45.9)	16 (6.2)	76 (29.1)	2 (0.8)
Vomiting	114 (44.4)	4 (1.6)	15 (5.7)	1 (0.4)
Neutropenia	111 (43.2)	51 (19.8)	30 (11.5)	8 (3.1)
Alopecia	97 (37.7)	1 (0.4)	7 (2.7)	0
Anemia	82 (31.9)	16 (6.2)	37 (14.2)	11 (4.2)
Leukopenia	79 (30.7)	17 (6.6)	21 (8.0)	2 (0.8)
Decreased appetite	68 (26.5)	3 (1.2)	34 (13.0)	0
Thrombocytopenia	65 (25.3)	19 (7.4)	137 (52.5)	65 (24.9)
Diarrhea	61 (23.7)	1 (0.4)	11 (4.2)	2 (0.8)
Constipation	60 (23.3)	0	25 (9.6)	0

- Most drug related AEs were hematologic or GI related
- Any grade nausea was the most common AE with T-DXd



DESTINY Breast03: Safety update

n (%)	T-DXd n = 257	T-DM1 n = 261
Patients discontinued from study treatment	141 (54.9)	222 (85.1)
Any grade TEAE	256 (99.6)	249 (95.4)
Grade ≥3 TEAE	137 (53.3)	130 (49.8)
Any grade serious TEAE	54 (21.0)	50 (19.2)
Grade ≥3 serious TEAE	39 (15.2)	38 (14.6)
TEAE associated with drug discontinuation	38 (14.8)	19 (7.3)
TEAE associated with dose reduction	59 (23.0)	36 (13.8)
Treatment duration, median (range) months	16.1 months	6.9

- Rates of TEAEs were similar on both treatment arms.
- TEAEs associated with drug discontinuation were higher on T-DXd arm (14.8% vs T-DM1 (7.3%)

Exposure-adjusted incidence rates (EAIRs)

- EAIRs per patient-year were lower in the T-DXd arm than the T-DM1 arm except for TEAEs associated with drug discontinuation, which were primarily associated with ILD/pneumonitis in the T-DXd arm
 - EAIR for grade ≥3 TEAEs was 0.42 for T-DXd and 0.70 for T-DM1
 - EAIR for any grade serious TEAEs was 0.17 for T-DXd and 0.27 for T-DM1



DESTINY Breast03: Adjudicated Drug-related ILD/pneumonitis

	T-DXd n = 257	T-DM1 n = 261
Any grade, n (%)	28 (10.9)	5 (1.9)
Grade 1	7 (2.7)	4 (1.5)
Grade 2	19 (7.4)	1 (0.4)
Grade 3	2 (0.8)	O
Grade 4	O	0
Grade 5	0	0
Time to first onset, median (range), days	181 (33-507)	289 (80-499)
Outcome of worst event, n (%)		
Fatal	0	1 (20.0)a
Not recovered/not resolved	8 (28.6)	0
Ongoing	0	0
Recovering/resolving	2 (7.1)	0
Recovered/resolved with sequelae	2 (7.1)	0
Recovered/resolved	16 (57.1)	4 (80.0)

Trastuzumab deruxtecan (T-DXd) was approved by the US FDA on May 6, 2022 for treatment of HER2+ MBC after 1 prior anti-HER2 regimen for MBC or relapse ≤6 months from (neo)adjuvant anti-HER2 treatment



Select Ongoing Trials with Tucatinib/T-DXd for HER2+ MBC

- DESTINY Breast07: T-DXd combinations with chemotherapy, immunotherapy and endocrine therapy in 1-2L setting (NCT04538742)
- DESTINY Breast09: T-DXd +/- pertuzumab vs THP as 1L therapy for HER2+ MBC (NCT04784715)
- o **DESTINY Breast12:** T-DXd in HER2+ MBC with or w/o brain mets (1-3L) (NCT04739761)
- DASH trial: T-DXd + ceralasertib (ATR inhibitor) for HER2+ MBC and other HER2 expressing solid tumors (NCT04704661)
- o **HER2CLIMB04:** T-DXd + tucatinib for ≥3L HER2+ MBC (NCT04539938)
- HER2CLIMB05: Tucatinib or placebo + HP as maintenance therapy for 1L HER2+ MBC (NCT05132582)
- TUGETHER: Tucatinib with pembrolizumab+ trastuzumab (PD-L1+) and + cape (in PD-L1-) HER2+ MBC (NCT04789096)
- Tucatinib + gem or vinorelbine + trastuzumab for HER2+ MBC (NCT04896320)



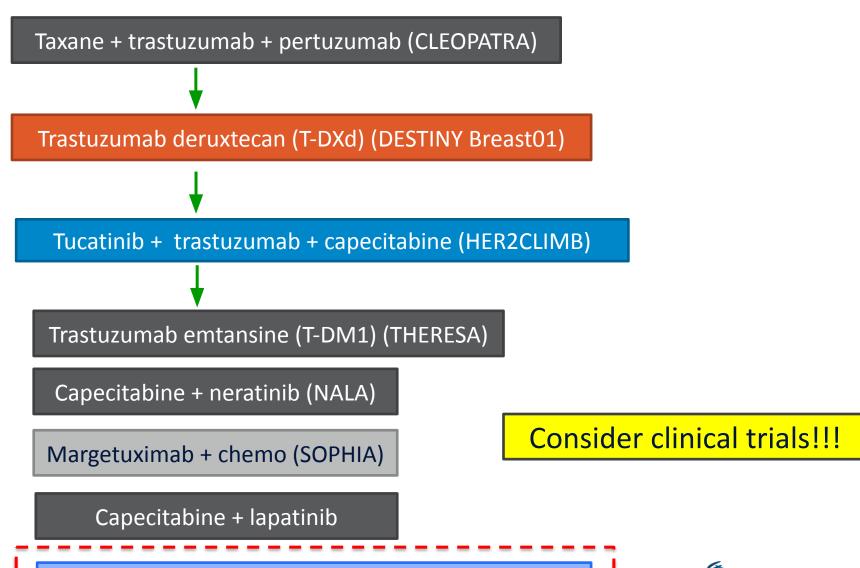
Current Treatment Algorithm for HER2+ MBC

1st line

2nd line

3rd line

4th line & later

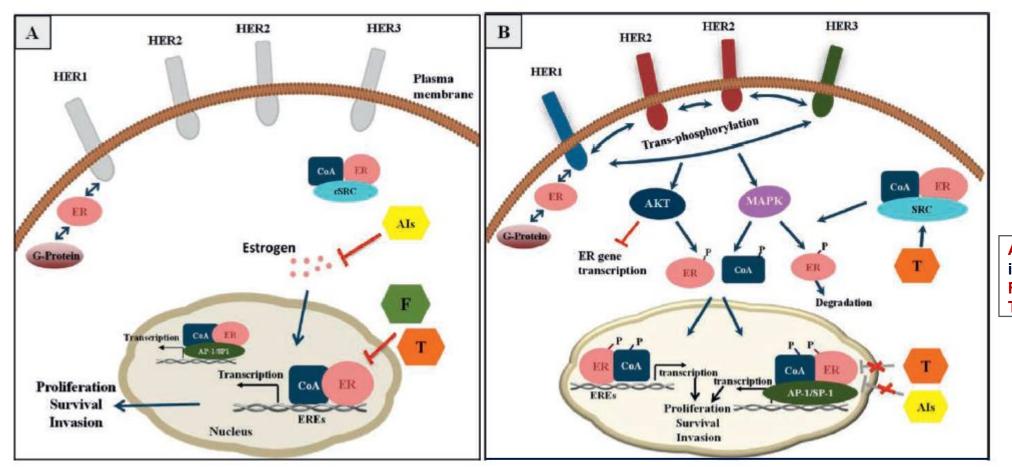


ET + anti-HER2 therapy (TAnDEM & EGF30008)



ry information.

Crosstalk Between ER Signaling and HER2

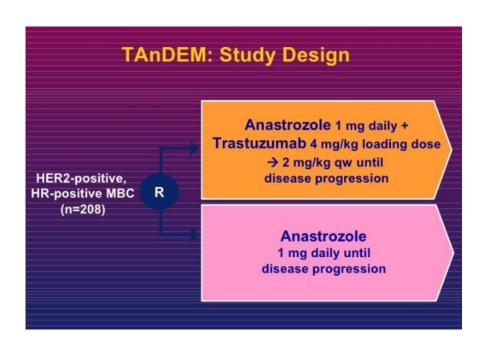


Al Aromatase inhibitor F Fulvestrant T Trastuzumab

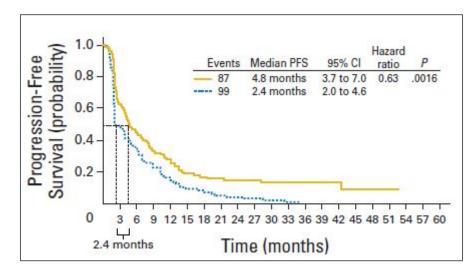
Bidirectional crosstalk between the ER and HER pathways can lead to resistance to endocrine therapy



TAnDEM: 1L AI +/- Trastuzumab for HR+/HER2+ MBC

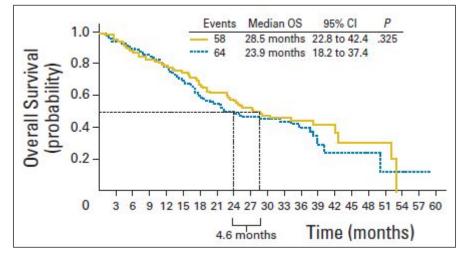


PFS (ITT)



- ✓ 1st phase 3 trial to evaluate ET with trastuzumab without chemo
- Addition of trastuzumab to ET significantly improved PFS & there was a numerical increase in OS
- ✓ G3 /4 tox were higher on trastuzumab arm, but they were reversible.





of all ICO

EGF30008: 1L Letrozole +/- Lapatinib for HR+/HER2+ MBC

N = 219

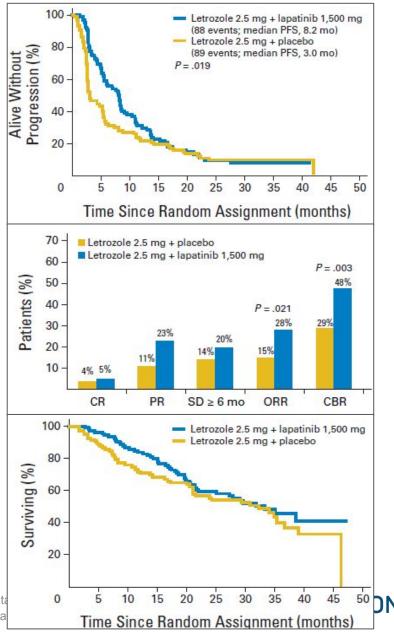
Pt w/ HR+ and HER2+ MBC and no prior tx for MBC were randomized 1:1
 Letrozole + placebo or Letrozole + lapatinib

Addition of lapatinib to letrozole significantly improved mPFS 8.2 months vs 3 months with letrozole ORR was 28% vs 15% CBR was 48% vs 29% Trend towards improvement in OS

✓ G3 /4 tox were higher on lapatinib arm (mainly diarrhea)

RR/ CBR

PFS



Johnston S

OS

CONFIDENTIAL – Conta

monarcHER: Abemaciclib + ET in HR+/HER2+ MBC

Eligibility Criteria

- HR+, HER2+ ABC
- ≥2 prior HER2 directed therapies for ABC
- prior T-DM1 and taxane required
- CDK4 & 6 inhibitor/ fulvestrant naive
- No untreated or symptomatic CNS metastases

Stratification Factors: number of previous systemic regimens (2-3 vs. >3) measurable vs. nonmeasurable Randomization N = 2371:1:1 Sample Size Calculations: 165 PFS events give 80% power at 2-sided alpha of 0.20, assuming a HR of 0.667

Continue until PD

Arm A

abemaciclib 150 mg PO BID + trastuzumab IV q21d + fulvestranta IM q28d

Arm B

abemaciclib 150 mg PO BID + trastuzumab IV q21d

Arm C

trastuzumab IV q21d + investigator's choice chemotherapy^b

Primary Endpoint

 PFS^c (A vs. C, then B vs. C)

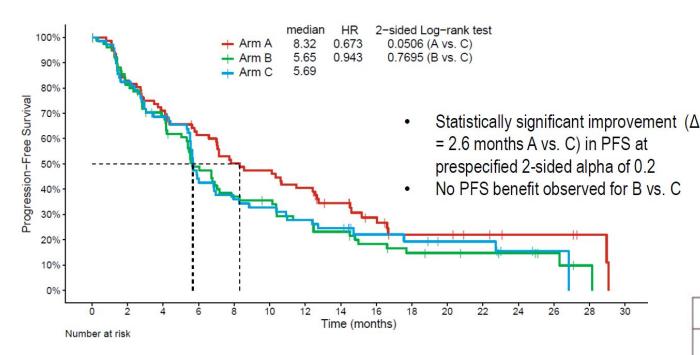
Secondary Endpoint

 ORR, safety, OS, PRO, PK



monarcHER: Efficacy Outcomes

Primary EP - PFS



- Significant improvement in mPFS with abema+fulvestrant+trastuzumab
 vs trastuzumab+chemo
- Numerical improvement is OS with abema added to anti HER2 therapy
 + ET

Arm A= abemaciclib + trastuzumab + fulvestrant Arm B= abemaciclib + trastuzumab

Arm C= trastuzumab + chemotherapy

Final overall survival analysis

	Arm A	Arm B	Arm C
Events	50	54	53
mOS, (mo)	31.1	29.2	20.7
HR (95% CI)	0.71 (0.48, 1.05)	0.84 (0.57, 1.23)	N/A
2-sided P value	0.086 A vs. C	0.365 B vs. C	N/A
		nal OS Analysis 31 Mar 2022	

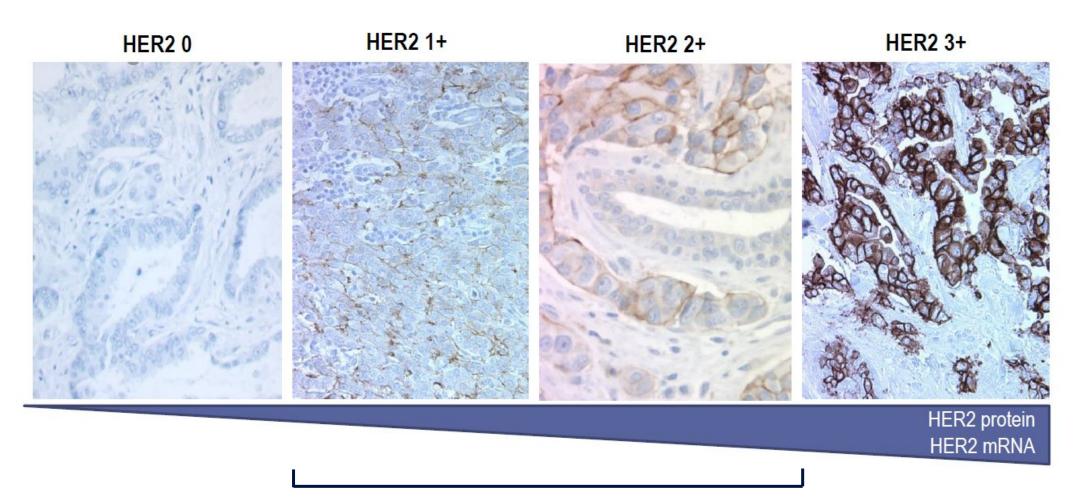
וזטן ווונפווטפט וטו פגנפווומו טוטנווטענוטוו.

Research Institute





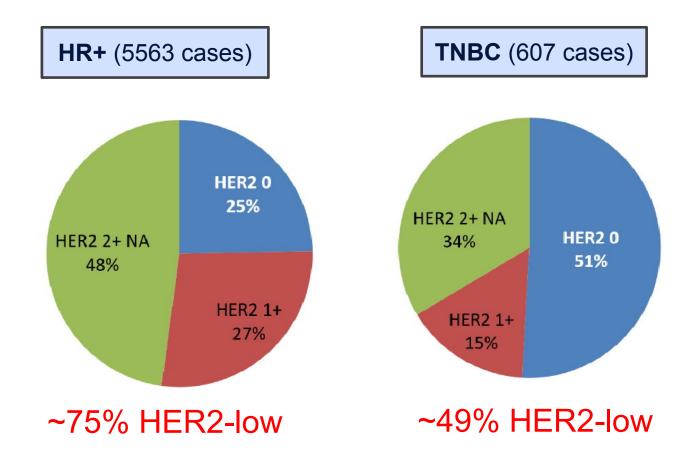
HER2: Continuum of Expression of in Breast Cancer



HER2-low
HER2 IHC 2+/ISH- OR IHC 1+/ISH – or untested

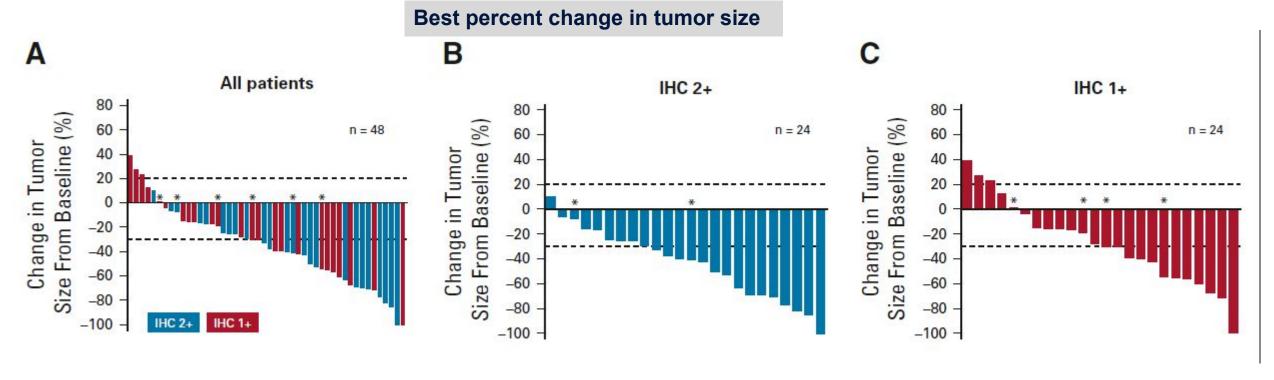


Frequency of HER2 IHC 0, 1+, 2+ in Breast Cancer





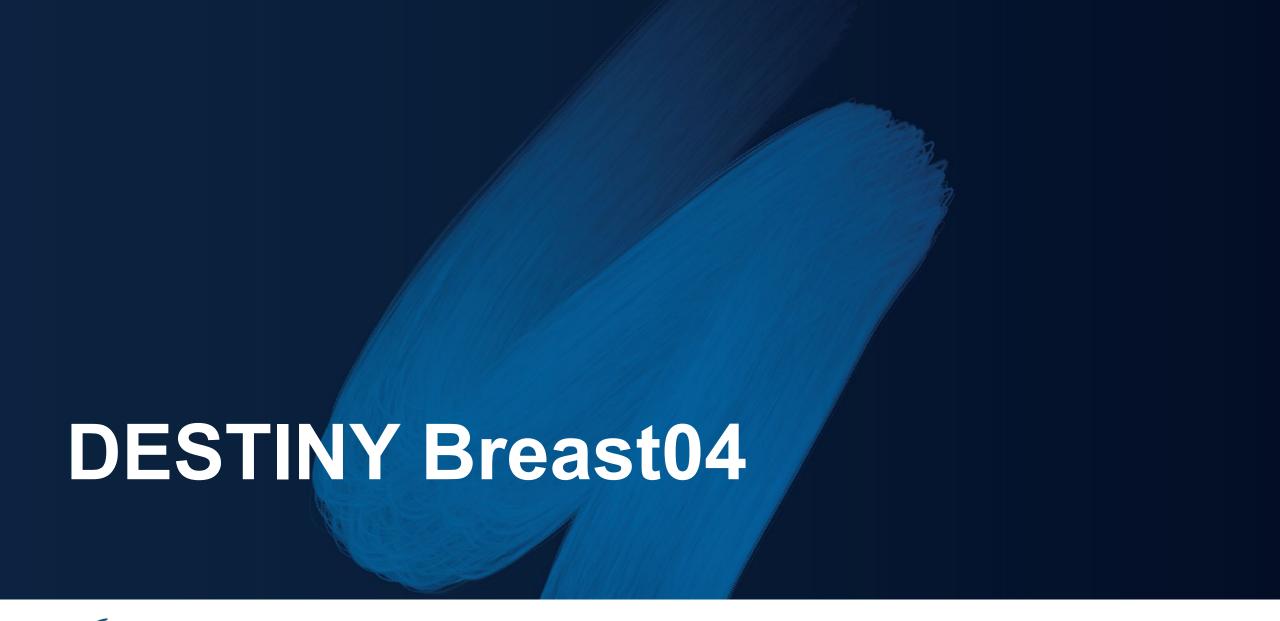
T-DXd: Activity in HER2-low MBC (DESTINY Breast-01)



Significant anti-tumor activity in HER2 IHC 2+ and 1+ tumors

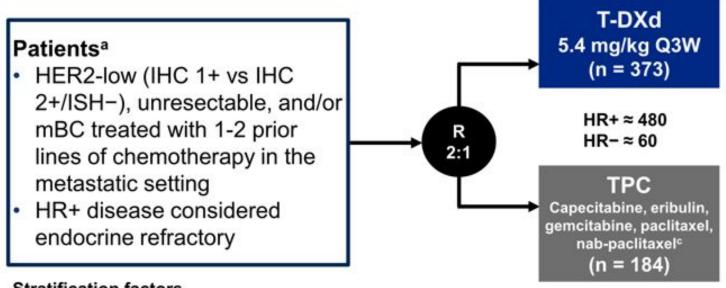
Confirmed ORR: 37%
Confirmed DCR: 87%
Median DoR: 10.4 months
Median PFS: 11.1 months







DESTINY Breast04 Schema



Primary endpoint

PFS by BICR (HR+)

Key secondary endpoints^b

- PFS by BICR (all patients)
- OS (HR+ and all patients)

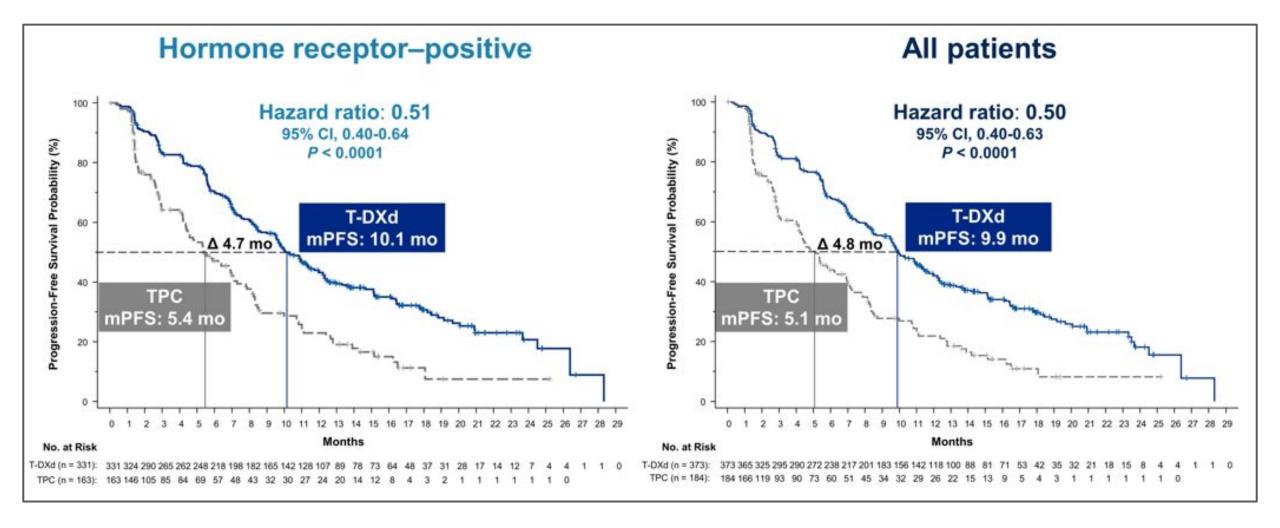
Stratification factors

- Centrally assessed HER2 status^d (IHC 1+ vs IHC 2+/ISH-)
- 1 versus 2 prior lines of chemotherapy
- HR+ (with vs without prior treatment with CDK4/6 inhibitor) versus HR-

	Patient popu HR+/HER2-Id	
≥3 priors for MBC	66%	62%
2 prior lines of chemo	40%	43%
Prior CDK 4/6i	70.5%	CONFIDENTIAL – Contains proprieta 4.5%.

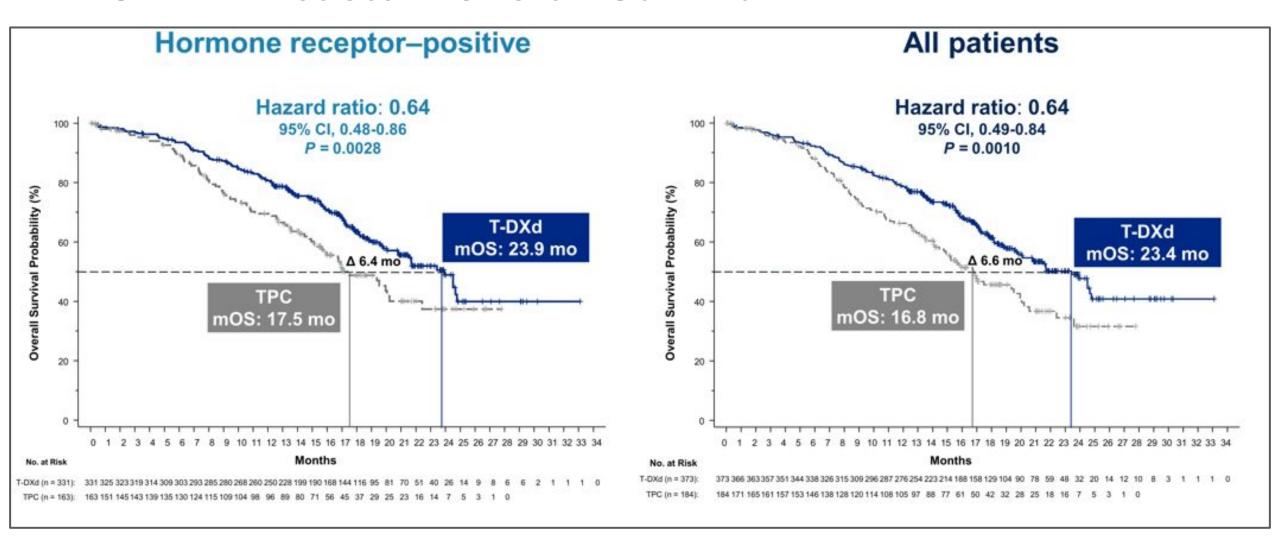
SARAH CANNON

DESTINY Breast04: Progression-free Survival Primary End Point





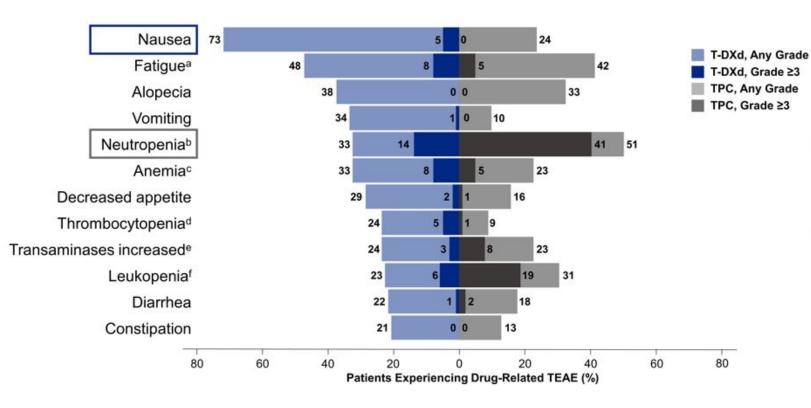
DESTINY Breast04: Overall Survival



DESTINY Breast04:

		y population 557)		-low cohort 494)	Exploratory H cohort	
	ENHERTU (n=373)	Chemotherapy (n=184)	ENHERTU (n=331)	Chemotherapy (n=163)	ENHERTU (n=40)	Chemotherapy (n=18)
mPFS (mo)	9.9 (95% CI: 9.0, 11.3)	5.1 (95% CI: 4.2, 6.8)	10.1 (95% CI: 9.5, 11.5)	5.4 (95% CI: 4.4, 7.1)	8.5 (95% CI: 4.3, 11.7)	2.9 (95% CI: 1.4, 5.1)
HR (P-value)		CI: 0.40, 0.63)		Cl: 0.40, 0.64)	0.46 (95% C	H: 0.24, 0.89)
mOS (mo)	23.4 (95% CI: 20.0, 24.8)	16.8 (95% CI: 14.5, 20.0)	23.9 (95% CI: 20.8, 24.8)	17.5 (95% CI: 15.2, 22.4)	18.2 (95% CI: 13.6, NE)	8.3 (95% CI: 5.6, 20.6
HR (P-value)		cl: 0.49, 0.84)		:1: 0.48, 0.86) .0028)	0.48 (95% C	l: 0.24, 0.95)

DESTINY Breast04: Adverse Events



- Median treatment duration
 - T-DXd: 8.2 months (range, 0.2-33.3)
 - TPC: 3.5 months (range, 0.3-17.6)
- Most common TEAE associated with treatment discontinuation
 - T-DXd: 8.2%, ILD/pneumonitis^c
 - TPC: 2.3%, peripheral sensory neuropathy

Adjudicated as drug-related ILD/pneumonitis^a

n (%)	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Any Grade
T-DXd (n = 371)	13 (3.5)	24 (6.5)	5 (1.3)	0	3 (0.8)	45 (12.1)
TPC (n = 172)	1 (0.6)	0	0	0	0	1 (0.6)



DESTINY Breast04: Summary

- In pts with HER2-low MBC, trastuzumab deruxtecan improved
 - Median PFS by 4.8 months (HR 0.50, p<0.0001)
 - Median OS by 6.6 months (HR 0.64, P=0.0010)
 - No new safety signals; there was an overall positive benefit-risk

These results establish T-DXd as the new SOC for HER2-low MBC

T-DXd approved by the FDA for treatment of MBC for the newly defined "HER2-low" subtype on August 5, 2022



DAISY: Efficacy of T-DXd in HER2 IHC 0+(HER2 null)

DAISY: phase 2 trial of T-DXd in HER2+, HER2-low and HER2 null MBC

Patient population for HER2 IHC null cohort (n=38)

o HR+: 68.4%

≥3 priors: 80%

Confirmed ORR: 30%

Median DoR: 6.8 months

Median PFS: 4.2 months

М	ed	iar	D	EC
IVI	eo	171	וו	-5

4.5 months

(HR-) 2.1 months

(HR+)

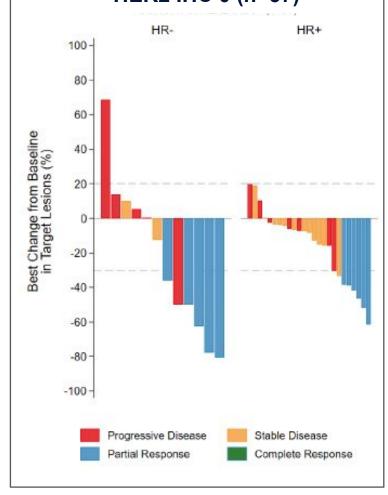
Median OS

11.6 months

10.3 months

Encouraging activity with T-DXd in HER2-null MBC







Select Ongoing Trials with Anti HER2 ADCs Enrolling HER2-low MBC

NCT04553770 T-DXd +/- anastrozole (neoadjuvant HR+ BC) (TALENT)

NCT05633979 T-DXd + Valemetostat (EZH1/2 inhibitor))

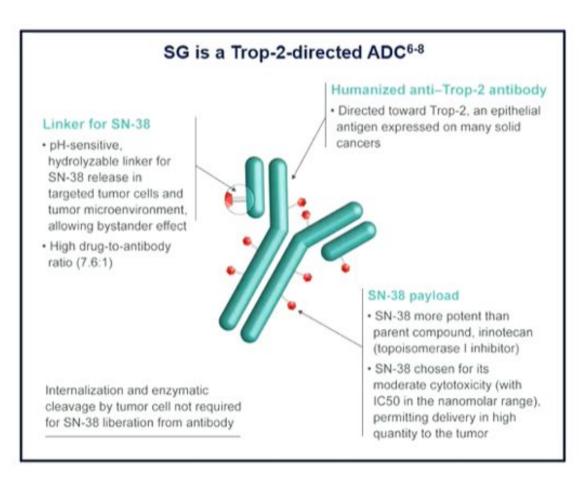
NCT05150691 DB-1303 (≥2L MBC)

NCT04257110 BB-1701 (≥2L MBC)

NCT03255070 ARX788 (≥2L MBC) (ACE Pantumor01)



Sacituzumab Govitecan (SG): Trop2 - Directed ADC in HR+/HER2- MBC



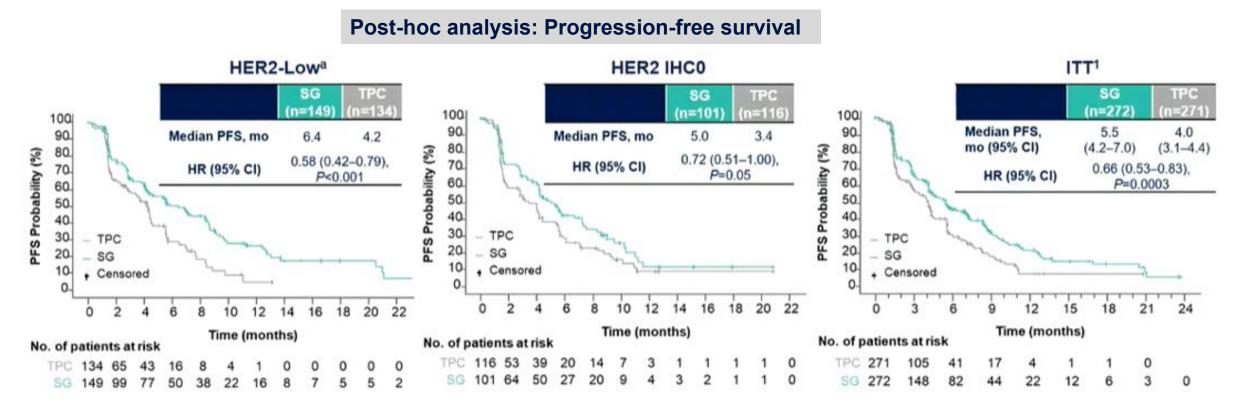
Phase 3 TROPICS-02 evaluated SG vs TPC in

HR+/HER2- MBC

- Significant improvement in mPFS with SG
 (HR 0.66, P<0.001)
- Significant improvement in OS with SG (HR 0.79, P=0.020)
- A posthoc subgroup analysis evaluated efficacy
 in the HER2-low subgroup



SG Improved Outcomes in HR+ ER2-low & HR+ HER2 IHC 0

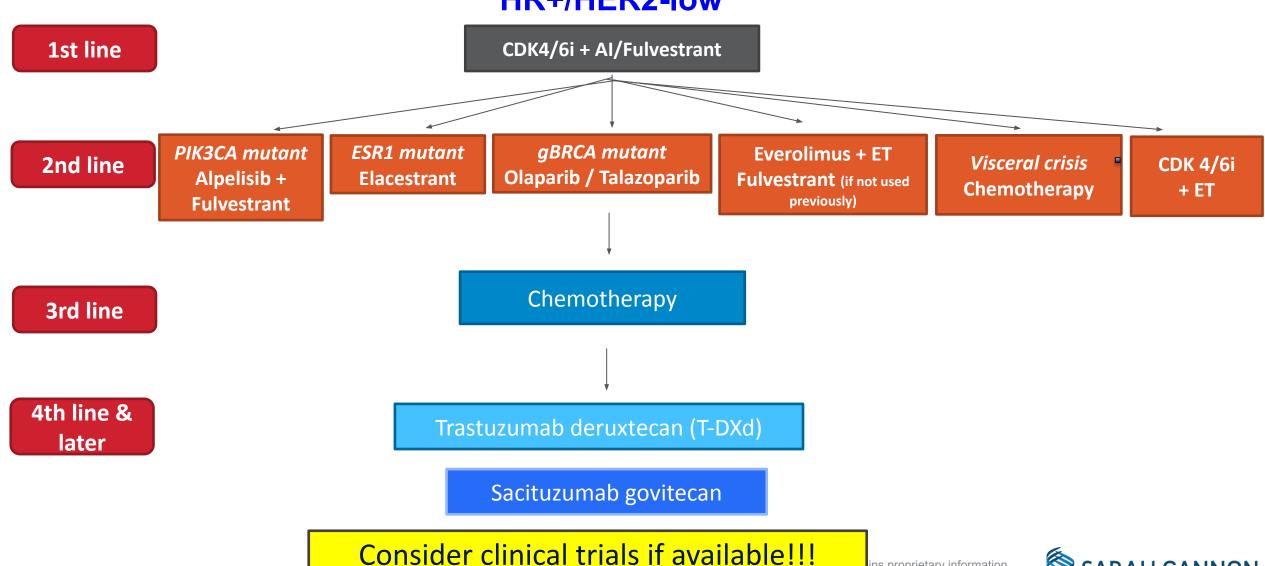


- Within the HER2-low population, median PFS with SG vs TPC for the IHC1+ and IHC2+ subgroups was 7.0 vs 4.3 months (HR, 0.57) and
 - 5.6 vs 4.0 months (HR, 0.58), respectively
- The hazard ratio for median PFS in a sensitivity analysis of the HER2-low subgroup (excluding ISH-unverified^b) was similar (HR, 0.53)



Current Treatment Algorithm for HR+ HER2-low MBC

HR+/HER2-low





Current treatment algorithm for HER2-low MBC

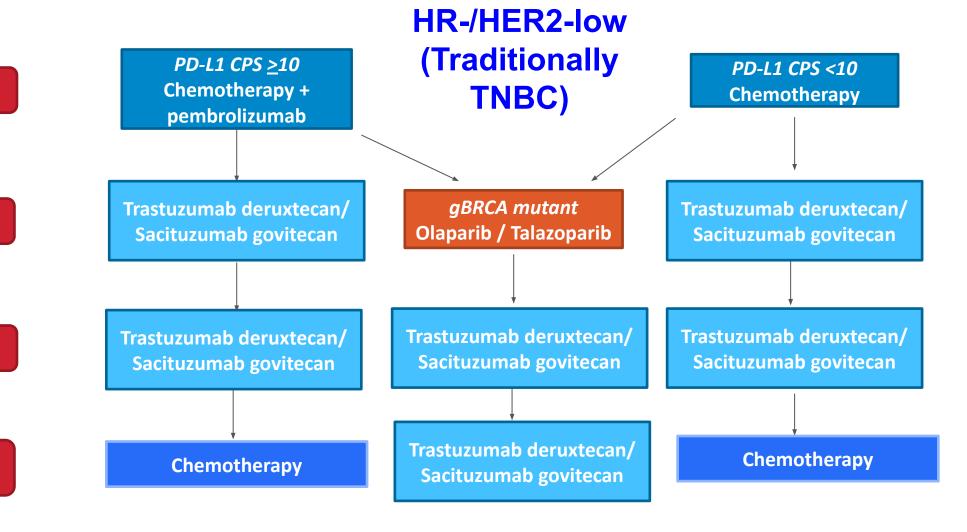
1st line

2nd line

3rd line

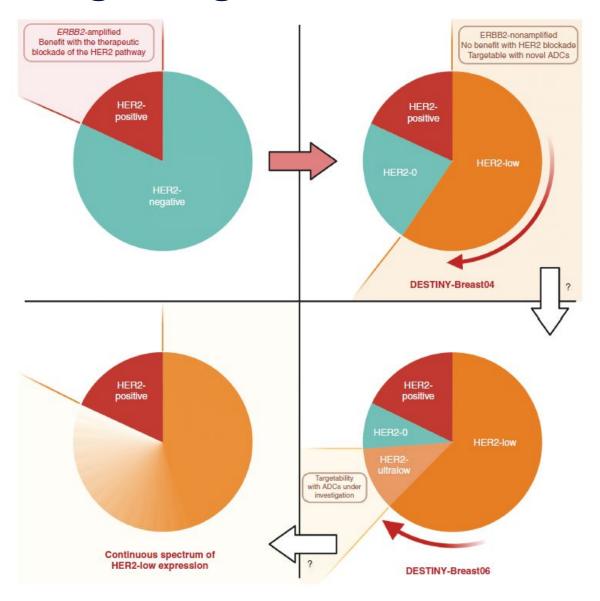
4th line &

later





Evolving categorization of HER2-low



Shift from a binary categorization of "yes" or "no" to HER2-positive, HER2-low and HER2-0

May undergo further evolution with HER2-"ultralow"

Development of more quantitative HER2 evaluation methods





