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Early Breast Cancer



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Disclosures

- Board Member : Oncolytics
- Consultant (honoraria): AstraZeneca, Camel-IDS, Immutep, NBE Therapeutics, Immunomedics, Lilly, Menarini, MSD, Novartis, Odonate, Pfizer, Roche-Genentech, Seattle Genetics
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- Speakers bureau/stock ownership: none



Early Breast Cancer (BC)



- Progress in adjuvant treatment tailoring for luminal BC...
 ... through the use of multigene expression signature!
- Adjuvant use of CDK4-6 inhibitors:
 not ready yet ?
 ... updated results of MonarchE, first results
 of PenelopeB



Early Breast Cancer (SABCS 2020) Progress in adjuvant treatment tailoring for luminal BC



A. Baseline gene expression profiles

Clinical utility proven for

Adjuvant chemo sparing

First resuls of <u>RX-PONDER</u> (1)

Put in perspective with TAILOR-X/MINDACT

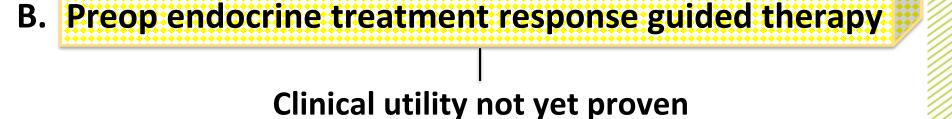
Extending adjuvant endocrine therapy

Level of evidence lb for « BCI » (2)



Early Breast Cancer (SABCS 2020) Progress in adjuvant treatment tailoring for luminal BC





ALTERNATE trial (1)

ADAPT HR+/HER2- trial (2)

- (1) Ma CX et al, abst GS4-05
- (2) Harbeca N et al, abst GS4-04

Why should we *perform GEPs* for HR+/HER2- early breast cancer?

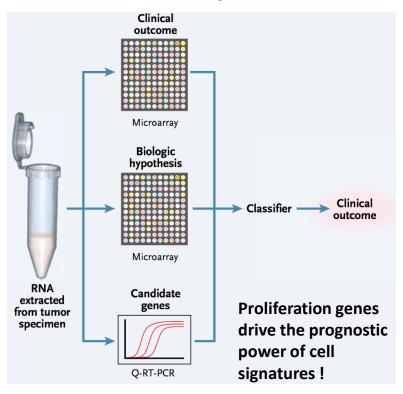
1) To *inform* physicians and patients on the risk of recurrence → *Prognosis*

- 2) To assist physicians and patients for the best treatment options (who will benefit from chemotherapy?)
 - > Prediction

→ De-scalation/Escalation of adjuvant systemic therapy

Gene expression prognostic classifiers

Top-down and bottom-up approaches











TAILOR X
RX-PONDER

OPTIMA

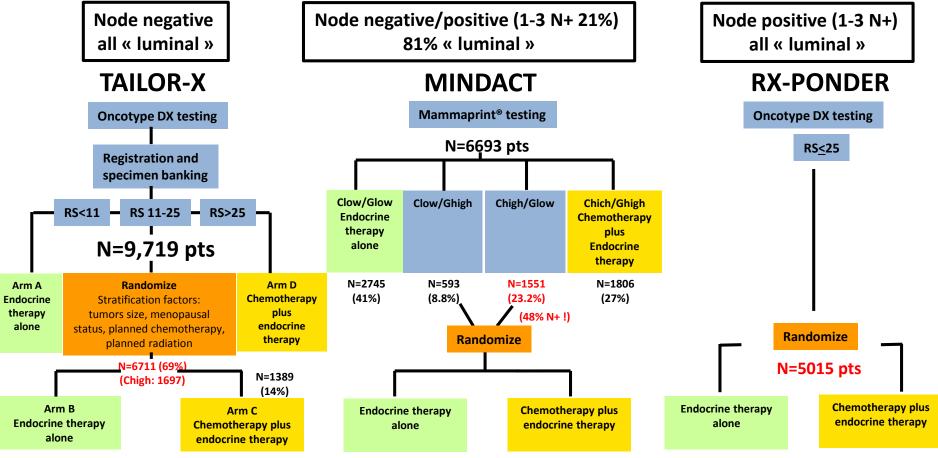




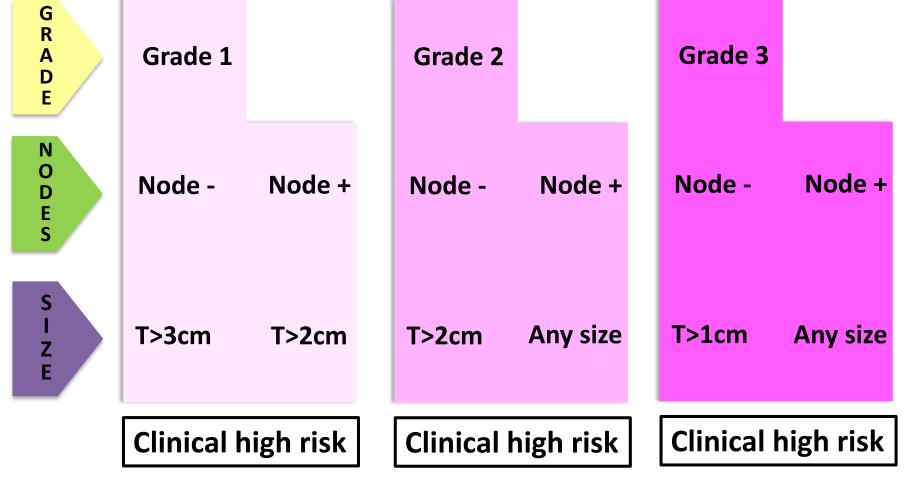
Retrospective studies

C Sotiriou & L Pusztai. NEJM 2009

« Low risk » gene expression prognostic classifiers and chemotherapy benefit



Sparano JA, NEJM 2019 Piccart MJ, Lancet Oncol, in press Kalinsky K, SABCS 2020



C-high risk according to « MINDACT » : expected 10 y OS < 92% with endocrine therapy alone (as per Adjuvant! Online)

"Precision medicine" prospective clinical trials in early

HER2- HR+ BC					
	TAILOR-X	MINDACT	RX-PONDER		
Years of accrual	2006-2010	2007-2011	2011-2015		
Patients recruited and eligible	9719 All node negative and HER2- HR+	6693 node- 79% 1-3 node + 21% HER2- HR+ 81%	5015 All 1-3 nodes + and HER2- HR+		
Primary endpoint Median follow-up	IDFS 9 years	DMFS 8.7 years	IDFS 5 years		
Primary	ET not inferior to CT+ET	Threshold for 5y DMFS >	Positive interaction test of		

92% in Chigh/Glow risk

receiving no CT

5 y DMFS 95.1% (93.1)-96.6)

required > 92%

chemo benefit with

increasing RS

p interaction 0.30

5y HR .81 (95% CI 0.67-0.98)

(p interaction 0.008 for CTX benefit & menopause)

in case of RS 11-25

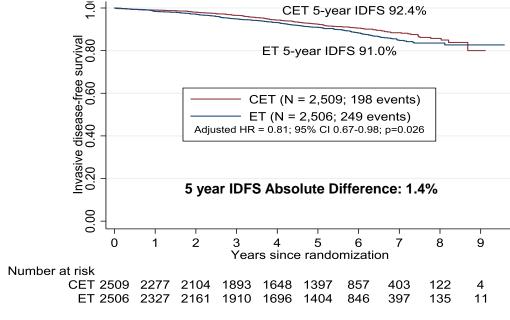
IDFS HR 1.08 (0.94(1.24)

required < 1.32

Hypothesis

Result

IDFS in Overall Population by Treatment Arm



CET = Chemotherapy + Endocrine Therapy; ET = Endocrine Therapy Alone

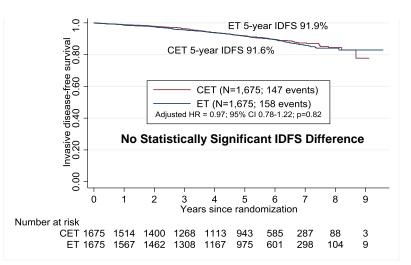
447 observed IDFS events (54% of expected at final analysis) at a median follow-up of 5.1 years



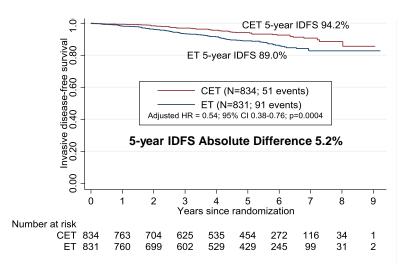


IDFS Stratified by Menopausal Status

Postmenopausal



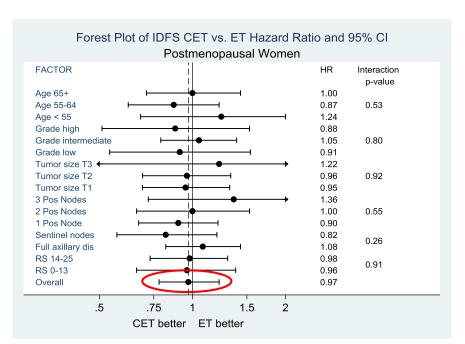
Premenopausal

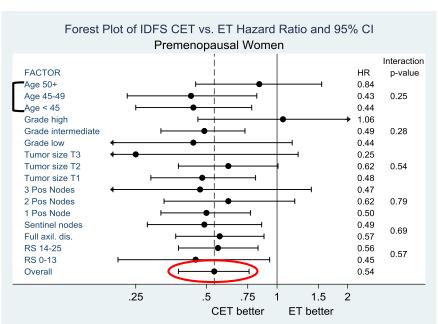






Forest Plots of IDFS by Menopausal Status





Landmarked Exploratory Analysis for IDFS in Premenopausal Women on Endocrine Therapy arm: Ovarian Function Suppression (n=126) vs. no Ovarian Function Suppression (n=647) at 6 months: HR 0.73 (95% CI: 0.39-1.37), p=0.33

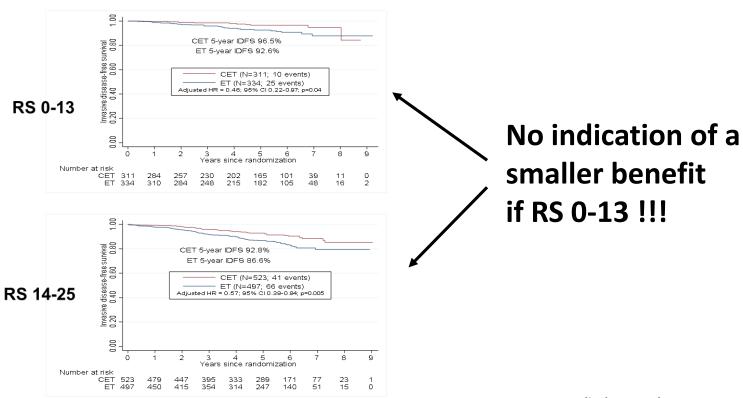




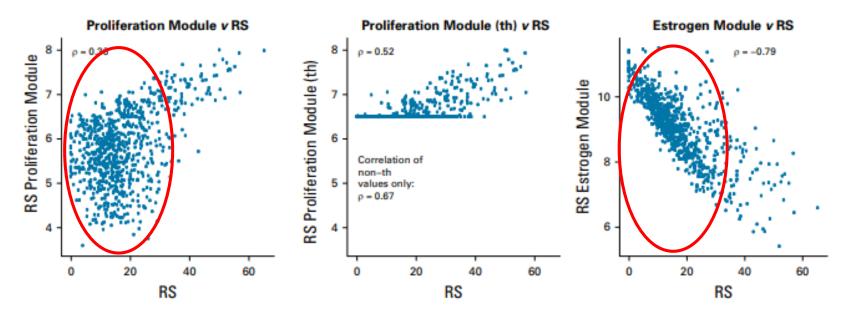


IDFS Stratified by Recurrence Score in premenopausal women

Premenopausal



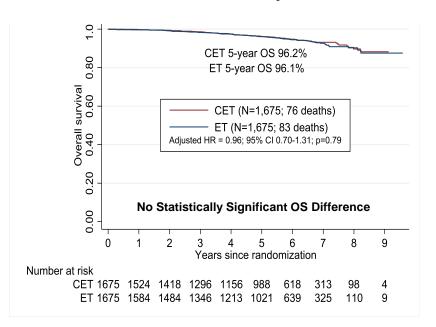
Why did RX-PONDER fail to show an increasing chemotherapy benefit with an increasing RS up to RS 25?



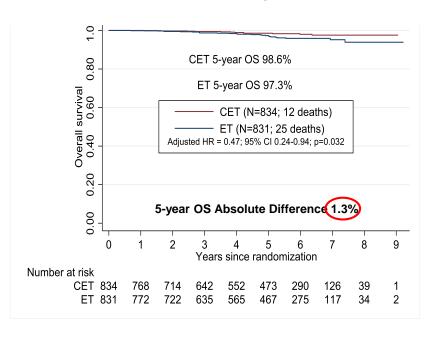
- RS is determined more strongly by its estrogen module than its proliferation module
- The score from the proliferation module is thresholded!

Overall Survival by Menopausal Status

Postmenopausal



Premenopausal







RxPONDER Conclusions

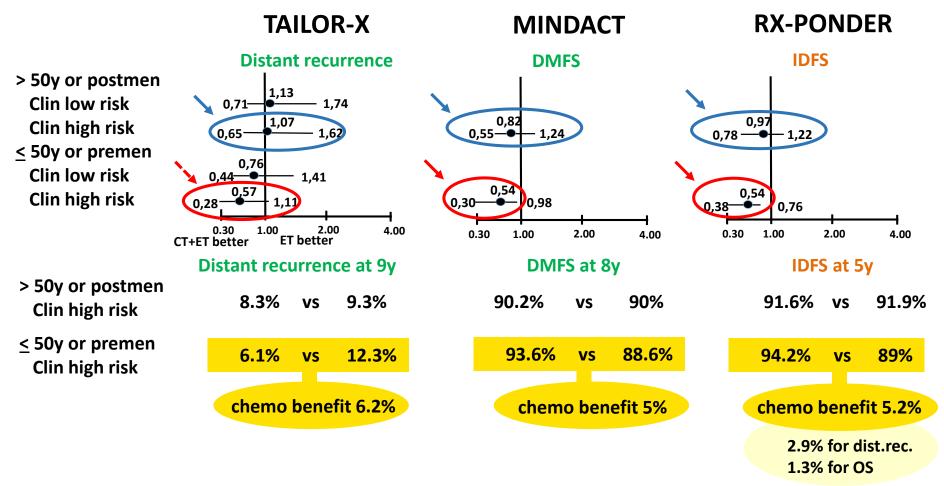
- At this interim analysis with 54% of anticipated IDFS events in the overall population, the 21gene RS 0-25 was prognostic but did not show a treatment interaction with chemotherapy
 - Relative benefit of chemotherapy was similar across RS 0-25
- Postmenopausal women with RS 0-25 did not benefit from adjuvant chemotherapy in any subgroup
- Premenopausal women with RS 0-25 had benefit from the addition of chemotherapy to endocrine therapy
 - 46% decrease in IDFS events; benefit was observed across premenopausal subgroups
 - 53% decrease in deaths, leading to a 5-year OS absolute improvement of 1.3%
- Additional follow-up is ongoing, and future analyses will also include QOL and other outcomes



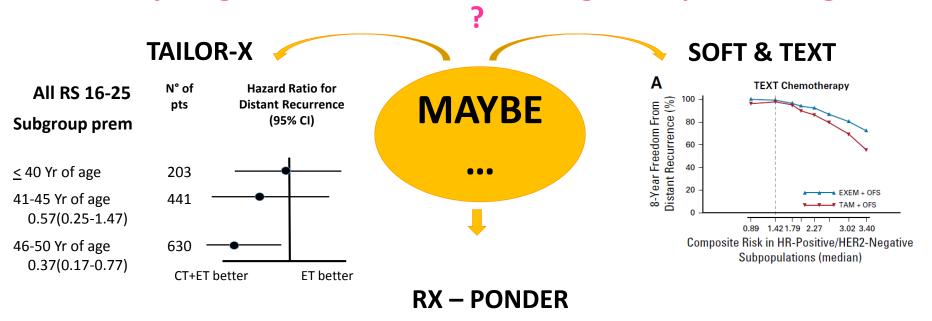
"Precision medicine" prospective clinical trials in early HER2- HR+ BC (2)

	TAILOR-X	MINDACT	RX-PONDER
Chemotherapy (CT) benefit	Primary endpoint	Secondary endpoint	Subprimary endpoint
- Populations tested	> 50 y N= 4353 (1180 Chigh) < 50 y N= 2143 (517 Chigh)	> 50 y N= 1016 (Chigh) < 50 y N= 535 (Chigh)	Postmenopausal N= 3350 Premenopausal N= 1665
- Type of CT	TC 56% A (<u>+</u> T) based 36%	T based 24% A (<u>+</u> T) based 64%	TC 50% A (<u>+</u> T) based 50%
- Non-adherence to rand. therapy	≈ 12%	≈ 13%	≈ 5%
- OFS in premenopause	13%	20%	16% (in ET arm) and 3% in CTX arm

Chemotherapy benefit among patients with "low risk" genomic signatures



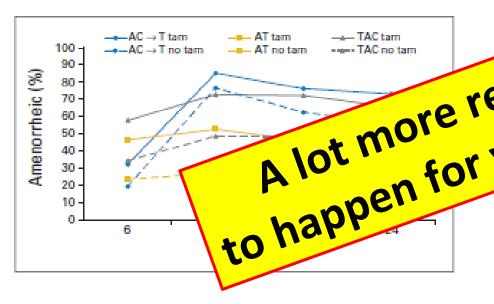
Could an ovarian function suppression effect explain the chemo benefit in younger women with "low risk" gene expression signatures

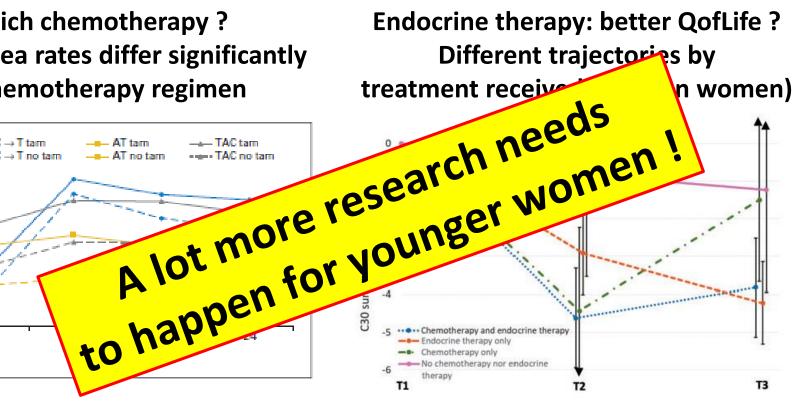


more data to be generated since menopausal status <u>after</u> chemotherapy was recorded in young women!

Premenopausal women Chigh/Glow

Which chemotherapy? Amenorrhea rates differ significantly by chemotherapy regimen





T3

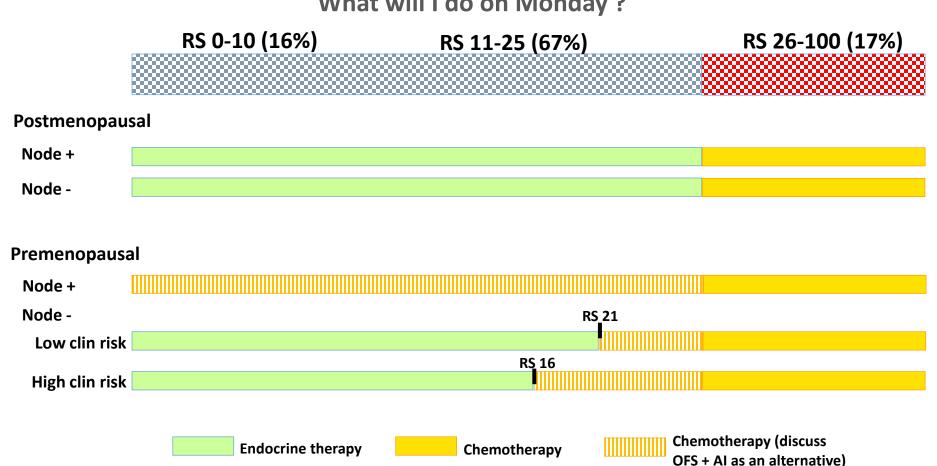




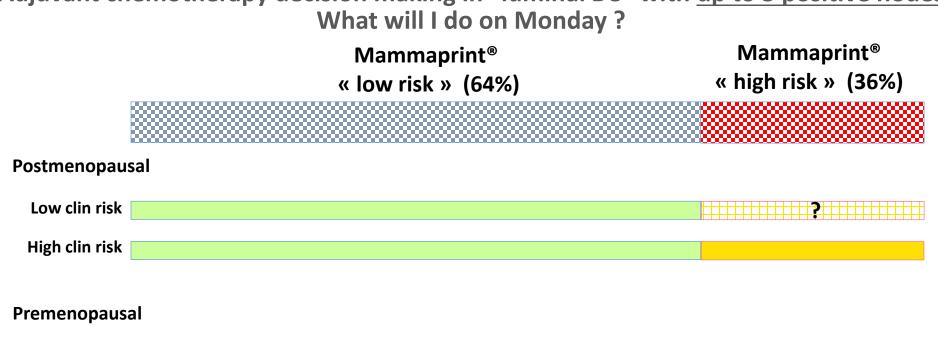
Message to clinicians

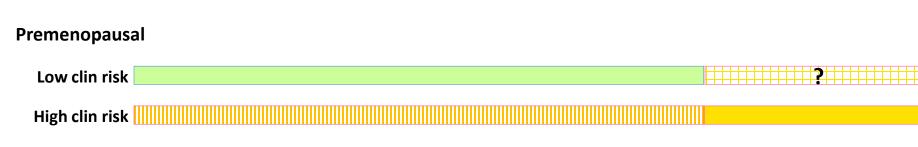
« What am I going to advise my patients? »

Adjuvant chemotherapy decision making in "luminal BC" with up to 3 positive nodes What will I do on Monday?



Adjuvant chemotherapy decision making in "luminal BC" with up to 3 positive nodes What will I do on Monday?





Uncertain chemo benefit **Chemotherapy (discuss** Abst GS4-11 L. van't Veer et al. OFS + AI as an alternative)

Could "Clinical" low risk/"Genomic" high risk patients benefit from chemotherapy?

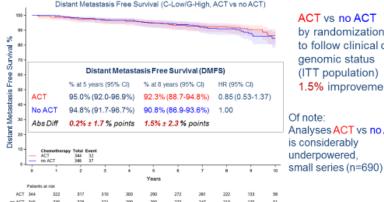


MINDACT RESULTS All Clinical Low risk



HR CT vs no CT: 0.85 (95% CI 0,53 - 1,37) by Triple Small group

condary MINDACT RESULTS C-Low/G-High



ACT vs no ACT by randomization to follow clinical or genomic status (ITT population) 1.5% improvement

Of note: Analyses ACT vs no ACT is considerably underpowered.



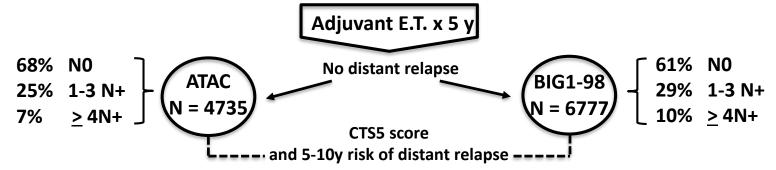
Luminal Breast Cancers

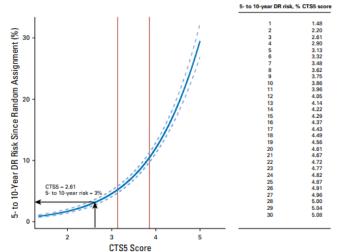
 WHO is at very low or very high risk of recurrence after 5 y of adjuvant E.T.?

WHO will benefit from extended adjuvant endocrine therapy?

Luminal Breast Cancers

Prediction of late distant relapses in ATAC/BIG1-98





60% of N- pts, 15% of pts 1-3 N+ and < 1% pts with \geq 4 N+ have a low score and derive little benefit from extended ET

Dowsett M et al, JCO 2018



Extending adjuvant endocrine therapy in a high risk patient does not mean that she will derive a benefit!

1

Breast Cancer Index (BCI) and benefit from extended hormonal therapy

DC Sgroi et al, abst GS4-08 SABCS 2020

Background Breast Cancer Index (BCI) Biomarker

- The Breast Cancer Index (BCI) is a gene expression-based signature comprised of two functional biomarker panels:
 - HOXB13 and IL17BR (H/I) 2 gene ratio measuring estrogen signaling
 - Molecular Grade Index (MGI) 5 genes measuring tumor proliferative status
- The BCI test reports both a prognostic and a predictive result:
 - The prognostic component consists of the integration of MGI and H/I into a score that quantifies the risk of both late (5–10 y) and overall (0–10 y) distant recurrence^{1,2,4}
 - The predictive component of BCI [BCI (H/I)] has been shown to predict endocrine benefit across multiple different endocrine therapeutic scenarios including extended endocrine therapy.¹⁻³

^{1.} Sgroi DC et al. *J Natl Cancer Inst* 2013;105:1036–42. **2.** Zhang Y et al. *Clin Cancer Res* 2013;19:4196–205. **3.** Bartlett JMS et al. *Ann Oncol* 2019;30:1776–83. **4.** Sgroi DC et al. *Lancet Oncol* 2013;14(11):1067-76.

BCI reaches level I_B for its utility in predicting benefit from extended ET

Tumor marker studies Levels of evidence

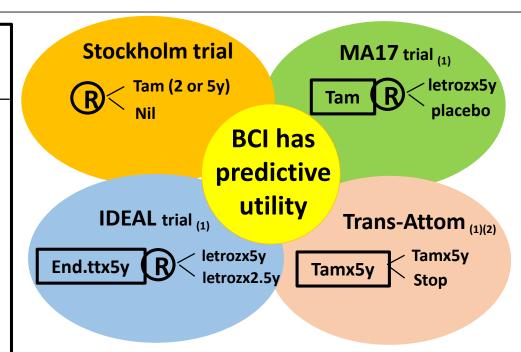
Level I_A Prospective randomized controlled trial designed to address the tumor marker utility

Level IB Prospective trial not designed to address tumor marker but design accommodates tumor marker utility

For a predictive marker the

For a predictive marker the trial must be a R controlled trial

+ ≥ 1 validation study

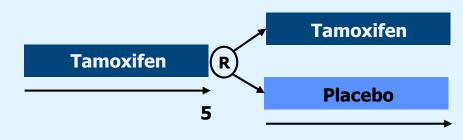


- (1) Statistical significant interaction between extended endocrine therapy benefit and BCI (N=1946 biosamples)
- (2) SABCS 2020: updated data showing lack of predictive value of ER, PgR, AR, Ki67 and confirming BCI utility

Background

Adjuvant Tamoxifen – To Offer More? (aTTom) Trial: Extended Endocrine Therapy

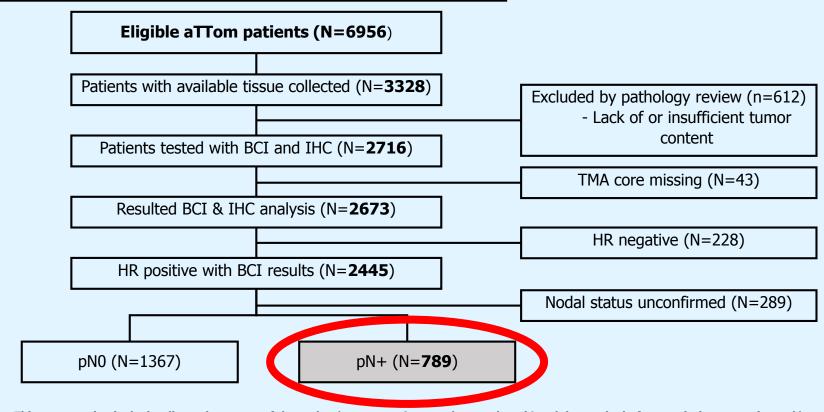
- Prospective phase III trial of 6956 early stage patients who completed at least 4 years of tamoxifen randomized to either stop or continue tamoxifen for an additional 5 years
- Data available to 12.6 years median follow-up (2017)
- Demonstrated benefit from 10 vs 5 years of tamoxifen with a HR HR: 0.86, 95% CI 0.77-0.96, (p=0.006) and a median followup of 8.9 years



(78% ≥ 55 years old, 50% T1, 38% T2, 31% node-positive)

Gray RG et al. J Clin Oncol 2013;31:5-5.

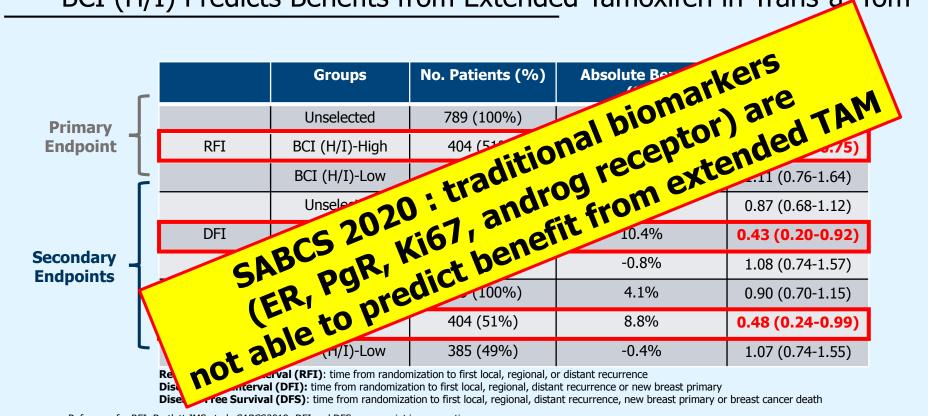
Patient Case Flow



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Background

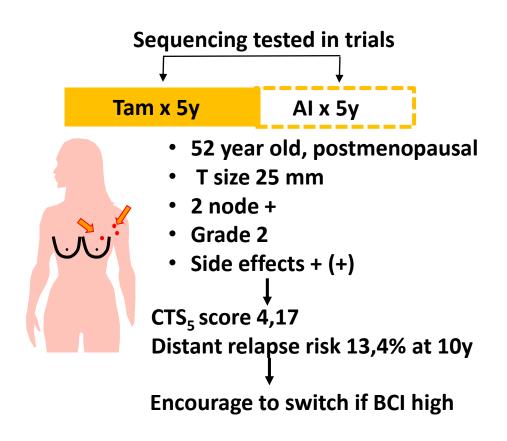
BCI (H/I) Predicts Benefits from Extended Tamoxifen in Trans-aTTom



Reference for RFI: Bartlett JMS et al. SABCS 2019; DFI and DFS: manuscript in preparation

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Using BCI to assist with extended ET decision







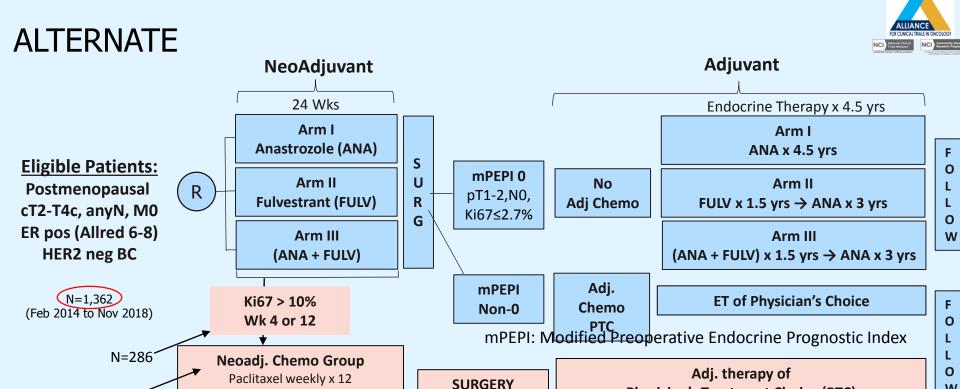


- ALTERNATE (1)
- ADAPT HR+/HER2- (2)

Elegant trials... but clinical utility NOT demonstrated

response guided therapy

- (1) Abst GS4-05, SABCS 2020
- (2) Abst GS4-04, SABCS 2020



The Primary Endpoint: The Endocrine Sensitive Disease (ESD: pCR + mPEPI 0) rate in FULV or FULV + ANA arm was not significantly higher than that of the ANA arm (Ma, C et al ASCO 2020).

N=154

N=1681

OR Chemo of Physician's Choice W

Physician's Treatment Choice (PTC)

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Objective of this analysis

To determine the rate of pCR and residual cancer burden (RCB) following NCT for patients triaged to NCT due to Ki67 > 10% at Wk 4 or 12

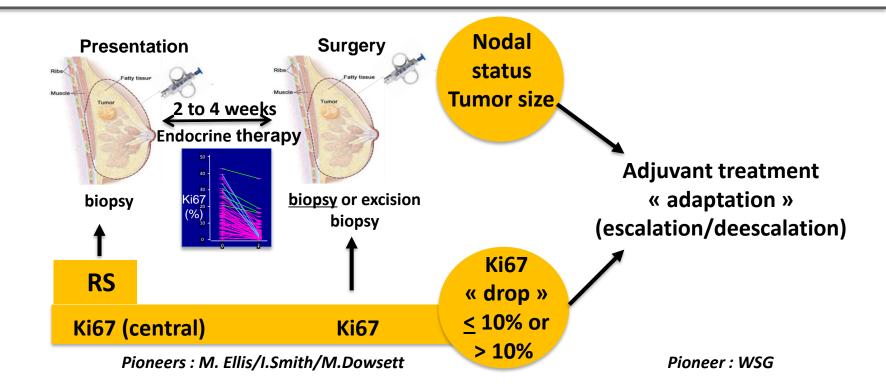
Results

pCR rate	4.8%	Chemotherapy is NOT an
RCB II and III	74% !!	attractive option!

Question

What is the underlying biology of these high risk BCs?

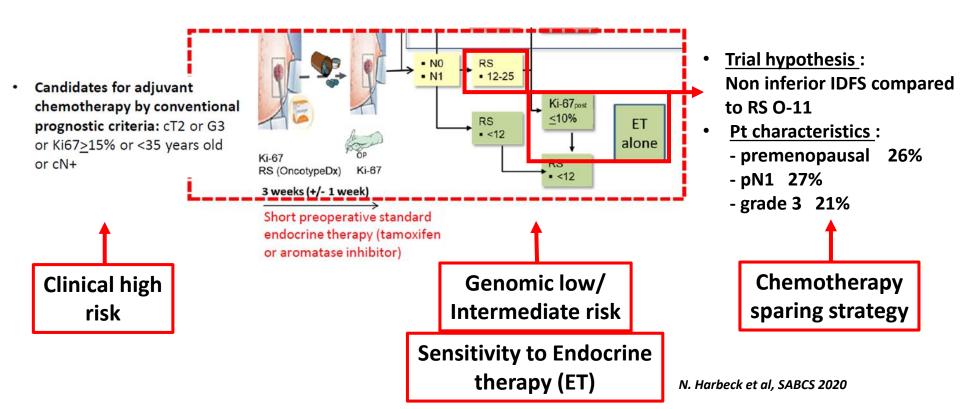
Philosophy of the "ADAPT" trials by the West German Study Group
Integration of baseline and dynamic biomarkers, measured in a short
window of drug exposure, with tumor burden in order to "adapt"
adjuvant systemic therapy



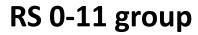


ADAPT HR+/HER2-Study design





ADAPT HR+/HER2- chemotherapy de-escalation (N=2290) 5 year results



N=868 women

RS 12-25/ET responders

N=1422 women

92.6% (95% CI 90.8-94)

95.6%

97.3%

... and no difference according to age (\leq 50 vs > 50), or to nodal status (N0 or 1-3 N+)

* Non inferiority margin respected (< 3.3%): difference is 1.3% with a 95% CI [-3.3% + 0.6%]

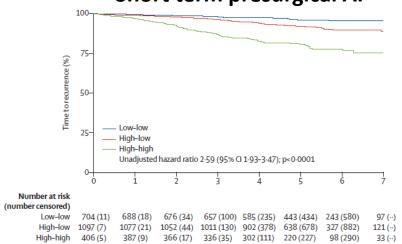
but poor outcome for 3+ Nodes ← (dDFS 76% only)

ADAPT HR+/HER2- chemotherapy de-escalation **Discussion**

- My worries
- My reluctance to use ADAPT HR+/HER2on Monday morning

Dynamic proliferation response to preoperative endocrine therapy is linked to long term outcome

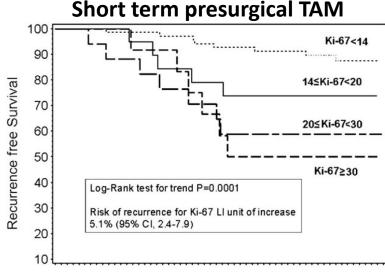




N = 2207 postmenopausal women

SOLID DATA for aromatase inhibitor

DeCensi (2) Short term presurgical TA



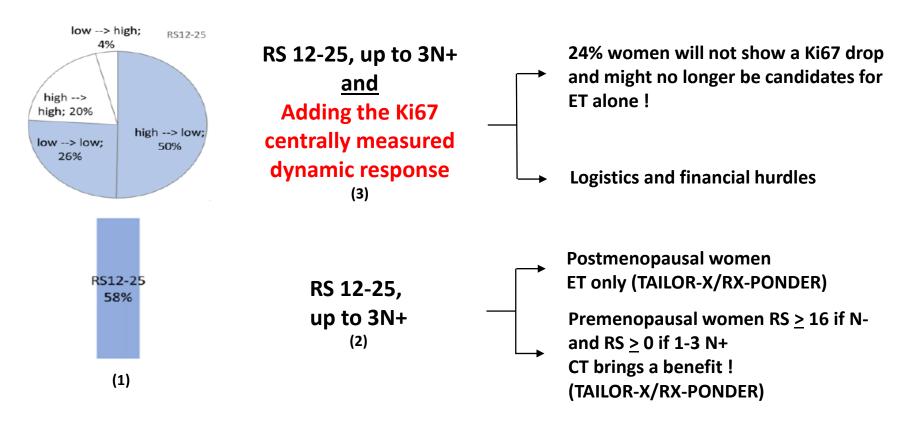
N = 86 postmen + 30 premen women

VERY WEAK DATA for tamoxifen

Particularly in premenopausal women

(1) Smith I et al, The Lancet Oncol, 2020 – (2) DeCensi et al, Annals of Oncol, 2011

Using ADAPT HR+/HER2- on Monday morning?



(1) Nitz et al, Ther Adv Med Oncol, 2020 (2) Sparano, NEJM, 2019 – Kalinsky, SABCS 2020 (3) Harbeck, SABCS 2020

SAN ANTONIO Breast Cancer Conference 2020 Further results from the incorporation of CDK4-6 inhibitors into the adjuvant treatment strategy for high risk luminal BC

• First results of Penelope B (1)

Updated results of Monarch E (2)

San Antonio Breast Cancer Symposium, December 08-11, 2020

PENELOPEB

Study Design

N=1250

- HR+/HER2- breast cancer
- no pCR after NACT
- CPS-EG score ≥3 or ≥2 with ypN+

Primary Endpoint: iDFS

Stratification factors

- Nodal status: ypN 0-1 vs ypN2-3
- Age: ≤50 vs >50 yrs
- Ki-67: >15% vs ≤ 15%
- Region: Asian vs non Asian
- CPS-EG Score: ≥3 vs 2 and ypN+

R

1:



Surgery +/Radiotherapy

Palbociclib

125 mg once daily p.o. d1-21, q28d for 13 cycles

Placebo

d1-21, q28d for 13 cycles

All patients will receive concomitantly endocrine therapy according to local standards

Penelope-B: ClinicalTrials.gov NCT01864746



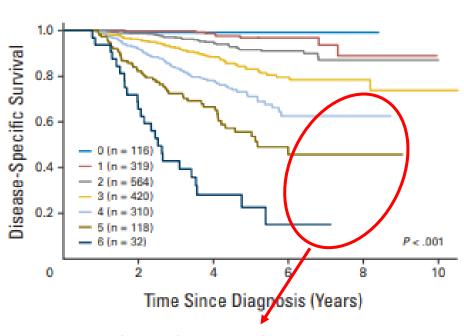




A novel staging system (CPS-EG) predicts disease specific survival after neoadjuvant chemotherapy

Stage	Points
Clinical stage	
1	0
IIA	0
IIB	1
IIIA	1
IIIB	2
IIIC	2
Pathologic stage	
0	0
T. Control of the Con	0
IIA	1
IIB	1
IIIA	1
IIIB	1
IIIC	2
Tumor marker	
ER negative	1
Nuclear grade 3	1

Abbreviations: CPS + EG, clinical-pathologic staging system incorporating ER-negative disease and nuclear grade 3 tumor pathology; ER, estrogen receptor.



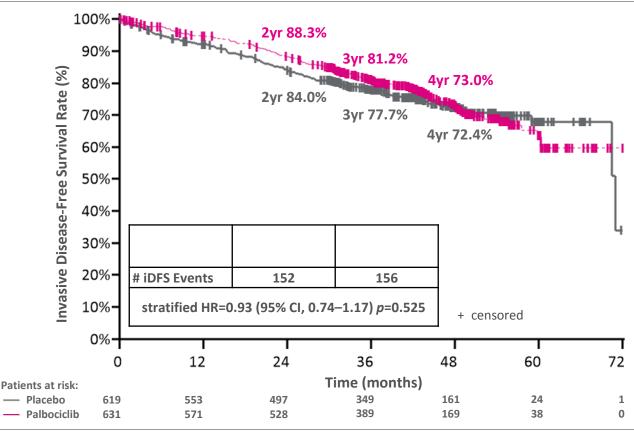
Selected in Penelope B

E. Mittendorf et al, JCO 2011

San Antonio Breast Cancer Symposium, December 08-11, 2020

PENELOPE

Results Primary Endpoint iDFS



Median Follow-Up
42.8 Months

* Weighted log-rank test based on the CHW method, taking into account the adaptive sample size re-estimation and groupsequential nature of the design





CDK4-6 inhibitors in early HR+/HER2- BC

	Penelope B	Pallas	Monarch-E
	N = 1250 Median age 49y Very high risk <u>postneoadj</u> CTX CPS EG score ≥ 3 60% pN2/pN3 50% pN+ 95%	N = 5600 Median age 52y High risk > 4N+ 49%	N = 5637 Median age 51y Very high risk cohort 1 ≥ 4N+ → 60% 1-3N+ & gr 3 or ≥ T3 cohort 2 1-3 N+ and Ki67 ≥ 20%
CDK4-6 inhibitor therapy	Palbo x 1 year intermittent dosing	Palbo x 2 years intermittent dosing	Abema x 2 years continuous dosing
Endocrine therapy	AI 50% Tam 50% LHRH≈10%	AI 67% Tam 32% LHRH≈20%	AI 69% Tam 31% LHRH≈21%
Chemotherapy exposure	100%	83%	95%

CDK4-6 inhibitors in early HK+/HEKZ- BC					
	Penelope B	Pallas	Monarch-E		
Primary endpoint	IDFS	IDFS	IDFS		
Secondary endpoint	DRFS	DRFS	DRFS		
Analysis	« final » N=308 events	2 nd interim N=351 events	2 nd interim / SABCS N=323 events /N=390 events		

43 months

HR 0.93 (95% CI 0.74-1.17)

p 0.52

88.3% vs 84%

81.2% vs 77.7%

NA

at 24 m!

there was a 4% benefit

Median F-up

Results IDFS

2y IDFS

3 y IDFS

Remarks

DRFS

24 months

HR 0.93 (0.76-1.15)

88.2% vs 88.5%

HR 1.00 (0.79-1.27)

0.3% benefit

 $15.5 \rightarrow 19.1$ months

HR $0.74 \rightarrow$ HR 0.71 (0.58-0.87)

p 0.0009

92.3% vs 89.3%

NA

3% absolute benefit

HR 0.68 (0.55-0.85)

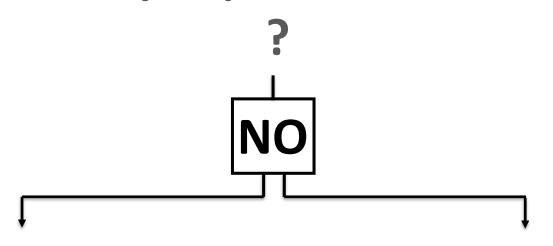
Possible greater benefit in

patients with Ki67 > 20%

CDK4-6 inhibitors in early HR+/HER2- BC

	Penelope B	Pallas	Monarch-E
Still on therapy	0%	26%	58% (!)
Premature treatment discontinuation	20%	42%	28%
Side effect profile			
 Neutropenia gr 3-4 	70%	61%	44%
 Diarrhea gr 3-4 	N.A.	0.7%	7.6%
Fatigue	N.A.	40%	38%
Arthralgia	N.A.	34%	20%
 Hot flushes 	N.A.	24%	14%
• VTE	?	?	2,3%





Demonstration of « robust » efficacy awaits a longer follow-up ... hoping that we are not just treating OCCULT METASTATIC DISEASE

Full demonstration of tolerability and safety awaits all patients to be off protocol therapy



SABCS 2020 Early BC



Most important take-home message

Luminal BC, high clinical risk (up to 2-3 N+) and low genomic risk

No adjuvant CT for postmenopausal women







... but we learned a lot!

THANK YOU