

Therapeutic Resistance

High-Risk

Low-Risk

Molecular Subtype

Specific Drug Therapy

Cancer Recurrence

Hormonal or Chemotherapy

SYMPHONY™

Personalized Breast Cancer Genomic Profile



mammaPrint®
Breast Cancer Recurrence Signature



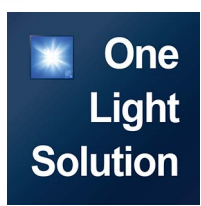
blueprint®
Molecular Subtyping Signature



targetprint®
ER/PR/HER2 Expression Assay



theraprint®
Therapy Gene Assay



Argentina, Chile & Uruguay



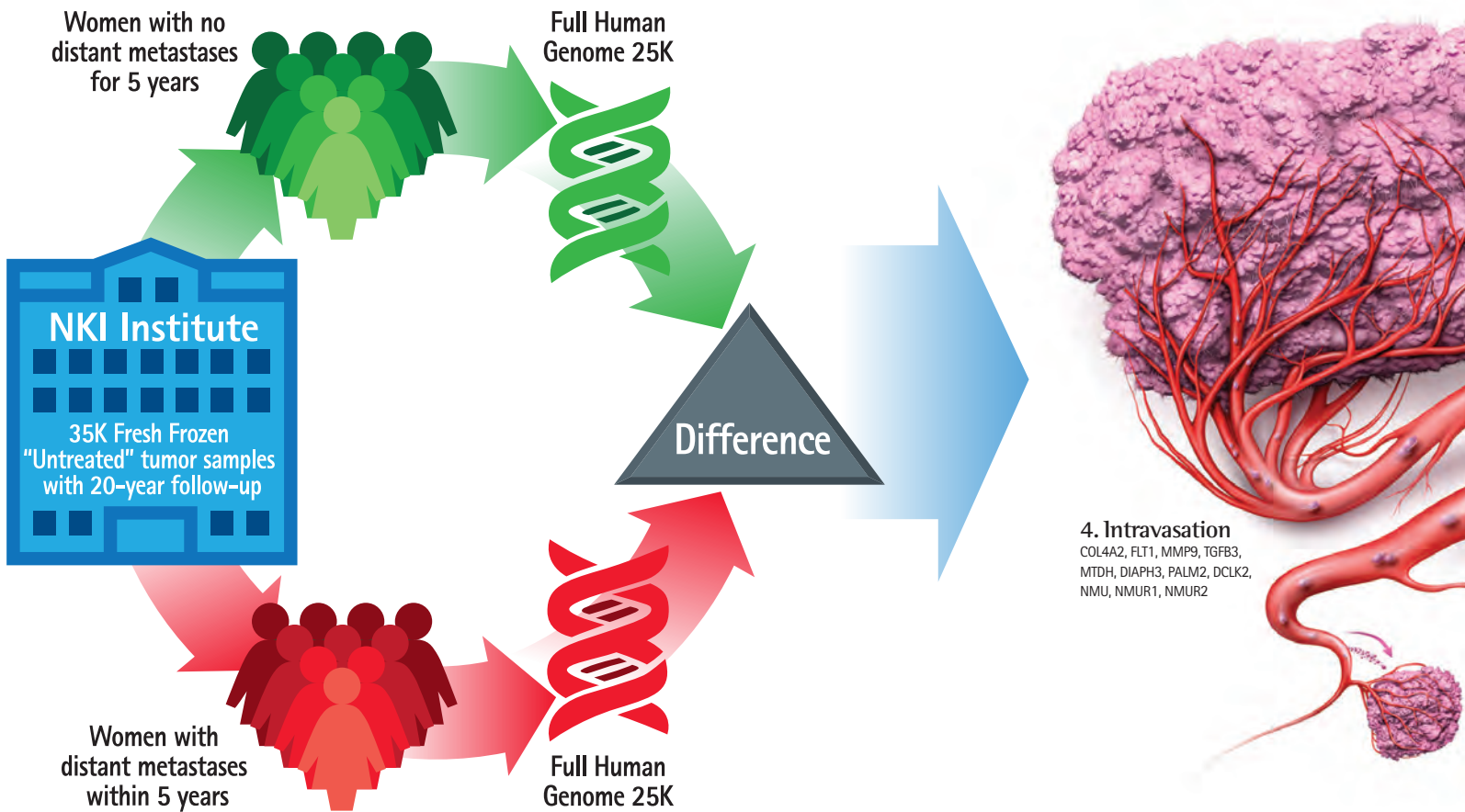
agendia®
decoding cancer.

When biology speaks, we listen.

Achieving definitive results by analyzing the entire human genome.

The SYMPHONY™ signature development process began by identifying two groups of women: those who had a recurrence within five years following surgery and those who were cancer free at five years. The entire human genome of 25,000 genes was analyzed for both groups, and the resulting differences in gene expression were captured. What's more significant, is that none of the women in either group were treated with either chemo or hormonal therapy. This control process allowed the pure biology of the tumors to be followed for more than 20 years – ultimately ensuring a definitive, actionable result for each of your patients.

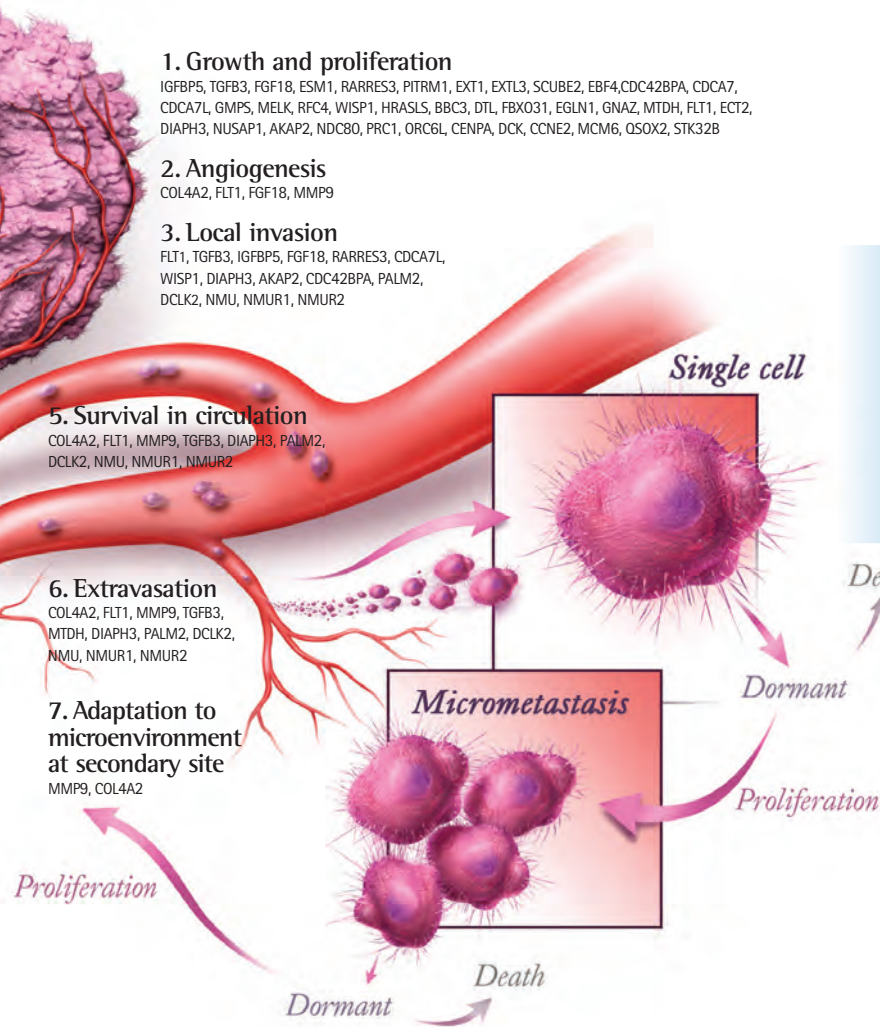
Analyzing genome in all



The benefit – 100% definitive results.

SYMPHONY results are valid at the time of diagnosis. Agendia's signatures were developed independent of drug therapy. Thus, the actual test result will indicate the prognosis for your patient if no therapy is provided. You do not have to assume that your patient will remain on a course of therapy to validate the test results. Which makes the SYMPHONY suite of genomic assays the perfect accompaniment to your current protocols.

the entire human
ensures gene coverage
7 Metastatic Pathway steps.



Can chemotherapy be
withheld safely from patients
identified as “Low Risk”?



mammaPrint®
Breast Cancer Recurrence Signature
70-gene signature
Prognostic and predictive tumor analysis

What therapy is most
appropriate for the patient’s
molecular subtype?



blueprint®
Molecular Subtyping Signature
80-gene signature
Profiles Basal, Luminal and HER2 subtypes

Is the patient a candidate
for targeted therapy?



targetPrint®
ER/PR/HER2 Expression Assay
Centralized quantification of mRNA
for receptor status

What potential therapy options
are available if the patient’s
cancer recurs?



theraPrint®
Therapy Gene Assay
56-gene measurement
Gene expression analysis for alternative therapy

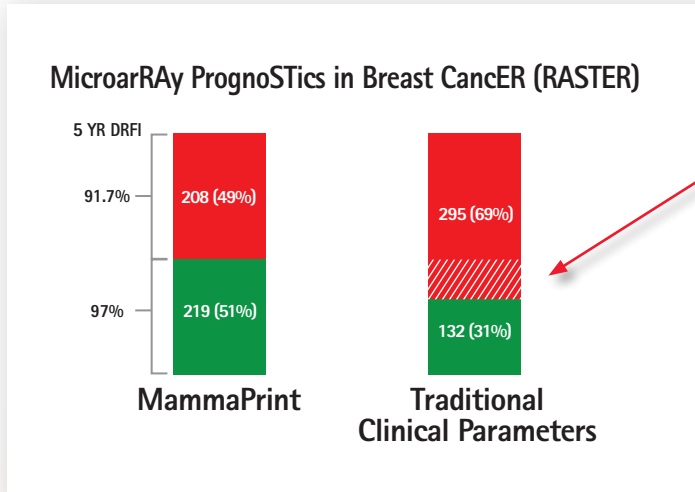
SYMPHONY™ MammaPrint®

A powerful, prognostic and predictive biomarker that helps you determine if you can safely withhold CT from “Low Risk” patients.

5 Year Prospective Evidence >97% DRFI

RASTER (MicroarRAy PrognosTIcS in Breast CancER)

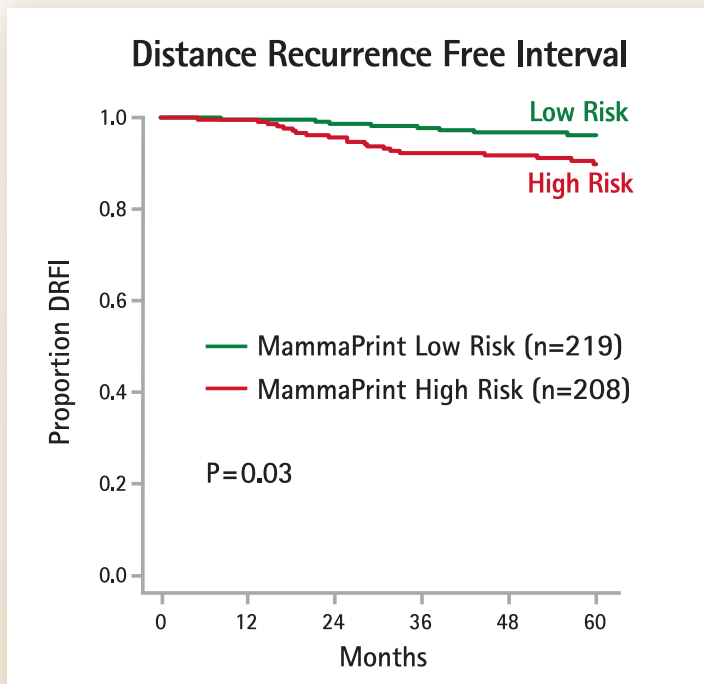
Linn, et al – 427 patients with 5 years follow-up (EBCC, 2012)



MammaPrint identified 29% more Low Risk patients than traditional clinical parameters with 98.4% DRFI.

Results

- Low Risk – 5yr DRFI = 97% (85% no chemotherapy)
 - ▼ Low Risk – 5yr DRFI = 97% (no chemotherapy)
- High Risk – 5yr DRFI = 91.7% (81% chemotherapy)
- MammaPrint helps to identify the right patients for the right therapy

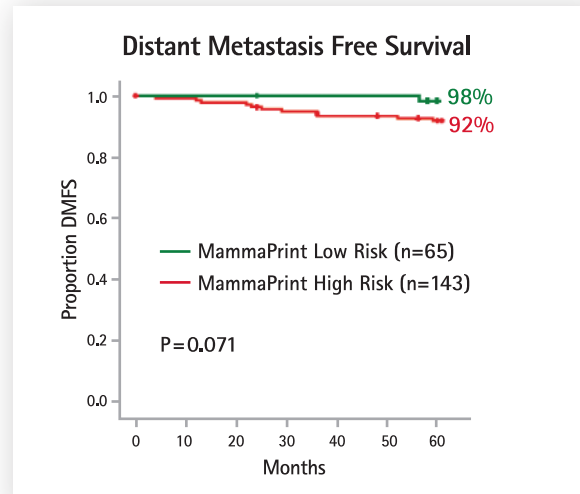


5 Year Retrospective Evidence >95% DMFS

Christofanilli, et al – 208 patients with 11.3 years follow-up (ASCO, 2012)

Results

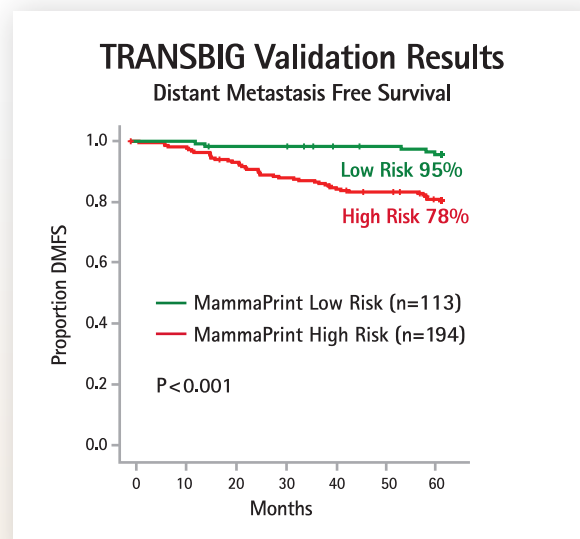
- Low Risk – 5yr DMFS = 98% (36% chemo)
 - ▼ Low Risk – 5yr DMFS (no chemo) = 100%
- High Risk – 5yr DMFS = 92%
73% treated with adj CT



Buyse – 307 patients with 13.6 years follow-up (Journal National Cancer Institute, 2006)

Results

- Low Risk – 5yr DMFS = 95% DMFS
(No Adjuvant therapy)
- High Risk – 5yr DMFS = 78% DMFS
(No Adjuvant therapy)
- Independent FDA clearance validation

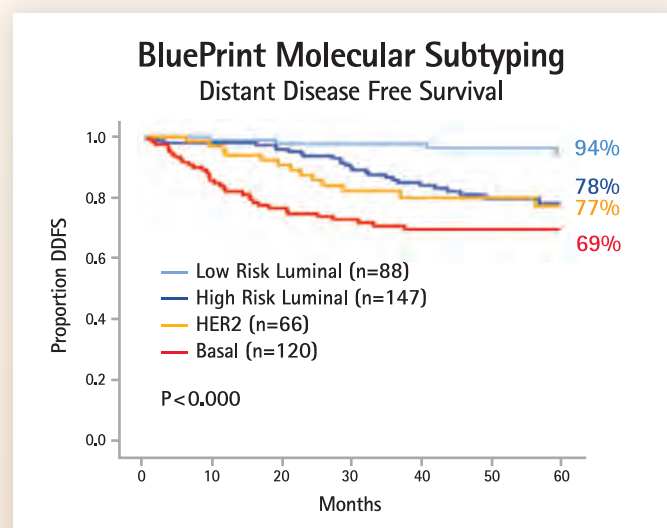


5 Year Neo-Adjuvant Evidence >94% DDFS

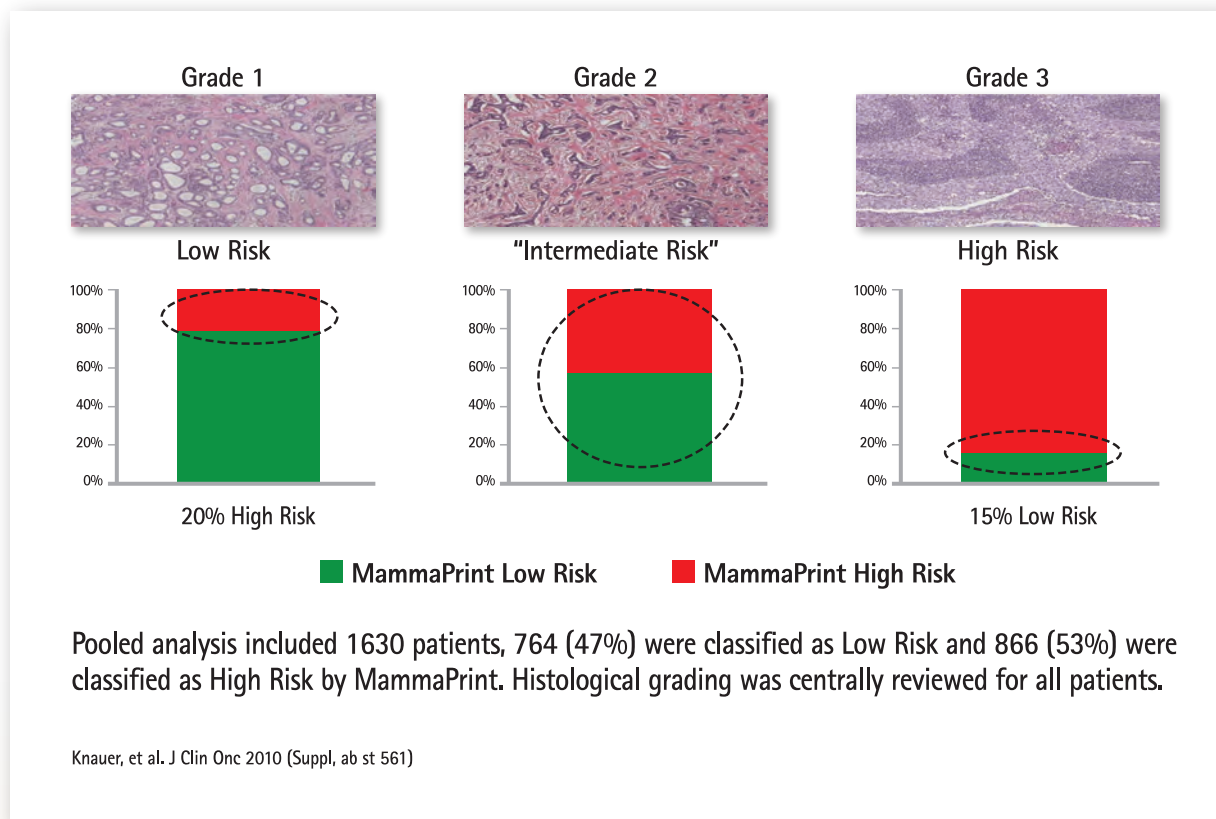
Glück, et al – 421 patients (ASCO, 2012)

Results

- Low Risk – 5yr DDFS = 94%
- Low Risk – 3% pCR yet 94% DDFS

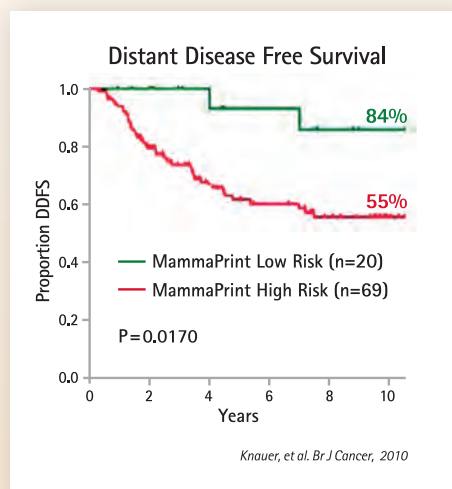


MammaPrint provides additional biological information on indeterminate cases.

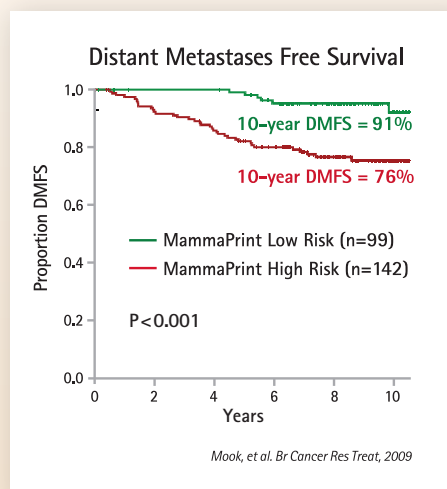


MammaPrint provides additional biological information even with traditional clinically determinate cases.

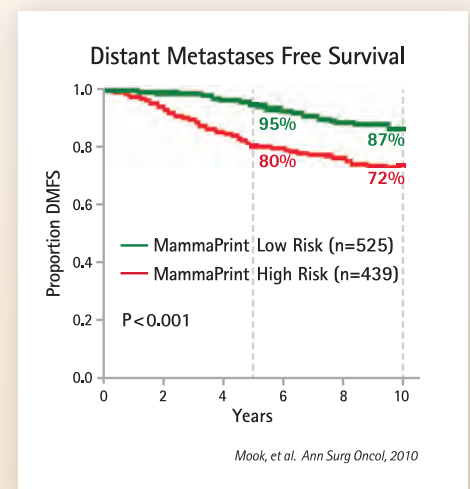
Not all HER2+ and lymph node positive cases are High Risk and not all Node negative, small tumors are Low Risk. MammaPrint will stratify these cases into Low and High Risk. This information may be helpful for your treatment decisions with patients who have significant co-morbidities.



HER2+



LN+ (1-3)



T1

The MammaPrint gene signature has been extensively validated.

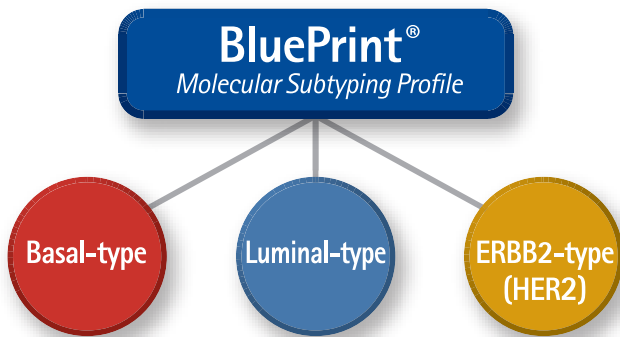
Publications	Country	Reference	Patients							
			2002	2006	2007	2008	2009	2010	2011	2012
MammaPrint Discovery		van 't Veer, et al. Nature	78							
Primary Validation Study		van de Vijver, et al. NEJM	295							
Independent European Study		Buyse, et al. JNCI		302						
Prospective Impact Study		de Mesquita, et al. Lancet Oncology			427					
Core Needle Biopsies		Mayordomo, et al. ESMO Meeting				35				
Validation in Older US Patients		Wittner, et al. Clin Cancer Res				100				
Validation in 1–3 LN+ Patients		Mook, et al. Br Cancer Res Tr				241				
Dutch Patient Cohort		de Mesquita, et al. Eur J Can				123				
Patients Treated with Tamoxifen		Kok, et al. Eur J Can					192			
Japanese Patient Cohort		Ishitobi, et al. JJCO					118			
Validation in 4–9 LN+ Patients		Saghastchian, et al. St. Gallen Conf					167			
Neoadjuvant Predictive Study		Straver, et al. Br Cancer Res Tr					162			
Predictiveness (Meta-Analysis) Study		Knauer, et al. Br Cancer Res Tr						1,696*		
Validation in Post Menopausal Women		Mook, et al. Ann Oncology						148		
Identification of Low Risk Patients in HER2+		Knauer, et al. British Journal of Cancer						168		
Comparison to German Guidelines		Gebensleben, et al. Int J Mol Med						140		
Validation in T1 Tumors		Mook, et al. Ann Surg Oncol						964*		
Prospective Validation MINDACT		Rutgers, et al. Eur J Can							6,600	
Validation in US Patient Cohort		Yao, et al. ASCO								208
5 Year Prospective Validation		Linn, et al. EBCC								427
Predicting Local Recurrence		Beitch. ASBS								594*
Neoadjuvant Prediction		Glück, et al. ASCO								421*
Implementation in US Population		Nguyen, et al. Ann Sur Onc								135



* Pooled analysis

SYMPHONY™ BluePrint®

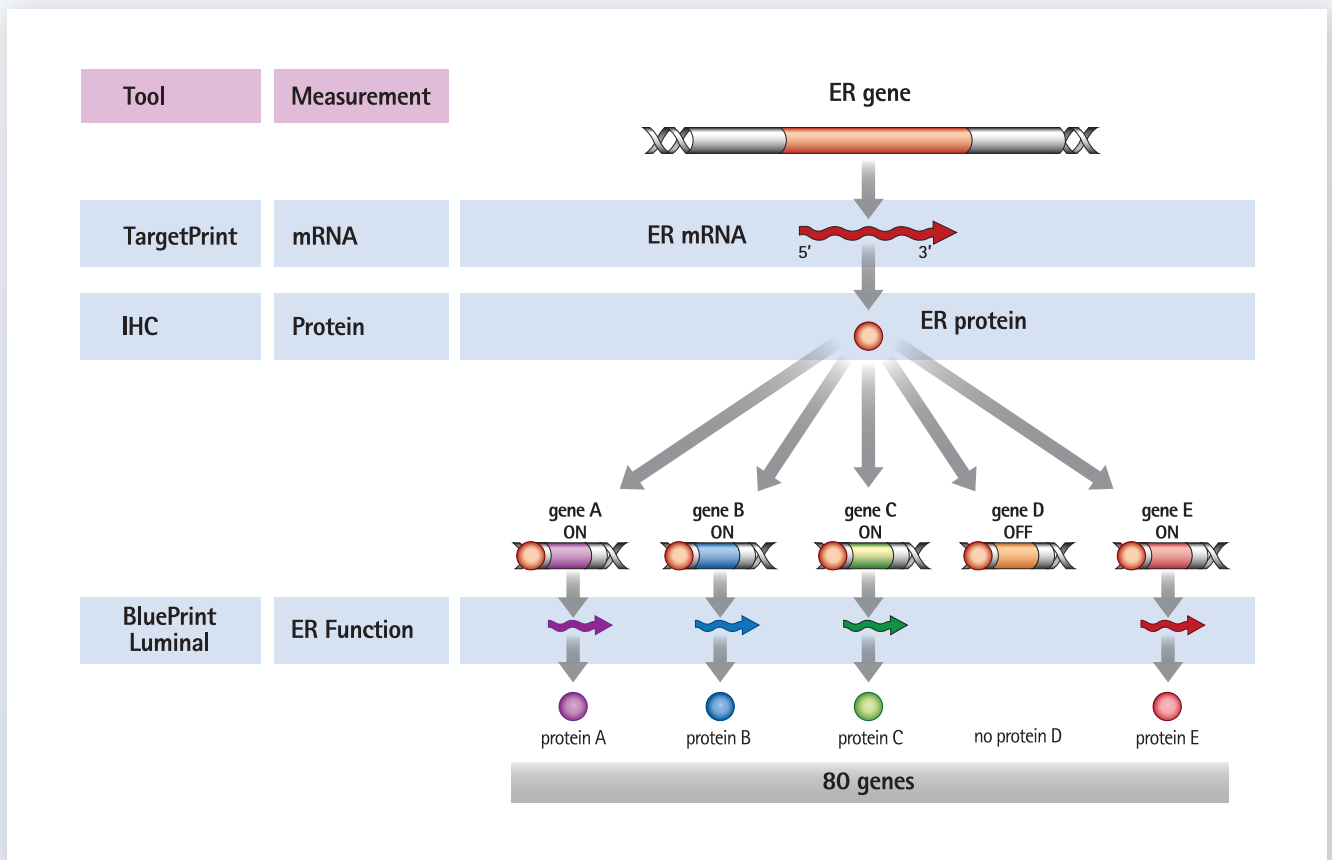
Identifies molecular subtypes to help you select the right therapies for each patient.



In *Nature* 2000, Sorlie and Perou identified tumor subtypes that may respond differently to adjuvant therapy. Agendia has developed a multi-gene profile for the classification of breast cancer into Basal-type, Luminal-type and ERBB2-type (HER2) molecular subtypes. The BluePrint molecular subtyping signature provides a greater level of clinical information to assist in therapeutic decision-making.

BluePrint measures gene function – not just the presence of the protein receptor.

While the two common ways (IHC/FISH) to measure ER/PR/HER2 will determine if the receptor is present, they do not determine their functional activity. BluePrint gene signature was designed to measure actual gene function, alerting you to the potential effect of adjuvant therapy.



SYMPHONY™ BluePrint®

MINDACT – Clinical data from the first 600 patients supports the clinical utility of BluePrint molecular subtyping.

HER2+ and ER+ are often BluePrint Luminal.

- There is a large group of clinical HER2+ cases that are BluePrint Luminal type (46%)
- In this group the tumor's expression of the Luminal profile is dominant over the expression of the HER2+ profile
- These patients may have a lower response to Trastuzumab (von Minckwitz, et al, 2012)
- Patients with co-morbidities, where there is a concern about aggressive therapy, may fall within a recently identified subset

Even the best Ki-67 assessment shows 30% discordance with MammaPrint.

- Ki-67 is assumed to be a fairly reliable measure of proliferation. Ki-67 is utilized as a biomarker for chemotherapy
- The concordance between MammaPrint and centrally assessed Ki-67 in Luminal-type patients is 71%, with a k score of 0.35 (95% CI 0.26–0.45)
- The relatively high discordance with MammaPrint indicates that Ki-67 and MammaPrint cannot reliably substitute for each other

BluePrint Molecular Subtyping ¹					
IHC/FISH	Luminal A <small>BluePrint Luminal MammaPrint Low Risk</small>	Luminal B <small>BluePrint Luminal MammaPrint High Risk</small>	HER2 <small>BluePrint HER2+</small>	Basal <small>BluePrint Basal+</small>	Total
ER+ and/or PR+ HER2-, Ki-67 low	263	19	4	1	287
ER+ and/or PR+ HER2-, Ki-67 high	111	70	4	11	196
ER+ and/or PR+ HER2+	25	3	31	1	60
ER-/PR-/HER2+	1	0	13	2	16
ER-/PR-/HER2-	0	0	1	61	62
Total	400	92	53	76	621

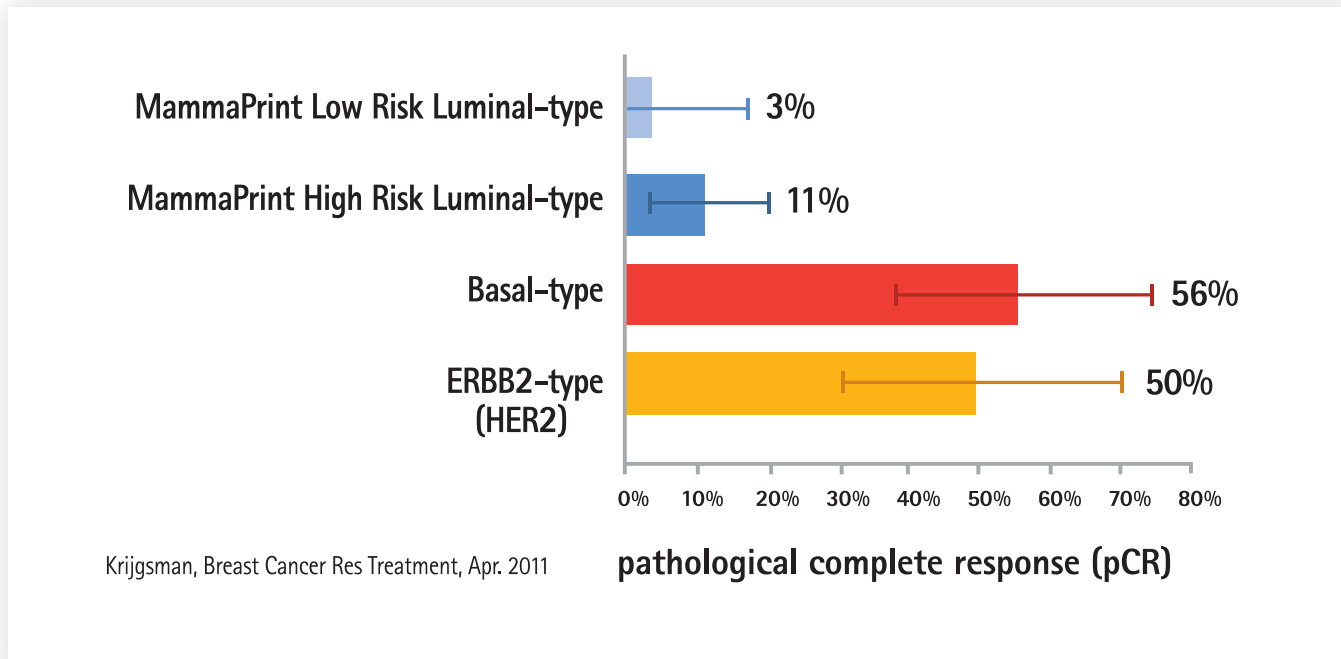
1. Viale, et al. (ASCO, 2012)

20% of BluePrint Basals were IHC ER+.

- These patients might not benefit from Endocrine therapy
- Of the BluePrint Basal cases, 20% are not pathological Basal (16% ER+, 4% HER2+)
- Of the 16% ER+ cases, the majority (80% are IHC ER/PR borderline ($\geq 1\%$ and $< 10\%$))

The predictive advantage of adding Blueprint to MammaPrint.

The Blueprint gene signature, when combined with MammaPrint risk recurrence, provides additional information to therapy response.



Basal and HER2-type show significantly higher pCR rates when treated with standard neo-adjuvant chemotherapy.

Therapy response varies by molecular subtype.

SYMPHONY Result	Prognosis	Chemosensitivity	Survival with recommended therapy
Low Risk Luminal	Good baseline prognosis	Low pCR, no expected benefit from chemotherapy	Excellent
High Risk Luminal	Poor baseline prognosis	Relatively low pCR, some benefit from chemotherapy	Good
High Risk ERBB2	Poor baseline prognosis	High pCR, especially with targeted therapy	Increased with therapy
High Risk Basal	Poor baseline prognosis	High pCR, high benefit from chemotherapy	Increased with therapy

Glück, et al. (ASCO, 2012)

SYMPHONY™ TargetPrint®

Objectively measures mRNA to accurately quantify your patients' ER/PR/HER2 levels.

In 2010, ASCO and CAP found in a review of the literature published since 1990, that up to 20% of current IHC determinations of ER/PR may be inaccurate¹ due to pre-analytic variables, with thresholds for positivity and interpretation criteria being the major causes.

- Subsequently, Viale, et al reported false negative rates for ER/PR ranges from 20%-30% and up to 60%-70%².
- Perez, et al also reported that the false positive rates for HER2 ranged from 20%-30% for IHC and 10%-15% for FISH³.
- Ma, et al found that "As part of our study, we demonstrated that determining hormonal receptor status by mRNA expression from FFPE tissues provided excellent concordance with IHC, as reported by others – and mRNA-derived receptor status is **more strongly associated with clinical outcome**"⁴.

High concordance of protein (by centralized IHC using FDA-cleared kits), gene (by FISH; HER2 only) and microarray readout (by TargetPrint) of ER/PR/HER2: results from the MINDACT trial.

TargetPrint	Concordance (95% CI)
ER	98% (96–99%)
PR	85% (82–88%)
HER2	96% (94–97%)

N=626. Viale, et al., SABCS Poster Presentation 2011.

The microarray-based assessment of ER, PR and HER2 gives results comparable to IHC and FISH and provides an objective and quantitative assessment of tumor receptor status. TargetPrint is part of a multi-profile platform for breast cancer treatment management.

targetprint®
Page 1 of 1

CUSTOMER
Doctor: Martin P. McDonald
Address: St. Luke's Hospital - Allentown
1801 Hamilton Street, Suite 100
City, St., Zip: Allentown PA 18106

SPECIMEN
Requisition #: E2145878
Collection Date: Jan-03-2010
Date Received: Jul-21-2010
Specimen Type: FFPE, Core
Customer Ref.: MRN123456

PATIENT
Patient: (anonymized)
DOB: (anonymized)
Patient #: (anonymized)
Gender: (anonymized)
SSN: (anonymized)

Quantitative Gene Expression Results

Estrogen Receptor
ER Positive
ER: -1 to 1 scale, value +0.60 (ER Positive)

Progesterone Receptor
PR Positive
PR: -1 to 1 scale, value +0.60 (PR Positive)

HER2/neu
HER2 Negative
HER2: -1 to 1 scale, value -0.33 (HER2 Negative)

Assay Description
TargetPrint determines the mRNA levels of estrogen receptor (ER), progesterone receptor (PR) and HER2 using DNA microarray technology. The values of the DNA microarray readout for these three genes have been validated in over 600 breast cancer samples against conventional immunohistochemistry (IHC) and fluorescence in situ hybridization (FISH), allowing a conversion of the microarray values to IHC and FISH equivalence which are shown in the red and green. The ER, PR and HER2 microarray values were compared to IHC which was assessed at one central laboratory indicating a 93% concordance (95CI: 91-95%) for ER, an 83% concordance (95CI: 80-86%) for PR and a 96% concordance (95CI: 94-98%) for HER2 respectively. For ER and PR a threshold of 1% IHC positive stained tumor cells was used to classify samples as positive; for HER2, an IHC score of 3+ was considered positive; in case of 2+ samples, FISH assessed final HER2 amplification status.

Pathology Results
Tumor Percentage: 30%
RNA Integrity Score: N/A
Pathology/Additional Comments: None

Sign Off
Cheryl Henning, MD
Pathologist
Laboratory Director

References
1. Hammond M, Hayes D, Allred D, et al. American Society of Clinical Oncology/College of American Pathologists guideline recommendations for immunohistochemical testing of estrogen and progesterone receptors in breast cancer. J Clin Oncol. 2010;28(16):2784-95
2. Viale G, Regan MM, Maiorano E, et al. Prognostic and predictive value of centrally reviewed expression of estrogen and progesterone receptors in a randomized trial comparing letrozole and tamoxifen adjuvant therapy for postmenopausal early breast cancer: BIG 1-98. J Clin Oncol 2007; 25: 3846-52
3. Perez EA, Suman VJ, Davidson NE, et al. HERT testing by local, central, and reference laboratories in specimens from the North Central Cancer Treatment Group N9831 intergroup adjuvant trial. J Clin Oncol 2006;24:3032-8
4. Ma X, et al. The HOXB13:IL17BR Expression Index Is a Prognostic Factor in Early-Stage Breast Cancer. J Clin Oncol. 2006; 24:4611-4619

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ADVANCED GENOMICS

1. Hammond M, Hayes D, Allred D, et al. American Society of Clinical Oncology/College of American Pathologists guideline recommendations for immunohistochemical testing of estrogen and progesterone receptors in breast cancer. J Clin Oncol. 2010;28(16):2784-95
2. Viale G, Regan MM, Maiorano E, et al. Prognostic and predictive value of centrally reviewed expression of estrogen and progesterone receptors in a randomized trial comparing letrozole and tamoxifen adjuvant therapy for postmenopausal early breast cancer: BIG 1-98. J Clin Oncol 2007; 25: 3846-52
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Working in concert with you for better patient care.

SYMPHONY is the most comprehensive decision support profile available for physicians treating breast cancer. By providing a complete profile of genomic assays, SYMPHONY gives you the tools needed to address complete decisions for any type and stage of breast cancer.

Physician Summary Report

A powerful prognostic and predictive biomarker that helps you determine if you can safely withhold chemotherapy.

Identifies targets for therapy.

Identifies molecular subtypes to help you select the right therapies for each patient.

Potential alternate therapy when there was no response to standard therapies.

The screenshot displays the SYMPHONY Personalized Breast Cancer Genomic Profile report. It is divided into several key sections:

- GENERAL SUMMARY:** Features 'mammaPrint' with 'LOW RISK' and 'HIGH RISK' categories. It provides detailed prognostic information, such as 'Low risk: 10 year Distant Metastasis-Free Survival (DMFS) prior to treatment ~90%; these patients can expect their risk to be reduced up to 50% with adjuvant hormonal therapy.' and 'High risk: 10 year DMFS prior to treatment ~71%; these patients can expect their risk to be reduced with adjuvant chemotherapy.'
- TARGETPRINT:** Includes 'GENE EXPRESSION ANALYSIS' for Estrogen Receptor, Progesterone Receptor, and HER2. It provides results for ER POS / NEG, PR POS / NEG, and HER2 POS / NEG, along with clinical interpretations of these markers.
- BLUEPRINT:** Focuses on 'MOLECULAR SUBTYPING RESULTS' with categories for Basal-type, Luminal-type, and ERBB2-type. It explains the characteristics of these subtypes and their response to various treatments.
- THERAPRINT:** A 'Therapy Gene Assay' (56-gene measurement) used for 'Gene expression analysis for alternative therapy' when standard treatments are not effective.

At the bottom of the report, there is a disclaimer and contact information for Agendia, including the address: 22 Morgan | Irvine | CA 92618 | ph: 888.321.2732 | fax: 866.756.7548 | customercare@agendia.com | www.agendia.com

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