MammaPrint + BluePrint Testing

What is MammaPrint + BluePrint Testing?

MammaPrint:

- The MammaPrint test is a genomic test that analyzes the activity of a group of 70 genes from a breast cancer tissue sample that can affect how likely a cancer is to recur and if there is a benefit of chemo-or endocrine therapy.
- MammaPrint is a prognostic and predictive diagnostic test for early stage breast cancer patients that assess the risk that a tumor will metastasize to other parts of the body.

BluePrint:

- BluePrint is a breast cancer genomic test that identifies tumor's molecular subtypes and may help guide a physician when making treatment recommendations. Everybody's breast cancer is different and may respond differently to treatment.
- BluePrint analyzes 80 different genes to classify tumor into three different functional molecular subtypes: Luminal-type, HER2-type, and Basal-type, each with marked differences in long-term outcome and response to neoadjuvant chemotherapy.
- According to a study in Cancer Research, the BluePrint molecular subtyping reclassifies up to 25% of breast cancers from traditional diagnostic tests like IHC and FISH.2

What is the clinical utility of MammaPrint (70 genes) + BluePrint (80 genes) Testing?

- MammaPrint enables confident treatment planning for all early stage breast cancer patients
- MammaPrint reduces chemotherapy utilization by 46%, sparing patients from the unnecessary burden of treatment side effects
- MammaPrint provides a binary result, either high risk or low risk.

- Patients with a low risk result are unlikely to develop distant metastases and are therefore unlikely to benefit from chemotherapy.
- Molecular diagnostics are used in combination with traditional clinicopathologic factors to decide on a treatment plan.
- For women over 50, MINDACT provided long-term follow-up data confirming those with a MammaPrint Low Risk result may safely avoid chemotherapy, regardless of clinical risk
- For women 50 and younger, MammaPrint results can be used as part of shared decision making regarding ovarian suppression or chemotherapy
- Since many breast cancers are considered genomically low-risk independent from clinicopathology, a significant number of patients can be saved from overtreatment with chemotherapy.

What are the Indications of MammaPrint + BluePrint Testing?

- Breast Cancer Stage 1 or Stage 2
- Tumor size <5.0 cm
- Lymph node negative (up to 3 positive lymph nodes in most countries)
- Estrogen receptor positive (ER+) or Estrogen receptor negative (ER-)
- Women of all ages for breast as a cancer prognostic and predictive diagnostic test

What are the Guidelines/Publications of MammaPrint + BluePrint Testing?

MammaPrint and BluePrint are backed by extensive clinical trials and research collaborations resulting in > 100 of publications that demonstrate their performance and clinical utility. It is recommended in the following guidelines:

- Dutch Institute CBO Guidelines for treatment of primary breast cancer
- St. Gallen's International Oncology Guidelines for the treatment of early stage breast cancer
- German Gynecological Oncology Group (AGO) guidelines for breast cancer management
- European Group on Tumour Markers (EGTM)
- In February 2007, the U.S. Food and Drug Administration (FDA) cleared the MammaPrint test
- NCCN guidelines
- ASCO guidelines
- ESMO guidelines

What are the Key Clinical trials of MammaPrint + BluePrint Testing?

1. MINDACT
2. PROMIS
3. STO-3
4. MINT
5. NBRST

MINDACT- 2016/20 findings:

MINDACT (Microarray in Node-negative and 1-3 node-positive Disease may Avoid Chemotherapy) was a phase III, prospective, randomized clinical study supported by the European Organization for Research and Treatment of Cancer (EORTC-10041/BIG3-04). The trial was designed primarily to determine whether the MammaPrint test could be used to safely de-escalate patients with early stage breast cancer from chemotherapy treatment without compromising their outcomes.

- 46% of MINDACT clinically high-risk patients were reclassified as genomically low risk by MammaPrint and therefore could be spared adjuvant chemotherapy
- 95% for clinically high-risk patients who were reclassified by MammaPrint as genomically low risk, 95% were free of distant metastasis* at 5 years without chemotherapy
- 96% for patients who were high clinical risk but MammaPrint low risk with 1-3 involved lymph nodes, 96% were free of distant metastasis* at 5 years without chemotherapy

PROMIS -2015 findings:

In 2015, PROMIS2 (Prospective Study of MammaPrint in Breast Cancer Patients with an Intermediate Recurrence Score) evaluated 840 patients with early-stage breast cancer who had received an "intermediate" recurrence result from the Oncotype DX genomic test. The aim was to assess the change in physician treatment decisions after receiving a MammaPrint result.

- 45% of Oncotype DX intermediate risk patients were reclassified as low risk by MammaPrint.
- 55% of Oncotype DX intermediate risk patients were reclassified as high risk by MammaPrint.
- 76%of patients had their treatment plan changed based on their MammaPrint result.

STO-3 (Stockholm Tamoxifen Trial-2017) findings:

These patients (Lymph node negative, most of whom received only two years of treatment with tamoxifen, had an observed 20-year breast cancer specific survival of 97%.

Patients with a Late Recurrence (20yr) Low Risk result who did not receive any treatment post-surgery (neither chemotherapy nor hormone therapy) had a 94% breast cancer specific survival rate. These data may help in counseling endocrine therapy. If a woman experiences a lot of side effects, she may feel confident to stop endocrine therapy if she has an Ultralow test result. MammaPrint Ultralow Risk was studied in a group of post-menopausal, lymph node negative women with tumors less than 3cm.

What are the Unique Selling Points of MammaPrint + BluePrint Testing?

1. FDA Cleared
2. NCCN, ASCO recommended
3. Backed by the highest level of evidence (1A) with the independent MINDACT trial, and other clinical trials and research collaborations resulting in>100 publications
4. binary result, either high risk or low risk.
5. 150 genes coverage (Mammaprint-70, Blueprint- 80) Comprehensive: Analyses 70-genes across the entire process of cancer metastases, more than any other test
6. Only test that also offers molecular subtyping with BluePrint.

Which are the target doctors for MammaPrint + BluePrint Testing?

1. Medical Oncologist
2. Surgical/Radiation Oncologist

3. Breast Oncologist
4. Breast surgeons? (depends per country)

How MammaPrint + BluePrint Testing is better than competitors?

S.No.	Details	MammaPrint® & BluePrint®	OncotypeDX®	Endopredict®	Prosigna® (PAM50)	Breast Cancer Index®
1.	Number of Genes	150 (+465 control)	16 (+5 control)	8 (+4 control)	50 (+8 control)	7 (+4 control)
2.	Technique*	Microarray & NGS (RNA)	qRT-PCR (RNA)	qRT-PCR (RNA)	Direct Hybridization (RNA)	qRT-PCR (RNA)
3.	Patient Population[1,2]	MP: ER+/-, HER2+/-, N+/-	ER+/HER2-, N-	ER+/HER2-, N-	ER+/HER2-, N-	ER+/HER2-, N-
4.		BP: All ESBC				
5.	TAT for Results (days)	4.23	~14[4]	~7[5]	~14[6]	~21[7]
6.	Risk of Recurrence Testing	Yes	Yes	Yes	Yes	Yes
7.		High or Low Risk	High or Low Risk (Age-based)	High or Low Risk	Low, Intermediate, High Risk	Low or High Risk
8	Tumor Subtyping	Yes	No	No	No±	No
9.		Luminal A/B, HER2, Basal			Luminal A/B, HER2, Basal	
10.	FDA Cleared	Yes (MP)	No	No	Yes	No
11.	Decentralized Testing	Yes	No	Yes	Yes	No
12.	Clinical Utility	Prognostic, Predictive	Prognostic, Predictive	Prognostic	Prognostic	Prognostic, Predictive
13.	Prospective, Randomized Data (pre-operative)	Yes[8]	No	No	No	No
14.	Prospective, Randomized Data (post-operative)	Yes[9]	Yes[10]	No	No	No

15.	Prospective, Randomized Data (LN+ Patients)	Yes[9]	No	No	No	No
16.	Chemo Prediction Data	Yes[11]	Yes[12]	No	No	No
17.	20-year ET Data	Yes[13]	No	No	No	No

Test Details:

S. No.	Test Name	Test Code	MRP	Technique	Specimen	TAT / Reported on
1.	MammaPrint + BluePrint Combination	SMO10242	220000	Microarray-based gene expression profile	Formalin-fixed paraffin-embedded tissue block or 10 unstained slides with a 5-micron section on each slide. Must contain at least 30% invasive tumour.	18th working day by 7:00 p.m.
2.	MammaPrint Assay	SMO10364	165000			