

Cancer Association of South Africa (CANSA)



Research • Educate • Support

Fact Sheet on MammaPrint Test

Introduction

The MammaPrint Test, made by Agendia, is a genomic test that analyses the activity of certain genes in early-stage breast cancer. Research suggests the MammaPrint Test may eventually be widely used to help make treatment decisions based on the cancer's risk of coming back (recurrence) within 10 years after diagnosis. Knowing if a woman has a high or low risk of early-stage breast cancer coming back might help women and their doctors decide if chemotherapy or other treatments to reduce risk after surgery are needed. (Breastcancer.org).

[Picture Credit: MammaPrint]



Genetics and Genomics

Genetics can help to tell pme's risk for getting cancer, while **genomics** can help once one has cancer, to choose one's course of care.

Genetics

Study of inherited traits, such as hair or eye colour, that are passed from one generation to the next through genes.

One's risk for certain cancers can be inherited, or passed through one's genes.

Genomics

Study of the activity and interaction of certain genes in the body, including their role in certain diseases.

Once one has cancer, the activity and interaction of certain genes in one's tumour tissue influences the behaviour of the tumour, including how likely it is to grow and spread.

The test for the BRCA1 and BRCA2 genes is a genetic test that can help to predict one's risk for getting breast or ovarian cancer.

The Oncotype DX breast cancer test is a genomic test that can help to predict the aggressiveness of a tumour and whether or not one will benefit from chemotherapy.

Once one knows one's genetic risk for cancer, one can take steps to lower that risk, such as making lifestyle changes.

Once one has the personalised information from one's Oncotype DX breast cancer test, patients and their doctors can decide what kind of treatment one might need following surgery.

(MyBreastCancerTreatment.org).

Understanding a Breast Cancer Patient's Risk of Breast Cancer Risk Recurrence

MammaPrint analyses the 70 critical genes identified in breast cancer metastasis to determine a woman's biological risk of recurrence. MammaPrint provides a definitive result, Low Risk or High Risk, which is significantly correlated with differences in probability of metastasis free survival.

Many surgeons and oncologists rely on MammaPrint with other clinical criteria to assist in their therapeutic decision making. When combined with traditional risk factors, if a breast cancer patient is Low Risk by MammaPrint, endocrine therapy (e.g. Tamoxifen) alone may be sufficient to further reduce the recurrence risk. Conversely, if a breast cancer patient is High Risk by MammaPrint and has additional risk factors, she may benefit from more aggressive treatment including chemotherapy.

MammaPrint is a 70-gene test that will assess one's cancer's risk of recurrence, in other words, how likely the cancer is to return in the future. The patient is given definitive results, either a Low Risk or High Risk result, with no intermediate or indeterminate results which are common with other genomic tests.

In patients with the most common type of breast cancer (hormone receptor positive, HER2 negative, lymph node negative [ER+ / HER2- / LN -]) a Low Risk MammaPrint result showed an excellent 97.8% chance of being metastasis free at 5 years with hormonal therapy alone (tamoxifen or aromatase inhibitor), with no significant benefit of adding chemotherapy. In patients with a High Risk MammaPrint and treated with hormonal therapy and chemotherapy, these women had a 94.6% chance of being metastasis free at 5 years. These results are based on the landmark MINDACT clinical trial and represent the average risk of recurrence for these two groups.

MammaPrint Low Risk Result - a "Low Risk" MammaPrint result means that a patient has on average a 10% chance that her cancer will recur within 10 years without any additional adjuvant treatment, either hormonal therapy or chemotherapy/.

MammaPrint High Risk Result - a "High Risk" MammaPrint result means that a patient has a 29% chance that her cancer will recur within 10 years without any additional adjuvant treatment, either hormonal therapy or chemotherapy.

A Low Risk result does not guarantee that the cancer will not recur. A High Risk result does not guarantee that the cancer will recur. These results, in addition to all other factors, will help patients and their doctors make the most appropriate breast cancer treatment decisions.

(Agendia).

MammaPrint Test Helps Some Women Avoid Chemotherapy

The MammaPrint breast cancer test can dramatically reduce the number of women who need to undergo chemotherapy to treat the disease, according to a newly published study.

The prospective, outcome-based study of 427 breast cancer patients showed the genomic test, which analyses 70 key genes, accurately determines which patients are at low risk of breast cancer recurrence and can, therefore, safely choose not to undergo chemotherapy.

Of the 219 patients in the five-year study who were determined to be "low risk" based on the MammaPrint test, 85 percent chose not to have chemotherapy. Of those patients, 97 percent were disease-free after five years. Of the 208 patients who were determined to be "high risk," 81 percent chose chemotherapy and 91% were disease-free after five years.

"MammaPrint correctly stratified patients into Low Risk and High Risk categories based on prognosis of a recurrence of the disease," said Prof Linn, M.D., the principal investigator. "The outcome data generated in the study confirmed it was safe for the Low Risk patients to choose not to undergo chemotherapy and still have excellent outcomes".

The results of the peer-reviewed study, called MicroarRAY PrognOSTics in Breast CancER (or RASTER), conducted in 16 community-based clinics in the Netherlands, were published online by *The International Journal of Cancer*.

The RASTER study is considered unique by its co-authors because it is the first and only study to prospectively evaluate the performance of a genomic breast cancer test by using outcome data -- in this case through follow-up of the patient cohort for five years. The study also showed that MammaPrint identified 30 percent more patients as Low Risk than traditional clinical parameters such as; tumour size, grade, patient age and lymph node status, which are often used to determine risk of recurrence. MammaPrint is a 70-gene, breast cancer assay performed on both fresh and FFPE tumour tissue, developed by Agendia.

Of the prognostic tests commercially available for breast cancer, this is the first and only prospective validation to include outcome data. MammaPrint can be administered to virtually all early-stage breast cancer patients, not just those with certain disease characteristics as with other tests limited to certain receptor and lymph node status. Finally, MammaPrint results benefit the physician by clearly categorising all patients as high or low risk, eliminating the uncertainty of indeterminate scores reported by other genomic test methods. (News Medical Life Sciences).

Ordering a MammaPrint Test from South Africa

Only a licensed healthcare provider (i.e. surgeon, medical oncologist, radiation oncologist, pathologist) can submit an order request for genomic testing. Ask a licensed doctor to order

the Agendia Breast Cancer Test Suite for breast cancer. Local Agendia Molecular Oncology Specialists can assist with the ordering process.

From South Africa, one should contact Agendia Customer Service in The Netherlands at +31 20 462 1500, or alternatively contact customerservice@agendia.com.

Patients diagnosed with stage I or II invasive breast cancer that is lymph node negative or lymph node positive (up to 3 nodes) and < 5cm, are eligible for Agendia Breast Cancer testing. Unlike other assays, the Agendia Breast Cancer Suite of tests has no restrictions on other factors such as hormone receptor status (oestrogen receptor/progesterone receptor), HER2 status, or hormonal therapy prescription.

Gknowmix is the exclusive distributor of *MammaPrint*® in Southern Africa and signed a collaborative agreement with the University of Stellenbosch, South Africa, to promote genome research innovation. A research protocol has been ethically approved to study the clinical utility of transcriptional profiling in the South African population in comparison with the use of conventional prognostic markers.

Agendia B.V., headquartered in Amsterdam in The Netherlands, provides innovative diagnostic testing for the treatment of cancer patients which is based on gene expression analysis.

For any enquiries, please email customerservices@gknowmix.com or phone 021 9389324 / 0828799108.

(Agendia; Gknowmix).

MammaPrint Testing

MammaPrint is a 70-gene microarray test which is used to assess the risk of metastases at an early stage of breast cancer with greater accuracy than is possible using conventional methods. MammaPrint reveals the activity (expression) of 70 specific genes in the tumour sample to indicate a 'Low Risk' or 'High Risk' profile (no intermediate). The risk of tumour recurrence is determined according to the degree of similarity between the tumour's gene expression profile and reference profiles.

The test is performed on a tumour biopsy obtained from formalin fixed paraffin embedded (FFPE) tissue by the local pathologist following the test request on this website. The sample is then shipped overnight to Agendia's ISO certified laboratory in The Netherlands where the test is performed under an export permit obtained from the South African Department of Health. In general, results will be available within 10 working days after receiving a tumour biopsy.

To be eligible for a MammaPrint Test, a breast cancer patient should fulfil the following international criteria:

- Tumour size < 5.0 cm
- Up to 3 positive lymph nodes
- Stage 1 and Stage 2 invasive breast cancer
- Oestrogen receptor (ER) + or -
- Tamoxifen independent

The test selection criteria for reimbursement by certain medical schemes in South Africa has been further redefined following a Health Technology Assessment (HTA) performed in 2009. A pre-screen algorithm has been developed and was incorporated into the Gknowmix Database for easy identification of breast cancer patients eligible for testing. An application form with the selection criteria stipulated is provided by some medical schemes. This represents a unique development in the application of pathology supported genetic testing aimed at the exclusion of inappropriate genetic testing.

The 80-gene BluePrint test is generally used together with the 70-gene MammaPrint test for tumour subtyping into four treatment groups: Luminal A, Luminal B, HER2-enriched and basal-like.

Local experience of the MammaPrint service in routine clinical practice led to the following quotes from opinion leaders in breast cancer:

“Genomics is now an established and frequently used tool in medical research, and particularly in the oncology field. In breast cancer, genomics has led to a better understanding of the biology and to a molecular reclassification of the disease.” – *Dr Rika Pienaar, GVI Oncology, Panorama Hospital, Cape Town, South Africa.*

“With the help of MammaPrint many early-stage breast cancer patients can safely forego chemotherapy. This is a major relief to patients with good prognosis as chemotherapy is the most dreaded part of breast cancer therapy.” – *Prof J Apffelstaedt, Faculty of Health Sciences, University of Stellenbosch, Tygerberg, South Africa.*

In the resource-poor South African context in 2009, results indicated a break-even-point for cost-effectiveness of the MammaPrint Test (at R22 000 per test) at approximately R88 000 for the cost of chemotherapy. (Gknowmix; Grant, *et al.*).

Medical Disclaimer

This Fact Sheet is intended to provide general information only and, as such, should not be considered as a substitute for advice, medically or otherwise, covering any specific situation. Users should seek appropriate advice before taking or refraining from taking any action in reliance on any information contained in this Fact Sheet. So far as permissible by law, the Cancer Association of South Africa (CANSA) does not accept any liability to any person (or his/her dependants/estate/heirs) relating to the use of any information contained in this Fact Sheet.

Whilst CANSA has taken every precaution in compiling this Fact Sheet, neither it, nor any contributor(s) to this Fact Sheet can be held responsible for any action (or the lack thereof) taken by any person or organisation wherever they shall be based, as a result, direct or otherwise, of information contained in, or accessed through, this Fact Sheet.

Sources and References

Agendia

<http://www.agendia.com/healthcare-professionals/breast-cancer/test-results/>
<http://www.agendia.com/patient/breast/faqs/>

Breastcancer.org

<http://www.breastcancer.org/symptoms/testing/types/mammaprint>

Gknowmix

<https://www.gknowmix.com/GeneticTests/BreastCancerGenescreen/MAMMAPRINTTEST.aspx>

Grant, K.A., Apffelstaedt, J.P., Wright, C., Myburgh, E., Pienaar, R., de Klerk, M. & Kotze, M.J. 2013. MammaPrint pre-screen algorithm (MPA) reduces chemotherapy in patients with early-stage breast cancer. *SA Medical Journal*.
<http://www.samj.org.za/index.php/samj/article/view/7223/5283>

MammaPrint

<http://knowyourbreastcancer.com/agendia-test-suite/mindact-publication/>

MyBreastCancerTreatment.org

<http://www.mybreastcancertreatment.org/en-US/LearnAboutOncotypeDX/WhatIsGenomicTesting>

News Medical Life Sciences

<https://www.news-medical.net/news/20130205/MammaPrint-breast-cancer-test-can-help-women-avoid-chemotherapy.aspx>