

# Breast Cancer: Prevention, detection targeting molecular markers.

*By Dr. Serge Jurasunas*

## *Abstract*

Breast cancer is the most common malignancy in the Americas, especially among Northwestern European Women. It remains the #1 cancer killer. Despite progress in Oncology, benefits of treatment, the Gold Standard of palliative therapy, radiation, and surgery, survival rates for patients with metastatic breast cancer continue to remain poor. Recurrence is still too high. 70% of women with primary cancer are subject to disease recurrence within the first 2 years, no matter which surgery or treatment they receive (1). Disease survival rates and recurrence depend upon the disease stage, but new avenue on diagnosing cancer, focusing on the P53 apoptotic pathway and P53 mutation seems to have a correlation with breast cancer recurrence as we are going to demonstrate.

## Introduction

### What is Cancer?

Cancer is an accumulation of abnormal cells with damaged DNA genetic material which divides without control and are able to grow and invade other tissue. Cancer cells contain a defective or mutated P53 tumor suppressor gene normally programmed to self-destruct damaged/abnormal cells before they become cancer cells. Programmed cell death is called apoptosis and when this process breaks down, cancer cells begin to form. A defective apoptotic pathway gives rise to excessive proliferation of cancer cells, along with a compensatory disruption of the survival signaling pathway.

Cancer cells with the defective P53 gene, escape their engagement from apoptosis, survive self-destruction, contributing to the formation and expansion of tumors. The resulting tumors are usually resistant to chemotherapy regimens as well as any treatment inducing apoptosis.

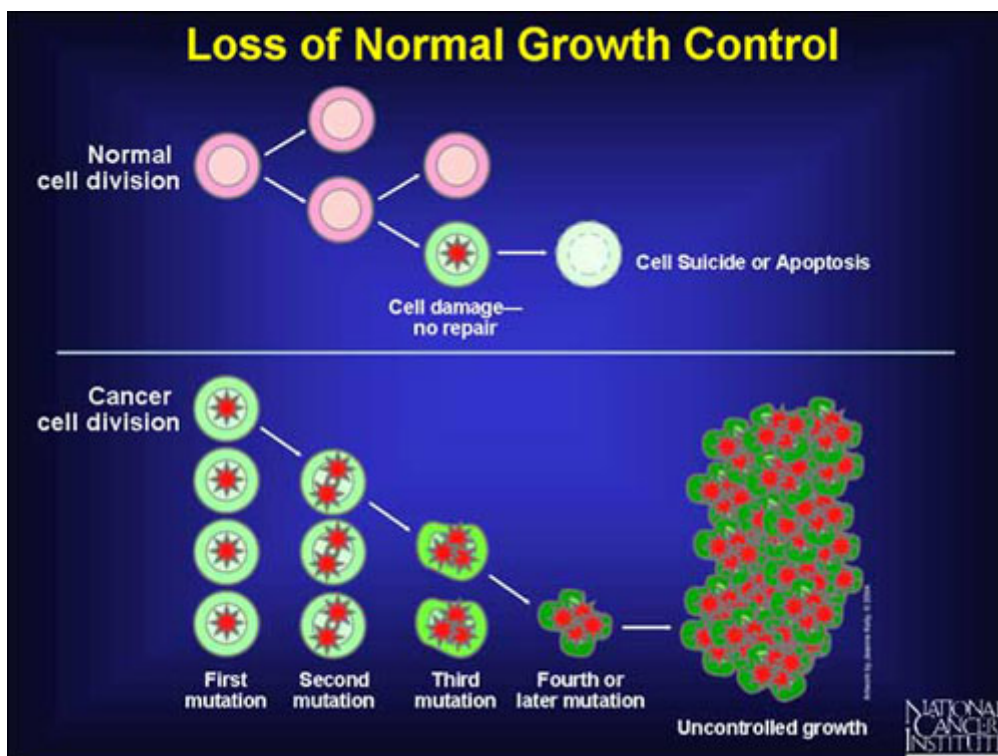


Figura 1

### P53 mutation

Mutation of the P53 tumor suppressor gene is the most common molecular genetic change that has been found in nearly all tumor types and is estimated to contribute to more than half of all cancers, again leading to the inactivation of apoptosis (2). When mutation occurs in the P53 gene sequence it results in a mutant non-functional protein rather than a normally functional protein.

The dysfunctional mutant protein accumulates in the cell nucleus, gaining an oncogenic function. Instead of normal tumor suppressive behavior which would result in self-destruction of transformed/cancer cells. The loss the functional P53 gene is eventually due to small mutations (mis-sense and nonsense mutations or deletions of several nucleotides) which lead to either mutant protein expression or an absence of protein. Altered levels of normal wild type proteins, not sufficiently high to engage full self-destruction of cancer cells may also increase risk of tumor. Defective apoptosis represents a major causative factor in the development and progression of cancer (3).

While P53 mutation may be transmitted in the same family and be responsible for aggressive cancer (4), mutation can also be induced in cells by mutagens such as chemicals, insecticides, radiation, bacteria, viruses, etc.

According to Catalin Marian M.D.,PhD., a research instructor in cancer genetics at the Lombardi Comprehensive Cancer Center, Georgetown University: “If we can find genetic or environmental risk factors that lead to damage of P53 or stress on the genes, we may be able to help development of breast cancer (treatment?)”. According to some studies, environmental pollution may be implicated in 70% of breast cancers (5).

Therefore P53 testing can effectively be used as a biomarker in carcinogenesis predicting any risk of breast cancer. Indeed this is what we try to do by alerting women of cancer risk, who are under strong oxidative stress, or those in contact with a polluted environment, by administering P53 test.

From P53 testing we have 2 pathways:

A - A test showing a high level of P53 protein means damaged cells are fully destroyed and this is a positive indication.

B - A test showing a low level of P53 protein or even mutation indicates we have a risk of cancer

## **Our experience with P53 and other targeting molecular markers.**

Few years ago we started working with P53 (and other molecular markers) as a research factor and as a new diagnostic test for our cancer patients. Essentially we know from cited studies that P53 controls the apoptotic pathway and can play a key role in cancer cell self-destruction. We also know from the growing body of evidence that mutated or defective P53 can alter the efficacy of antineoplastic agents (6).

Initially my idea was first to check out the connection between cancer and P53 mutation as described in the literature and what could be done about it. Of course it was necessary to teach patients about the meaning of the P53

apoptotic pathway and its relation to cancer. We prepared informative leaflets about the P53 tumor suppressor gene and testing procedure to educate our patients. In the beginning patients were reluctant to have this test. After fully understanding the benefit of P53 testing, most patients were in favor of it.

After 2 years observing P53 gene expression and P53 protein level tests from about 400 patients with different types and grades of cancer, we actually found that more than half exhibited the P53 mutation. For breast cancer cases 50% tested for mutation (not 25% as described in the literature) while others exhibited a defective P53 function.

While the P53 gene is active, it only produces low level P53 protein, which is not sufficiently high to self-destroy abnormal cells. An inactivation of normal (wild type) P53 genes with very low protein production may offer the same unfavorable result as would a mutation, since transformed cells are not fully self-destroyed, accumulate further mutations, favoring the transformation toward tumor growth. Not all cancers harbor a P53 mutation but low protein production contributes to cancer development, resistance to tumor chemotherapy drugs even with the newest agents (7).

At this point I want to make clear the apoptotic effects of certain dietary agents such as curcumin and resveratrol. When we say, they induce apoptosis, it only occurs in cells expressing wild type P53, not in P53 mutated cells. This is not always clearly explained and can be misleading when it comes to patient treatment.

We also learned from many studies that by targeting P53 and reverse mutation, we have a therapeutic application, which can be seen as an anticancer therapy (8-9), increasing the effectiveness of chemotherapy. We know that chemotherapy doesn't directly kill cancer cells but rather destroys them by inducing apoptosis through the cell's cycle arrest and the activation of the P53 cellular death channel.

Cancer cells with mutated P53 are resistant to most forms of treatment that target self-destruction by apoptosis, including chemotherapy unless the P53 pathway is reactivated. P53 mutation in malignant breast cancer increases the aggressiveness of the disease and risk of death (10). Unfortunately few patients were unable to understand the meaning of their tests with mutated P53 and preferred to pursue chemotherapy, and even those choosing conventional therapy, died because of poor response and damaging effects of toxic agents. Again the P53 test can only check for the efficacy of chemotherapeutic agents and predict reactive P53 gene expression before the patient starts treatment. I have a case where a 36-year-old well known female musician, was under family pressure to seek medical treatment. She opted solely for chemotherapy despite her P53 test that showed mutation and poor prognosis. About 6 months later I heard on the evening TV news about her death, which was tragic since I warned the family about the consequences unless we first treated her, in order to reverse her P53 mutation.

## Genetic correction strategies

Our second objective was to see if P53 mutation could be reversed, to restore oncogenic function activating self-destruction of cancer cells. Obviously for the first time we demonstrated that selected natural compounds made from small molecules, nucleic acids, and antioxidants can restore P53 function by targeting mutant P53 with significant therapeutic application. Indeed we developed a “genetic corrective strategy” which is a breakthrough in the treatment of cancer.

This new strategy selectively increases self-destruction of mutant cancer cells but not healthy cells with a normal P53 function. With our cancer therapy, we improve both survival time and quality of life of cancer patients. We determined this treatment either reduces or eliminates the risk of disease recurrence.

After having fully experimented with P53 testing and P53-based cancer therapy we intend to investigate other molecular markers that correlate with cancer development as follows:

- P53 Gene expression
- BAX Gene expression
- BCL2 gene expression
- Survivin Gene expression
- P21 gene expression

We are going to demonstrate that not only P53 but other molecular markers provide full information about cancer development, and offer both evaluation and predictive value for breast cancer patients (11-12).

## Molecular Markers

Evidence has shown that the pro-apoptotic gene BAX that mediates apoptosis through the mitochondria becomes inactive in one-third of invasive breast cancers. In a study of 119 women with metastatic breast cancer, patients whose tumors had lost BAX activity also had a poor response to combination chemotherapy, a faster time line to tumor progression and shorter overall survival (13) whereas enhanced expression of BAX protein correlates with a good response to chemotherapy in vivo (14). There is a relationship between P53 and BAX in signaling apoptosis (15) but some of the failure of P53 to stimulate BAX protein is due to anti-apoptotic protein BCL2 activity, which acts to inhibit apoptotic protein which up-regulates in 70% of breast cancers and correlates with resistance of cancer cells to a wide Spectrum of chemotherapeutic agents (16). Over expression of the anti-apoptotic BCL2 protein blocks cytochrome C release in response to a variety of apoptotic stimuli, whereas the pro-apoptotic BAX protein stimulates cytochrome C to activate an apoptotic cascade.

We ourselves have observed that this multiresistance to drugs involves P53 mutation, low BAX activity and highly activated BCL2. Not only is this common in primary breast cancer but is usually exhibited in cancer recurrence along with the risk of metastases invasion. Therefore not only P53 but BCL2 may both be seen as offering prognostic value in breast cancer (17) becoming an attractive target in developing new therapeutic approaches (18). Over the years we have been successful in targeting as well as decreasing highly expressed BCL2 or inhibiting its activity to eliminate cancer cell resistance, activating their self-destruction.

Survivin is another highly expressed gene in most cancers (19), but not in healthy tissue. It plays a key role in the development and aggressivity of breast cancer (20). Survivin is virtually absent from normal breast tissues, but mostly present at very high levels in malignant breast tumors (21). Survivin inhibits apoptosis with the apoptotic enzymes, caspase 3 and 7 activation (22-23) leading to negative regulation of apoptosis and cancer cells resistance. Increased expression of Survivin is associated with chemotherapy resistance, increased rate of tumor recurrence and shorter patient survival (24).

In a study of over 500 breast cancer patients conducted at University College Dublin's, Department of Biochemistry by Brid Ryan(25), it was found that patients with high levels of Survivin had reduced survival times and were more likely to have tumor recurrence and therefore was a strong predictor of poor prognosis in breast cancer patients. Increased Survivin expression is associated with angiogenesis since Survivin expression protected endothelial cells from apoptosis during the proliferative and remodeling phases of angiogenesis. Some new studies have shown that targeting Survivin to breast cancer brain metastases may well be an effective antiangiogenic therapy (26) since many drugs cannot enter the brain because of brain's impermeable blood vessels.

This serves as one other reason for tumors resistance characterized by strong neovascularization making more difficult the task of killing these cells with chemotherapeutic drugs. Also it is suggested that Survivin may be involved in driving the growth of tumor cells by sending a signal that allows cancer cells to grow at a very fast rate.

Overall Survivin may serve as a prognostic marker for breast cancer and recurrence risk as well as for attractive new cancer interventions (27). As described through our observation and molecular marker tests Survivin is overexpressed in 60% of primary breast cancer with metastases, and I would propose a similar percentage concerning disease recurrence.

Monitoring P53, BAX and Survivin gene expression in primary breast tumors may be a relevant prognostic marker for tumor's resistance and may indicate as well the strong angiogenic activity and microvessel density (28). Therefore a strategy is required to inhibit and reduce angiogenesis activity, which in turn may reduce tumor growth and prevent from metastases invasion.

We have ourselves observed that in breast cancer highly expressed Survivin may be a very bad prognostic for patients with shorter life survival especially with poor response to chemotherapy and faster metastases invasion. However we have been successful in targeting expressed Survivin and therefore have increased the rate of remission or prevent from imminent breast cancer recurrence.

P21 is a gene that promotes the self-destruction of cell's damaged by toxic agents including radiation.

Elevated levels of P21 indicate that cells are being exposed to an attack by toxic agents and will self-destruct which is positive in the presence of cancer and radiation treatment. Low levels of P21 indicate that self-destruction process is not operating properly and many harmful cells survive representing a poor prognosis. P21 is associated with the second line of cellular defense (after P53 gene) against the growth of cancer cell population. Lack of P21 expression has been related to poor prognosis in several solid tumor types with metastases (29).

P21 and Survivin gene expression work together and when P21 is highly active, Survivin is usually less activated and vice versa. For instance if the Survivin gene expression is normal and P21 gene expression is high, radiotherapy regimen will be effective. However if Survivin gene expression is low and P21 gene expression is low radiotherapy regimen will not be effective. If Survivin gene expression is high and P21 gene expression is low, radiotherapy regimen will not be effective. BAX and BCL2 represent one type of cancer cells while Survivin and P21 represent another type of cancer cells and evaluation between the two respective genes is important to establish as diagnostic and prognostic.

## Tumor Marker 2 - Pyruvate Kinase (TM2-PK)

Another interesting novel molecular marker is TM2-PK a key regulator of the metabolic alteration found in tumor cells.

TM2-PK is the glycolytic isoenzyme that is overexpressed in a wide range of tumor cells. This enzyme plays a significant role in the metabolic process in which cancer cells generate needed energy. As such, TM2-PK is a strong marker for the presence of metabolically active tumor growth (30-31). Elevated levels are associated with the presence of a primary tumor while a level slightly above reference range indicates a situation potentially at risk - very low levels reflect cancer cell's use of the body's fat or protein store as an energy source, a process that can severely damage general metabolism.

We usually perform the TM2-PK level test to our cancer patients at the first consultation and to patients that we feel may have a risk of cancer. You will be surprised by the result. We then perform a second test after a period of 30 to 60 days after P53 has been activated to check if cancer cells are less active. There is also a way to determine the quantity of dying cancer cells

from the applied treatment by having the patient take the extra-cellular telomerase and intracellular telomerase test. We know that telomerase activity is overexpressed in most cancer cells in order that they may become immortal and resistant to most forms of destruction (32). We know that an activated P53 pathway led to the appearance dying cancerous cells in the blood, which then are detected by measuring the telomerase activity of patients. It may also indicate evidence of the tumor's disintegration.

By performing the extra-cellular telomerase and intracellular telomerase testing, after activation of P53 expression and decreased anti-apoptotic gene activity we have been able to prove that our treatment without conventional therapy, can target and destroy cancer cells which is a new advance in treating cancer with non toxic treatment. It also shows how important it is to evaluate molecular markers since it may serve in diagnostic, prognostic and predictive value (33).

(For more information and reference range of the molecular markers see [www.sergejurasunas.com](http://www.sergejurasunas.com)) Diagnostics.

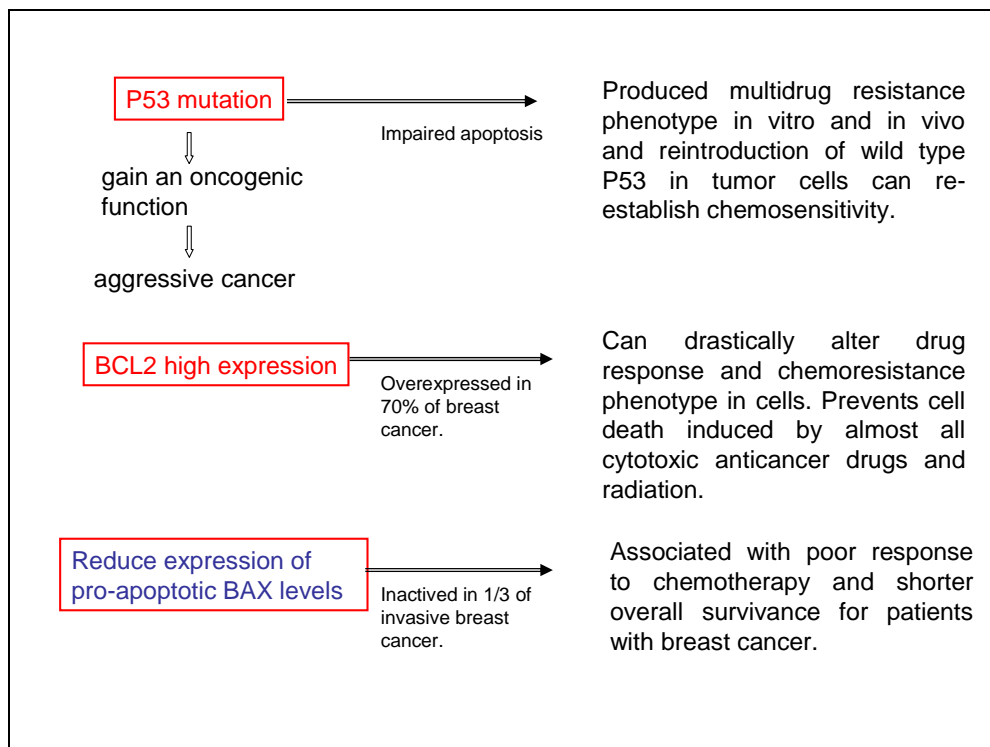


Figure 2



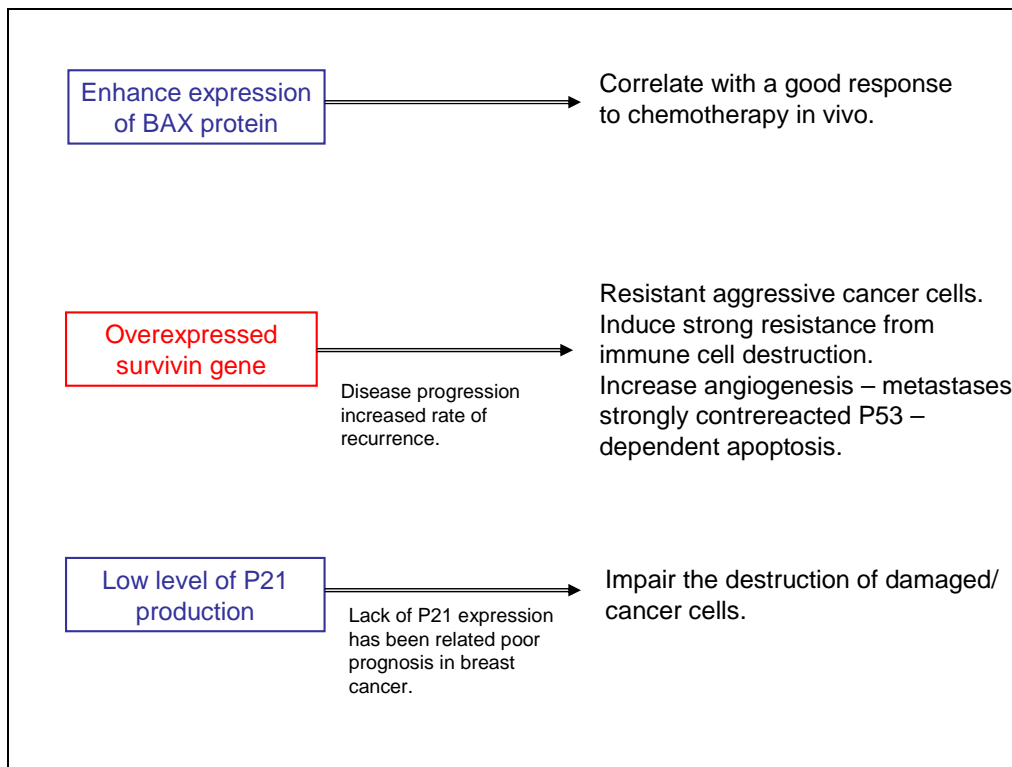


Figure 3

## Advantage of the genetic blood assay

This package of a complete molecular markers permits the physician to know from the outset what the full scenario is and therefore introduce a better treatment strategy where from time to time the physician can check from a scientific standpoint if the treatment is effective.

- 1 - Do we have a declared cancer
- 2 - Do we have one or more population of resistant cancer cells
- 3 - Do we have resistant cancer cells
- 4 - Do we have a pro-tumoral activity over a anti-tumoral activity
- 5 - Do we have a anti-tumoral activity
- 6 - Do we have a positive effect from treatment protocols
- 7 -What is the percentage of cancer cell's self-destruction/ or tumor disintegration from the treatment.

## What causes cancer recurrence?

A quickly increasing body of evidence shows that psychological stress and impaired immune system could be associated with breast cancer recurrence (34)

From what we commonly read in the literature there is also strong correlation between low intake of green and yellow vegetables and breast cancer recurrence (35). This is a fact showing after remission most patients keep

their same dietary style which increases disease recurrence risk (36), however breast cancer recurrence correlates with P53 mutation or inactivation and at least this is the conclusion of our observation over a period of 3 years. What is new is the fact that fruits and vegetables may have an effect on the P53 gene and increasing protein level with the effect of depleting mutant P53 in tumor cells (37).

At least 2 compounds are known to have a selective effect on P53 restoring the “Wild type function” in a variety of tumor cells.

First the isothiocyanates family could play an important role in both cancer prevention and treatment of human cancer with mutant P53. Secondly apigenin, a naturally occurring dietary agent found mostly in artichokes, celery, parsley, grape, apple, eggs, chestnuts, etc. that activates P53, which is usually inactive in many cancers.

Eating fruits and vegetables not only may prevent from cancer but actually in cancer disease it improves the response to chemotherapy (38) while it also decreasing adverse effects.

A study, published in the online early edition of The Proceedings of the National Academy of Sciences (USA) suggests this novel approach to conquering tumor resistance to chemotherapy via naturally occurring agents. Extensive research over the past several decades has identified numerous dietary agents and natural compounds along with their molecular targets (39) along with the chemical structures of dietary compounds, such as resveratrol, curcumin, pomegranate, ellagic acid, luteolin, quercetin, and capsaicin. These have shown properties that target molecular markers for prevention and therapy of cancer (40). Over my 44 years of experience with cancer I have observed that dietary style is important both as prevention or support to chemotherapy and today it seems that our work has been recognized to a certain extent. This novel approach has demonstrated that cancer and cancer recurrence with metastases correlate with P53 mutation or deletion and predicts poor response to chemotherapeutic agents because of cancer cell resistance (41).

## Restoration of P53 function - targeting mutant P53 and other molecular markers

One of the new therapeutic strategies in cancer is the option to restore P53 functionality and to activate the production of P53 proteins which in turn increase self-destruction of cancer cells and may even lead to tumor regression (42). Other attractive targets include BAX, BCL2, Survivin and P21 manipulation. To illustrate this article we would like to offer some interesting results based upon several years of our clinical work, encompassing molecular marker testing on breast cancer patients, disease recurrence or imminent recurrence. followed by targeting molecular targeting therapy (43).

## Examples:

Red Color - Mutated protein (at risk)

Black color - Normal protein

F - 48 year old patient - Remission breast cancer 2009 - Recurrence risk	
<p>1st test - 1.2.2010</p> <p>P53 protein level  <b>Result: 52.5 u of abnormal (mutated protein/ml of plasma)</b></p> <p>P53 Gene Expression            52.245 copies/ml of plasma</p> <p>Comments:            Two types of cancer cells            1 - One with a mutated P53 and transformed/cancer cells resistant to most forms of destruction.            2 - cancer cells with normal P53 and apoptotic cells.            Possible recurrence</p>	<p>2nd test - 19.4.2010 (after treatment)</p> <p>P53 protein level            10.99 u of normal protein/ml of plasma</p> <p>P53 Gene Expression            170,000 copies/ml of plasma</p> <p>The P53 Gene expression is activated resulting in the restoration of a normal P53 tumor suppressor gene follow by production of normal protein which activate self-destruction of cancer cells. However to increase self-destruction with efficiency more activation of P53 gene is required.</p>

Figure 4

<p><b>F – 51 year old patient</b>            Story of a breast cancer with 3 years remission follow since our treatment but under disease recurrence risk as shown by the Tumor Marker 2 – Pyruvate Kinase test.</p> <p><b>6th July 2010</b>  <b>TM2-PK level – 52.48 units/ml of plasma</b>            Reference range – 0.5 - 15.00 units/ml of plasma</p> <p><b>Comment:</b>            The elevated TM2-PK level is associated with the presence of a neoplastic formation with altered metabolism (increased risk of metastases)</p> <p><b>12th August 2010</b>            The patient has follow our special treatment to inhibit the glucose pathway used by the tumor to produce an increased energy level, boost her immune system and balance her emotional behavior and decrease oxidative stress.</p> <p><b>TM2-PK level</b>            18.96 units/ml of plasma</p> <p><b>Comment:</b>            The substantially decreased level of TM2-PK now only tests above the reference range to a small extent. The neoplastic formation is mostly inhibited with no metabolic activity and at present the appearance of any resistant transformed/cancer cells in the blood circulation is very unlikely.</p>
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Figure 5

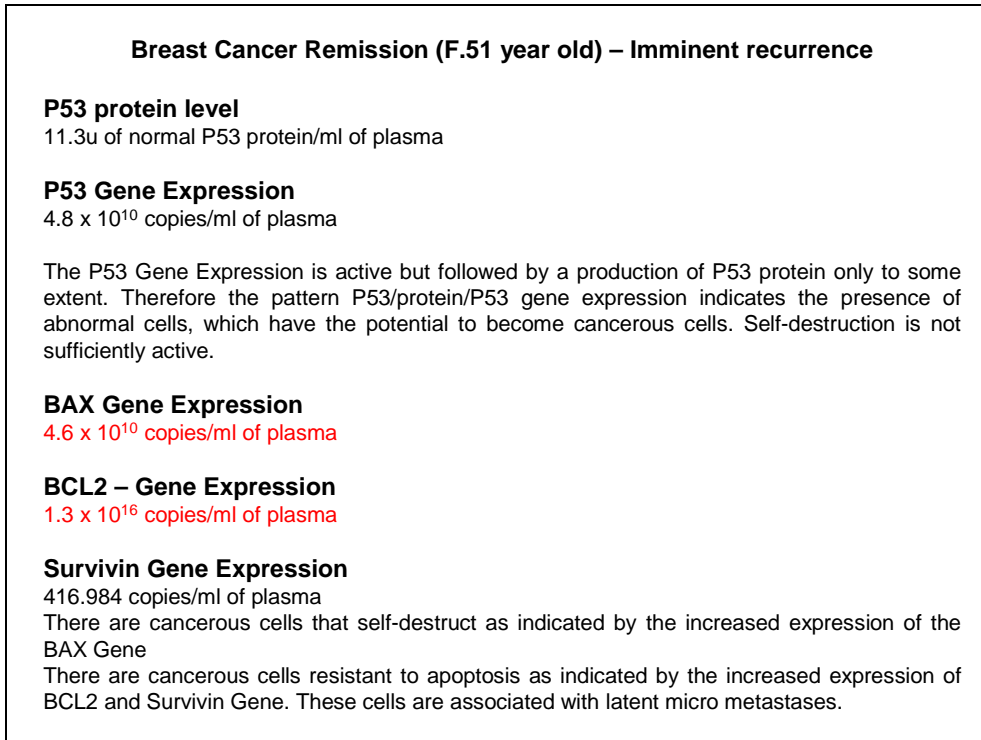


Figure 6

### Breast cancer recurrence with distant metastases to lung and liver

P53 Protein Level	- Not detectable
P53 Gene Expression	- Not detectable
BCL2 Gene Expression	- Not detectable
Survivin Gene Expression	- 7.059 units/ml of plasma
P21 Gene Expression	- 2.543 units/ml of plasma
TM2-PK	- 39.00 units/ml of plasma
	Reference range - 0 - 15.00 units/ml of plasma

Figure 7

## Comments:

The P53 tumor suppressor gene and P53 protein level are totally inactive and show apoptosis is not functioning. A proliferation of resistant cancer cells can be expected, while Survivin gene expression is very high. The ratio of Survivin/P21 genes indicates a pool of resistant cancer cells may accumulate in the blood. The only anti-tumor cellular activity is mainly dependent on the P21 activity, which is not enough to arrest the growth of cancer cell population.

The TM2-PK result indicates a metabolically active tumor but not very high at the moment. However the context is not favorable for chemotherapy effectiveness and the patient followed several lines of chemotherapy regimen including 5 Fu, Cytosofamide, Paclitaxel, Herceptin, etc., without success.

This is a poor prognosis.

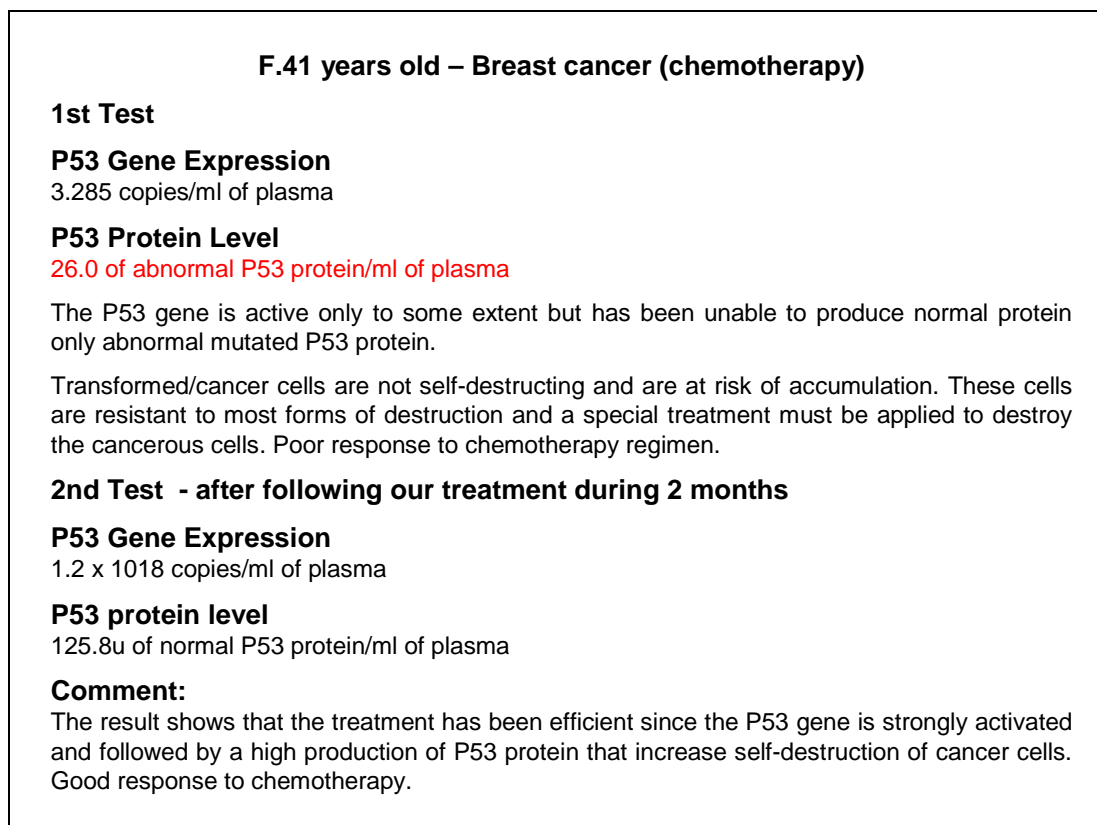


Figure 8

### F- 42 years old – Breast carcinoma

#### 1st consultation – 4.8.2009

##### **P53 Gene Expression**

326.152 copies/ml of plasma

##### **P53 protein level**

1.1 u of normal protein/ml of plasma

##### **Comment:**

The P53 gene is activated but it has not resulted in a increased production of P53 protein, but only to some extent. This is a very low level and an increased P53 protein level is necessary to activate self-destruction of cancer cells, which accumulate. Chemotherapy is inefficient, needs an alternative to P53 apoptotic independent pathway, to inhibit such necrosis and activation of T-cells and NK cells..

#### 2nd consultation – 18.01.2010

##### **P53 Gene Expression**

$1 \times 10^8$  copies/ml of plasma

##### **P53 protein level**

29 u of normal protein/ml of plasma

##### **Comment:**

The P53 gene is strongly active and followed by a high production of P53 protein that activated self-destruction of cancer cells. Good response to chemotherapy.

Figure 9

### F.36 years old – Remission of breast cancer (From USA)

##### **P53 Protein Level**

5.2 u of normal of P53 protein/ml of plasma

##### **P53 Gene Expression**

$1.2 \times 10^8$  copies/ml of plasma

##### **Extracellular telomerase**

$69 \times 10^6$ /ml of plasma – (very high)

##### **Intracellular telomerase**

398 cells with non active telomerase/ml of plasma (low)

The presence of an active P53 tumor suppressor gene and increased production of the P53 protein indicates the presence of transformed/cancer cells which have self-destroyed as demonstrated by an extracellular telomerase test. A high quantity of dying cancer cells are circulating in the blood.

This demonstrates an anti-tumor dominance but in this case further monitoring of P53 protein and gene pattern is recommended to be certain that the destruction of cancer cells dominates over their accumulation.

Figure 10

<b>Bad scenario in a case of advanced breast cancer with poor response to chemotherapy</b>	
<p><b>P53 Gene Expression</b> 77 units/ml of plasma</p> <p><b>P53 Protein Level</b> 7.77 u of abnormal (mutated) protein/ml of plasma</p> <p><b>BAX Gene Expression</b> Not detectable</p> <p><b>BCL2 Gene Expression</b> Not detectable</p> <p><b>Survivin Gene Expression</b> 731 units/ml of plasma</p> <p><b>P21 Gene Expression</b> Not detectable</p>	<p><b>Comments:</b> The P53 tumor suppressor pathway is not sufficiently active and produces mutant protein unable to trigger apoptosis of cancer cells. Presence of resistant cancer cells with active Survivin gene and risk of the spread of cancer. P21 gene expression is not active and many harmful cells survive. BAX is not active to trigger apoptosis through mitochondria pathway. Bad prognosis</p>

Figure 11

<b>Normal Molecular Marker Pattern</b>	
P53 Gene Expression	- Normal or activate
P53 Protein Level	- Normal or high level
BCL2 Gene Expression	- Inactive or low
BAX Gene Expression	- Normal or Active
Survivin Gene Expression	- Inactive or low
P21 Gene Expression	- Active
 <b>This is a normal condition or an anti-tumor activity dominance</b>	

Figure 12

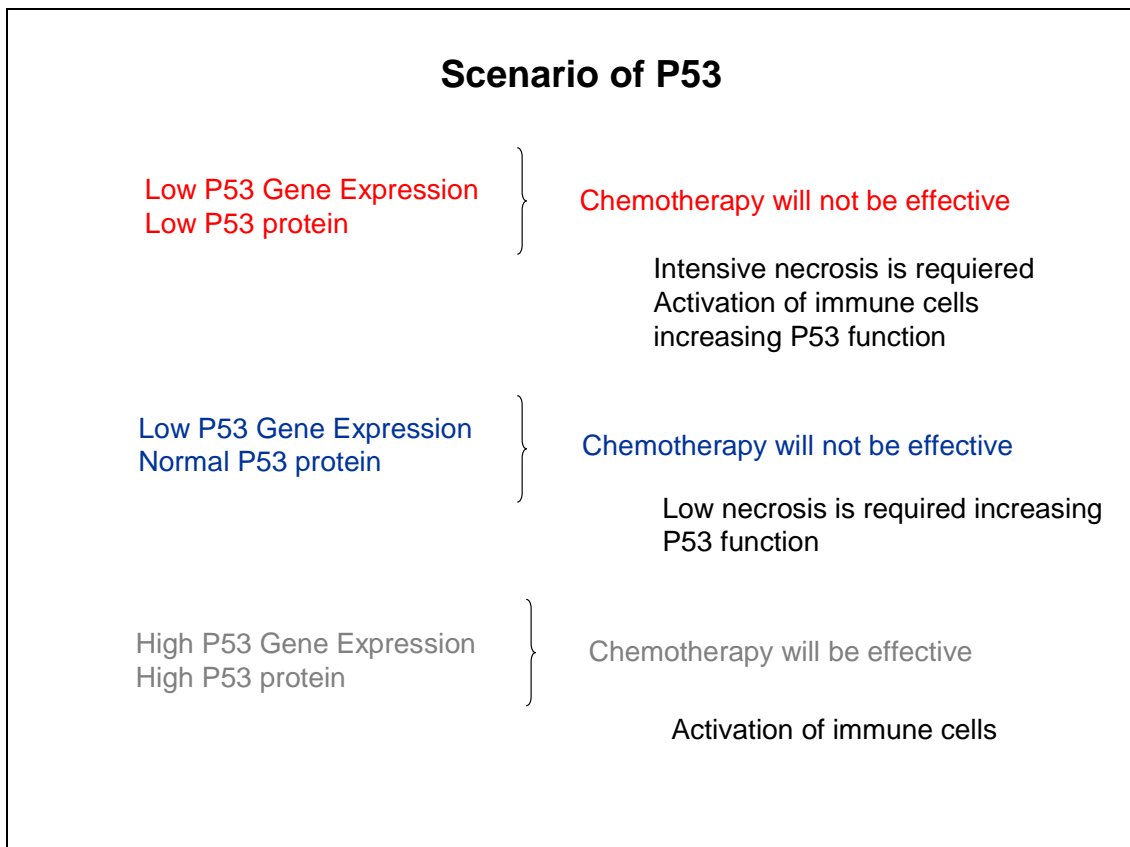


Figure 13

### Scenario for treating your patients with cancer cells and abnormal molecular markers

- improve glucose metabolism
- Target P53, BCL2 and Survivin with PSJ53 therapy including enzyme yeast cells (to restore P53 normal function) - *see reference 43*
- As alternative to apoptosis (mutant P53 protein) use the Ukrain therapy.
- Treatment to kill any major fungal and bacterial invasion (that may induce a P53 mutation).
- Balance the emotional behavior of your patient implicate in P53 dysfunction



## Suggested Dietary phytochemicals that targets molecular markers

Resveratrol	- induces apoptosis in normal P53 - Survivin - P21 - BAX
Pomegranate	- BAX - BCL2 - P21
Curcumin	- induce apoptosis in normal P53 - BAX - P21
Ellagic acid	- induce apoptosis in normal P53 - P21
Green Tea	- induce apoptosis in normal P53 - BCL2 - P21
Genistein	- induce apoptosis in normal P53 BCL2 - Survivin
N-Polyunsaturated (fatty acids)	- induce apoptosis in normal P53 BAX - BCL2 - P21

## Molecular targets of dietary agents

Cruciferous vegetables Sulforaphane Indole-3 - carbinol	BCL2 - Survivin
Citrus fruits Quercetin	BAX - BCL2

Source: Perspective for cancer prevention with natural compounds - Journal of clinical oncology - Volume 27 - Number 16 - June 1, 2009.

## Conclusions:

Today we have opened a new road that now can drastically contribute to anticipate and prevent cancer disease by monitoring patients with P53 testing and other related molecular markers. P53 has a central role in the control of cell growth and apoptosis and frequent mutations in a tumor making P53 a unique target for cancer therapy. In addition P53 activity in normal cells may protect them from the side effects of chemotherapy or radiation. Over the years we have worked with P53 and other molecular markers directly with cancer patients and observed how they may improve or not improve in function of the molecular marker tests as seen with several examples that we

have included in this article. What is important is that breast cancer can be prevented, while breast disease recurrence can be prevented as well. This helps overall to avoid more trauma and often a poor outcome.

In addition, several new natural compounds, and combination therapies, including low molecular antioxidants, nucleic acids, and peptides have demonstrated efficiency in targeting P53 and other related molecular markers, which is a breakthrough in naturopathic oncology.

We now have a greater possibility to select the best treatment protocols with positive effects, and follow the decreasing tumor's activity and the percentage of cancer cell self destruction. This means for the first time you can prove the efficacy of your treatment, and observe improvement step by step.

By administering P53 testing together with BAX, BCL2, Survivin and P21 gene expression tests, we are in position to know which patient may improve quickly with no metastases condition and to the contrary which patients have already from the beginning, metastases risk or dissemination. If you consult my Internet site section on Molecular Diagnostics:

([http://www.sergejurasunas.com/index.php?option=com\\_content&view=article&id=12&Itemid=13](http://www.sergejurasunas.com/index.php?option=com_content&view=article&id=12&Itemid=13)) one example shows a case of a patient where the result from molecular testing had shown only a relatively small proportion of cancer cells (about 25%) under self-destruction. By inhibition of the anti-apoptotic protein and activation of pro-apoptotic protein and overall apoptotic pathway, we can scientifically control the disease and the treatment prescribing to patients.

Of course this requires the need of choosing the adapted treatment that first is always experimental, and this is what I did. Personal experience is always necessary if we want to discover the best treatment for our patients even if we are not successful at the beginning. Sometimes you may have difficulty to reactivate a mutated P53 expression even by using the selected compounds because you may find out that the patient has an emotional disorder involving neurotransmitters and exhausted immune system leading to a bacterial infection responsible for the mutation. But this is the beauty of the Healing Art we are practicing, which requires experience and intuition to achieve the best results.

## Information:

As mentioned before for more information about molecular markers and reference range, consult: [www.sergejurasunas.com](http://www.sergejurasunas.com)

The reader may be confused with the P53 Gene Expression results, first in understanding 'copies' and then the term 'units', which totally depends on the testing laboratory. 1 (one) unit is approx. 1.000 copies. The reader may wish to obtain more information about Breast Cancer and the P53 tumor suppressor gene, "Cancer prevention and detection, ad well as molecular

targeting strategies and target therapy”. Please look into the references that follow:

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