“From My Breast Cancer to Enabling Genetic Testing Access” (Sandra Balladares, PhD, MSc) [#145]

Brad Power and Victoria Dombrowski
May 28, 2025

“I invited patients considered candidates by NCCN guidelines to get genetic testing. Some of them said, ‘No, I do not think I need it since my doctor has not recommended it. I'm going to trust whatever my doctor tells me. And if they didn't recommend genetic testing for me, perhaps it is because I don't need it.’ I had difficult or strong conversations with them, giving them alternative scenarios, for example, ‘Perhaps they didn't offer it because they didn't know that this existed.’ In some cases, even with my close friends, I had to push hard for them to open and be receptive to all this new information.” – Sandra Balladares, PhD, MSc

“I see that across all the developing countries now there is a strong need to bring genomics at a price point that can be implemented in those developing countries.” – Sandra Balladares, PhD, MSc

“The Cancer Patient Lab can fulfill two goals: One is to direct patients that come to us to other support organizations for the different types of needs that they may have. We can also leverage the great technical team that we have here, in order to share cutting-edge information about what is happening out there in terms of new diagnostic methods and new therapeutics, to give them visibility to all the different options that are emerging out there, for them to make the best decisions and to improve their outcomes. A patient who is empowered and gets involved is going to get better outcomes.” – Sandra Balladares, PhD, MSc

Meeting Summary

As patients, we live with significant anxiety and fears about treatment side effects and recurrence. Many of us would prefer not to have any chemotherapy, but would be confident about doing it if we were able to prove that cancer is still present and extra treatment is needed. In order to do that, we need better methods to detect cancer with high sensitivity. Ideally, additional treatment should be personalized and administered only when cancer is confirmed, thereby preventing undesired side effects in patients who do not need and would not benefit from it. Having a test that informs patients after each intervention that the treatment is working would help manage anxiety and enable timely therapeutic management during treatment and surveillance.

We are experiencing a remarkable era in cancer diagnostics as many powerful DNA-based methods are emerging to detect cancer DNA with high sensitivity and enable an effective method to detect “Minimal Residual Disease” at different points during treatment and surveillance. Hopefully these methods get broadly available soon to provide the confidence and comfort that patients need.

Doctors, patients, and caregivers often don't know about the latest cancer tests or treatments. This is particularly true in places where access to the latest tests and treatments and information about them is scarce. As a result, patients get worse outcomes.

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Consider the case of Sandra Balladares. In 2010, as a 36-year-old molecular biologist and new mother, she discovered a lump in her breast. Despite her in-depth knowledge of genomics, she faced a lack of access to BRCA genetic testing in Mexico City. This gap propelled her mission to bring genetic testing to Mexico and Latin America. After undergoing a mastectomy and chemotherapy, she attended the AACR meeting in Chicago, where she connected with Dr. Jeffrey Weitzel, a specialist in clinical cancer genetics. They collaborated on engaging with Mexican healthcare professionals to establish the genetic testing infrastructure in Mexico and other Latin American countries. Their efforts have enabled over 3,000 underserved patients to receive advanced genetic risk assessments. Sandra’s continued advocacy promotes personalized treatment approaches and underscores the importance of genomic testing for cancer patients to enable better treatment and improved outcomes. Now in remission, Sandra is dedicated to empowering others through education and access to genetic testing. For more on her story, please see here.

What are the challenges in accessing the latest cancer tests and treatments, especially in Latin America?

- Limited availability of cutting-edge diagnostic tests, such as BRCA testing in Mexico in 2010, despite being standard in the U.S.
- Lack of genetic testing infrastructure in many countries
- Insufficient education for both healthcare professionals and patients about advanced diagnostic methods
- Economic barriers preventing access to the latest treatments
- Significant disparities between private and public healthcare systems

What are approaches to overcoming these barriers?

- Collaborate with local healthcare institutions to provide testing, train clinical providers, and create awareness about the importance of genetic screening
- Create affordable testing options that can be implemented in developing countries
- Facilitate sample testing and result sharing with local institutions
- Create easily accessible education resources and information about testing for clinicians and patients

What are tips for being an advocate for your care?

- Get detailed information about your specific diagnosis and treatment options - ask questions and seek multiple medical opinions
- Find out about your testing options and request additional tests or screenings you feel are important
- Seek psychological support early to manage anxiety and emotional challenges
- Trust your instincts and don't be afraid to challenge standard recommendations
- Connect with support organizations to learn from others' experiences

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- Take an active role in treatment decisions
- Prioritize your mental and physical well-being throughout the process

How can we leverage the expertise and resources of the Cancer Patient Lab to support the broader breast cancer community?

- Connect with existing cancer support organizations
- Share cutting-edge information about new diagnostic methods and treatments; empower patients with technical knowledge to help them make informed decisions
- Leverage the Cancer Patient Lab's technical experts and resources to provide visibility into emerging cancer tests and treatments

How can you learn more about engaging in your care and expanding access to new tests and treatments?

- Join the breast cancer community (and other communities) on the Cancer Patient Lab discussion hub.
- See other stories of engaged patients and how they advocated for themselves:
  - "What I Learned from Navigating Three Cancers" (Ert Dredge) [#139]
  - "A Rogue Cancer Patient Gets Better Outcomes" (Ari Akerstein) [#109]
  - "A Guy with Two Cancers Explores Treatments and Life" (Burt Rosen) [#112]

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For the video recording of this conversation, please see here.

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Meeting Notes

KEYWORDS

breast cancer survivor, cancer diagnostics, genetic testing, chemotherapy, radical mastectomy, anxiety management, support organizations, pharmaceutical biologist, immunogenetics, cancer patient lab, oncology treatment, liquid biopsy, minimal residual disease, cancer survivorship, cancer community

SPEAKERS

Sandra Balladares (88%), Brad Power (7%), Phil (3%), Michael Liebman (3%), Marianne Gault (1%), David Plunkett (1%), Roger Royse (1%)

SUMMARY

Sandra Balladares, a breast cancer survivor and pharmaceutical biologist, shared her journey and advocacy in cancer diagnostics. Diagnosed with breast cancer in 2010 at 36, she underwent a radical mastectomy and chemotherapy, including Herceptin. Despite initial fears, she completed treatment and later had a double mastectomy due to genetic testing revealing no BRCA mutations. Sandra emphasized the importance of genetic testing, especially for young patients, and her efforts to promote it in Mexico and Latin America. She highlighted the need for better education and resources for both patients and healthcare providers to improve cancer care and outcomes.

OUTLINE

Introductions

- Sandra Balladares is a breast cancer survivor and expert in cancer diagnostics.
- She has volunteered to launch a breast cancer community at the Cancer Patient Lab.
- Sandra was diagnosed with breast cancer in 2010 while living in Mexico City at the age of 36.
- She discovered a lump in her breast on Mother's Day and sought immediate medical attention from her sister, an OBGYN.
- She was a chemist and pharmaceutical biologist, with cautious approach to medications.
- After a biopsy, she was diagnosed with invasive ductal carcinoma and had to quickly consult with multiple oncologists.

Treatment Decisions and Surgery

- Sandra underwent a mammogram, ultrasound, and multiple consultations with surgeons, leading to a recommendation for a radical mastectomy.
- She had a PET scan to rule out metastasis, which confirmed the cancer was localized but multicentric.
- She scheduled her surgery for May 25, the day of her son Matteo's birthday, and organized a special party beforehand.

- During surgery, her tumor was found to be well-encapsulated, and her sentinel lymph nodes were negative, but she required chemotherapy.

Chemotherapy and Its Impact

- Sandra initially feared chemotherapy and was reluctant to undergo it due to its toxicity.
- She consulted with her doctor and decided to proceed with the recommended treatment plan, which included epirubicin, taxotere, and Herceptin.
- She joined a support organization to cope with her fears and contributed information about the side effects of chemotherapy.
- She experienced severe side effects, including necrotized skin, requiring a second surgery and hyperbaric chamber therapy.

Genetic Testing and Further Treatment

- Genetic testing, though important, was not initially recommended by her doctors.
- She decided to proceed with genetic testing and found she was BRCA negative, which provided her with a sense of relief.
- She underwent a second radical mastectomy due to adenomas found on her right breast.
- She became an advocate for genetic testing and organized campaigns to raise awareness and provide access to genetic counseling in Mexico.

Advocacy and Professional Career

- Sandra worked at companies like Applied Biosystems and Illumina.
- Leveraging genomics is important to improve cancer patient outcomes.
- She has been involved in projects related to comprehensive tumor profiling, liquid biopsy, and minimal residual disease testing.
- She is grateful for the opportunity to bring genomic knowledge and tools to improve cancer care.

Differences in Healthcare Systems

- Sandra compared the healthcare systems in the United States, Mexico, and other developing countries, noting significant differences in the availability and affordability of diagnostic tests and treatments.
- Education and awareness about genetic testing and cancer care is needed in developing countries.
- Programs like those initiated by Dr. Weitzel provide access to genetic testing and counseling.

Sandra's Vision for the Breast Cancer Community at the Cancer Patient Lab

- Sandra aims to connect patients with support organizations and provide cutting-edge information about new diagnostic methods and treatments.
- She believes that empowered patients will achieve better outcomes.
- She plans to leverage the technical team at the Cancer Patient Lab to share information and support patients.

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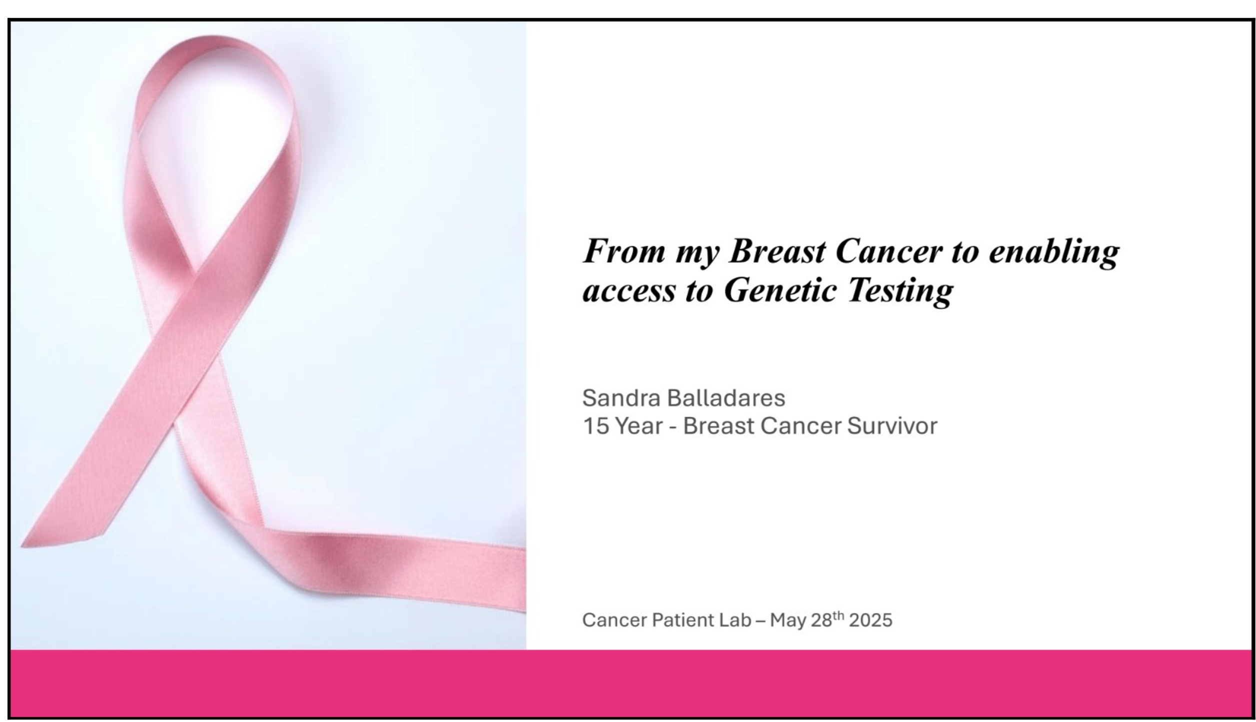
TRANSCRIPT

Brad Power
This is the Cancer Patient Lab.



Today we're honored to have with us Sandra Balladares, who is a breast cancer survivor. She is going to talk about her journey, both as a breast cancer survivor and her work in cancer diagnostics at a number of companies, and how those stories interlink. We like to showcase people who get actively engaged in their care and are role models for others. Sandra is one of those role models.

Sandra has generously volunteered to launch a breast cancer community at the Cancer Patient Lab. We're really for all cancers, but we have a focus, given our heritage of prostate cancer, which is due to two of our co-founders being prostate cancer survivors. We added pancreatic and brain cancers because of our collaboration with Cancer Commons. Now we've added breast cancer as a focus area, and Sandra is leading that community.

This is medical information. It's not medical advice. We try to arm our patients with information they can take to their medical team.

We are a nonprofit 501(c)(3), and we depend on the kindness of people who donate to us, which is easy to do. If you go to our website, there's a Donate button and you can donate there.

Roger Royse 1:54

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Please check out our Cancer Patient Lab website. It’s been redesigned and has some new features. We have a discussion and a chat board there.

Sandra Balladares 2:15
It is a great pleasure to be here with all of you today, sharing my journey in my breast cancer and how that impacted what I do today as part of my professional life. I'm also happy to share that I am in my 15 years of survivorship.

About me (2010) ...

- Based in México, 36 yo
- Chemist Pharmaceutical Biologists, BSc
- Molecular Biomedicine PhD & MSc - Immunogenetics
- 8-year Biotech – DNA technologies, Sales & Support Manager
- Healthy habits, diet, exercise
- No familiar history of Breast Cancer
- Two children ~2 and ~4

Let me start with introducing myself. Around 2010 I was diagnosed. During that time, I was based and living in Mexico City. I was 36 years old. I am a chemist, a pharmaceutical biologist. While given my pharmaceutical background, I was always very careful about the drugs or medicine I took. I was always reading the labels, and many times refusing to take medicine. I am the same today.

After I finished my bachelor degree, I did a master's and a PhD on immunogenetics. During that time, the whole human genome sequencing project was on-going. It was extremely exciting to me, and I decided to work on the most complex region in the human genome, HLA (Human Leukocyte Antigen, National Library of Health (NLH)).

I did both my master's and PhD in immunogenetics (*def*: study of genetics of immune response, such as the study of immune response genes or the association of HLA antigens with disease susceptibility, or the generation of antibody diversity. Medical Dictionary). By that time, I was already working for eight years in biotech companies - companies producing DNA technologies for different purposes - as the faith and supporting manager. I was healthy: I used to exercise a

lot, had a good diet, and there was no breast cancer history in my family. I had two kids who were almost two and four years old at the time.

May 10th 2010 – Mexico Mother’s Day …

- Lump on left breast - self exploration during shower…
- FNA – Fine Needle Aspiration Biopsy

May 12th: Moderately differentiated invasive ductal carcinoma (IDC)

I learned about my cancer on the morning of May 10 in Mexico City - Mother's Day in Mexico. I was preparing to meet my mom and sisters for breakfast to celebrate Mother's Day. As I was showering, I identified a lump in my left breast. I got extremely concerned, but I was thinking it will disappear as other lumps that come and go as part of the hormonal changes. As soon as I went to breakfast, I asked my youngest sister (who was an OBGYN) to come with me and check my breast in the restroom. I recalled I had a similar lump in the same breast five months before in December, so I started to get concerned. Indeed, after this quick exploration in the restroom in the restaurant, my sister recommended I go with her to her office after breakfast. As soon as we got to her office, she wanted to take a biopsy with a fine needle.

I was scared. I said “no”, because I was thinking that if it was cancer, it would potentially release the cancer to my blood and increase chances for metastasis (*def*: Cancer that spreads from where it started to a distant part of the body. National Cancer Institute (NCI)). I calmed down, thinking it could not be cancer because there was no history of breast cancer in my family. I decided to do the biopsy. Two days later, we received the pathology result confirming I had invasive ductal carcinoma (*def*: Most common type of invasive breast cancer. NCI).

It took me a while to process this news. I was in the exponential phase of my professional career. Super excited growing. I was the mom of these two wonderful kids. I had many plans. We were preparing to go to Disney World to celebrate Mateo's birthday. I was launching a big project in Mexico. I was not ready for cancer. It was really difficult to accept, for sure, as it has been the case for all of you.

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Identifying the enemy and preparing the battle

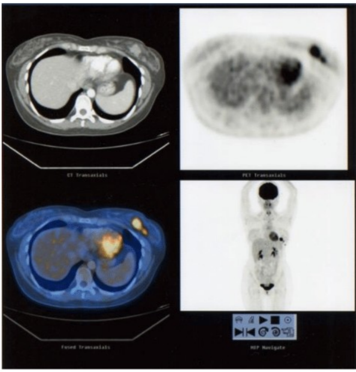
May 12th - 13th: 3x Surgeon Oncologist visits, 3x Medical Opinion

- First mammogram & ultrasound: BI-RADS 6
- Left breast tumor potentially malignant and multicentric
- Right breast, solid nodules suggestive of adenomas
- Histopathologic analysis recommended for both breast tissues

May 13th: PET-CT

- Solid tumor 3x2.6cm SUV 10.08,
- 4 more nodules of 0.6-0.9 cm SUV 4.6
- Localized only on left breast

May 23rd: Mateo’s birthday party – 4yo



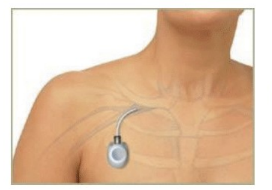
May 25th: Radical Mastectomy left breast

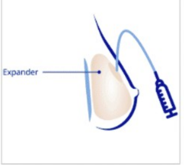
3 Good news:

- Clean surgical borders
- Negative sentinel lymph nodes
- Port-a-Cath AND tissue expander have been placed!

Pathology Report:

- Immunochemistry: HER2+ (GREAT NEWS!), p53 + (85%), Ki-67 + (60%)
- Multicentric Invasive Ductal Carcinoma, Stage IIA





Regardless, I knew I had to move quickly. As soon as I got the results, I got my first visit with a surgeon, an oncologist, and then I got two extra oncologists. I wanted to have different opinions. I got, for the first time, my mammogram and an ultrasound. I was 36 years old, but mammograms are not encouraged until age 40. The three surgeons that examined me and my breast came to the consensus that I needed a radical mastectomy, based on the pathology results, clinical exploration, and mammogram. I had a potentially malignant tumor on my left breast, but I also had some nodes on my right breast. The recommendation was to have pathology analysis for both tissues.

Sandra Balladares 8:18
One of the oncologists recommended a PET scan (*def*: positron emission tomography - imaging test producing images of organs and tissues. Cleveland Clinic), a PET CT (*def*: Computed tomography - scans using X-rays. Cleveland Clinic), in order to identify if I have metastasis. Things were getting worse as I was learning more things - I was shocked, like, “What do you mean by metastasis?” This should be kind of early, but I was happy I got the test. Before doing anything, he told me it's important to get a PET CT to determine where the tumor is - if there is something outside of the breast. I got the PET scan the next day. It confirmed it was localized and actually multicentric: there were several models. That was good news, because it was just present in my left breast.

Life was pulling me in another direction. We canceled a trip to Disney World. Matteo's birthday was on May 25 and that was the date I was scheduled for the radical mastectomy surgery. So we organized a birthday party two days before my surgery, just to make sure that we didn't miss Matteo's birthday and to also imprint some nice pictures and memories of his mom. My worst

fear was I would leave my kids without a mom. We organized a beautiful party, and then on May 25, I went to get my mastectomy.

Everything went well, except that morning, I expected to drop off Matteo to his public daycare. I totally forgot that as soon as kids turn four in Mexico, public health daycares don't accept them anymore. I had to find a private daycare and ask them to keep my child because I was going to the hospital to get surgery. They were extremely shocked at that and they were supportive.

After that, I went into surgery. When I woke up from the anesthesia, my surgeon approached me with three updates. One was that the borders of the surgery were clean. He told me, “Your tumor was very well encapsulated (*def*: confined, localized. NCI).” Then second was that the sentinel lymph nodes (NCI) were negative, which was great. There was no metastasis so he told me “we have put in a chemo port (*def*: small, implantable device attached to a vein, usually in upper chest. Cleveland Clinic) because you are going to require chemotherapy. This is going to help to spread the chemo as soon as it enters into your body, because otherwise it can burn your veins.” Then, he also said they put the tissue expander (BreastCancer.org) to initiate the reconstruction of my breast at some point.

I was extremely shocked because we never talked about that as we were preparing for the surgery. I asked him who approved that, and he said, “your husband. During the surgery, we told him that everything was fine and that we could do that.” I don't really think my husband was thinking, but that was the good news they gave me. I was extremely shocked and upset about the situation. It was difficult to live now, with my body feeling all these extra things that were strange - the sensations changed and it was not something pleasant.

Days later, I got the results from the pathology laboratory, which informed me that my tumor was HER2-positive (Cleveland Clinic) which was great news, because according to my doctor, this was one of the most aggressive and lethal types of cancer. However, now there is a targeted treatment, which is Herceptin (NCI), that is really improving survival rates for these patients, and their response. This is great news because it is going to be effective for you.

The results again confirmed it was invasive ductal carcinoma. They also removed part of the tissue from my right breast, however, that tissue came back negative. Again, this was extremely scary. I was extremely worried I could die during my surgery and that it will be traumatic for my son to have his mom die during surgery. But I made it and I was able to go back home to be with my kids.

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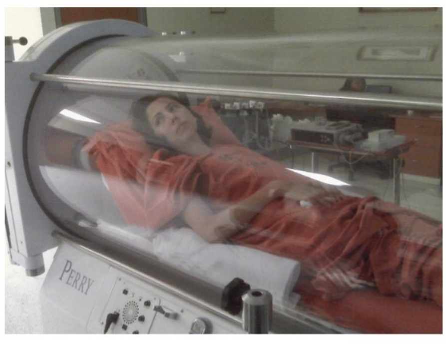
My wound is not healing!

June 6th – Second surgery

- The skin in my wound is getting necrotized!
- Remove the tissue expander – more necrosis around the tissue expander
- Hyperbaric chamber therapy: 1 hr daily for 10 days to improve-accelerate wound healing (June 8th-18th)



Next step: Chemotherapy

- 4x Clinical Oncologists, 4x Medical Opinions (Private or Public, Mexico, USA)
- 4x Anthracycline cycles: Adriamycin (doxorubicin) vs Epirubicin plus Cyclophosphamide
- 4x Taxanes cycles: Taxol (Paclitaxel) vs Taxotere (Docetaxel)
- 12 cycles Herceptin (Trastuzumab, targeted treatment for HER2+ BC) – Antibody anti HER2 receptor
- USA Clinical Oncologist: ***Because of your age, you should consider genetic testing!***

Chemotherapy Plan defined:

Clinical Oncologist, current in Oncology treatment landscape, attends international conferences, good reputation, recommended by the surgeons.

Treatment:
- 4x Epirubicin + Cyclophosphamide cycles
- 4x Taxotere (Docetaxel) cycles
- 12 cycles Herceptin

Genetic Testing:
- Identify if I am a carrier of BRCA1/2 mutations

Then, one week after the surgery, I noticed the skin in my wound was getting black, so it was necrotized (*necrosis def*: death of body tissue. Cleveland Clinic). I had to have a second, urgent surgery one week after my first surgery. It seems all the tissue around the surgery area got necrotized and it was extremely challenging, extremely difficult. Again, something was threatening my life. I needed hyperbaric oxygen therapy (*def*: treatment supplied with 100% oxygen inside a special chamber. Cleveland Clinic) in a chamber to help my tissue heal. It was stressful to be there. But it did help and I was also trying to resolve what I was going to do with my chemotherapy.

Something I learned from my surgeon is that whenever you are living with and treating a cancer, you have a window of two weeks where you have to make a decision and move quickly because cancer is growing. As I was having my oxygen therapy, I needed to also identify what was going to be my next step, and hopefully complete it in 10 days.

The next step was to identify a clinical oncologist to get the chemotherapy. I got a meeting with four Clinical Oncologists, two in private medicine in Mexico, one in the public health system and another one from the U.S. I wanted to know, given the pathology results, what would be the treatment they would provide me? Interestingly, the doctor I saw in the public health system told me, “I will give you the treatment that I consider is necessary for you.” But he refused to give me any information about what treatment will look like. I decided he was not going to be my doctor. I simply couldn't work or let my life in his hands. I was evaluating the other two doctors in the private system, and they were proposing to have four cycles of anthrax, anthracycline chemotherapy and four cycles of taxane followed by 12 cycles of Herceptin (NLM).

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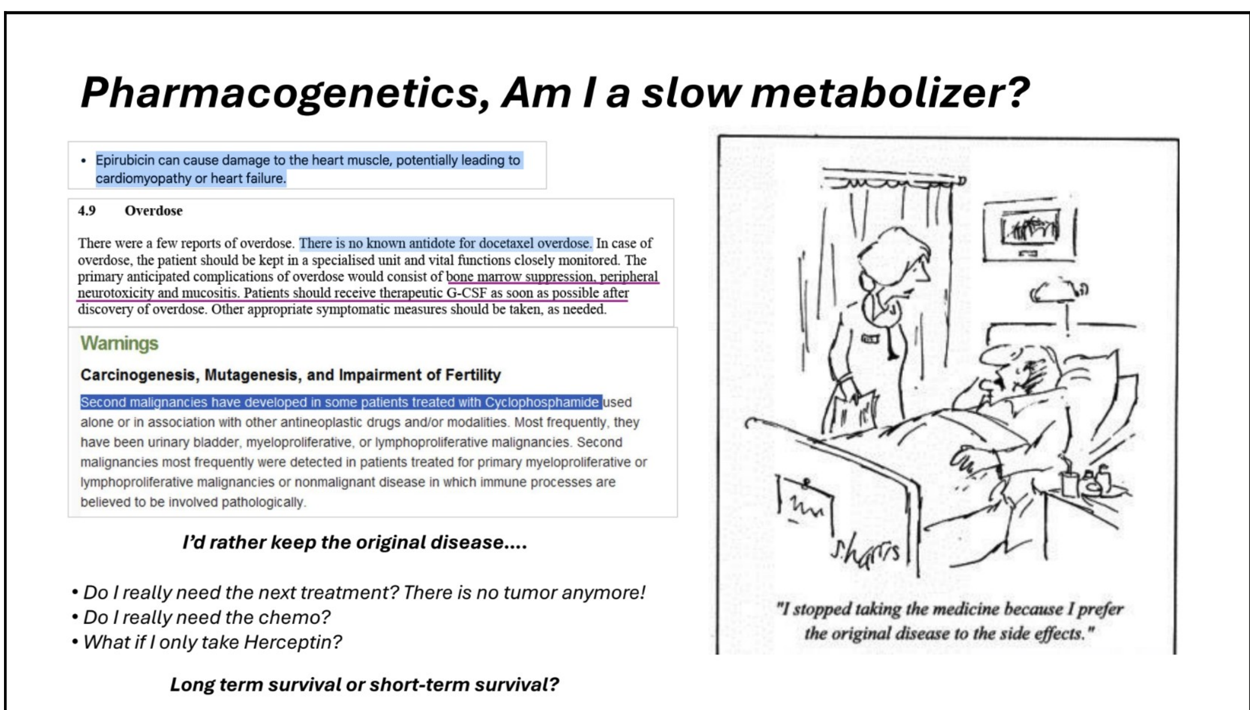
I was hesitant about whether I should take Adriamycin (BreastCancer.org) or Epirubicin (NCI), because those were the two options. It was Taxol versus Taxotere (Drugs.com). I contacted a fourth oncologist this time in the U.S. The doctor told me, "Well, you know that any of those treatments are very effective. Some doctors have preferences related to the side effects, but you should be very well covered with both of them."

Interestingly, none of these three doctors, plus the other three doctors I saw between surgeons and clinical oncologist, told me anything about genetic testing, the fact I was 36, and that I will have some genetic predisposition to cancer. One oncologist in the U.S., immediately highlighted, however, how important it was to get genetic testing at all.

I decided who was going to be my doctor in Mexico. I picked a doctor who was attending international conferences. For me, that was important because I wanted to trust that she knew everything needed to give me the best care. I moved on with Epirubicin plus Cyclophosphamide (NCI), and then four cycles of Taxotere and 12 cycles of Herceptin.

As I started to read and learn about genetic testing, I considered that was going to be important for my survival. I could prioritize and investigate further after chemotherapy.



Sandra Balladares 18:10
I told you at the beginning of the presentation my background is in pharmaceutical sciences. This was not an exception, so I looked at the label of all the medications I was going to receive. I got extremely terrified just learning about all the toxicity to my heart, bone marrow, to a neurotoxicity, etc, that I couldn't really believe under my own will, I was going to receive this treatment.

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I was extremely fearful. My kids were super young. I really wanted them to have a mom. I talked to my husband, and told him, “I don't think that I want to do this. I'm not going to do it.” I went to see my doctor, and I told her, “I don't really like the side effects. What if I don't do chemo? What will happen? Or what if I only do Herceptin? How will that impact my survival?”

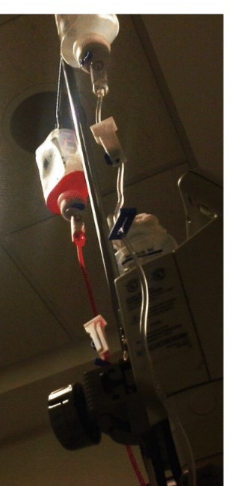
She said, “Well, we can do whatever you want, and I understand. The treatment has been created and personalized for you based on your biomarkers, in order to decrease the chances for recurrence with the surgery.” I don't remember the exact numbers, but she said, “With the surgery, we are reducing the chances for recurrence by 50, 60%. When we use Herceptin, we are reducing the chances by another 20%. The chemotherapy, each one of the four cycles, is going to give you a 10% extra chance of reducing recurrence. Not having the chemo will be equivalent to having 20% *more* chance of recurrence.

That was super scary. My husband asked me, “What would you do if one of our kids got cancer? Would you give them chemo or not?” I said, “I would.” He said, “Would you please take chemotherapy for us?” I accepted, but I was not really very happy about the decision.

The holy liquid and the red devil!

How are other women managing their fears to chemo?

Women at the Breast Cancer Patient Support Group:
Chemo is the holy liquid that will heal you....
Me:
No it’s not, it is a bomb that destroys many cells in your body!



Oswaldo Guayasamín, Ecuador (1919-1999): "Lágrimas de Sangre"

July 1st, Chemo 1 (Emilio’s birthday 2y): Panic Attack!
Vital signs only - from Thursday to Sunday, headache, confusion, nausea, dizziness. I did not turn yellow! Neutropenia (Neupogen (G-CSF) added to treatment after chemotherapy – enlarged spleen

I decided to move forward with chemotherapy. However, I thought “I cannot be the only woman thinking or feeling this hesitancy about chemotherapy, so perhaps this is an opportunity for me to engage with other women in a support organization and learn from them. How are they dealing with all these fears?”

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That's when I joined the first support organization. Interestingly, none of the women had fears about chemo. They actually refer to chemo as the “holy liquid that enters and fills your body”. I told them, “No - it's poison! It's a bomb, killing many of your cells.”

I don't know how happy they were having me there, but eventually we started to work together. We understood each other and I started to contribute by bringing that type of information to the support organization. Even though they thought chemo was a holy liquid, they said something important. The red chemo was very aggressive, and would make you feel very bad, but the white chemo was easy - it was easy to tolerate and will not give you many side effects. I asked them, “What do you mean red chemo and white chemo? Is it the box, package, or the label you are referring to?” They just responded that it's the chemo. I couldn't understand. I have Epirubicin and Taxotere. I couldn't know which one was coming in a red or white box.

It wasn’t until my first chemotherapy, that I could understand more. Unfortunately, my treatment coincided with my little one's second birthday. I was in bed ready to receive the chemo, when suddenly the nurse came with a black plastic bag. She put the IV in the pole to start to give me the chemotherapy and also practice. It was wrong. I was extremely shocked and terrified. I wanted to remove the catheter and run out the door. The nurse told me, “you better calm down, because if not, I'm going to cancel your chemo and you will need to get another appointment.”

I did what I could to calm myself down, and my husband brought my iPad with videos of my baby when he was born and beautiful things for me to focus on something else and to be able to receive the chemotherapy.

As my friends in the support organization said as soon as the chemo finished, I was feeling so bad. I was confused. I had headaches. I went to bed and I slept from Thursday to Sunday, feeling so terrible. I suppose I had my vital signs taken, but I couldn't think clearly. What I remember is waking from time to time and checking myself in the mirror. Just checking that I was not turning yellow - that I was not having toxicity. That was my biggest fear. But nothing happened. I never turned yellow.

One week before my second chemotherapy, my doctor ordered a blood test to check my liver and my organs and also my blood count. Everything came back almost normal with my liver. However, my blood count was so low that they had to postpone my second chemotherapy until I recovered my blood count.

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The holy liquid and the red devil!

Resuscitating on Sunday

3x more cycles to go every 21 days, shaved my head, Psychiatrist – anxiety pills, Psychologist

Every 21 days I had to receive my red chemo. I felt I was resuscitating every Sunday after. I had three more chemos and when I started to lose my hair, it actually hurt that I had to shave my head. One of my very good friends recommended visiting a psychiatrist to get some anxiety pills, because I couldn't live with the anxiety the treatment was generating besides the cancer, which I did. I was very happy. I think that was important because I had to have three extra more chemotherapies, but I was able to better manage the situation and my anxiety.

What?????

Congratulations on finishing your first phase of Chemotherapy, <u>we will now initiate the most difficult part of the treatment</u>!

Taxotere (Taxoterrible)

No headache, no dizziness but gum bleeding, numbness, muscle pain, fatigue, dry eyes, nail changes, hot flashes and more severe neutropenia

“From My Breast Cancer to Enabling Genetic Testing Access” (Sandra Balladares, PhD, MSc) [#145]

Sandra Balladares 25:30
I finally finished my four cycles and went to see my doctor. I was very excited and feeling victorious. I went to see the doctor in the afternoon by myself. My husband was traveling, so he was not there, but I told him not to worry because my friends said the red one is the worst. From here forward, I supposed everything was going to be easier. I was talking to my doctor when she said, “Congratulations on finishing your first cycles of chemotherapy. We will now initiate the most difficult part of the treatment.” And I was like, “What? What do you mean?” I started crying immediately and asked her, “What was all of this then? How are just going to start the most difficult part? What is that? How is it going to look?” Again, I had fears, not that my life was in danger, but with the next treatment. Good thing I had my anxiety pills.

I started to take the first cycle of Taxotere. It was a surprise when I finished treatment that I didn't have headaches or feel dizzy. I was actually working after I got my infusion because I decided to continue working. It helped me to manage all the anxiety. I remember after having the first cycle of Taxotere, I was working that evening, and then having dinner with my family.

I didn't have any side effects until one week later. Then I had muscle pain and my immune system went down, which the doctor warned me about. My gums started bleeding and many other side effects you don't want to hear, but were terrifying.

For the second infusion, I went to the hospital, and they just started to give me the infusion. When I felt that all the veins in my body started to contract. I got a bronchospasm (*def*: when the muscles that line the airways in your lungs tighten. Cleveland Clinic). I was having obviously difficulty breathing, chest pain. It was terrible. I thought I might die.

“From My Breast Cancer to Enabling Genetic Testing Access” (Sandra Balladares, PhD, MSc) [#145]

My husband was traveling again and I was alone with one of my friends. I told her, as soon as I was able to recover, to contact my family, which was my best friend and my sister who came as soon as they could. But this was really terrifying. I had another meeting as a follow up with my doctors. We needed to decide if I was going to continue with the two remaining treatments or not.

All of the statistical analysis about my chances of recurrence, etc, came to mind and I had to make the most difficult decision in my whole life: if I should continue with the two remaining Taxotere infusions or not. I did a lot of surveys with a lot of people and, finally, I decided that I will do it. I didn't come all this way just to lose thirteen percent chance of increasing my survival. That morning I kissed my kids and told them I loved them. I took many pictures. I was not sure if I was going to come back home.

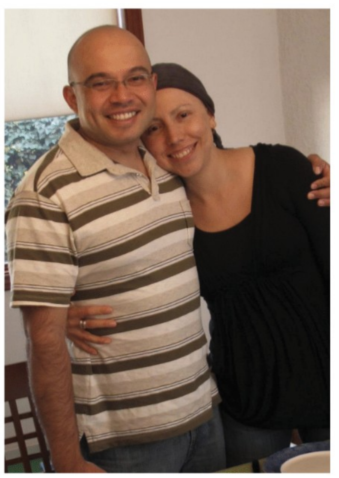
Then, we went to the hospital and it was very stressful as they were preparing me. This time I was in a special room. It was a kind of an emergency room with a crash cart and all the equipment ready for resuscitation in case I had a more severe hypersensitivity reaction.

I had two nurses, my doctor there with me. They released one drop and checked my reaction. Nothing happened. Then they moved to the second, and third drop. I was extremely lucky because I was able to finish my whole treatment, the whole infusion, without any reaction. Obviously, there was preparation before the chemotherapy with more corticosteroids, more antihistamines. For sure that helped and I was able to come back home that night to my kids.

Almost done!

Surveillance for 10 years

- *December 12th 2010: 4/4 Taxotere (+ Herceptin) – DONE!*
- *August 2011 - 8x Herceptin completed*



- *PET-CT every year for 5 years*
- *Follow up for 5 more years CT Scan*
- *December 2020 - Full remission*

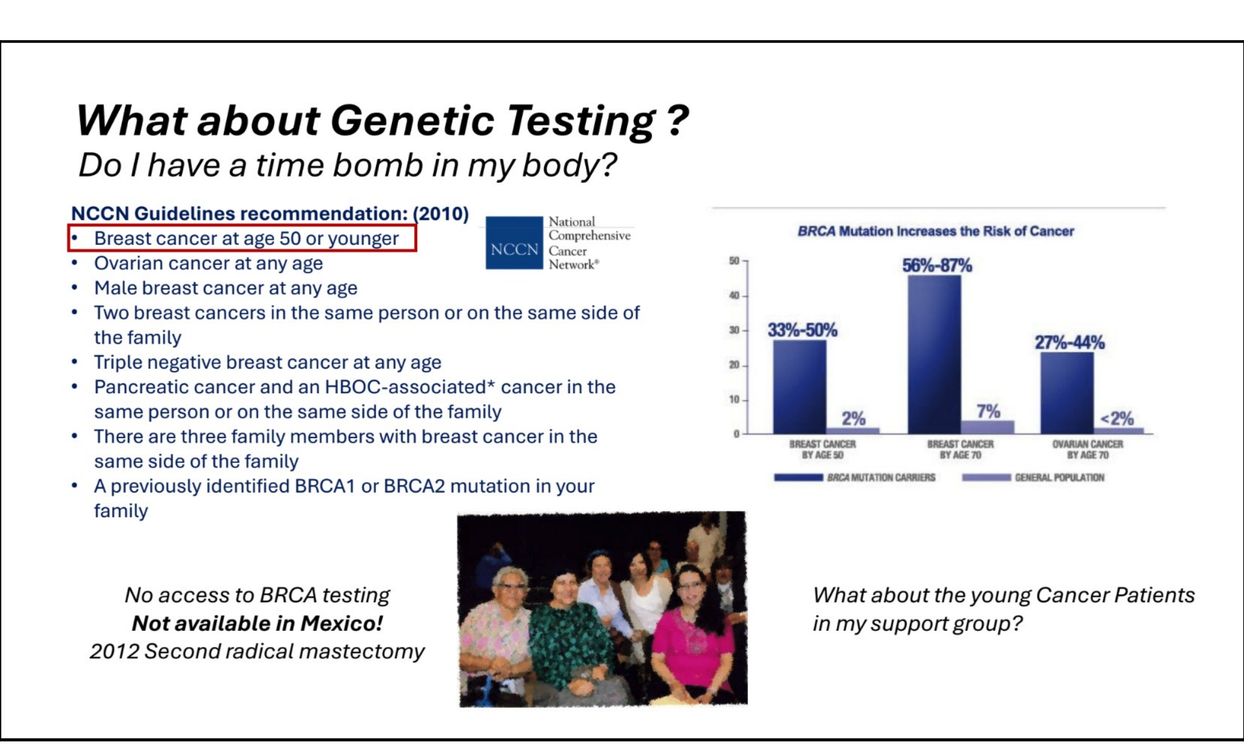
“From My Breast Cancer to Enabling Genetic Testing Access” (Sandra Balladares, PhD, MSc) [#145]

I got my last infusion on December 12th that year. I didn't have any complications. I was extremely lucky. It was probably the happiest day in my whole life. After that, I needed to complete the extra eight cycles of Herceptin, which I finished by August 11th. After that, I was back home with my kids and my husband. It was super scary, but finally, I made it.

Because I was extremely anxious about recurrence, I asked my oncologist to order another PET CT scan for me. She said, “that's not the standard of care - it has radiation. It's not good for you.” But I told her, “I don't care if that's the standard of care or not. I want to see my body clean and free of cancer, no?” Given the circumstances, she ordered another PET scan. Everything was clean. I was super happy. But then, every year I wanted to see my body was clean.

Obviously, you can imagine when I got the results, it was very difficult to open the envelope and read the results. But every time that I read it was negative, that everything was fine, it was like “you get a ticket to live one more year without concerns”, no? I needed to do it.

I did it for five years. For the last five years of surveillance, I just got a CT scan every two years. When I got into full remission in December 2022, we were in San Diego. I still had pending genetic testing. Once I was done with that, I could focus on the next piece.



I was thinking, “based on the National Comprehensive Cancer Network (NCCN) guidelines, since I am 36 years old, I should have genetic testing and get my BRCA gene sequenced to identify if I have mutations.” (NCCN) Those mutations increase your risk of breast and ovarian cancer as well. Since I was keeping my right breast, I didn't know if I had a time bomb in my body, so I was extremely concerned.

“From My Breast Cancer to Enabling Genetic Testing Access” (Sandra Balladares, PhD, MSc) [#145]

I started to look for a laboratory that was performing BRCA testing in Mexico. Unfortunately, I couldn't find a single lab. I was selling sequencers, so I checked with my customers in case anyone was doing BRCA sequencing, even for research purposes, and I couldn't find any labs. I decided, together with my doctor, that given my age, and the adenomas (*def*: non-cancerous tumors. Cleveland Clinic) we found on the right breast that it would be better to do a second radical mastectomy, which we did. I was very happy with my decision and feeling fine. Now I was done with cancer and that I could forget about cancer for the rest of my life.

However, when I went back to the support organization, I remembered my friend, Candy. She was in her 20s, and had breast cancer. She didn't have a background in science, and didn't even know she needed genetic testing. I felt, as a scientist, it was my responsibility to do something. It would be negligence on my part if I didn’t do anything knowing what was happening. That's when I decided that I would start to work on genetic testing and creating campaigns. I was working again at a DNA company, selling sequencers and organizing marketing events. I thought, perhaps we should start to work from any angle promoting genetic testing and creating awareness with the need of genetic testing in order to impact patients like Candy who may need or may have pathogenic variants.

Sandra Balladares 35:06
I talked to my boss at the time. He was extremely supportive about the idea and about the plan.

Jeffrey N. Weitzel, MD, FACMG
Professor, Precision Prevention at the University of Kansas.
Former **Director of the department of clinical cancer genetics at the City of Hope Comprehensive Cancer Center.** Founder of the Division of Clinical Cancer Genomics and the Cancer Screening & Prevention Program at City of Hope Founder of the Division of Clinical Cancer Genomics and the Cancer Screening & Prevention Program at City of Hope. Comprehensive Cancer Center ASCO Conquer Cancer Research Professor in Breast Cancer Disparities. Principal investigator for the Clinical Cancer Genomics Community Research Network and received the American Society of Human Genetics Arno Motulsky-Barton Childs Award for Excellence in Human Genetics Education.

Kathleen Blazer, Ed.D; M.S; CGC
Genetic Counselor, Division of Clinical Cancer Genomics, Department of Medical Oncology & Therapeutics Research
Professor, Division of Clinical Cancer Genomics, Department of Medical Oncology & Therapeutics Research
Associate Director, Cancer Genomics Education Program
Co-director, Intensive Course in Cancer Risk Assessment
Co-investigator, Cancer Genomics Career Development Program

The Crusaders: Collaboration to implement Genomic Cancer Risk Assessment (GCRA) in Mexico

- Awareness campaigns Scientific Community about the need of genetic testing to improve cancer patient outcomes
- Accelerate engagement with specialized cancer care institutions in Mexico
- *Networking for needs assessment, identify champions or sites*
- *On-site meetings with leadership and key Academic and clinical staff and Web-based follow-up meetings*
- *GCRA and counseling proficiency training for clinicians*
- *Implementation support, monitoring, and quality assurance*

GENETIC TESTING FOR CANCER

Development and Pilot Implementation of the Genomic Risk Assessment for Cancer Implementation and Sustainment (GRACIAS) Intervention in Mexico

Kathleen R. Blazer, EdD[1]; Yanin Chavarri-Guerra, MD, MSc[2]; Cynthia Villarreal Garza, MD, DSc[3]; Bita Nehoray, MS[1]; Alejandro Mohar, MD[4,5]; Adrian Daneri-Navarro, MD, PhD[6]; Azucena del Toro, MD[6]; Dione Aguilar, MD[3]; Jazmin Arteaga, MD[2]; Rosa Maria Álvarez, MD[4]; Rosa Mejia, BS[1]; Josef Herzog, BS[1]; Danielle Castillo, BS[1]; Maria Fernandez, PhD[7]; and Jeffrey N. Weitzel, MD[1,8]

“Dr Weitzel and his team have provided genetic testing access to more than **6,000 breast cancer patients in Latin America**”

* Dr Weitzel and his team

BRCA1/2 sequencing test Myriad: Negative
Expanded Genetic Testing Invitae: Negative
Passionate about leveraging genomics to improve patient outcomes

One of my best friends was very close to me during my whole cancer journey. She is an expert in oncology, working on oncology projects during her entire higher education journey. During that time, she was the Director of Oncology for a pharmaceutical company. I asked her, “Hey, do you know anyone who is doing BRCA testing that you could recommend? We need to

conduct training, awareness, and collaboration in Mexico. She said, “I don't know anyone, but I will suggest that you go to the American Association for Cancer Research (AACR) in 2011.”

I decided to go and find this expert that I wanted to bring to Mexico to change the situation. I was already in Orlando attending AACR, still wearing my scarf. I couldn't have been luckier because I attended a 7am conference about the prevalence of BRCA testing mutations in the Hispanic population in LA and Dr. Weitzel was presenting. It was just amazing.

It was the topic that I was looking for in the population that I was looking at. At the end of his presentation, I approached him and said, “As you can tell, I'm a breast cancer patient. I'm 36 years old, I didn't get genetic testing, and I'm fine. I made my own decisions. But other patients in Mexico don't have genetic testing, and they are unaware. I need you to help me to resolve the situation. I want to organize seminars and webinars to increase awareness. Hopefully you can join me and share your experience with the health systems in Mexico.”

He said, “of course, count on me. I will do it.” This picture is us in Mexico one month later - after we met in AACR. He traveled with Dr. Kathy Blaser, a genetic counselor, also at A City of Hope. She's also a professor for a cancer genomics education program. Dr. Weitzel was the director of the Department of Clinical Cancer Genetics at City of Hope, and they had a wonderful program to train genetic counselors in the US.

We had numerous meetings with several authorities and institutions involved in oncology and I organized some activities and a campaign targeted to the scientific/clinical community in order to create awareness. We invited him to speak and share his research at the different meetings we created with the different institutions. Dr. Whitefield was able to collaborate on some projects where the institutions would send the samples from many patients to his laboratory in A City of Hope.

He offered to perform the BRCA sequencing and shared the results back to the different institutions. Not only that, he brought his whole team to train different clinical care providers on providing genetic counseling to patients. This was an amazing project. After Mexico, we decided to replicate the experience in Peru, Colombia, and Brazil. Different populations, different collaborations Dr Weitzel initiated. You can learn more about this beautiful project in the papers mentioned on this slide.

Dr. Weitzel and his team have so far provided genetic testing access to more than 6000 patients in all Latin America. I'm so proud our path grows and that we were able to collaborate on these projects.

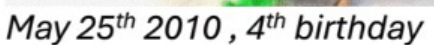
With regards to my BRCA testing, I was not concerned because I decided to have a double mastectomy; however, when we were in Peru, he handed me an envelope with my results from Myriad. He sent my sample to Myriad confirming I was BRCA negative.

"From My Breast Cancer to Enabling Genetic Testing Access" (Sandra Balladares, PhD, MSc) [#145]

When I moved to the USA years later, I got a second genetic test this time from [Invitae](). They looked not only for BRCA, but for 50 genes to identify genetic susceptibility, which was negative as well. This project gave me the passion to continue to leverage genomics to improve cancer patients. I'm lucky that there are companies out there that have the same purpose and that I can continue to bring genomics to other places and help more patients.

15th Cancer Anniversary

10 years of Surveillance and 5 years on Remission



May 25th 2010 , 4th birthday

May 25th 2025 , 19th birthday

Breast Cancer, Surgery and Treatment Survivor!

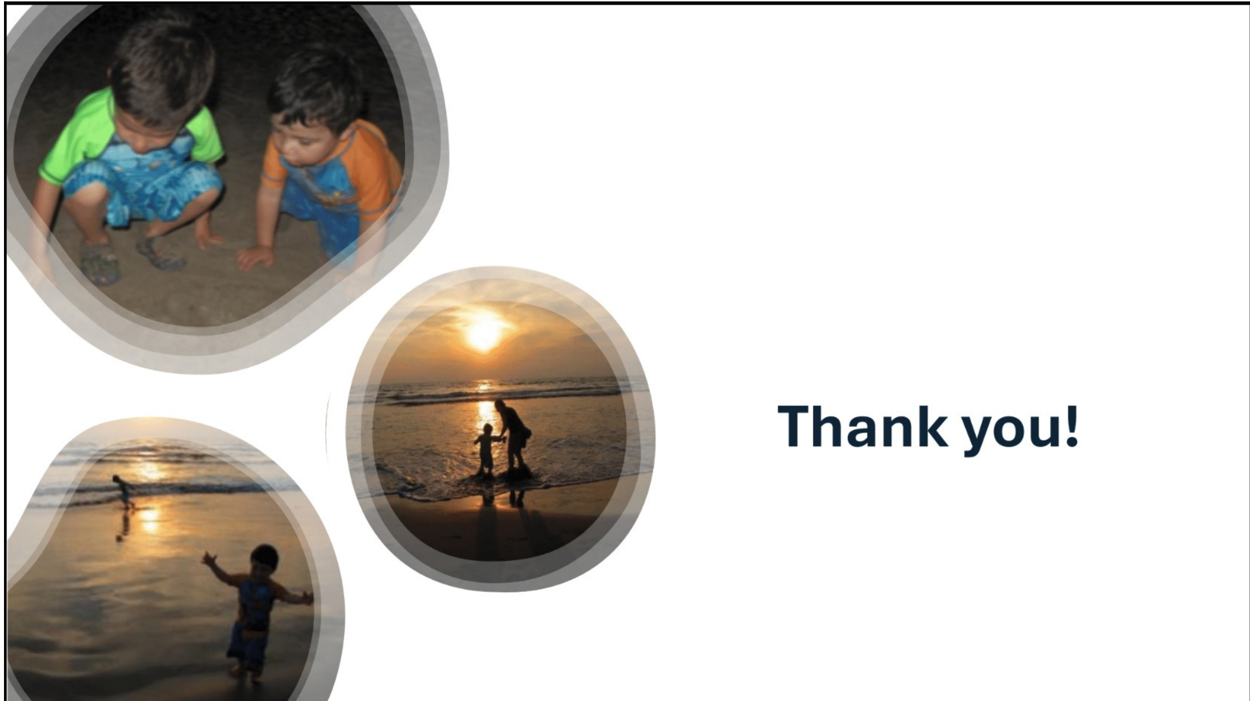
With that, I just want to tell you that again, I am extremely fortunate. This is a picture from last Sunday, Mateo turned 15, so it has been 15 years. I was just kind of asking for 10 more years, but you know, well, I feel now finally happy.

For a long time, I didn't buy things for myself. I didn't buy clothes because I thought I was going to die at some point. Eventually, I was able to manage those fears. I survived not only the cancer, but the surgery and the treatment. I feel kind of back to normal. I'm very happy and lucky to be here celebrating with my kids.

“From My Breast Cancer to Enabling Genetic Testing Access” (Sandra Balladares, PhD, MSc) [#145]

To Bryce Olson, thank you for your inspiring life and legacy!

I want to dedicate this presentation to Bryce, who I have the pleasure and really honor to meet, and who inspired me with his life and his legacy. So thank you, Bryce. I think that is the reason why we are here together, why I met Brad and so thank you. We will continue with his legacy.



That's my presentation. Thank you very much.

Brad Power 42:06
Allen Morris had a question: After a double mastectomy, what were you told about your risk for breast cancer? Do your doctors or you consider yourself cured?

Sandra Balladares 42:51
I will say, because of the second mastectomy and all of the results from the genetic testing I had, I feel back to normal. I feel safe. I don't have fears. I thought I would never be able to manage these fears. But finally, I feel safe, I feel fine and I feel healthy.

David Plunkett 43:41
I have two questions. One is the anxiety that you described pre-treatment is understandable and I think very common. What advice do you give new patients to help deal with that?

Sandra Balladares 43:56
I will say that it's important to get psychological, anxiety pills very early. When I went to see my psychiatrist, he said, “when you get diagnosed, before going to find an oncologist, it's super important that you find a psychiatrist. I agreed with you because it was very hard for me. I couldn't manage even in the surgery, when I was feeling strange sensations in my body, it was really crazy. That would be my recommendation for newly diagnosed patients.

David Plunkett 44:37
What advice have you given your children?

Sandra Balladares 44:44
I feel lucky they were very young. Obviously it was so difficult, but there are things that they don't remember. Something they remember is playing with my prosthetic breast. It was like a ball for them. We have been bringing things from the cancer story that I showed Matteo yesterday, so they know cancer could be deadly and devastating. We try, we use sunblock, we try to eat healthy, we do prevention. That's kind of the message we need to take care of and prevent cancer, because that's the best way to manage cancer, is by preventing it.

Marianne Gault 45:45
You talked about anxiety. I'm curious if you experienced anxiety in the survivorship period upon completion of treatment, and how did that feel?

Sandra Balladares 46:05
Yes, that is true. I think that's a very strong fear. I will say I manage it better now. But its still there and it's very difficult. When you get a fever or something and you go to the doctor, the first thing that they want to do is a CT scan or something. I have had many of them. I still get concerned.

What I have been doing is kind of a lot of exercise, being mindful of what I'm eating, getting enough sleep. I did have, for instance, another CT scan last year because I was feeling fearful again.

It’s important because CT scans are not ideal. There is some radiation. Another important piece is we have been talking about genetic testing and pharmacogenetics, but there is a big need for having better methods to identify cancer, early detection, and cancer through DNA. Cancer is a disease of the genome, and we can see the disease in the genome, no? I'm so happy that right now, tests for a minimal residual disease (MRD. OncoLink) using whole genome sequencing are emerging. That's what I'm planning for my next tests instead of CT scans. They are not as toxic as the CT scan and can predict cancer recurrence a couple of years earlier, before you can see by imaging, which is really great. Another opportunity to bring access to better tools to identify cancer earlier.

Michael Liebman 48:17
I have a quick clarification on the question about the double mastectomy and breast cancer. We were working with Mayo and working with young oncologic surgeons a while ago. It was a period when a number of women who did have genetic risk factors, were opting for prophylactic mastectomies.

What the surgeons would tell you is it's a good preventative, but it's not a perfect preventative, because the breast tissue can be very much commingled with the chest wall. It's almost impossible to remove all of the breast tissue from the chest wall in a surgical procedure. Something to keep in mind. Women were getting double mastectomies, but some of them were getting breast cancer later.

I'm working with a brand new cancer and genomes Institute center in Tijuana that is having a formal opening in July. If you're interested in being connected with that, I can put you in touch with them directly.

Sandra Balladares 49:43
Happy to be in contact with them.

Brad Power 49:48
You're in San Diego, which is one of the biotech centers of the world. You've talked about your personal story, but a bit less about your professional arc, and how those two things intersected. How has your personal experience influenced your professional interests or focus and some of the missions and passions you've had? Could you speak to that intermingling of your professional career and your advocacy for cancer?

Sandra Balladares 50:21
When I graduated, I decided to work in genomics, because that was a very exciting topic for me. I worked for Applied Biosystems Life Technologies, which then became Thermo Fisher, for 10 years. Applied Biosystems was the company that provided the sequencers for sequencing the first human genome, which was exciting. I was super happy to work there. My contribution to the oncology field was in the lab leveraging genomics to improve genetic testing.

“From My Breast Cancer to Enabling Genetic Testing Access” (Sandra Balladares, PhD, MSc) [#145]

I moved in 2014 to San Diego. I was lucky to join Illumina. During my time at Illumina, I also had the privilege to work in the oncology team. I was in charge, which is what I wanted to do. I wanted to continue to leverage genomics to improve cancer patient outcomes. During that time, my focus got broader because it was not only on genetic testing and identifying the mutations that could increase your risk to cancer, but I was also heavily involved in comprehensive tumor profiling. All the therapy selection assays used to identify are not in the germline genome, but in the somatic genome, the mutations used as biomarkers to identify the best treatment. That has been another area that is fascinating. I have been lucky to be able to continue to bring back to patients what I'm doing at work.

More recently, I have been working on liquid biopsy, identifying the different types of liquid biopsies. Liquid biopsy is emerging as the price of sequencing is decreasing. It's now enabling us to do whole genome sequencing and liquid biopsies. You can do heavy sequencing and identify variants at a very low representation - critical for determining best treatment and, in some cases, for determining minimal residual disease that we have been talking about. I couldn't be luckier to be working in a place where I can leverage all of this genomic knowledge and tools to bring them back to improve the condition of cancer patients. I'm extremely fortunate.

Brad Power 53:26
Sandra says that she's your “tocaya”, which I had to look up, that means you have the same first name.

Your story is inspiring, and I would love to replicate your genomic awareness journey, but with leukemia in Mexico after my diagnosis. Can you speak to your experience, looking globally at the differences between what you experience in healthcare in the United States, Mexico, and Latin America more broadly?

Sandra Balladares 53:58
It is very, very different, even in Mexico itself. I shared with you my experience about going to the private health system and the public health system. There are huge differences.

My professional career has given me the opportunity to work with developing countries other than Mexico. I see that across all the developing countries now, there is a strong need to bring genomics at a price point that can be implemented in those developing countries. I will say that's one of the similarities.

In fully developed countries like the U.S. and some countries in Europe, you will see that different cutting-edge diagnostic tests are available.

I can bring the same example with BRCA testing. In 2010, there was no BRCA testing in Mexico, but it was already available for 15 years in the U.S. It is hard to say, but that continues to happen. Even when the technologies are available, there is a strong need for education: education to oncologists and to patients.

Five years ago, another one of my friends got diagnosed in Mexico. It was the same situation, she never got recommended genetic testing. I had to push her to go and get genetic testing. Unfortunately, she had an important mutation that needed special attention.

Programs like this one Dr. Weitzel initiated with different institutions are key. They have proven they can give access to other patients, and we should promote that collaboration.

Brad Power 56:19
What is your vision for your work in the breast cancer community at the Cancer Patient Lab?

Sandra Balladares 56:32
There are already wonderful support organizations out there doing great things. I attended some support organizations during my years here in Mexico. They are different compared to what I had in Mexico. Each one of them covers different purposes.

The Cancer Patient Lab can fulfill two goals: One is to direct patients that come to us to other support organizations for different types of needs they may have. We can also leverage the great technical team we have to share cutting-edge information about what is happening in terms of new diagnostic methods and therapeutics, to give them visibility to all the different options that are emerging out there, for them to make the best decisions and to improve their cancer patient outcomes. A patient who is empowered and gets involved is going to get better outcomes. We can bring all of that information to other patients.

Phil 58:04
I wanted to find out with regards to your raising awareness. It's very different in England with the NHS and the genomic testing we have available in that we have testing as standard of care. There is an eligibility criteria to have BRCA testing, but it is available. One of my roles is about education of nurses. We are mainstream in genomic testing where we want nurses to be more empowered to have that knowledge in order to either signpost patients or to offer testing to patients. What are the barriers you have when you're talking to patients about genomic testing? What barriers are they encountering? Because quite rightly, you said it's about empowering patients. But if we empower patients, we also need to empower the healthcare professionals.

Sandra Balladares 59:07
Not all patients are the same. I invited patients to learn more. Some of them will say, “No, I'm going to trust whatever my doctor tells me. If they didn't recommend genetic testing for me, perhaps it is because I don't need it.” I had difficult or strong conversations with patients, giving them alternative scenarios. For example, perhaps they didn't offer it because they didn't know this existed. In some cases, with my close friends, I had to push hard for them to be receptive to this new information. There are other patients that by themselves are going to go look around, and connect with a cancer support organization. But not all the patients are the same. How do you convince those patients they need to do something different? That is difficult. We should

provide resources and make them available. But in the end, a decision by the patient needs to happen. We can be proactive and create information and put them at their heart to use it.

“From My Breast Cancer to Enabling Genetic Testing Access” (Sandra Balladares, PhD, MSc) [#145]

CHAT CONVERSATION

00:18:24 Brad Power: From our conversation with Phil before we started recording:

00:18:36 Brad Power: You may find this article of interest: Sir John Bell: Transforming Life Science and Medicine's Future

A world leading physician-scientist heads up the UK's new, unique, and richly supported Ellison Institute of Technology

ERIC TOPOL

MAY 26

00:19:50 Phil: Replying to "You may find this ar..."

Thank you

00:45:22 allen morris: Do your doctors or you consider yourself cured?

00:55:45 allen morris: After a double mastectomy, what have you been told about your risk for breast cancer?

00:59:39 Michael Liebman: Trying to raise my hand…

01:06:18 Sandra Pérez : Hi Sandra, your “tocaya” here. Your story is inspiring and I would love to replicate your genomic awareness journey but with Leukemia in Mexico after my diagnosis, big hugs and regards!

01:12:38 Laurel Nelson: Good to see you Sandra, thank you for sharing your story with everyone :)

01:13:36 allen morris: The conversation I think is about "germ line"/genetic (genome) testing not somatic (genome) testing