# Preventing Breast Cancer in Our Daughters

## A Community-Based Participatory Research Study of the Effect of Changing Personal Care Products on Healthy Human Breast Cells

Pink Ribbon Day
Peninsula Jewish Community Center
October 27, 2019

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Breast Cancer Over Time
polly@breastcancerovertime.org

Funded by the California Breast Cancer Research Program

# Dedication

Luisa Preciutti Tumini

Luisa’s daughter

# Breast Cancer Over Time

BCOT Steering Committee 2015

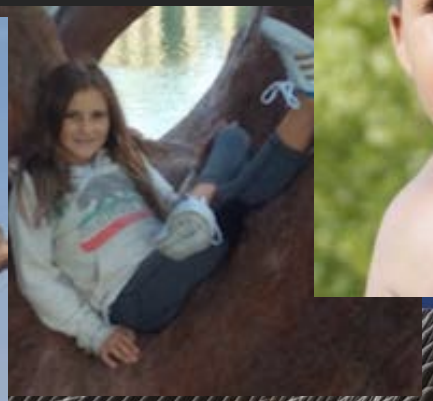
Created and controlled by breast cancer survivors to support and assist scientific research on the PREVENTION of breast cancer

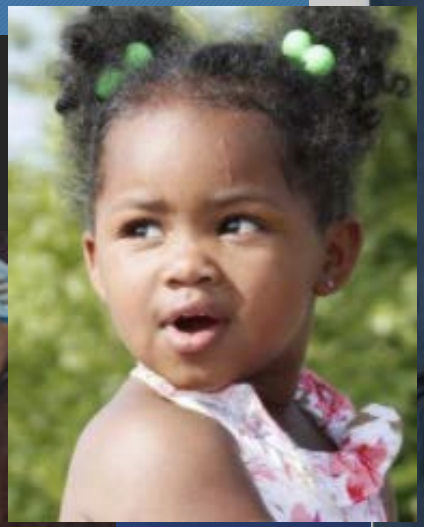
Community-based support

BREAST CANCER OVER TIME

Community-based research

# Our Daughters





# Our Research Team

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Breast Surgeon
California Pacific Medical Center

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Dr. Shanaz Dairkee, Ph.D
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California Pacific Medical Center
Research Institute

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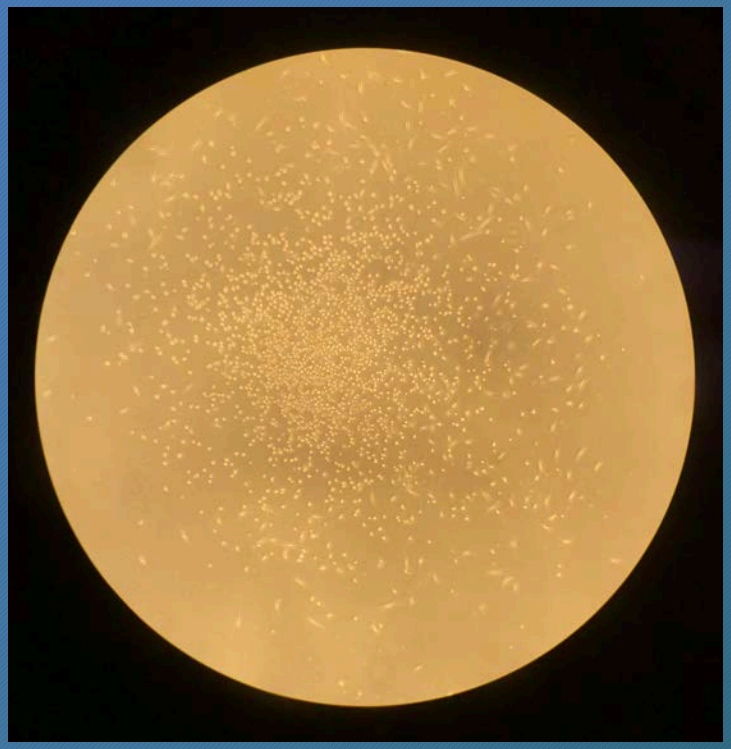
Study Coordinator
Assistant Director
Breast Cancer Over Time

# Normal Human Breast Cells



Propagated as a breast cell culture in Dr. Shanaz Dairkee's lab at CPMCRI

# Healthy Breast Cell Donors

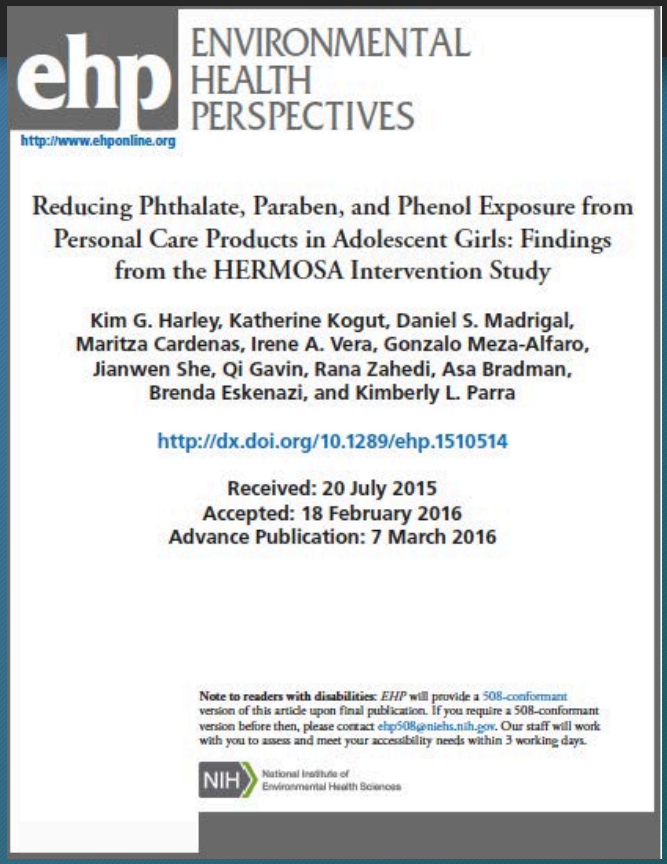
# Our Research Question

Does reduced exposure to common chemicals, known as xenoestrogens (XEs), in personal care products curb estrogenic hyper-signaling and its adverse effects on normal cell function within the healthy breast tissue of women volunteers participating in the XE-Low (XEL) intervention?

# Preceding studies

HERMOSA Study – 2016

- Community-based participatory research study
- Measured phthalate, paraben, and phenol levels in urine of adolescent girls
- Significant drop after 3 day intervention
- Also funded by CBCRP



ehp ENVIRONMENTAL HEALTH PERSPECTIVES

http://www.ehponline.org

Reducing Phthalate, Paraben, and Phenol Exposure from Personal Care Products in Adolescent Girls: Findings from the HERMOSA Intervention Study

Kim G. Harley, Katherine Kogut, Daniel S. Madrigal, Maritza Cardenas, Irene A. Vera, Gonzalo Meza-Alfaro, Jianwen She, Qi Gavin, Rana Zahedi, Asa Bradman, Brenda Eskenazi, and Kimberly L. Parra

http://dx.doi.org/10.1289/ehp.1510514

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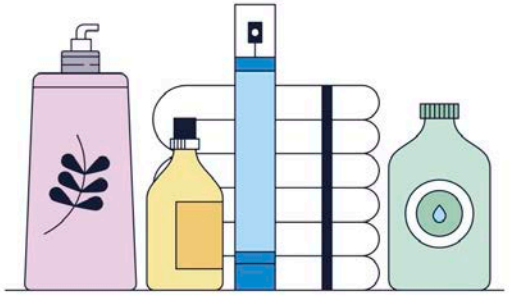
NIH National Institute of Environmental Health Sciences

# Personal Care Products and Breast Cancer Risk



San Francisco-based breast cancer prevention study seeking volunteers who meet all the following criteria:

- Are women 18-50 years old
- Are pre-menopausal
- Have not had any kind of cancer (except basal cell skin cancer)
- Use self-care products (such as shampoo, moisturizer, sunscreen, etc.)

Volunteers will participate in a healthy intervention in which they use paraben- and phthalate-free self-care products provided by the study, and donate samples of blood, urine, and breast cells (via fine needle aspiration) in a medical office in San Francisco. **Volunteers receive over $200 worth of locally-made healthy cosmetics and $40 in Peet's cards.**

Sponsored by CPMC Research Institute and Breast Cancer Over Time

Community-based support
BREAST CANCER OVER TIME
Community-based research

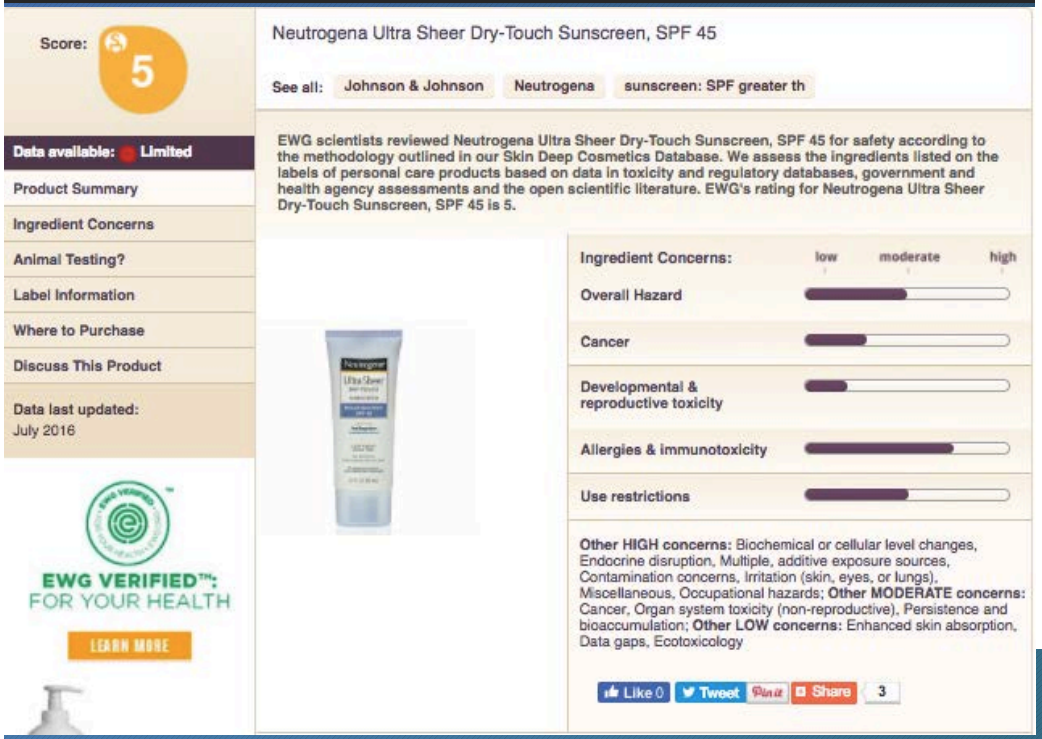
## Interested?

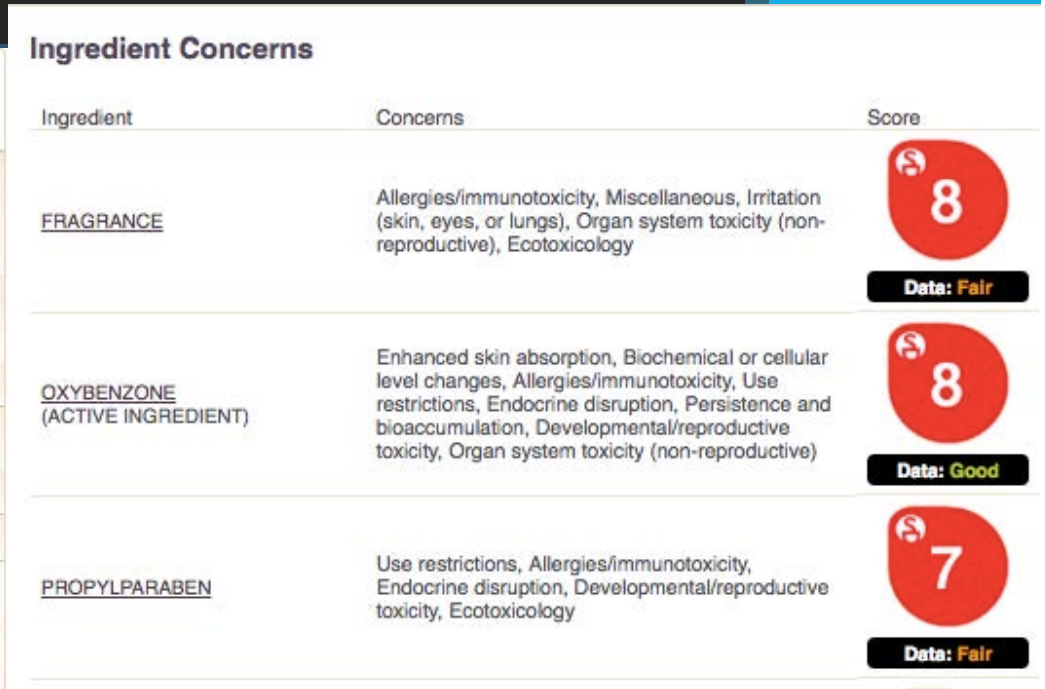
Take our Intake Questionnaire at:
bit.ly/breastcancerovertime

or contact Samantha Torres:
951.486.8285
storres@breastcancerovertime.org

# What xenoestrogens are in the products we use?


# Neutrogena Ultra Sheer Dry-Touch Sunscreen, SPF 45




http://www.ewg.org/skindeep/product/593518/Neutrogena_Ultra_Sheer_Dry-Touch_Sunscreen%2C_SPF_45/#.WgCghBOPKT-

| | | |
|---|---|---|
| RETINYL PALMITATE (VITAMIN A PALMITATE) | Use restrictions, Developmental/reproductive toxicity, Biochemical or cellular level changes, Cancer, Organ system toxicity (non-reproductive) | 9 Data: Fair |
| OXYBENZONE | Enhanced skin absorption, Biochemical or cellular level changes, Allergies/immunotoxicity, Use restrictions, Endocrine disruption, Persistence and bioaccumulation, Developmental/reproductive toxicity, Organ system toxicity (non-reproductive) | 8 Data: Good |
| OCTINOXATE | Enhanced skin absorption, Biochemical or cellular level changes, Endocrine disruption, Allergies/immunotoxicity, Persistence and bioaccumulation, Developmental/reproductive toxicity, Organ system toxicity (non-reproductive) | 6 Data: Fair |
| HOMOSALATE | Enhanced skin absorption, Use restrictions, Organ system toxicity (non-reproductive), Endocrine disruption, Ecotoxicology, Contamination concerns (SALICYLIC ACID, TRIMETHYLCYCLOHEXANOL) | 4 Data: Fair |

## Data Sources


Boehnlein J, Sakr A, Lichtin JL, Bronaugh RL. 1994. Characterization of esterase and alcohol dehydrogenase activity in skin. Metabolism of retinyl palmitate to retinol (vitamin A) during percutaneous absorption. Pharm Res 11(8): 1155-9.

CIR (Cosmetic Ingredient Review). 2006. CIR Compendium, containing abstracts, discussions, and conclusions of CIR cosmetic ingredient safety assessments. Washington DC.

Cherng SH, Xia Q, Blankenship LR, Freeman JP, Wamer WG, Howard PC, et al. 2005. Photodecomposition of retinyl palmitate in ethanol by UVA light-formation of photodecomposition products, reactive oxygen species, and lipid peroxides. Chem Res Toxicol 18(2): 129-38

Duell EA, Kang S, Voorhees JJ. 1997. Unoccluded retinol penetrates human skin in vivo more effectively than unoccluded retinyl palmitate or retinoic acid. J Invest Dermatol 109(3): 301-5.

EC (Environment Canada). 2008. Domestic Substances List Categorization. Canadian Environmental Protection Act (CEPA) Environmental Registry.

FDA (U.S. Food and Drug Administration) 2006. Food Additive Status List. Downloaded from http://www.cfsan.fda.gov/%7Edms/opa-appa.html, Oct 16, 2006.

# Common Endocrine Disruptors in Cosmetics

- Propylparaben
- Butylparaben
- Isobutylparaben
- Methylparaben
- Ethylparaben
- Benzyl Salicylate
- Triclosan
- Oxybenzone
- Oxtinoxate
- Homosalate
- Cyclopentasiloxone
- BHT
- Lillial butylphenyl methylpropional

# Other hazardous chemicals in cosmetics

- DMDM Hydantoin (formadehyde releaser)
- 2-Bromo-2-Nitropropane-1,3 Diol (formadehyde releaser)
- Retinyl palmitate  (biochemical and cellular level changes
- Methylisothiazolinone  (human immune toxicant - banned in Europe, Germany; restricted in Japan and Canada)
- Cocamide DEA (possible carcinogen, nitrosamine contamination)
- Octisalate  (enhanced skin absorption)

# Fragrance

?

- “Trade secret” - Ingredients not disclosed
- Very likely to include phthalates, per EWG

# Our Study Protocol

1. Obtain blood, urine, and breast cell samples before and after 28 day XE-low healthy intervention.

2. Test blood for levels of natural hormones

3. Test urine for paraben and phthalate levels

4. Propagate live breast cells and perform tests to measure ERα activation, cell proliferation, and apoptosis signaling (higher levels of which are associated with increased breast cancer risk)

# Our Healthy Intervention

- Participants used only XE-low personal care products provided by Breast Cancer Over Time for 28 days between cell donations
- Participants kept logs of all products used for 28 days between cell donations

# Analysis and Comparison of Samples

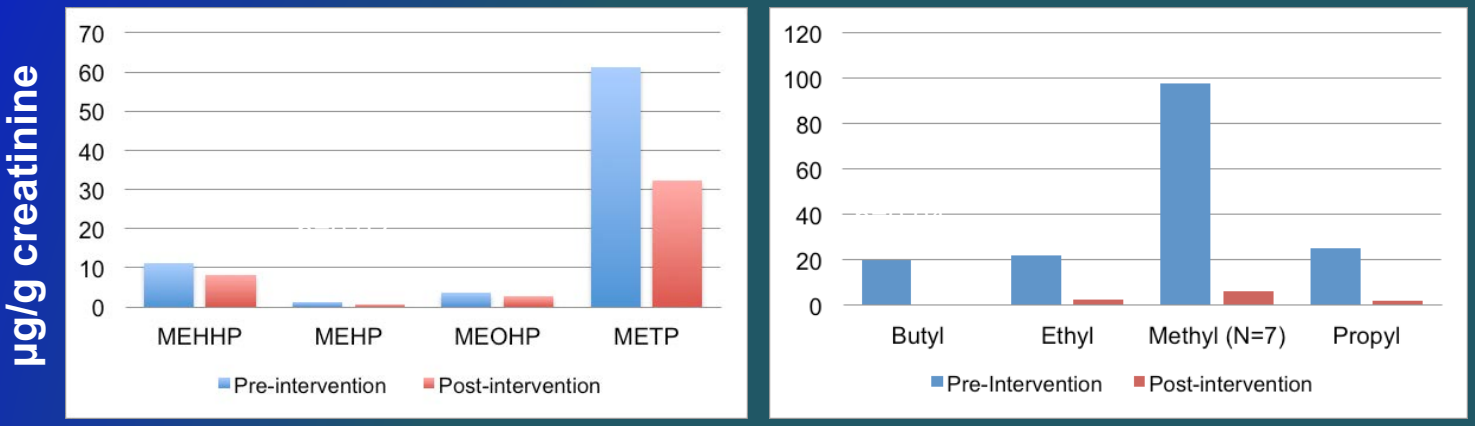
- Blood: analyzed for levels of natural hormones (estradiol, progesterone, sex hormone-binding globulin)
- Urine: analyzed for paraben and phthalate levels
- Breast cells: cultured and tests performed for functional differences in live cells

# Results

- Participants: no attrition and positive reviews
- Blood: hormone levels not significantly different
- Urine: significant drops in paraben and phthalate levels after healthy intervention
- Cells: differences on functional tests on live cells measuring estrogen receptor isoform levels, cell proliferation, and cell death

# Change in XE metabolite levels of urine samples 1 and 2 from XEL volunteers

**POST-MENOPAUSAL (N=8)**



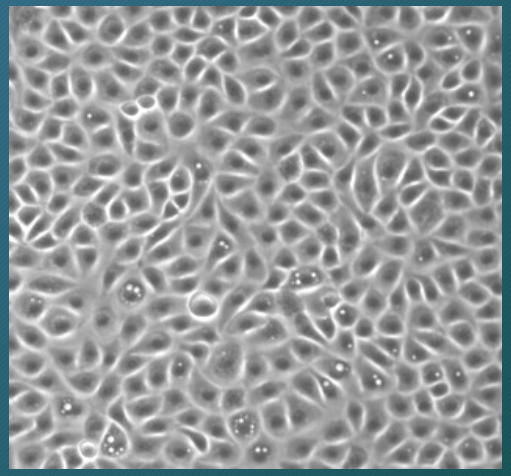

**Phthalates** **Parabens**

# Exit Surveys

- Very positive experience
- Liked the “healthy” personal care products
- Liked having breast cancer survivor buddies
- Reported starting to read ingredient labels in cosmetics
- Gratified and proud to have donated breast cells for a scientific study
- Felt they were making a difference
- FNAs “not a big deal” – they would do it again

# Study Conclusions

- Women will donate normal breast cells for research
- Volunteers will comply with study protocol
- Positive changes to human breast cells are observable after both 14 and 28 day interventions
- Study of responses of HEALTHY LIVING HUMAN BREAST CELLS to environmental exposures is feasible and can provide important information on human breast carcinogenesis



# Additional Community Conclusions

- Women want to help in scientific research
- Their participation is meaningful and educational
- Survivors are fantastic recruiters and supporters
- More stringent government regulation of environmental chemicals, including cosmetic products, is essential to public health and must be demanded by all of us!

# New Full Study: In Vivo Impact of Estrogen Exposure on the Human Breast

- Funded by California Breast Cancer Research Program (cigarette tax monies)
- 60 participants: 40 “Intervention” and 20 “Controls”
- Nanostring gene expression test added for all participants, both visits
- To volunteer, email Samantha Torres at storres@breastcancerovertime.org or scan our QR code:

# Current Legislation to Support

- California: The Cosmetic Fragrance and Flavor Ingredient Right to Know Act of 2019 (SB 574)
  - Requires cosmetics companies to report toxic fragrance and flavor ingredients in their products to the California Safe Cosmetics Database within the California Department of Public Health
- Federal: Safe Cosmetics and Personal Care Act of 2019 (H.R. 4296)
  - Requires full fragrance and flavor ingredient disclosure on a company's website and disclosure of a product's toxic fragrance and flavor ingredients on the product label
  - Bans from cosmetics 20 chemicals known to be toxic

# Acknowledgements


- California Breast Cancer Research Program
- Breast Cancer Over Time funds and volunteers
- Environmental Working Group
- CPMC Foundation
- CPMC Research Institute
- Our dedicated and diligent study participants
- Beauty Counter, Human Gear, Eco-Apothecary, Luminance Skin Care, Bathing Culture
- San Francisco Public Health Foundation



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