Inclusion of Latina breast cancer survivors in biomarker research of stress and premature aging – the value of collaborative community-academic partnerships

Cathy Samayoa, PhD

Postdoctoral Fellow | Department of Biology, San Francisco State University

Scholar | Center for Aging in Diverse Communities | University of California, San Francisco

Health disparities in breast cancer

In Latinas living in the United States:

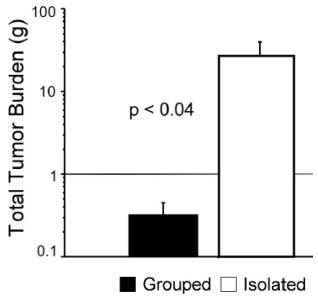
- Breast cancer is the leading cause of cancer death among Latinas.
- Latinas are less likely to develop breast cancer, but 20% more likely to die from it.
- Social factors affecting health in Latinas:
  - Limited English proficiency
  - Discrimination
  - Low socioeconomic status
  - Limited access to health insurance
  - Lack of transportation
  - Barriers navigating the health care system

Bowen et al. 2007
Ashing-Giwa et al. 2004
Spencer et al. 1999

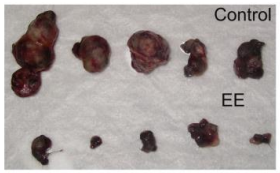
Stress and cortisol can contribute to the initiation and progression of cancer.

Murine models exposed to psychosocial stressors show:

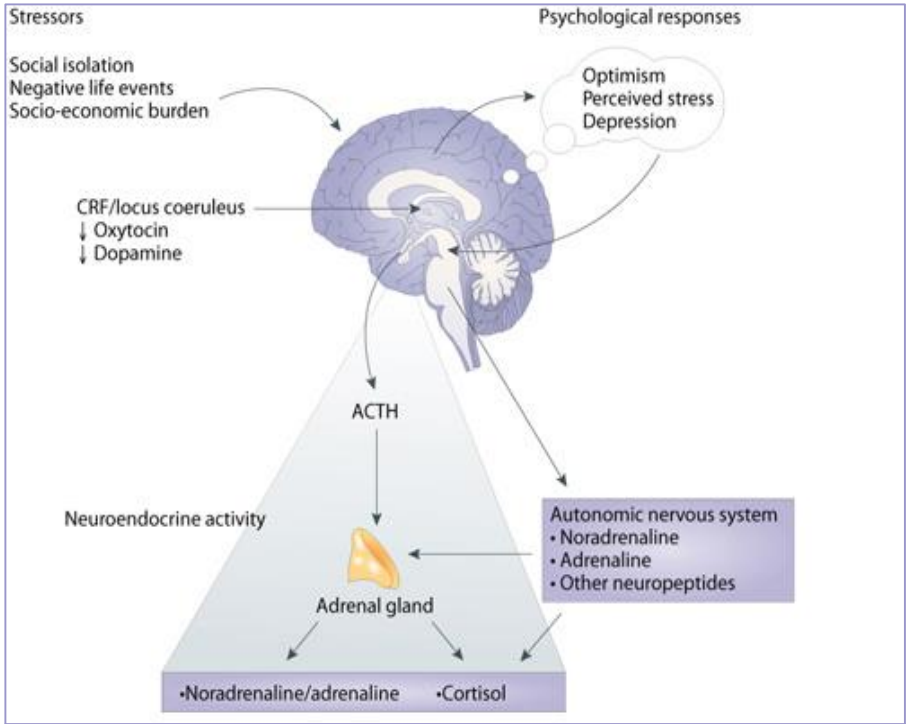
- Stress hormone dysregulation
- ↑ tumor burden and invasiveness
- ↓ effectiveness of chemotherapy



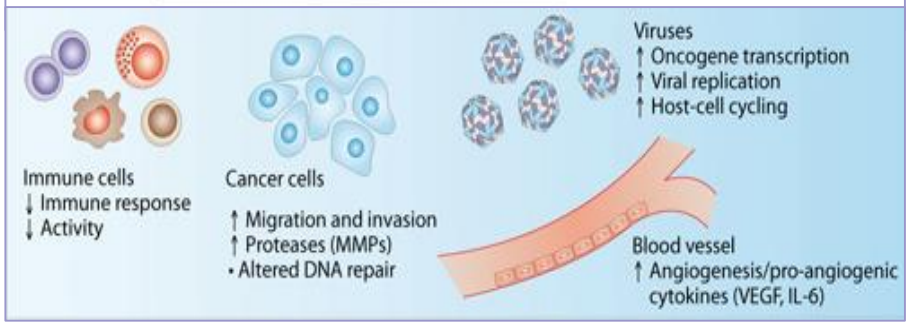
Hermes et al. 2009 PNAS



Grimm et al. 1996 Physiol Behav
Kerr et al. 1997 Cancer Res
Cao et al. 2010 Cell



Living in enriched environment (EE) reduces tumor growth.



Antoni et al. 2006. Nat Rev Cancer
Zorzet et al. 1998
Ghoshal et al 1998

Ben-Eliyahu et al. 1999
Van der Pompe et al 1996

Decreasing stress through a peer-delivered stress management Intervention

- PSYCHO-SOCIAL INTERVENTIONS can alter mood, modulate immune responses, affect the HPA axis, and decrease cortisol levels.
- NUEVO AMANECER: peer-delivered cognitive-behavioral stress management (CBSM) program

Nuevo Amanecer
stress management intervention

Improved	Decreased
Physical well-being Emotional well-being Overall quality of life	Breast cancer concerns Depressive symptoms Somatization

Antoni et al. 2001 Health Psychology
Ashing-Giwa K. 2004 Psycho-Oncol 2004
Spencer SM. Health Psychol
Eversley R. 2005 Oncol Nurs Forum

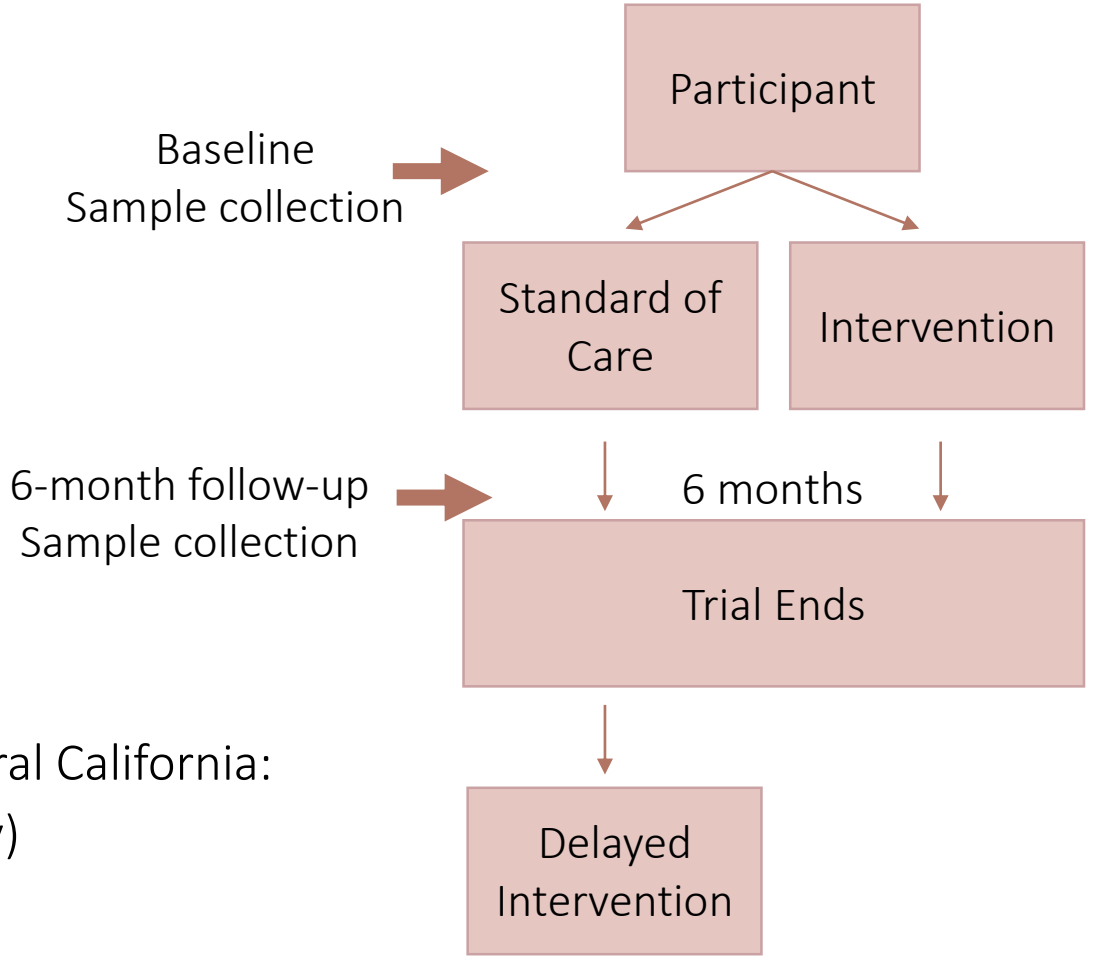
Napoles at el. 2017 J Cancer Educ
Napoles et al. 2015. Am J Public Health
Napoles et al. 2014 Clin Trials

Objective

- To determine the feasibility of biospecimen collection in Latina Breast Cancer Survivors (LBCS) living in rural California.
- To determine the effects of the NA-II intervention on cortisol levels, the Cortisol Awakening Response (CAR), and telomere length.

Research design

- Randomized Control Trial
- Goal: n=100 in 2 years ✓
- Spanish speaking Latinas in rural California:
  - Visalia (San Joaquin Valley)
  - El Centro (Imperial Valley)



Addressing barriers to participation

- Language and race/ethnicity concordance
  - Research team
  - Community health workers
  - Multimedia instructional material (YouTube & Pictorial instructions)
- Community Health Workers
  - Demonstrated & collected biospecimens
- Elimination of Social Security Numbers for incentives ($40)

Biospecimen collection: Measuring biomarkers of stress

1. Telomere Length using DNA

from saliva

- Telomeres length as a measure of premature aging

Bisoffi et al 2006
Cawton et al. 2002
O'Sullivan and Karlseder 2010

2. Cortisol Awakening Response

from saliva

- 3 samples/day for 3 days
- Predictor of breast cancer survival
- Flattened CAR in metastatic breast cancer patients

Abercrombie et al. 2004
Sephton et al. 2000
Giese-Davis et al. 2004

3. Hair Cortisol Concentration

from hair

- Measure of long-term tress

Gow et al. 2009
Saleem et al. 2012

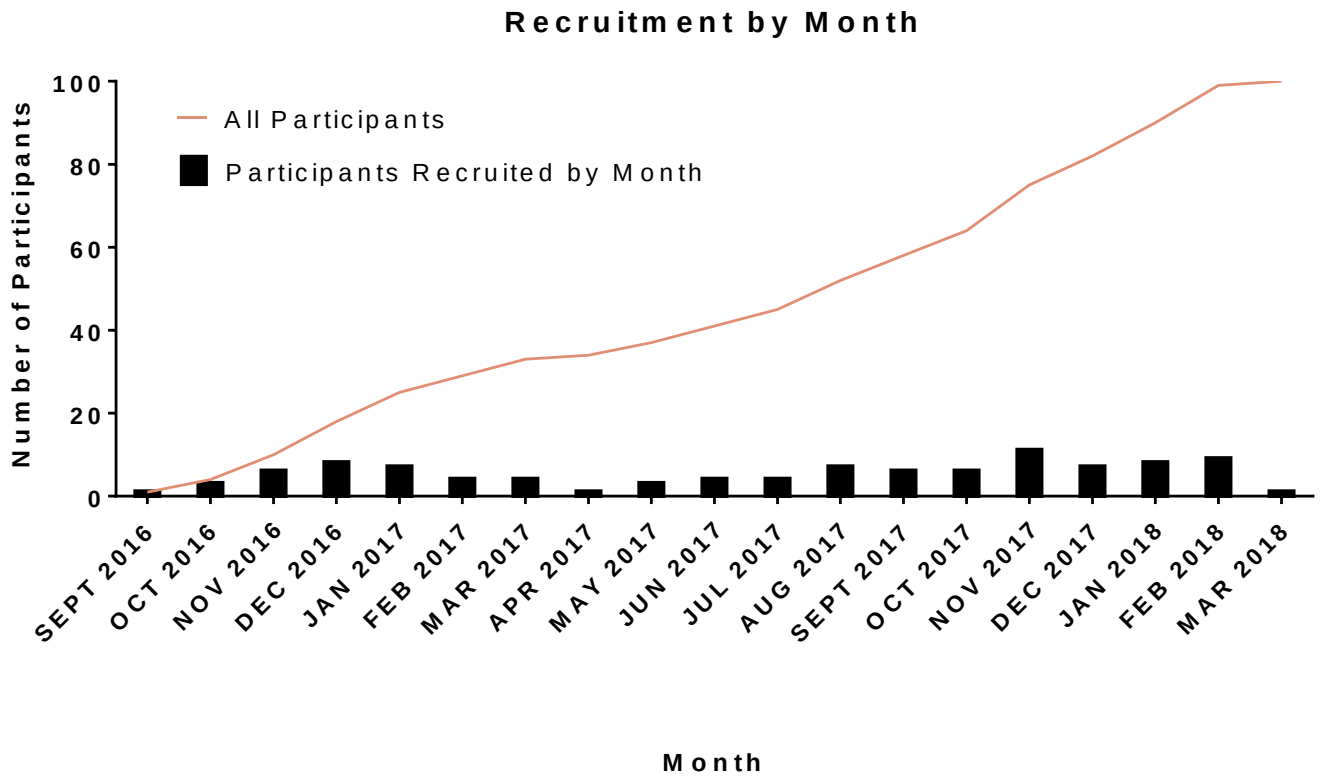
Participant demographics

	N	%
Age	55.9 ± 11.4	
Range	28-88	
Ethnicity		
Mexican, Chicana, Mexican American	98	97%
Other Latino or Hispanic	3	3%
Education		
Did not attend school	4	4%
Elementary-Highschool	75	74.3%
Vocational School/Some college or more	22	21.7%

Breast cancer diagnosis

	N	%
Years since diagnosis	3.2± 3.3	
Range	0-16	
Breast Cancer Diagnosis		
Known (DCIS, Invasive, Inflammatory)	24	23.8%
Don’t know	77	76.2%

Recruitment



Feasibility of collection & willingness to participate

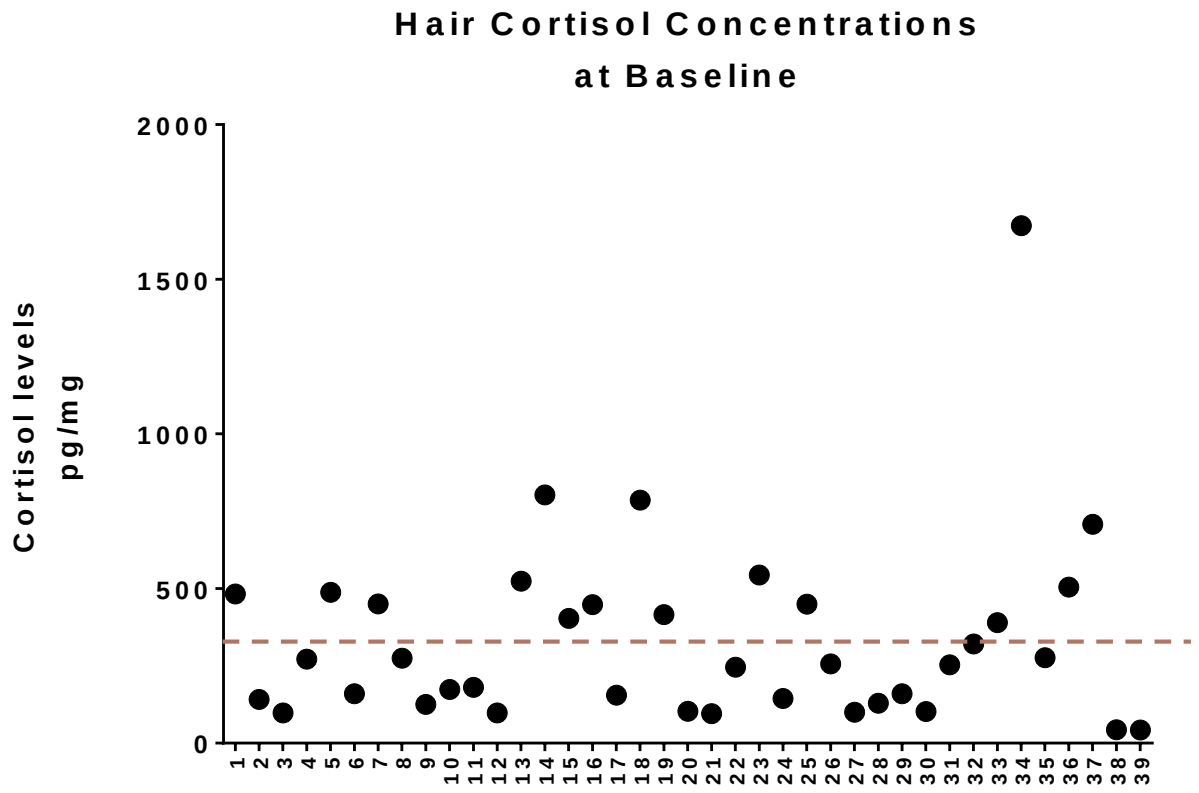
Feasibility

	Baseline		6-month follow-up	
	n	*%*	*n*	*%*
Total	**100**		**35**	
1. DNA *saliva*	97	97%	32	91%
2. C.A.R. *saliva*	89	89%	30	86%
3. Cortisol *hair*	55	55%	21	60%

Willingness

- **100%** of NA-11 participants were willing to provide hair.
- **100%** of NA-11 participants were willing to provide saliva.
- **>90%** Retention to date

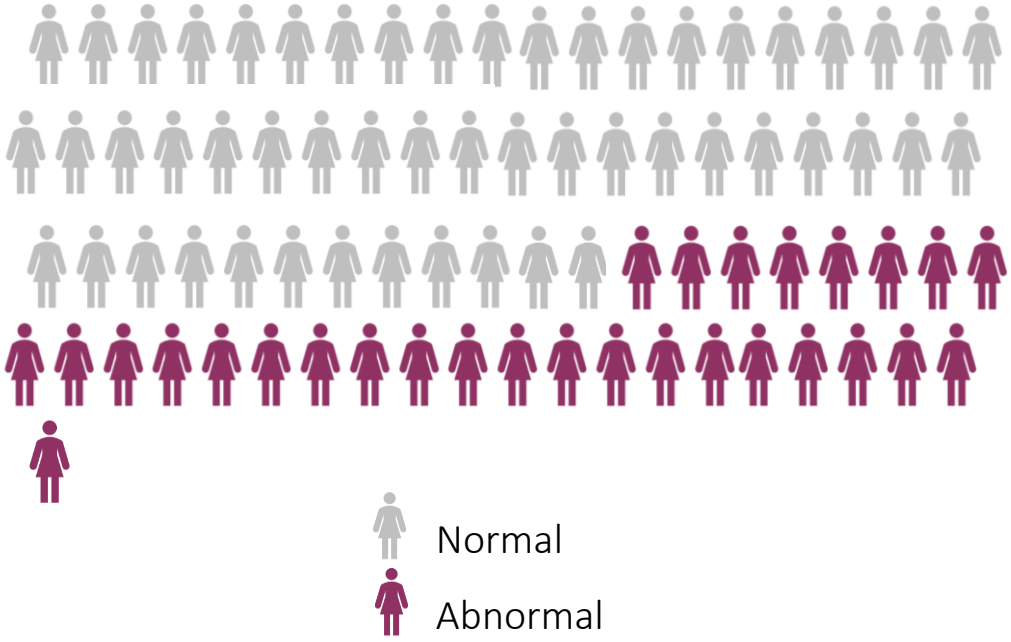
Hair cortisol concentrations, a measure of long-term stress, are high.



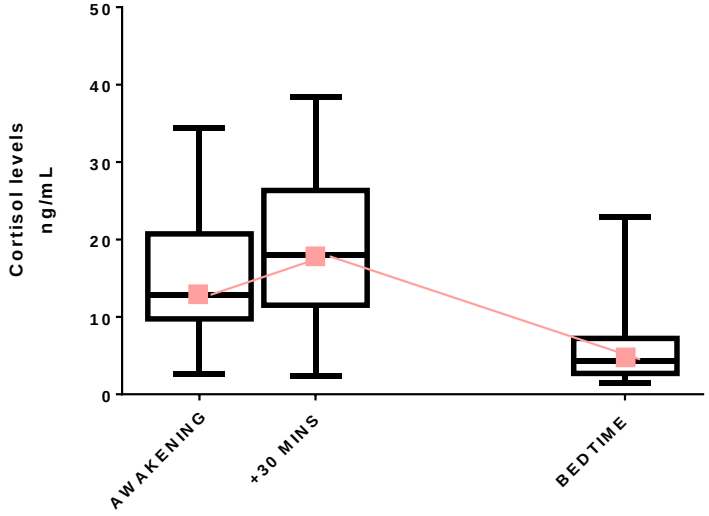
Average **334** pg/mg

Cortisol Awaking Response (CAR), a measure of the stress reactivity, is abnormal in 36% of LBCS.

36% of participants show an abnormal Cortisol Awakening Response at Baseline
N=81



Average
Cortisol Awakening Response
at Baseline



Limitations / considerations

Programmatic

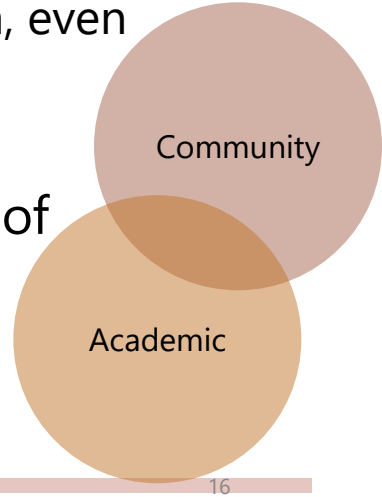
- Use of Social Security Numbers
  - Changes at SFSU to use client ID in lieu of SSN's for incentives
- Cost of sample collection
- Time commitment from all personnel
  - Reminder phone calls
  - Travel

Sample Collection

- Although a convenient sample, rates of hair collection may be low in cancer studies due to chemotherapy.
- Collecting saliva can trigger disgust.

Conclusions

- **First biomarker study** to examine biological markers of stress in Latina breast cancer survivors receiving a stress management intervention.
- Baseline results suggest alterations in cortisol production due to chronic stress:
  - Acute responses to stress are abnormal in **37%** of participants
  - Long-term stress levels were high.
- Latina are willing to participate in clinical and biomedical research:
  - **100%** of participants were willing to provide hair and saliva, even when repeated samples are required.
  - To date **>90%** provided samples at 6 month follow-up.
- Community-Academic partnerships can increase success of recruitment of minorities to clinical trials.



Acknowledgements

Participants

Community Organizations

Cancer Resources Center of the Dessert in El Centro, CA

Kaweah Delta Hospital Foundation in Visalia, CA

Leticia Marquez-Magana, PhD

Anna Napoles, PhD MPH

Jasmine Santoyo-Olson, MS

Carmen Ortiz, PhD

SF State

UCSF University of California San Francisco

UCSF University of California San Francisco

CIRCULOdeVIDA Una comunidad para Latinos con cancer

NIH SFSU SFBUILD 5TL4GM118986

NIH RCMAR-CADC P30AG015272

California Breast Cancer Research Program

SF BUILD enabling full representation in science

NIH National Institute on Aging

RCMAR