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Table of Contents

Cover.....	1
SF 298.....	2
Table of Contents.....	3
Introduction.....	4
Body.....	4
Key Research Accomplishments.....	6
Reportable Outcomes.....	9
Conclusions.....	
References.....	
Appendices.....	

Introduction

This report is submitted in compliance with contractual reporting requirements for Award Number DAMD17 -99-1-9289, Institutional Training Program in Breast Cancer. The program is a collaborative effort that includes Meharry Medical College and Vanderbilt University Medical Center.

The program's tasks are to: (1) Recruit Trainees; (2) Recruit Visiting Professors; (3) Enroll additional trainees; and (4) successfully complete the education of at least three trainees as evidenced by publications and secured appointments in the field of breast cancer.

Tasks # 1 and # 3 Trainee Recruitment

The program exceeded its goals. The original schedule was to have one fellow by the end of the first year since originally, with enrollment of a second or third trainee to occur in the second year of the program. However, during the first year, we identified and enrolled three trainees: Alecia Malin, Dr. P.H., Cass Teague, Ed.D., and Ling Wu, Ph.D. (two of whom have completed their work with the project). Last year, we added a fourth, Michael Epelbaum, Ph.D. and last year, we added a fifth, Dr. Sonya Boyapati. Dr. Boyapati, like Dr. Malin, was a joint trainee with Vanderbilt. This reflected the excellent collaboration and support from the Vanderbilt University School of Medicine throughout the

project. In particular, it is the collaborative programs between the two schools that has allowed for the higher than expected enrollment of fellows and has thereby increased the potential of the program for productive work.

Task # 2. Visiting Professors. (Recruitment Months 1-6).

Recruitment was completed as scheduled during the first year.

As per our plan, the trainees have had the benefit of collaborations with two prominent local researchers, Drs. Lawrence Gaines, Assistant Professor of Psychiatry at Vanderbilt University, and Dr. Baqar Husaini, Professor of Sociology at Tennessee State University. They provided valuable insight into the work of the current fellows and served as catalysts for the future. In addition, Dr. Phyllis Champion (University of Illinois) and Dr. Charles Hennekens (University of Miami) made valuable contributions.

Tasks #3, #4 and #5. Complete Training of At Least Four Trainees

This goal was been completed. Two of the five trainees are now working in academic research positions. Dr. Alicia Malin became Principal Investigator on a project entitled, "Insulin resistance, IGF's and energy balance in the risk of breast cancer", and she is now on the faculty of Meharry Medical College, working on cancer epidemiology. Dr. Boyapati has also made the transition to academia, and is a faculty member in the Vanderbilt Ingram Comprehensive Cancer Center. Dr. Teague successfully completed his MSPH degree. Dr. Epelbaum continues to pursue epidemiologic investigations and is teaching in the Meharry Medical College Master of Science in Public Health program. Dr.

Wu, however, made a career decision to leave the field of academic scientific research.

Key Research Accomplishments.

Peer Reviewed Abstracts/Presentations/Publications

Trainee: Alecia Malin, Ph.D.

Int J Cancer. 2003 Jun 20;105(3):413-8.

Intake of fruits, vegetables and selected micronutrients in relation to the risk of breast cancer.

Malin AS, Qi D, Shu XO, Gao YT, Friedmann JM, Jin F, Zheng W.

Department of Medicine and Vanderbilt-Ingram Cancer Center, Vanderbilt University, Nashville, TN, USA.

High fruit and vegetable intake has been linked with a reduced risk of breast cancer, but evidence is not consistent. We investigated the associations of breast cancer risk with vegetables, fruits and related micronutrient intake in a population-based case-control study among Chinese women in Shanghai, where dietary patterns differ substantially from other study populations. Included in the study were 1,459 incident breast cancer cases and 1,556 frequency-matched controls. Usual dietary habits were assessed by in-person interviews. Logistic regression was used to compute adjusted odds ratios (ORs) and 95% confidence intervals (CIs) to measure strength of the associations. There was no association between breast cancer risk and total vegetable intake. The risk of breast cancer declined, however, with increasing intake of dark yellow-orange vegetables (trend test, $p = 0.02$), Chinese white turnips (trend test, $p \leq 0.001$), and certain dark green vegetables (trend test, $p \leq 0.001$) with adjusted OR in the highest quintile being 0.79 (95% CI = 0.60-0.98), 0.67 (95% CI = 0.53-0.85) and 0.65 (95% CI = 0.51-0.83) respectively. Intake of fruits, except watermelons and apples, was inversely associated with breast cancer risk (p -values for trend tests ≤ 0.05). Our study suggests that high intake of certain vegetables and fruits may be associated with a reduced risk of breast cancer. Copyright 2003 Wiley-Liss, Inc.

Trainee: Sonja Boyapati, Ph.D.

Nutr Cancer. 2003;46(1):38-43.

Dietary calcium intake and breast cancer risk among Chinese women in Shanghai.

Boyapati SM, Shu XO, Jin F, Dai Q, Ruan Z, Gao YT, Zheng W.

Division of General Internal Medicine and Vanderbilt-Ingram Cancer Center, Vanderbilt University, Nashville, TN 37232, USA.

Limited epidemiological evidence suggests that calcium intake may be related to breast cancer risk. Data from a large, population-based, case-control study (n = 1,459 cases, 1,556 controls) conducted in Shanghai, China, between 1996 and 1998 were used to investigate the association between calcium intake and risk for breast cancer. Diet was assessed using a quantitative food-frequency questionnaire. The multivariate-adjusted odds ratio (OR) comparing all women combined in the highest to lowest deciles of total calcium intake was 0.74 (95% confidence interval [CI] = 0.46-1.20). Whereas calcium primarily derived from poultry was inversely associated with risk for breast cancer (comparing the highest to lowest quintile OR = 0.71, 95% CI = 0.55-0.93) with a statistically significant test for trend, calcium derived from milk, seafood, fruit, and vegetables was not associated with risk of breast cancer. Given that breast cancer is one of the top contributors to cancer incidence worldwide, even a moderate inverse association between calcium and breast cancer risk, if confirmed, could have important public health implications in breast cancer prevention.

Trainee: Sonja Boyapati, Ph.D.

**Cancer Epidemiol Biomarkers Prev. 2003
Jul;12(7):631-7.**

Calcium, vitamin D, and risk for colorectal adenoma: dependency on vitamin D receptor BsmI polymorphism and nonsteroidal anti-inflammatory drug use?

Boyapati SM, Bostick RM, McGlynn KA, Fina MF, Roufail WM, Geisinger KR, Wargovich M, Coker A, Hebert JR.

Center for Health Services Research, Vanderbilt University, Nashville, Tennessee, USA.

Previous epidemiological studies have been inconclusive in demonstrating an inverse association among calcium, vitamin D, and risk for colorectal adenoma. The purpose of this analysis was to evaluate the associations among calcium and vitamin D and risk for incident, sporadic colorectal adenoma according to the vitamin D receptor BsmI polymorphism and nonsteroidal anti-inflammatory drug (NSAID) use. We analyzed data from a colonoscopy-based case-control study (n = 177 cases, 228 controls) conducted in North Carolina between

1995 and 1997. Adjusted odds ratios (ORs) comparing participants in the highest to those in the lowest tertiles of total calcium and vitamin D intakes were 0.64 [95% confidence interval (CI), 0.35-1.15], $P(\text{trend}) = 0.14$ and 0.69 (95% CI, 0.41-1.18), and $P(\text{trend}) = 0.19$, respectively. Adjusted ORs for those in the upper tertile of total calcium intake relative to those in the lower were 0.25 (95% CI, 0.08-0.80) among those who had a Bb genotype, 0.57 (95% CI, 0.18-1.82) among those who had a bb genotype, and 0.36 (95% CI, 0.15-0.85) among those who did not take NSAIDs. The ORs for the highest tertile of calcium intake was 0.05 (95% CI, 0.01-0.41), $P(\text{trend}) < 0.01$ among those who were Bb and did not take NSAIDs, and 0.16 (95% CI, 0.02-1.36), $P(\text{trend}) = 0.47$ among those who were bb and did not take NSAIDs. These data support the hypotheses that higher calcium intakes may decrease risk for colorectal neoplasms, and that such a relationship is more readily detectable among those who do not take NSAIDs, and may be strongest among those who have at least one vitamin D receptor BsmI b allele.

Trainee: Michael Epelbaum, Ph.D.

Epelbaum M. (2002). Distinguishing between average equality and optimal equality, and estimation of lives lost or gained by racial inequalities in mortality in the United States, 1979-1998. *American Journal of Epidemiology*. 155:S47.

Trainee: Cass Teague, Ed.D.

Teague, C. Depression, Social Support, and Mammography. A thesis completed in partial requirements for the Master of Science in Public Health Degree at Meharry Medical College and presented at the National Medical Association national meeting, August 2003.

Faculty:

Husaini, B.A., Levine, R.S., Cain, V.A., Emerson, B.A., Sherkat, D.E. Effect of an educational program on mammography among African American females. *American Public Health Association*. Atlanta, GA. October 2001.

Husaini, B.A., Sherkat, D. E., Bragg, R., Levine, R. , Emerson, J. S., Menten, C. M. & Cain, V. A. Predictors of Breast Cancer Screening in a Panel Study in Women's Health. 2001. 37 (3): 35-51.

Mentes, CM, Emerson, JS, Husaini BA, Hull PC, Sherkat DE, Cain VA. Role of Social Support and Depression in Breast Cancer Screening Among African American Women *American Psychological Association*. February 2002. .

Husaini, BA, Sherkat, DE, Levine R, Bragg R, Cain VA, Emerson JS, Menten CM. The effects of a church-based breast

cancer screening education program on mammography rates among African-American women. J. Nat. Med. Assoc. 2002. 94(2): 100-106.

Zhu K, Hunter S, Bernard LJ, Payne-Wilks K, Roland CL, Elam LC, Feng Z, **Levine RS**. An intervention study on screening for breast cancer among single African American women aged 65 and older. Preventive Medicine. 2002. 34:536-45.

Levine RS, Foster JE, Fullilove RE, Fullilove MT, Briggs NT, Hull PC, Husaini BA, Hennekens CH. Black-white inequalities in mortality and life-expectancy, 1933-1999: Implications for Healthy People 2010. Pub. Health Rep. 116:474-483. 2001.

Zhu K, Beiler J, Hunter S, Payne-Wilks K, Roland CL, Forbes DS, Chinchilli VM, Bernard LJ, Jacobsen KH, Levine RS. The relationship between menstrual factors and breast cancer according to estrogen receptor status of tumor: A case-control study in African-American women. Ethn. Dis. 12(4):S3-23-9. 2002.

Reportable Outcomes:

Ten publications in the peer reviewed scientific literature, including nine articles and one published abstract.

Five trainees completed the program. Two trainees now have full-time faculty positions, one at Vanderbilt (S. Boyapati) and one at Meharry (A. Malin). A third trainee (M. Epelbaum) teaches in the Meharry Medical College Master of Science in Public Health Program.