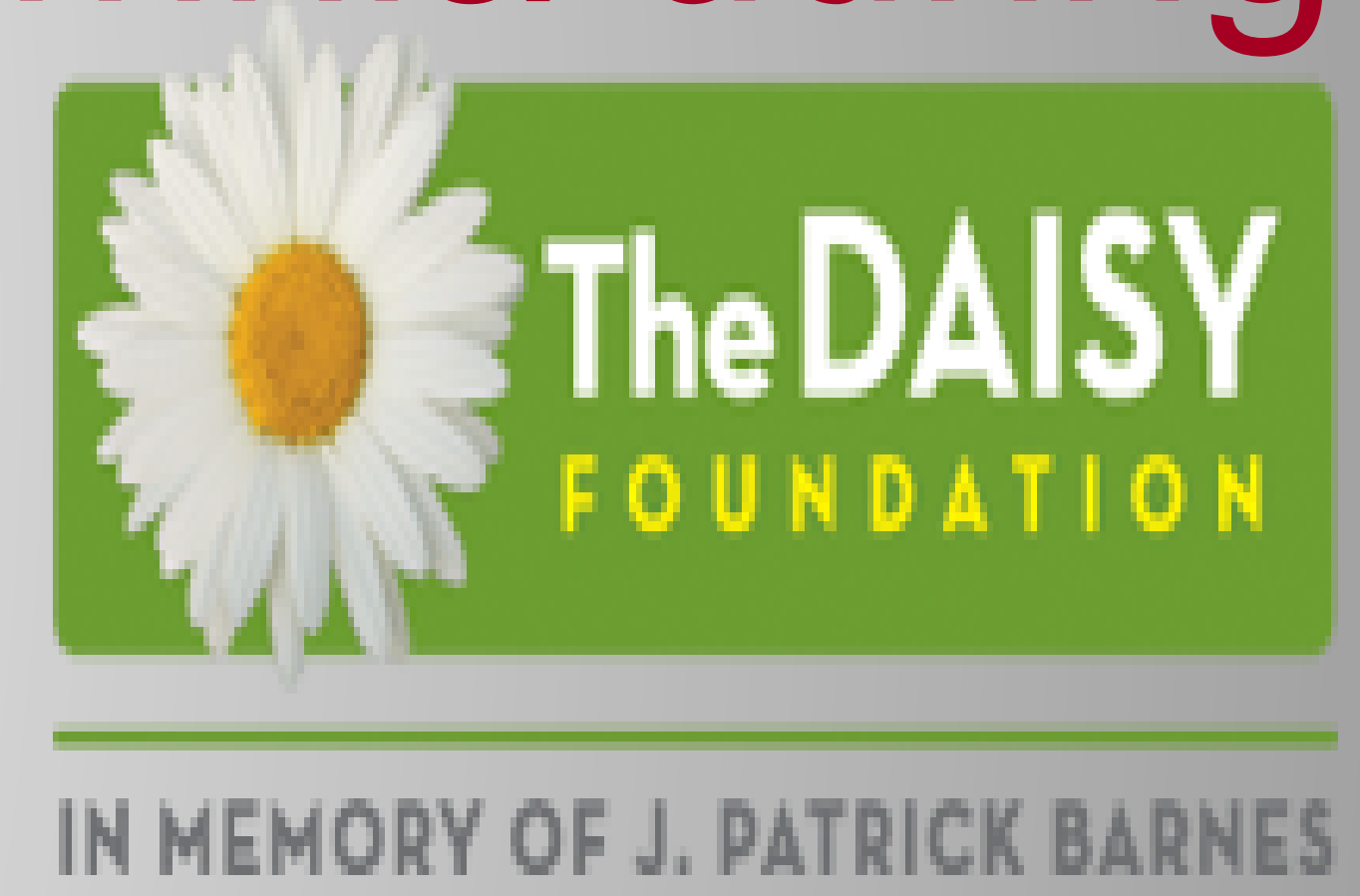


# The Clinical and Biochemical Effects of Massage Therapy on Fatigue and Insomnia during Radiation Treatment for Breast Cancer: A Pilot Study



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## Background

Many women undergoing radiation therapy for breast cancer experience debilitating fatigue and insomnia with limited treatment options. The management of treatment and cancer-related effects, is growing in importance as cancer survivors are expected to reach 18 million in the United States by 2022, an increase of nearly 4 million from 2012 (ASCO) In a recent study of 413 participants diagnosed with breast cancer 18.6% exceeded the threshold for clinically significant insomnia and another 31.5 percent had sub- threshold insomnia as measured by the Insomnia Severity Index (ISI) (Desai K, 2013)

## Aims and Hypothesis

1. Study the efficacy of Massage Therapy (MT) as intervention for management of fatigue and Insomnia .  
**Hypothesis:** Fatigue and Insomnia scores from baseline to end of study will be lower in the treatment group verses the control group.
2. Examine the effect of Massage Therapy on fatigue and insomnia at the biochemical level by measuring pro-inflammatory cytokines: Interluken -6 (IL6) and C-reactive protein (CRP).  
**Hypothesis:** Levels of IL-6 and CRP will be lower in the treatment group verses the control group from baseline to end of radiation treatment.

## Methodology

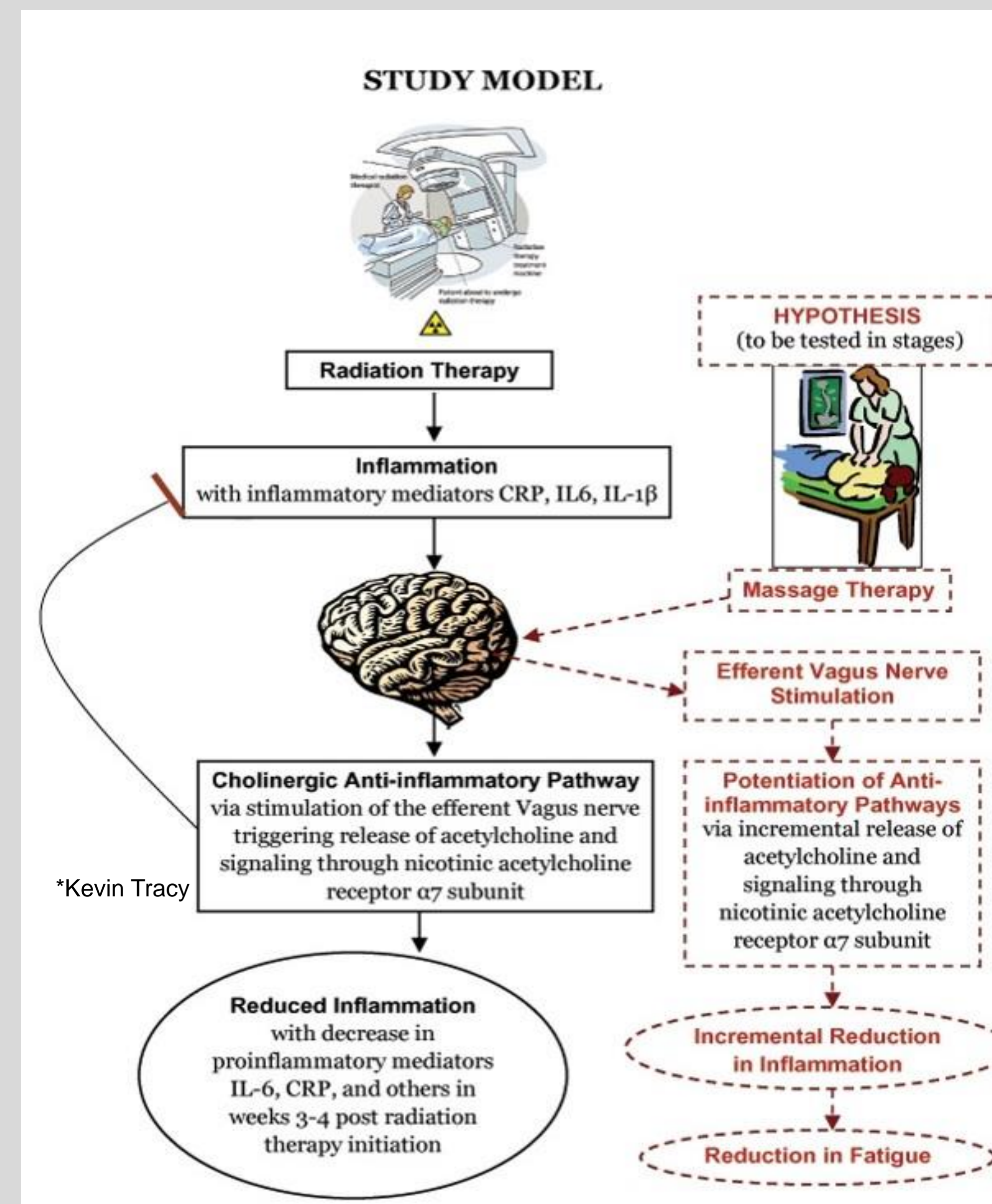
**Design:** Two-armed, randomized, controlled and partially blinded pilot study  
**Participants:** 29 female patients age  $\geq 18$  years, diagnosed with breast cancer and undergoing radiation therapy.  
**Excluded:** Stage IV disease, presence of an underlying disease/injury, which is clearly irreversible and anticipated to be fatal within 5 months, long-term (> 3months) steroid medications in the past year, plans to move out of study region within six months, received regular (at least twice per month) bodywork over the past six months.  
**Setting:** Midwest Community Hospital Outpatient Cancer Center- (Floyd Memorial Hospital and Health Services)  
**Data Collection**  
 History, Questionnaires- (Baseline, End of Radiation Tx. End of Study -3 months after last Radiation tx.) Lab Analysis of Bio-Markers- (Baseline, Mid-point of Radiation and End of Radiation Therapy). Weekly assessment of symptoms  
**Variables**      **Instruments**

Fatigue	Fatigue Symptom Inventory (FSI)
Insomnia	Insomnia Severity Index (ISI)
Sleep Quality	Pittsburg Sleep Quality Index (PSQI)
Inflammation	IL-6 and C-Reactive Protein (CRP)
Depression	Patient Health Questionnaire (PHQ-9)
Life Events	Social Readjustment Rating Scale (SRRS)
Anemia	CBC
Concomitant Meds	Medical History
BMI, Exercise	Health Assessment



**Treatment Group/Intervention:** 60 minute full body massage during each week of radiation therapy. Location (massage room in the Cancer Center) and massage therapist were the same for all participants.  
**Control Group:** standard care plus study visit each week of radiation therapy

## Study Model



## Data Analysis

**Data Analysis:** Descriptive statistics- frequency and percentages for discrete measures and means, standard deviation, minimum and maximum for continuous measures are produced in entire cohort and in each group. A chi-square test (and Fisher's exact in case of 2x2) is used to associate categorical characteristics distribution in each group. Paired sample t-tests were run to get the means and levels of significance. To answer the question, "do participants that have both chemotherapy and radiation have higher levels of fatigue, insomnia and inflammation, an independent samples T-test was run to compare the means and determine significance. Leven's test was looked at to determine if equal variances were assumed.

## Research Team

Krystal Angevine LCSW; Raphael Botran-Fernandez PhD (Immunologist); Anthony Dragun MD (Rad. Oncologist) Susan Waiz MT, Rayna Withers MA (Health Admin) Angela Leonard and Shesh Rai PhD (statisticians), Judy Myers PhD, RN, Primary Investigator

## Findings

Demographic, life style, disease burden variables were not significantly different between groups. There were no adverse events associated with massage therapy. Outcomes trended as projected with fatigue and insomnia levels lower in treatment group. CRP-Treatment group had greater positive net change i.e. lower levels of IL6 and CRP.

Fig. 1. Net Change in Inflammatory Biomarker-CRP

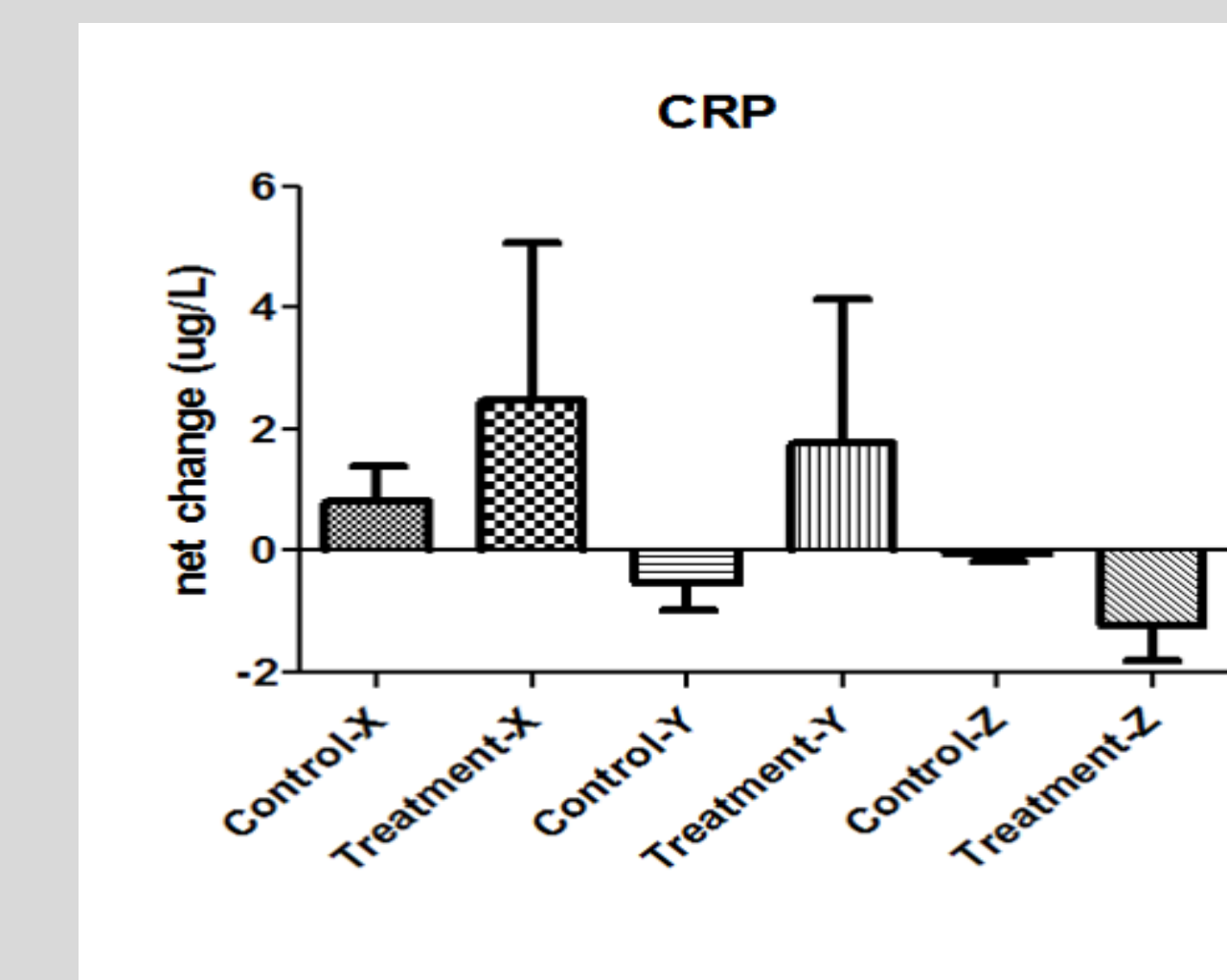


Fig. 2. Net Change in Inflammatory Biomarker-IL6

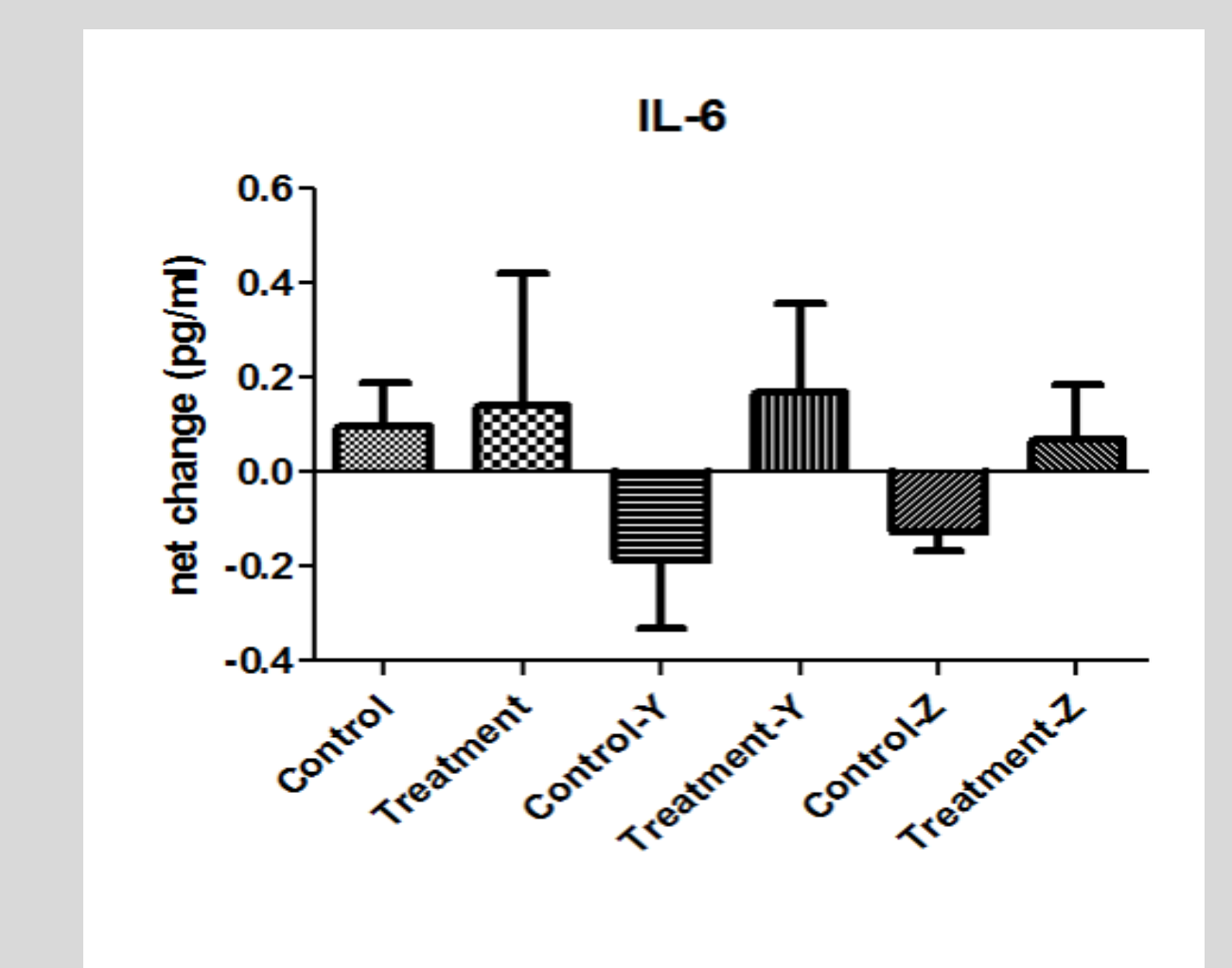


Table 1. Measures of Fatigue and Insomnia Baseline to End of Study

Measure	Control N=6	Treatment N=17
Fatigue Symptom Inventory (FSI)	14.833	17.176
FSITDI Base		
FSITDI End	12.833	11.706
FSIALF Base	3.5	4.235*
FSI ALF End	3.167	2.765*
Insomnia Sleep Index (ISI)	10	9.059*
ISI Base		
ISI End	6.667	5.765*
Patient Health Questionnaire (PHQ9) Base	4.33	5.412
PHQ9 End	4.83	4.059

\*significant at p<.05

Table 2. Difference in combined therapy vs. radiation only- Fatigue and Insomnia baseline to End of Study

Measure	No Chemo Mean N=14	Yes Chemo Mean N=9
Fatigue Symptom Inventory (FSI)	12.929	22.222
FSITDI Base		
FSITDI End	10.786	13.889
FSIALF Base	3.429*	5
FSIALF End	2.5*	3.444
Insomnia Sleep Inventory (ISI)	5	13.111*
ISI Base		
ISI End	5	7.556*
Patient Health Questionnaire (PHQ9) Base	3.429	7.778
PHQ9- End	3.426	5.556

\*significant at p<.05

## Discussion

Findings support previous studies suggesting the efficacy of massage therapy for management of cancer related fatigue and insomnia. During the end of study interviews, several J et.al. participants from the treatment group described their experience as having more energy and better sleep for approx. 3 days following massage. This suggests future studies should focus on the duration of effect and frequency of massage (2x a week instead of 1x a week) during radiation therapy. Collaborative interdisciplinary research is a viable means to fund and conduct small intervention studies in a community based cancer center. Larger, multi-site studies with more diverse sample are needed to explain biochemical effects of massage therapy.

### Works Cited

Desai, K; Mao, J et.al 2013. Prevalence and risk factors for insomnia among breast cancer survivors on aromatase inhibitors. *Supportive Care in Cancer* 12(1) p3-51  
 Tracy, Kevin, Physiology and immunology of the cholinergic anti-inflammatory pathway. *J Clin Invest* Feb 1.2007 117(2) 289-296.