Abstract 3 – Oral Session: Literature Review RISK PERCEPTION AND COMMUNICATION IN CLINICAL PRACTICE INVOLVING CANCER PATIENTS’ USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE: A META-SYNTHESIS
T. Stub1,2, S. A. Quandt2, T. A. Arcury3, J. C. Sandberg1, F. Musial2, A. Salamonsen2
1 Department of Epidemiology and Prevention, Wake Forest School of Medicine, Winston-Salem, North-Carolina, USA, 2 The National Research Center in Complementary and Alternative Medicine (NAFKAM), Department of Community Medicine, UiT The Arctic University of Norway, Tromsø, Norway and 3 Department of Family and Community Medicine, Wake Forest School of Medicine, Winston-Salem, North-Carolina, USA.

BACKGROUND: Although many cancer patients combine conventional and complementary and alternative medicine (CAM), their conventional and CAM providers may place such patients at risk by their own perceptions and communication about these treatments. The aim of this review was to summarize the research literature on risk perception and communication about CAM among oncology experts, general practitioners, and CAM providers, and to identify direct and indirect risks.

METHODS: Systematic searches in seven medical databases, covering literature from 1980 to 2015, were performed. The studies were assessed according to level of evidence and summarized into direct and indirect risks by a multidisciplinary team.

RESULTS: Seventy-three papers were included in the primary analysis; 39 papers in the main analysis, and 34 used as background information. The main direct risk was the effect of treatment based on a risk/benefit ratio. Other direct risks identified were adverse effects, interactions, toxicity, and harms of treatment regime. Indirect risks identified were different models of disease causality and treatment philosophy, lack of regulation and standardized education, need for common medical terminology, risk communication, and lack of CAM and conventional medicine knowledge among different health providers.

CONCLUSION: Even though the direct risk of consuming herbs containing high levels of toxins is a threat to patient safety, indirect risk may pose more danger to patients who want to combine CAM with conventional treatment in cancer care. Differences in epistemology and treatment philosophy impede effective communication between health providers with or without CAM training. However, a respectful and unprejudiced communication about CAM is desirable. Thus, better cross training among conventional and CAM providers will contribute to the reduction of indirect risk and enhance patient safety.

Abstract 8 – Oral Session: Natural Products: Clinical Exploratory Study on Anti-inflammatory Effect and QOL by Low Molecular Fucoidan (LMF) for Advanced Cancer Patients in Japan.
H. Takahashi1, M. Kawaguchi2, K. Kitamura3, S. Narumiya4, M. Kawamura5, I. Tengan6, S. Nishimoto7, Y. Hanamura8, Y. Majima9, K. Teruya9, S. Shirahata10
1 Seren Clinic Fukuoka, Fukuoka; 2 Kawaguchi Medical Clinic, Okayama; 3 Kitamura Clinic, Fukuoka; 4 Dojima Liga Clinic, Osaka; 5 Kyowa Hospital, Hyogo; 6 Clinic Ginowan, Okinawa; 7 Nishimoto Clinic, Wakayama; 8 Hanamura Hospital, Kagoshima; 9 Majima Gastrointestinal Clinic, Fukuoka; 10 Graduate School of systems Life Sciences, Kyushu University, Fukuoka, JAPAN

BACKGROUND: Standard chemotherapy (Cx) against advanced cancers still face to their limited efficacies and side-effects as yet and thus the patients are forced to search for various complementary and alternative therapies. One in Japan is fucoidan, a high molecular weight sulfated polysaccharide, extracted from seaweeds. In particular, enzyme digested fucoidan as low molecular weight (LMF) has been reported to exhibit broad biological activities such as anticancer and anti-inflammatory effects in basic research. Recently, we have experienced that an advanced pancreatic cancer patient treated with standard Cx, dendritic cell cancer vaccine and LMF showed a drastic tumor regression, and a rapid improvement of C-reactive protein (CRP) value. After this experience, we exploratory examined fucoidan effects in advanced cancer patients especially on CRP value and several inflammatory cytokines (IL-1β, IL-6, TNF-α).

METHODS: Study was carried out from January 2014 to February 2015 under the Institutional Ethics Committee approval.
Patients with advanced cancer were recruited to ingest LMF (Trade name: Power Fucoidan) at least 4 weeks (wks) and the changes of those biomarker values were monitored before, after 2 and 4 wks.

RESULTS: Although CRP value was not decreased statistically among 28 total participants, 15 patients (58%) exhibit a decrease of CRP values within the first 2 wks, and 10 patients (38%) decreased by half or more values. Among the inflammatory cytokines, IL-1β showed decreasing tendency (p=0.06), and particularly IL-6 was decreased significantly (p<0.05). QOL values were not changed during the study period.

CONCLUSIONS: As the Cx-related side-effects have been reported to involve inflammatory cytokines, the suppressive effects of LMF on these cytokines may be contributing to the reduction of Cx-related side-effects. It is desirable to be investigated in this regard about the clinical significance of LMF as one of the supportive therapies for advanced cancer patients especially with Cx.

Abstract 11 – Oral Session: Multi-modality Therapy and Program Development IDENTIFYING AND ADDRESSING NUTRITION AND PHYSICAL ACTIVITY NEEDS FOR CANCER RISK REDUCTION IN A COMPREHENSIVE CANCER CENTER
Bonnie Nelson, M.Ed., CHES; Amanda Klimitchek, BS; Rachel M. King, MPH, CHES; Sally Scroggs, MS, LD, RD; Shamsha Damani MBA; Therese Bevers, MD
Cancer Prevention Center, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

BACKGROUND: The Cancer Prevention Center completes over 4,000 patient visits each month with one goal: to reduce cancer risk. When these patients arrive for a clinical screening appointment, they are given the opportunity to be screened for and receive a primary prevention intervention with a Health Education Specialist (HES) in the areas of nutrition and physical activity (energy balance).

MAIN CONCEPTS: To identify energy balance needs a unique survey was developed, as no tool currently existed, containing questions that align with national guidelines for cancer risk reduction through lifestyle. When completing the survey, patients are asked to think about their current diet and physical activity routine. The survey also asks questions concerning how important it is to the patient to make a change and their readiness and confidence in making a change. This patient-reported data collected during the consultation with the HES, trained in Motivational Interviewing, allows for a tailored, patient-centered comprehensive lifestyle intervention. Goals are set in clinic and the patients are given the opportunity to follow-up with the HES, free of charge, in clinic, by telephone or through an electronic messaging system.

DESCRIPTION: From 10/06/2014 to 04/14/2015, approximately 380 surveys were completed. The survey will be administered again when patients return for their screening and survivorship visits. At baseline, patients reported consuming an average of 3.5 sugary drinks and 2 processed meats each week, being physical activity at a moderate intensity for an average of 2 days for 22.7 minutes each week and completing muscle strengthening exercises less than 1 day each week.

SIGNIFICANCE: These baseline results indicate there is much work to be done in this population to make lifestyle changes for cancer risk reduction. Next steps include continuing to collect baseline data, comparing baseline with follow-up data, and making an effort to have surveys completed before the patient’s scheduled appointment.

Abstract 14 – Oral Session: Mind-body Medicine PILOT STUDY ON THE FEASIBILITY OF A MEDITATION INTERVENTION TO CHANGE TELOMERE LENGTH IN COLLEGE STUDENTS
M. Isgut1; A. Smith2; D. Kang1, J. Kang1; H. Bilen1; O. Kucuk1
1Department of Hematology and Medical Oncology, Winship Cancer Institute, Atlanta, GA; 2Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, GA

BACKGROUND: Telomere shortening is linked to cellular senescence, age-related tissue dysfunction, and morbidity and mortality in humans. Studies have shown that individuals who experience chronic psychological stress or childhood adversities tend to have shorter telomeres. Stress-reduction practices, such as meditation, have been associated with
increased telomerase activity after short term training, and with longer telomeres in long-term practitioners. This study aimed to examine the feasibility of studying the effects of a short-term meditation intervention on psychological parameters and telomere length in college students with little or no previous training.

METHODS: In this study, college students (n=12) who participated in a four-week campus meditation class were evaluated for changes in their buccal cell telomere length at basal, two-week, and four-week time points. They were also given two psychological questionnaires to measure changes in their levels of perceived stress (Perceived Stress Scale; Cohen et al., 1983) and psychological well-being (Flourishing Scale; Diener et al., 2010) at the same time points. The same psychological and biological parameters were measured in control participants (n=10). A post-completion questionnaire was administered to both meditation and control participants. Telomere length was measured using quantitative PCR.

RESULTS: After the intervention, mean telomere length increased for meditation participants but did not change for controls. However, these changes were not statistically significant. While psychological well-being increased slightly for meditation participants and decreased for controls (p=0.15), these were not significant. Perceived stress decreased significantly in meditation participants (p=0.03) after four weeks. Higher levels of perceived helpfulness of the intervention were associated with more pronounced decreases in perceived stress (r=0.39, p=0.27) and increases psychological well-being (r=0.51, p=0.11) among meditation participants, but these correlations were not statistically significant.

CONCLUSIONS: These preliminary data support the possibility of a short-term effect of meditation on telomere length in novice practitioners, and warrants larger future studies.

Abstract 15 – Oral Session: Yoga intervention for patients with prostate cancer undergoing external beam radiation therapy – a pilot feasibility study

Avital Ben-Josef, DMD MBA RYT1, E. Paul Wileyto, PhD2, Jerry Chen, BA1, Neha Vapiwala, MD1
1Department of Radiation Oncology, Abramson Cancer Center, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA
2Department of Biostatistics and Epidemiology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA

Background/Purpose: Studies have demonstrated beneficial health and quality of life (QOL) effects from yoga interventions during and after cancer treatment. However, yoga as a modality for symptom management has been predominantly evaluated in breast cancer patients, and research on its role in alleviating prostate cancer (PC) patients’ side effects has been lacking, presumably in large part due to the perception that men would not be willing to participate in this form of holistic exercise. The primary goal of this pilot study was to determine the feasibility of recruiting and retaining PC patients to a clinical trial of yoga while they undergo external beam radiation therapy (RT).

Methods: Twice-weekly yoga interventions, each 75 minutes, were offered for the duration of the RT course (6-9 weeks). Demographic information was collected at baseline. The endpoint of feasibility was to be declared if 15 of the first 75 eligible PC patients approached (20%) were successfully accrued and able to complete the regimen per protocol.

Additional endpoints included standardized assessments of fatigue, erectile dysfunction (ED), urinary incontinence (UI) and general quality of life (QOL) conducted at time points before, during and after RT.

Results: Between 5/2013 and 6/2014, 68 eligible PC patients were approached and offered participation in this pilot study. 23 patients (34%) declined to participate in the study. Of the 45 patients who consented to the study, 18 (40%) were voluntarily withdrawn early due to insufficient attendance secondary to unavoidable and unanticipated conflicts between their radiation treatment times and the yoga class schedule. Of the remaining 27 patients, 12 (30%) participated in 50% or more of the classes, and 15 (59%) finished the required number of yoga classes and were ultimately deemed evaluable. Severity of fatigue scores demonstrated a significant variability over the time of
treatment, with fatigue increasing by week 4 as expected, but then improving over the course of treatment (p=0.008). ED, UI and general QOL scores demonstrated reassuringly stable albeit not significant trends.

Conclusions: A structured yoga intervention in the form of twice-weekly classes appears to be feasible for PC patients during a 6-9 week course of outpatient radiotherapy. Preliminary results are promising, showing stable measurements in fatigue, sexual health, urinary incontinence and general quality of life. Data on the full complement of patients, including control subjects from the currently-accruing randomized phase of this protocol, will permit more detailed evaluation of the impact of yoga on various QOL measures.

Abstract 16 – Oral Session: Multi-modality Therapy and Program Development Effects of Lifestyle Interventions on fatigue in Breast Cancer Patients

H. Ghavami 1, N. Akyolcu2, A. Nanbakhsh 3
1Department of Medical Surgical Nursing, Nursing Faculty of Urmia Medical Sciences University, Urmia, Iran
2Department of Surgical nursing, Florence Nightingale Nursing Faculty of Istanbul University, Istanbul, Turkey
3Department of Pediatrics, Children's Hospital Boston, Harvard University, Boston, MA, USA

BACKGROUND: According to literatures about one third of breast cancer survivors report that fatigue interferes with daily activities, on the other hand regular exercise can reduce fatigue. This study assessed the impact of lifestyle intervention on fatigue in women with breast cancer.

METHODS: This is a randomized clinical trial study. The Study samples were 80 women with stage I, II, or III breast cancer, that operated for breast cancer and their chemotherapy or radiation therapy completed 3-18 months ago. They are divided randomly into two groups; control group and lifestyle interventions group. Those in the lifestyle intervention group were instructed to practice aerobic exercises 45-60 minutes three times per week for 24 weeks with dietary energy restriction training. Those in the control group were instructed to continue normal activities and their routine health care. Data were obtained from the patient information form and Cancer Fatigue Scale (CFS) questionnaire that completed before and after the lifestyle intervention in both groups.

RESULTS: No baseline differences existed between the two groups for the mean of CFS score (p=0.957) before the study; but the mean of CFS score in the lifestyle intervention group after the application decreased to 8.15 ± 6.12, while in the control group it increased to 22.30 ± 7.73. The difference between the mean of CFS score between the two groups after the application was statistically high (p = <0.001).

CONCLUSIONS: Lifestyle intervention could be considered as part of a cancer survivorship program. For women with breast cancer, lifestyle intervention can decrease their fatigue. Additional research in lifestyle intervention along with cognitive behavioral therapy also may be beneficial.

Abstract 18 – Oral Session: Clinical Practice and Usage DEVELOPING MYCaW TO CAPTURE SUPPORTERS’/CARERS’ CONCERNS TO AID INTEGRATIVE CONSULTATIONS

M. Polley*, N. Collaco1, R. Jollife2 and H. Seers2.
1Department of Life Sciences, Faculty of Science and Technology, University of Westminster, London, UK, 2Penny Brohn Cancer Care, Bristol, UK.

BACKGROUND: People with cancer and their supporters/carers’ experiences are symbiotic. This reciprocal influence of the ‘dyad’ can negatively impact on the supporter/carers’ quality of life, making them more likely to suffer chronic illness. This research investigated the use of the validated Measure Yourself Concerns and Wellbeing (MYCaW) outcome measure to identify individual concerns and needs of supporters/carers’, specific to integrative cancer care.

METHODS: Qualitative data from 35 supporters collected during a service evaluation of Penny Brohn Cancer Care was analysed to understand the supporters’/carers’ experience. These data were used to design a bespoke exploratory open-ended questionnaire to further investigate the supporter’s/carers’ concerns, experiences and needs, when supporting a person with cancer, in a new group of supporters/carers. All data were
thematically analysed to derive primary themes and categories.

**RESULTS:** Initial service evaluation data identified a complex relationship between patient and support/carer. Furthermore, this relationship could positively enhance the cancer journey if each person were able to honestly articulate their concerns and needs.

21/48 new supporters/carers completed the bespoke questionnaire. Two primary themes evolved: **Theme 1** - ‘supporter concerns about themselves’: Categories included ‘psychological concerns’; physical concerns’ changing identity; ‘emotional experiences’, ‘concerns about providing appropriate support’. **Theme 2** – ‘concerns for the patient and the support-patient dyad:’ categories included ‘relationship concerns’ concerns for the psycho-emotional health of patient’; ‘practical concerns’ concerns about end-of-life’.

A qualitative analysis framework has been devised and is being piloted on further data collected within the UK.

**CONCLUSIONS:** MYCaW can effectively identify the concerns of supporters/carers, who are providing care for a person with cancer. Integrating this data into a clinical consultation can facilitate provision of appropriate clinical and practical support. Ultimately this integrative approach can positively impact many aspects of both of their quality of lives.

**Abstract 19** – Oral Session: Natural Products: Clinical PERIPHERAL BLOOD LYMPHOCYTE SUBSETS IN NON-SMALL CELL LUNG CANCER PATIENTS USING AN HERBAL INTRAVENOUS INJECTION, A RETROSPECTIVE STUDY

Xiaoyan Wang, Yu Wan, Hui Wang, Ying Wang, Yiling Jiang, Hang Zhang, Yuhua Zhao, Feng Chai, Hongming Fang, Weidong Lu
Department of Integrative Oncology, Cancer Center and Department of Clinical Pharmacy, Zhejiang Xiaoshan Hospital, Hangzhou, Zhejiang, P.R. China
Dana-Farber Cancer Institute, Harvard Medical School, Boston, MA, USA

**BACKGROUND:** Shenmai (SM), an intravenous injection containing two Chinese herbal extracts, Panax Ginseng and Radix Ophiopogonis, is commonly used in hospitals in China, for the claimed improving immunity of cancer patients and reducing toxicities of chemotherapy. The study was conducted to investigate SM associated changes in peripheral blood lymphocyte subsets in patients with non-small cell lung cancer (NSCLC).

**METHODS:** Electronic medical records, between September 2013 and December 2014, were searched for NSCLC SM users and non-users during hospitalization. Data included patient demographics, tumor stages, pathology, performance status, smoking history, co-morbidities, concomitant medications, and peripheral blood counts on lymphocyte subsets including total T lymphocytes (CD3), CD4 T-cells, CD8 T-cells, CD4/CD8 ratio, and natural killer (NK) cells. Lymphocyte subsets were analyzed by flow cytometry at the central laboratory of our hospital. Mean lymphocyte subsets were measured as per cell/ml (mean ± SD). Data was analyzed using SPSS (version 17.0).

**RESULTS:** NSCLC SM users (n=60) and NSCLC non-SM users (n=30) with available data during the same period were identified. Patient demographics and tumor stages between the SM group and non-SM group were comparable with no significant difference (p>0.05). The mean age of the SM group was of 62.3 ± 7.2. However, the mean total T lymphocyte level in the SM group was significantly lower than that in the non-SM group (662.2±388.3 vs. 999.7±493.8, p=0.002); The mean CD4 T-cells level in the SM group was significantly lower than that in the non-SM group (337.6±189.1 vs. 639.4±358.5, p=0.000); the mean NK cell level in the SM group was significantly lower than that in the non-SM group (143.7±112.9 vs. 242.3±192.4, p=0.013). No significant difference was found between the SM group and the non-SM group in the mean CD8 T-cells level and the mean CD4/CD8 ratio (250.9±263.8 vs. 329.7±187.3, p=0.15; 2.0±1.7 vs. 2.3±1.3, p=0.55), respectively.

**CONCLUSIONS:** The use of SM is associated with reduced total T lymphocytes, CD4 T-cells, and the NK cells in the peripheral blood circulation in patients with NSCLC. Our finding is contradictory to previous reported studies and claimed effectiveness of SM from China. Further investigation is needed to clarify the role of SM in its immunoregulatory effects and clinical
significance in the management of NSCLC patients.

Debra L Roter,1 Susan Larson,1 Gail Geller,2 Cara Fernandez,3 Kathleen Yost,2 Aaron L Leppin,3 Ashok Kumbamu,3 Jon C Tilburt3
1Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland; 2Johns Hopkins School of Medicine and Berman Institute of Bioethics, Baltimore, Maryland; 3Mayo Clinic, Rochester, Minnesota

BACKGROUND: Complementary and alternative medicine (CAM) use is common among cancer patients but oncologists are rarely consulted about it. It is widely suggested that the more patient-centered the visit the greater the likelihood that a CAM discussion would take place. However, little is known about the relationship between the overall patient-centeredness of cancer visits and the frequency and extensiveness of CAM discussions. This study explores these relationships.

METHODS: 323 cancer patients (58% female; average age 61; range 22-90) and 38 oncologists were audio recorded during a routine cancer care visit. A companion was present in 69% of visits. Recordings were coded with the Roter Interaction Analysis System (RIAS) and participants completed pre- and post-visit questionnaires.

RESULTS: CAM was discussed in 37 (12%) visits; discussion was initiated by the patient and/or a companion almost twice as often as the clinician (65% vs 35%). Occurrence of a CAM discussion was not related to patient sociodemographic variables, pain severity or overall quality of life. In visits with CAM discussions (vs without), both patients and clinicians talked more and clinicians provided more psychosocial and biomedical information (p<.05); patients tended to disclose more psychosocial information (p<.06) and their global affect was judged as more anxious (p<.05). Mean visit length tended to be longer (33 vs 28 minutes; p<.06) with CAM discussions. Patients were more satisfied with their visit (p<.001) and clinician (p<.02) in visits with CAM discussions. More overall visit patient-centeredness was unrelated to the occurrence of a CAM discussion, but marginally related to the extent of CAM discussion (p<.09).

CONCLUSIONS: CAM discussions in cancer care visits are infrequent but associated with greater levels of patient satisfaction. The overall patient-centeredness of the visit is not associated with whether a CAM discussion takes place but it appears to facilitate fuller discussion once the topic is broached.

Abstract 26 – Oral Session: Acupuncture Effect of Acupuncture for Radioactive-Iodine-Induced Anorexia in Thyroid Cancer Patients: A Randomized, Double-Blinded, Kim Sham-Controlled Pilot Study
Hwa-Seung Yoo1*, Ju-Hyun Jeon2, Chong-Kwan Cho1,
1 Department of acupuncture & moxibustion, Dunsan Korean Medicine Hospital, Daejeon University, Daejeon, Republic of Korea
2 East-West Cancer Center, Daejeon Korean Medicine Hospital, Daejeon University, Daejeon, Republic of Korea

Background: The aim of this study is to evaluate the efficacy and safety of acupuncture for radioactive-iodine (RAI) induced anorexia in thyroid cancer patients.

Methods: Fourteen thyroid cancer patients with RAI-induced anorexia were randomized to a true acupuncture or sham acupuncture group. Both groups were given 6 true or sham acupuncture treatments in 2 weeks. Outcome measures included the change of the Functional Assessment of Anorexia and Cachexia Treatment (FAACT; Anorexia/Cachexia Subscale [ACS], Functional Assessment of Cancer Therapy, General [FACT-G]), Visual Analogue Scale (VAS), weight, body mass index (BMI), ACTH, and cortisol levels.

Results: The mean FAACT ACS scores of the true and sham acupuncture groups increased from baseline to exit in intention-to-treat (ITT) and per protocol (PP) analyses; the true acupuncture group showed higher increase but with no statistical significance. Between groups, from baseline to the last treatment, statistically significant differences were found in ITT analysis of the Table of Index (TOI) score (P = .034) and in PP analysis of the TOI (P = .016), FACT-G (P = .045), FAACT (P = .037) scores. There was no significant difference in VAS, weight, BMI,
ACTH, and cortisol level changes between groups.

**Conclusion:** Although the current study is based on a small sample of participants, our findings support the safety and potential use of acupuncture for RAI-induced anorexia and quality of life in thyroid cancer patients.

**Abstract 28 – Oral Session: Multi-modal Therapy and Program Development Integrating mindfulness in supportive cancer care: effects of a mindfulness-based day-care clinic in cancer survivors**

Gustav Dobos1, Tatjana Overhann1, Arndt Büssing2, Thomas Ostermann2, Petra Voiß1, Jost Langhorst1, Sherko Kümmel2, Anna Paul1, Holger Cramer1

1Department of Internal and Integrative Medicine, Klinikum Essen-Mitte, Faculty of Medicine, University of Duisburg-Essen, Essen, Germany
2Center for Integrative Medicine, Faculty of Medicine, University of Witten/Herdecke, Herdecke, Germany
3Department of Senology / Breast Center, Klinikum Essen-Mitte, Essen, Germany

**Background:** Physical and mental symptoms are common consequences of cancer diagnosis and treatment. The aim of this study was to investigate the effect of a mindfulness-based day-care clinic group program on quality of life, cancer-related symptoms, mental health, mindfulness, and interpretation of their illness in cancer patients.

**Methods:** 117 cancer survivors (91.0% female; 53.9±10.7 years; 65% breast cancer; mean time since diagnosis 27.2±46.5 months) participated in an 11-week mindfulness-based day-care clinic group program, 6 hours per week. The intervention incorporated mindfulness-based meditation, yoga, cognitive-behavioral techniques, diet, and lifestyle modification. Outcome measures including quality of life (EORTC QLQ-C30), life satisfaction (BMLSS), mindfulness (FMI), and interpretation of illness (IIQ) were assessed before, immediately after, and at 3 months after the intervention.

**Results:** Using mixed linear models, improvements in global health status (p=0.001), physical functioning (p=0.010), role functioning (p<0.001), emotional functioning (p<0.001), cognitive functioning (p=0.001), and social functioning (p=0.001) were found. Cancer-related symptoms, including fatigue (p=0.009), pain (p=0.033), insomnia (p<0.001), constipation (p=0.033), anxiety (p<0.001), and depression (p<0.001) also improved. Mindfulness (p<0.001), life satisfaction (p<0.001), health satisfaction (p<0.001), all coping styles (p<0.001-0.017), all spiritual/religious attitudes (p=0.002-0.31), and interpretation of illness as something of value (p<0.001) increased; interpretation of illness as punishment decreased (p=0.005). Improved outcomes were associated with increases in process variables, mainly life satisfaction, health satisfaction, and trust in medical help (R²=7.3%-43.6%; p<0.05).

**Conclusion:** An 11-week mindfulness-based day-care clinic group program improved quality of life, cancer-related symptoms, and mental health in cancer survivors at the short- and medium-term. Patients’ mindfulness was increased, and patients interpreted their illness more positively and less guilt-associated negative. Supportive mindfulness-based interventions can be considered as an effective means to improve cancer survivors’ physical and mental health. The program provides a basis for specialized programs during chemotherapy and endocrine therapy, which are going to be evaluated.

**Abstract 36 – Oral Session: Mind-body Medicine INCREASING POSTTRAUMATIC GROWTH IN MEN DIAGNOSED WITH PROSTATE CANCER ON ACTIVE SURVEILLANCE: RESULTS FROM A RANDOMIZED CONTROLLED PILOT TRIAL**

David Victorson, Ph.D.1,2, James Burns, M.A.1, Bruriah Gutierrez, MEd1, Nat Sufrit, B.A.3, Carly Maletich, M.A.1, Stephanie Schuette1, Charles Brendler, M.D.3

1Department of Medical Social Sciences, Northwestern University Feinberg School of Medicine, Chicago, IL; 2Osher Center for Integrative Medicine at Northwestern, Northwestern Medicine, Chicago, IL; 3NorthShore University Health System, Evanston, IL

**BACKGROUND:** Men diagnosed with prostate cancer on active surveillance (AS) often report experiencing significant anxiety. It is unclear whether men on AS also experience positive changes, and whether this may be cultivated or enhanced with integrative oncology-based support.
The study examined the feasibility and preliminary efficacy of an 8-week, mindfulness based stress reduction (MBSR) intervention in a sample of men on AS on important psychological outcomes including posttraumatic growth.

**METHODS:** Men were randomized to either MBSR (n=23) or an attention control arm (n=18) and completed self-reported measures at baseline, 8-weeks, 6 months and 12 months.

**RESULTS:** Compared to the control arm, participants in the MBSR arm saw significant (p<.01) and robust increases in posttraumatic growth at 8 weeks (p<.01; d=.43), 6 months (p<.05; d=.41) and 12 months (p<.01; d=.73). Two of the five posttraumatic growth subscales were statistically significant with large effect sizes: relating to others (p=.03; d=.55) and personal strength (p=.01; d=.80).

**CONCLUSIONS:** MBSR was found to be feasible and acceptable by men on active surveillance for prostate cancer. While larger sample sizes are necessary to examine the efficacy of MBSR on important psychological outcomes, posttraumatic growth was shown to significantly increase over time for men in the treatment group. This work has the potential to offer men on AS with important self-regulatory skills to counterbalance some of the stressors commonly experienced with this treatment approach.

**Abstract 40 – Oral Session: Literature Reviews**

**REVIEW OF YOGA THERAPY DURING CANCER TREATMENT**

S.C. Danhauer,1* S.J. Sohl,2 E.L. Addington,1,3 A. Chaoul,4 & L. Cohen4

1 Department of Social Sciences & Health Policy, Division of Public Health Sciences, Wake Forest School of Medicine, Winston-Salem, NC, USA; 2 Department of Medicine, Vanderbilt University School of Medicine, Nashville, TN, USA; 3 Department of Psychology, University of North Carolina Charlotte, Charlotte, NC, USA; 4 Department of Palliative, Rehabilitation, and Integrative Medicine, The University of Texas, MD Anderson Cancer Center, Houston, TX, USA

**BACKGROUND:** People with cancer turn to complementary health approaches like yoga to manage symptoms of cancer, side effects of treatment, or stress. Patients and providers should therefore understand the state of the evidence on the potential benefits of yoga for cancer patients during active treatment.

**MAIN CONCEPTS:** Yoga is a mind-body practice that incorporates postures/movements, controlled breathing techniques, relaxation, and meditation. Yoga may decrease the effects of stress on cancer biology and improve biological and quality of life outcomes among people with cancer. Yoga is a popular complementary health approach for US men and women; however, the proportion of people with cancer who have used yoga is still low. We reviewed yoga research conducted during cancer treatment and provide recommendations for future research and clinical practice.

**DESCRIPTION:** Six non-randomized studies and eleven randomized controlled trials that examined effects of yoga in adults undergoing cancer treatment were included in our review. Evidence suggests that yoga is safe during treatment and may improve multiple aspects of quality of life, mental health, physical function, cancer-related symptoms, and, in some cases, biological function among adults undergoing cancer treatment. Because only three published trials tested yoga for children receiving treatment, more research is needed to determine the safety and efficacy of yoga in pediatric oncology patients.

**SIGNIFICANCE:** Preliminary research findings support that adults undergoing cancer treatment can safely practice and benefit from yoga. As yoga has not been incorporated as the standard of care, there is still potential to expand the portion of cancer patients who have access to yoga and thus the ability to achieve the best possible clinical outcomes. Future studies should enroll diverse samples (e.g., children, adults with non-breast cancers), use an active control group, include objective/physiologic measures, and identify the ideal "dose" of yoga to advance science in this field.

**Abstract 42 – Oral Session: Natural Products: Clinical**

**DOES DIETARY FUCOIDAN ALTER STEADY STATE LEVELS OF TAMOXIFEN AND LETROZOLE IN BREAST CANCER PATIENTS?**

J.H. Fitton5; S. Tocaciu1; L. Oliver1; R.M. Lowenthal2; G. Peterson3; R. Patel3; M. Shastri5; I. Oleson4

1 Royal Hobart Hospital, Liverpool Street, Hobart, Tasmania 7000; 2 Menzies Research Institute, Tasmania, Australia; 3 Menzies Research Institute, Hobart, Tasmania 7000; 4 School of Pharmacy and Pharmaceutical Sciences, University of Tasmania, Hobart, Tasmania 7000; 5 Department of Nursing, The University of Tasmania, Hobart, Tasmania 7000; 6 School of Medicine, The University of Texas, MD Anderson Cancer Center, Houston, TX, USA

**BACKGROUND:** Fucoidan is a naturally occurring sulfated polysaccharide present in the brown seaweed. Fucoidan has been shown to have anti-cancer properties, including inhibiting tumor growth and metastasis.

**OBJECTIVE:** The objective of this study was to determine the effect of dietary fucoidan on steady state levels of tamoxifen and letrozole in breast cancer patients.

**METHODS:** This was a prospective, randomized, placebo-controlled, double-blind study conducted at the Royal Hobart Hospital in Hobart, Tasmania, Australia. Eligible patients were receiving treatment with tamoxifen or letrozole for breast cancer. Patients were randomized to receive either fucoidan or placebo for 12 weeks.

**RESULTS:** There were no significant differences in steady state levels of tamoxifen or letrozole between the fucoidan and placebo groups. No adverse events were reported.

**CONCLUSIONS:** Dietary fucoidan did not alter steady state levels of tamoxifen or letrozole in breast cancer patients.

**SIGNIFICANCE:** This study provides preliminary evidence that dietary fucoidan does not affect steady state levels of tamoxifen or letrozole in breast cancer patients. Further research is needed to explore the potential of fucoidan as an anti-cancer therapeutic.
BACKGROUND: The aim of this study was to investigate the effect of co-administration of the Undaria pinnatifida derived fucoidan on the pharmacokinetics of two commonly used hormonal therapies, letrozole and tamoxifen, in breast cancer patients. Fucoidans are a group of sulphated carbohydrates, derived from marine brown algae, commonly used as dietary supplements due to their reported medicinal properties, including anti-cancer activity. Complementary medicine usage is common in cancer patients. Although assumed to be safe with regards to concurrent use of anti-cancer therapies, few clinical studies have been carried out to demonstrate this.

METHODS: This was an open label non-crossover study in patients with active malignancy taking letrozole or tamoxifen (N=10 per group). Patients took oral fucoidan, given in the form of Maritech® extract, over a three week period (500mg twice daily). Trough plasma concentrations of letrozole, tamoxifen, 4-hydroxytamoxifen and endoxifen, were measured at baseline and after treatment with fucoidan using HPLC-CAD. Adverse drug reactions were graded using the NCI Common Terminology Criteria for Adverse Events.

RESULTS: No significant differences in steady-state trough plasma concentrations of letrozole (p=0.12), tamoxifen (p=0.27), 4-hydroxytamoxifen (p=0.07) and endoxifen (p=0.09) were detected before and after administration of fucoidan. In addition, no significant adverse effects of fucoidan were reported and toxicity monitoring showed no significant differences in all parameters measured over the study period.

CONCLUSIONS: Administration of fucoidan showed no effect on the steady-state trough concentration of letrozole or tamoxifen and was well tolerated. These results suggest that fucoidan could be taken concomitantly with letrozole and tamoxifen without the risk of any clinically significant interactions.

Abstract 45 – Oral Session: Multimodality Therapy and Program Development Whole person care at the Ottawa Integrative Cancer Centre

Seely D (1,2), Zhao L (1), Herrington C (1), Flower G (1), Pitman A (1), Wilcox R (1), Young S (1). Ottawa Integrative Cancer Centre, Ontario, Canada Ottawa Hospital Research Institute, Ontario, Canada

BACKGROUND: The Ottawa Integrative Cancer Centre (OICC) provides evidence-informed integrative and preventative cancer care, research, and education across the spectrum of prevention to survivorship. The purpose of this presentation is to describe the population receiving care at the OICC in terms of demographic and disease-related characteristics, in addition to their experience receiving care in terms of preliminary quality of life and symptom outcomes.

METHODS: All patients receiving care at the OICC are invited to complete a registration package that documents demographic and disease-related characteristics in addition to questionnaires assessing quality of life (EORTC-QLQ C30), cancer-related symptoms (ESAS) and patient-identified concerns (MYCaW) at baseline and every 3 months thereafter for continuing patients.

RESULTS: The most common reasons for people seeking care at the OICC are to improve well-being (26.4%, n=451) and manage cancer symptoms and treatment-related side effects (18.0%). The most common cancer types seen at the OICC are breast (46.7%), colorectal (10.3%), and ovarian (9.0%) among women (n=300) and colorectal (19.3%), prostate (15.8%), and lung (14.0%) among men (n=141). A total of 377 patients completed the questionnaires at first clinic visit with 39 completed 3-month follow up at time of analysis. At baseline, approximately half of respondents self-identified as under distress for at least one common cancer-related symptom. Baseline quality of life function and symptom scores are comparable to EORTC reference values.

At 3 months following first clinic visit, a majority of patients reported improvements in patient-identified concerns, cancer-related symptoms (noticeable reduction in...
overall distress), and various quality of life scores.

**CONCLUSION:** The results presented here contribute to the understanding of the population seeking integrative care at the OICC. The majority of patients are presenting with advanced cancers and high symptomology. Preliminary outcomes analysis suggests patients undergoing integrative care showed improvement in their cancer-related symptoms and quality of life.

**Abstract 47 – Oral Session: Natural Products: Clinical NON-INVASIVE MEASUREMENT OF SKIN CAROTENOIDS SCORE (SCS) MAY CORRELATE TO CANCER STATUS**

Guannan (David) Li¹, Wayne Matecki²,³, Tinnin Chew³,⁴, Alex Feng⁵,⁶,⁷, Amy Matecki⁴,⁵,⁷, Charlene Ossler⁴, David Irwin⁶, Gary Cecchi⁸

¹Tufts University School of Medicine, Boston, Massachusetts  
²Doctor of Acupuncture and Oriental Medicine (DAOM) Program, Five Branches University, Santa Cruz, California  
³Division of Nutrition, ⁴International Center for Integrative Medicine, Oakland, California  
⁵Division of Integrative Medicine and ⁶Division of Hematology and Oncology, Department of Medicine in affiliated with UCSF, Alameda Health System, Oakland, California  
⁷Center for Integrative Medicine and ⁸Department of Hematology and Oncology, Alta Bates Summit Comprehensive Cancer Center, Berkeley, California

**BACKGROUND:** Studies have indicated that higher plasma carotenoid levels are associated with reduced risk of breast cancer recurrence in women previously diagnosed and treated for early stage breast cancer. Resonance Raman Spectroscopy (RRS) is a feasible and valid method for noninvasively assessing dermal carotenoids as a biomarker for studies of nutrition and health. The purpose of this study is to examine the potential relationship between non-invasively acquired skin carotenoid scores (SCS) and cancer status.

**METHODS:** Retrospective chart reviews from June 2009 to July 2014 were acquired from twelve patients in a community Integrative Oncology clinic who were undergoing chemotherapy and/or radiation therapy. The cohort criteria of this study required a SCS before treatment, one during treatment, and one after treatment (if applicable). All patients were provided with standard of care and also received acupuncture and dietary counseling regularly. Patient demographics, cancer type, side effects from cancer treatment, current condition, and occasional tumor marker levels were acquired from patient charts.

**RESULTS:** Nine of twelve patients had increased SCS when they finished treatments, and among them, seven are in remission. Two of the nine patients who experienced initial SCS improvement, then decreasing SCS, had recurrence of cancer. Upon restarting chemotherapy, both had increased SCS and are now in remission. The last three patients had decreasing SCS, coupled with increasing tumor marker levels; two of these three patients are deceased, and one is experiencing disease progression.

**CONCLUSIONS:** Of the patients who fit the cohort criteria, those who had higher or increasing SCS seem to be more likely to go into remission. In patients who had a continuously decreasing SCS, and rising tumor markers, disease progression was seen. Due to the retrospective nature of this study, further randomized controlled studies should be performed to better evaluate the association between SCS and cancer status.

**Abstract 48 – Oral Session: Natural Products: Preclinical Selective anticancer and protective effects of the botanical compound LCS101**

Yair Maimon, PhD¹,², Noah Samuels, MD²

¹Refuot Integrative Medical Center, Tel Aviv, Israel  
²Tal Center for Integrative Oncology, Institute of Oncology, Sheba Medical Center, Tel Hashomer, Israel

**Background:** There is a need to look for new treatment options which can reduce the side effects of cancer treatment, without compromising the efficacy of treatments and enabling patients to complete conventional treatment regimens. The botanical compound LCS101 has been found in a randomized controlled study to reduce chemotherapy-induced hematological toxicities, while showing inhibitory effects on cancer cell growth.

**Study purpose:** We examined the selectivity of the anti-cancer effects of the compound, alone and in conjunction with conventional chemotherapy agents. For
this purpose, we tested the effects of LCS101 on cancer and on normal cell vitality, as well investigating the mechanism of action for such selectivity. **Study methods:** The effects of LCS101 were tested on a number of cancer cell lines (breast, MCF7, MDA-MB-231; colorectal, HCT116; prostate, PC-3, DU-145) and on normal human epithelial cells (breast, MCF10A; prostate, EP#2). Cell viability was analyzed using an XTT assay and observed by light microscopy. Necrosis and apoptosis were examined using FACS analysis and immunoblotting. **Results:** LCS101 selectively induced cell death in breast and prostate cancer cell lines, as measured by XTT assay, light microscopy and FACS analysis. The findings showed a dose- and time-dependent selective cytotoxic effect on breast and prostate cancer cell lines, with a negligible effect on the normal human epithelial cells. As for the mechanism for the selective effects observed, LCS101 was found to induce PARP-1 reduction in breast cancer cells, with no effect on breast epithelial cells. The compound also showed selectivity in protecting the human epithelial cells from chemotherapy-induced cell death, while increasing cytotoxicity in cancer cells exposed to doxorubicin and 5-FU. This selective effect was correlated with apoptosis-associated PARP-1 cleavage. The PARP-1 cleavage seen in the cancer cells, which may explain the observed cell death, was not seen in the human epithelial cells. **Conclusion:** These findings demonstrate that the anti-proliferative effects exhibited by the botanical compound LCS101 are selective to cancer cells, and offer protection to normal epithelial cells from chemotherapy agents. These outcomes potentially serve to explore further synergism in applying integrative oncology models that combines conventional therapies with botanicals.
interfering with toxicity to cancer cells. Breast cell lines were treated with rising concentrations of doxorubicin (Doxo) or 5-fluorouracil (5-FU), either alone or in combination with 3 mg/ml LCS101. After 72 h of treatment the viability of cells was tested by XTT (A, Doxo; B, 5-FU). Protection of MCF10A cells from doxorubicin-induced death was also examined by light microscopy (C).

Figure 3. LCS101 selectively reduces PARP-1 levels in doxorubicin-treated cancer cells. MDA-MB-231 (A), MCF10 and MCF7 (B) cells were treated with 3 mg/ml of LCS101, 1 μM doxorubicin or both. Protein was extracted 24-72 h after the beginning of the treatment for MDA-MB-231 cells and 72 h after the beginning of the treatment for MCF10A and MCF7 cells, resolved by SDS-page and immunoblotted with PARP-1 antibody and tubulin/β-actin for loading control.

Abstract 55 – Oral Session: Natural Products: Clinical Effect of Chinese Herbal Formula JDXZO Cream on patients with Chemotherapy-induced hand-foot syndrome
Hongsheng Lin, Jie Li, Wei Hou Ying Zhang
Oncology Department of Guang’anmen Hospital, China Academy of Chinese Medical Sciences
BACKGROUND: Hand-foot syndrome (HFS), also known as palmar-plantar erythrodysesthesia, is a skin reaction that appears on the palms and/or soles after using certain chemotherapy drugs, including capecitabine, sorafenib, and gefitinib. Most cases are associated with fluorouracil, liposomal doxorubicin, or capecitabine. The incidence of HFS is approximately 7.3%-63%. Due to effective methods to prevent and cure HFS are not established, it influences patient quality of life (QOL) seriously. In this study, Traditional Chinese Herbal Formula JDXZO cream was examined for its effect on treating and relieving the symptoms of HFS and improving QOL of patients.

METHODS: Patients were assigned randomly to group A or B. Group A was given Traditional Chinese Herbal Formula JDXZO Cream gently applied on affected areas, twice daily. Group B was given placebo cream on affected areas, twice daily too. After a 2-week treatment, the therapeutic effect was assessed by observing three major symptoms, including pain, ulceration, and muscular atrophy. This was assessed with the HFS-14 questionnaire.

RESULTS: Significant differences were observed between the two groups in pain relief, and improvement of daily life, walking, and interpersonal communication (P<0.01). No significant differences in driving ability or interpersonal relationships were found. After 2 weeks, the effective rate was 81.96% in group A, which was significantly higher than the 33% in group B (P=0.00).

Table 1 HFS grading

<table>
<thead>
<tr>
<th>Grade</th>
<th>Clinical symptom</th>
<th>Functional</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Numbness, tingling, painless erythema, and swelling</td>
<td>Discomfort that does not disrupt normal activities</td>
</tr>
<tr>
<td>2</td>
<td>Painful erythema and swelling</td>
<td>Discomfort that affects activities of daily life</td>
</tr>
<tr>
<td>3</td>
<td>Moist desquamation, ulceration, blisters, and sever pain</td>
<td>Severe discomfort, inability to work or perform activities of daily living</td>
</tr>
</tbody>
</table>
Note: the National Cancer Institute classification is adopted for Hand-foot syndrome grading. HFS: hand-foot syndrome.

Table 2 Evaluation of effect

<table>
<thead>
<tr>
<th>Effect</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovery</td>
<td>The disappearance of pain, ulceration and muscular atrophy, etc., the patients recover to normal daily life.</td>
</tr>
<tr>
<td>Effective</td>
<td>There is obvious alleviation of pain, ulceration and muscular atrophy, etc., but the patients can still feel some unfitness such as numbness.</td>
</tr>
<tr>
<td>Ineffective</td>
<td>There is no obvious alleviation of hand-foot syndrome symptoms and the patients has serious unfitness condition, which badly influences the patients' daily work and life</td>
</tr>
<tr>
<td>Worse</td>
<td>The hand-foot syndrome symptoms get worse, and the chemotherapy and biological target therapy have to be stopped.</td>
</tr>
</tbody>
</table>

Table 3: Comparison of effect between groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Recovery (%)</th>
<th>Effective (%)</th>
<th>Ineffective (%)</th>
<th>Ineffective (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>37</td>
<td>13</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>81.96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group B</td>
<td>9</td>
<td>10</td>
<td>21</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: group A were treated by given Traditional Chinese Herbal Formula JDXZO cream gently applied on affected areas, twice daily; group B received placebo cream twice daily.

Table 4 Effect evaluated with HFS-14 for group A

<table>
<thead>
<tr>
<th>Items</th>
<th>Before treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>End and muscular atrophy, etc.</td>
<td>5</td>
</tr>
<tr>
<td>Difficulty in closing the door</td>
<td>69</td>
</tr>
<tr>
<td>Difficulty in preparing meals</td>
<td>75</td>
</tr>
<tr>
<td>Difficulty in walking face and brushing teeth</td>
<td>89</td>
</tr>
<tr>
<td>Not able to drive the car</td>
<td>93</td>
</tr>
<tr>
<td>Difficulty in putting on socks or gloves</td>
<td>65</td>
</tr>
<tr>
<td>Difficulty in getting dressed</td>
<td>66</td>
</tr>
<tr>
<td>Difficulty in putting on shoes</td>
<td>55</td>
</tr>
<tr>
<td>Difficulty in standing</td>
<td>67</td>
</tr>
<tr>
<td>Difficulty in walking, even a short distance</td>
<td>99</td>
</tr>
<tr>
<td>Staying seated or lying down</td>
<td>75</td>
</tr>
<tr>
<td>Difficulty in falling asleep</td>
<td>81</td>
</tr>
<tr>
<td>Feeling suffering in work</td>
<td>33</td>
</tr>
<tr>
<td>No good relation with others</td>
<td></td>
</tr>
</tbody>
</table>

Notes: a higher score indicates poorer quality of life. NS: not significant; HFS: hand-foot syndrome

CONCLUSION: Chinese Herb Formula JDXZO Cream is effective in the treatment of patients with HFS. It improves patients' quality of life according to the HFS-14.


Sheila N. Garland¹,², Angela DeMichele²,³, Qing Li¹, Sharon X. Xie⁶, Jun J. Mao¹,²,³

¹Department of Family Medicine and Community Health, ²Abramson Cancer Center, ³Department of Biostatistics and Epidemiology, Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA

PURPOSE: Hot flashes are one of the most common and disruptive side effects experienced by breast cancer survivors. Nocturnal hot flashes are among the most problematic because they can cause significant sleep disruption and fatigue. Disrupted sleep has been associated with poorer overall psychological and physical health outcomes. This study evaluated the effects of electro-acupuncture vs. gabapentin.
Gabapentin for sleep quality among breast cancer survivors experience daily hot flashes.

**PATIENTS AND METHODS:** We analyzed data from a randomized controlled trial involving breast cancer survivors experiencing bothersome hot flashes twice daily or greater. Participants were randomly assigned to receive eight weeks of electro-acupuncture or daily gabapentin (total dose of 900 mg per day). The primary outcome was change in the total Pittsburgh Sleep Quality Index (PSQI) score between groups at Week 8. Secondary outcomes include specific PSQI domains.

**RESULTS:** Among 58 participants, mean age was 51.7 (SD=8.5), 74.1% White, 22.4% Black. 86.0% were post-menopausal and 63.8% were on hormonal treatments. By Week 8, the mean reduction in PSQI was significantly greater in the electro-acupuncture group as compared to gabapentin (-2.6 vs. -0.8, p=0.044). Compared to gabapentin, electro-acupuncture also had improved sleep latency (-0.5 vs. 0.1, p=0.041) and sleep efficiency (-0.6 vs. 0.0, p=0.05). Compared to baseline, by week 8, electro-acupuncture improved sleep duration, sleep disturbance, sleep latency, daytime dysfunction, sleep efficiency, and sleep quality (p<0.05 for all); whereas gabapentin improved duration and sleep quality (p<0.05).

**CONCLUSIONS:** Compared to gabapentin, electro-acupuncture significantly improved sleep quality among women experience hot flashes, specifically in the area of sleep latency and efficiency. Larger randomized controlled trials with longer follow-ups are needed to confirm this preliminary finding.

**TRIAL REGISTRATION:** clinicaltrials.gov identifier: NCT01005108

Abstract 58 – Oral Session: Clinical Practice and Usage QUALITY INDICATORS OF ONCOLOGY ACUPUNCTURE PRACTICE, A DANA-FARBER EXPERIENCE

Weidong Lu, MB, MPH, PhD, Zhi-Ping Li, MB, MA, Guan Hou, MB, CMD, Yue Zhang, MB, Dongyan Yu, MB, MS, David S. Rosenthal, MD
Leonard P. Zakim Center for Integrative Therapies, Department of Medical Oncology, Dana-Farber Cancer Institute, Harvard Medical School, Boston, MA, USA

**BACKGROUND:** Oncology Acupuncture (OA) is an emerging subspecialty that applies acupuncture for symptoms management in cancer care. More cancer centers are offering OA services for their patients. Historically, acupuncture is largely based upon personal experience of solo practitioners and no standard for hospital- or team-based practice has been established, especially for OA. Therefore, developing and measuring quality indicators (QIs) of OA is needed to improve the quality of care.

**METHODS:** A systematic literature search on QIs of acupuncture was performed. Discussions and team meetings on QIs were regularly conducted to reach a consensus among 5 members of an oncology acupuncturist team, who have over 10 years of experience in OA practice at Dana-Farber Cancer Institute (DFCI). A retrospective chart review of medical records (n=100) was randomly selected to extract the documentation of the QIs from two periods: January 2013 to April 2013 (n=50) and January 2015 to April 2015 (n=50). The adherence of the QIs was compared between the two periods using descriptive statistics. Chi-square test was used to compare the significant changes.

**RESULTS:** A literature search revealed that no QIs of any types of acupuncture practice were ever published. However, twelve items of OA QIs were developed based upon Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) 2010 checklist and our own practice experience at DFCI (Table 1). In the both periods, OA practice at DFCI showed high rates of adherence to the QIs, including cancer types (100%), reasons for acupuncture visit (100%), names of acupuncture points (100%), and needle retention time (100%). Significant improvements over the two-year period were noted in use of electroacupuncture (44% vs. 68%, p=0.016), intensity scores of acupuncture stimulation (66% vs. 88%, p=0.009), and immediate post acupuncture response scores (78% vs. 94%, p=0.021).
CONCLUSIONS: Twelve quality indicators of OA were developed that can be used as performance measures to guide OA quality improvement practices in hospitals. Quality improvement efforts resulted in better performance in some metrics, stating for the need of reassessment of adherence to QIs for high quality performance in the practice of acupuncture in cancer centers.

Table 1. Changes in Adherence (%) to Oncology Acupuncture Quality Indicators from 2013 to 2015

<table>
<thead>
<tr>
<th>Indicators</th>
<th>2013 Adherence</th>
<th>2015 Adherence</th>
<th>Change from 2013 to 2015</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentati</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>on: cancer types</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Documentati</td>
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<td>3</td>
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<td>3</td>
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<td>on: cancer stages</td>
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<td>5</td>
<td>8</td>
<td>9</td>
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<tr>
<td>Documentati</td>
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<td>4</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>on: reasons for acupuncture visit</td>
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<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Documentati</td>
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<td>0</td>
</tr>
<tr>
<td>on: symptom scores</td>
<td>0</td>
<td>5</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Documentati</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>on: needle types (diameters, length)</td>
<td>0</td>
<td>5</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Documentati</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>on: names of acupuncture points</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Documentati</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>on: De Qi sensation</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Documentati</td>
<td>9</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>on: electroacupuncture used</td>
<td>8</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Documentati</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>on: other interventions</td>
<td>0</td>
<td>5</td>
<td>9</td>
<td>4</td>
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<tr>
<td>Documentati on: immediate post acupuncture response</td>
<td>7</td>
<td>3</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Documentati on: intensity scores of acupuncture stimulation</td>
<td>8</td>
<td>9</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

*P-value was calculated using chi-square test, p<0.05 was declared as significant.
NS: non-significant
rodent chow diet. Mineral supplementation had no effect on this. Several metabolic markers were also not affected by mineral supplementation. Steatosis was observed in most animals, irrespective of dietary calcium level. In contrast, fibrotic changes, formation of large regenerative hyperplastic nodules and extensive necrosis were less frequent and less severe in the mice that received mineral supplementation. Premalignant hepatic adenomas and malignant hepatocellular carcinomas were also less prevalent in mice receiving calcium supplementation. The combination of calcium plus additional trace elements was more efficacious than calcium alone in suppressing tumor formation, but collagen deposition and necrosis were suppressed comparably by calcium alone or calcium with the additional minerals.

CONCLUSION: Dietary calcium (alone and in conjunction with additional trace elements) may provide a way to reduce the consequences of the HFWD in the face of steatosis.

Abstract 65 – Oral Session: Natural Products: Preclinical Fraxini inhibits human hepatocellular carcinoma cells growth and liver tumor development through targeting c-Myc signaling and downstream metabolisms
Pelying Yang, Yan Jiang, Patrea R. Rhea, Lin Tan, Yong Pan, Jinbin Ding, Richard Lee
Departments of Palliative, Rehabilitation & Integrative Medicine, The University of Texas MD Anderson Cancer Center, Houston, Texas, USA.
Background: We previously reported that Fraxini inhibited growth and induced apoptosis in Hep3B human HCC cells potentially through c-Myc signaling. Currently, we continued investigating the role of c-Myc in Fraxini induced cell growth inhibition by testing the Fraxini’s effects on c-Myc mediated cancer cell metabolisms including glucose and glutamine metabolisms, determining how Fraxini alters c-Myc protein, and studying the antitumor efficacy of Fraxini in Hep3B cells xenograft models.
Methods: The glucose and glutamine metabolisms were measured by LC/MS/MS. The antitumor efficacy of the Fraxini was tested in the Hep3B mouse xenograft model and Fraxini was administered subcutaneously.

Results: Comparing the antiproliferative effect of Fraxini, the highest c-Myc expressing cells Hep3B were the most sensitive to Fraxini treatment among the three HCC cells tested (IC50, 0.24 μg/ml), whereas PLC/RF/5 cells with the lowest amount of c-Myc protein were least responsible to Fraxini (IC50, > 20 μg/ml). In c-Myc knockdown Hep3B cells, Fraxini induced growth inhibition was less pronounced as opposed to that in the mock control cells (6% vs. 29% inhibition for 1.25 μg/ml Fraxini). Furthermore, Fraxini reduced c-Myc protein, but not mRNA potentially through modulation of phosphorylation of c-Myc. Additionally, compared with vehicle control, Fraxini noticeably reduced productions of α-ketoglutarate (α-KG), 2-hydroxyglutarate (2HG), isocitrate and pyruvate, and concentration-dependently inhibited hexokinase II, LDHA, PMK1/2 and pyruvate dehydrogenase proteins in Hep3B cells, suggesting that Fraxini inhibits glucose and glutamine metabolisms which could be mediated through c-Myc inhibition. Lastly, two weeks of Fraxini treatment (8 mg/kg body weight) in Hep3B mouse xenografts significantly reduced the tumor volume (34.6 ± 11.86 mg) compared to that in the control treated mice (161.6 ± 79.4 mg, p<0.007).

Conclusion: The results from current study confirmed the importance of c-Myc in Fraxini elicited antiproliferative activity and further supported that Fraxini exerts potent antitumor activity in HCC, particularly in c-Myc overexpressed HCC, which deserves further investigation.

Abstract 66 – Oral Session: Acupuncture POST-MASTECTOMY Acupuncture for Pain, Anxiety, Nausea, and Coping: A Randomized Controlled Pilot Study
Jill R. Johnson; Adam S. Reinstein; Jeffery A. Dusek, Penny George Institute for Health and Healing, Allina Health, Minneapolis, MN, USA
Background: The purpose of this study is to evaluate acupuncture plus standard of care (AQ), compared to standard of care alone (SC), on self-reported pain, anxiety, nausea, and ability to cope among hospitalized post-mastectomy breast cancer patients.
METHODS: We conducted a randomized controlled trial of AQ compared to SC among 30 female breast cancer patients who had a unilateral or bilateral mastectomy. AQ patients received up to two sessions during their post-surgical hospitalization. The study acupuncturist treated four points bilaterally with up to an additional nine needles depending on patient presentation. SC patients were visited by a research assistant up to two times during their hospitalization. Outcomes were change in patient-reported pain, anxiety, nausea, and ability to cope, assessed before and after a 30 minute acupuncture or waiting period, depending on group. Outcomes were assessed using a numeric rating scale (0-10), with higher scores indicating higher levels of pain/anxiety/nausea/ability to cope.

RESULTS: AQ patients had Visit 1 post scores that were significantly lower from pre scores for pain (p<0.001), anxiety (p=0.006), and significantly higher ability to cope scores (p=0.029); Visit 2 post scores remained significantly different for pain (p<0.001). There were no significant differences between Visit 1 or Visit 2 pre and post scores among the SC group. Mean change scores were significantly different for pain (-1.47 vs. -0.07, p-value=0.011), anxiety (-1.33 vs. +0.53, p-value=0.039), nausea (-1.53 vs. +0.73, p-value=0.011), and coping (+1.87 vs. -0.47, p-value=0.012) between the AQ and SC groups at Visit 1. Mean pain change scores were significantly different between the AQ and SC groups at Visit 2 (-1.50 vs. -0.43, p-value=0.017).

CONCLUSION: Compared to SC, AQ produced short-term reductions in pain, anxiety, and nausea, among post-surgical mastectomy patients. Additional studies with larger sample sizes and more extensive outcome measures are needed.

Abstract 71 – Oral Session: Natural Products: Preclinical In vitro evaluation of fucoidans safety and efficacy in oncology setting
Judith A. Smith, Pharm.D., BCPP, CPHQ, FCCP, FISOPP,1,2 Anjali Gaikwad, M.S., MBA (ASCP)1; Maryam Burney, B.S.1; Lata Mathew, B.S.1
1Department of Obstetrics, Gynecology and Reproductive Sciences, The University of Texas Health Science Center at Houston Medical School at Houston, Houston, TX

BACKGROUND: Fucoidan is a general term to describe the products composed of sulfated polysaccharides derived from brown seaweeds. Previous studies have demonstrated that fucoidans inhibit tumor growth through inducing apoptosis and cell cycle arrest, inhibiting tumor metastasis and potentiating the toxic effect of chemical drugs. This primary objective of this study was to evaluate for any potential hepatic metabolism interactions with fucoidans as well as potential for additive, antagonistic or synergistic activity with other commonly used chemotherapy agents.

METHODS: High-throughput cytochrome P450 (CYP450) metabolism inhibition experiments were conducted in vitro evaluating CYP450 3A4, 2C8, 2C9, and 2D6 followed by an ex vivo model of human hepatocytes to evaluate the CYP450 metabolism induction potential of each fucoidan. Four primary hepatic metabolism phase II pathways were evaluated including: GST, UGT, COMT and QOR using standard, validated immunoassays. Growth inhibition assays were performed to determine the cytotoxic activity of each fucoidan alone and in combination with selected chemotherapy agents in a panel of human cancer cell lines.

RESULTS: Fucus Fucoidan an inhibitor of the CYP450 pathways while undaria fucoidan was not. Neither of the fucoidan products were inhibitor or inducer of GST, or QOR and UGT pathways. When evaluating the COMT pathway, undaria fucoidan exhibited induction of COMT. Fucus fucoidan exhibited inhibition of COMT pathway. Neither of the fucoidans achieved IC50 across all cell lines. In the screening of the undaria fucoidan and fucus fucoidan both compounds appear to have overall synergistic activity given in combination with paclitaxel or tamoxifen and additive activity given in combination with topotecan.

CONCLUSION: Undaria Fucoidan appears to have no potential for drug-supplement interactions and fucus fucoidan with only limited potential of interactions with phase II COMT pathway.
Additional studies are warranted to evaluate potential for synergistic activity between fucoidan compounds and paclitaxel, tamoxifen and additive activity with topotecan.

Abstract 75 – Oral Session: Mind-body Medicine

OBSERVED EMOTIONAL INTIMACY PROCESSES DURING SUPPORT DISCUSSIONS IN COUPLES COPING WITH HEAD AND NECK CANCER

K. Milbury1, D. Jooris1, H. Badr2

1Department of Palliative, Rehabilitative & Integrative Medicine, MD Anderson Cancer Center, Houston, TX, 2Oncological Sciences, Mount Sinai School of Medicine, New York, NY

Background: Although empirical evidence supports the Relationship Intimacy Model in couples coping with cancer, previous studies almost exclusively relied on self-reports of relationship processes, which are susceptible to self-presentation and defensive biases. Thus, the purpose of this research was to examine the association between intimacy behaviors observed during a laboratory discussion, self-reported intimacy processes, and positive and negative affect.

Methods: Patients (n= 86; 87% male) with newly diagnosed head and neck cancer and their spouses were asked to discuss a topic related to self-improvement (e.g., communication skills, health behaviors). Before and after the video-recorded discussions, couples completed self-report measures of perceived intimacy (e.g., closeness, disclosure, responsiveness) and positive and negative affect. The discussions were coded for emotional vulnerability, reinforcing (e.g., validation, expressions of love) and punishing (e.g., criticism, disinterest) responses to vulnerability, tolerance and positive engagement.

Results: Controlling for gender, social role and baseline affect, participants who revealed more punishing behaviors (P=.02) and less positive engagement (P=.03) during the discussion reported more post-discussion negative affect. Moreover, those who also revealed more engagement (P=.04) and tolerance (P=.005) reported more positive affect. Participants who were observed as more vulnerable (P=.04) during the discussion rated the discussion as a more positive experience. The more reinforcing (P=.05) and less punishing (P=.05) behaviors and more the more tolerance (P=.0001) was observed, the more intimacy was reported. There was no evidence for role or gender difference.

Conclusion: These observational findings map on to the literature pointing to the importance of emotional self-disclosure as a key aspect of affective and intimacy processes in couples coping with cancer. Mind-body programs teaching social connectedness as well as emotional regulation (i.e., tolerance) may be beneficial in improving spousal interactions and thus their emotional wellbeing.

Abstract 76 – Oral Session: Literature Reviews

LITERATURE REVIEW AND CRITIQUE OF DAENEN ET AL., “INCREASED PLASMA LEVELS OF CHEMoresistance-INDUCING FATTY ACID 16:4(N-3) AFTER CONSUMPTION OF FISH AND FISH OIL”

C. Shannon1, M. Winters2, C. Castillo2, J. Birdsall1, A. Banerji1, M. Walker1, S. Hoang1, J. Hill1

Naturopathic Medicine Department, Cancer Treatment Centers of America 1Zion, Illinois, USA, and 2Philadelphia, Pennsylvania, USA

BACKGROUND: The recent JAMA Oncology manuscript, “Increased Plasma Levels of Chemoresistance-Inducing Fatty Acid 16:4(n-3) After Consumption of Fish and Fish Oil,” by Daenen et al. led to concern of the possible harms of fish oil with chemotherapy. Due to the ubiquitous use of fish oil supplementation in oncology, a literature review and critique was undertaken to investigate the clinical use of fish oil with chemotherapy.

METHODS: A literature review was completed using PubMed, OVID, and Google Scholar. A total of 23 studies were identified examining a correlation between fish oil and chemotherapy efficacy and/or side effect reduction. The inclusion criteria for the review were: 1) the study included a platinum-based chemotherapy, 2) the study’s intervention included fish consumption or fish oil supplementation, and 3) the study cannot include extracts of fish oil. Clinical trials in humans were required to provide chemotherapy efficacy data.
RESULTS: Six studies met inclusion criteria. One human study indicated a benefit to fish oil supplementation during platinum-based chemotherapy across multiple outcome measures, including response rate. Three preclinical animal studies indicated decreased tumor growth, metastasis, and decreased side effects and toxicity of chemotherapy. Two publications by Daenen et al. and Roodhart and Daenen et al. were the only studies identified indicating a potential for fish oil-induced chemoresistance.

CONCLUSIONS: Daenen et al. recommends withholding fish oil around the days of chemotherapy administration. A critique of their publications and comparison of available literature does not support this recommendation for the following reasons: 1.) Daenen et al. assumes elevations of serum 16:4 (n-3) in humans correlates to preclinical data regarding 16:4 (n-3) inducing chemoresistance, 2.) there is preclinical and human data supporting the use of fish oil with platinum based chemotherapy, and 3.) mesenchymal stem cells have also been shown to produce fatty acid-induced chemoresistance independent of omega-3 fatty acid intake.

Abstract 79 – Oral Session: Literature Reviews Bringing Anti-Cancer 'Off-Label' onto the Integrative Oncology Table: utilizing the evidence-base of molecularly-targeted anti-cancer effects of numerous drugs commonly prescribed in primary care to increase the anti-cancer benefits of multi-agent, multi-targeted Integrative Oncology protocols by including targeted off-label prescriptions re-purposing already-available, commonly administered drugs.

J.W. LaValley\textsuperscript{1,2}

\textsuperscript{1}Chairperson - Section of Integrative and Complementary Medicine, Doctors Nova Scotia, Canadian Medical Association, Halifax, Nova Scotia, Canada \textsuperscript{2}Travis County Medical Society, Texas Medical Association, Austin, Texas, USA;

BACKGROUND: Many physicians remain unaware of important evidence-base demonstrating anti-cancer effect of numerous drugs already available and widely-prescribed in primary care. Significant data exist regarding the molecularly-targeted anti-cancer effects of many pharmaceuticals commonly administered in primary care. Off-label prescribing already accounts for 10\% or more of primary care prescribing in the US and Canada. In oncology, up to 30\% of chemotherapy is administered off-label. Integrative Oncology includes the integration of a broad range of anticancer treatment options including molecularly-targeted natural products and off-label pharmaceuticals.

METHODS: Data demonstrates molecularly-targeted anti-cancer effects of multiple commonly prescribed drugs with anti-cancer off-label indications. This review compiles several therapeutic options available from several important commonly prescribed drugs with anti-cancer off-label indications. These include (and not limited to) metformin, celecoxib, and other NSAIDs, beta-blockers, hydroxychloroquine, cimetidine and diphenhydramine. Multiple familiar molecular targets associated with these common drugs exist in cancer cells. Examples of relevant druggable molecular targets in tumor cells responsive to drugs commonly prescribed in primary care include COX2 and celecoxib (and other NSAIDs), beta-adrenergic (ADRB) receptor and beta-blockers, proton pump inhibitors (PPI’s), hydroxychloroquine, cimetidine and diphenhydramine. Additional anti-cancer off-label pharmaceutical indications and associated molecular targets include metformin and AMPK activation (fuel sensing enzyme 5’-AMP-activated protein kinase activation), hydroxychloroquine and autophagy inhibition, simvastatin and MCT4 inhibition (Monocarboxylate Transporter 4 inhibition), valproic acid and HDAC (histone deacetylase) inhibition, and lithium and GSK3beta (glycogen synthase kinase 3-beta) inhibition.

RESULTS: Additional anticancer molecularly-targeted effects can be provided for patients through rational, evidence-based, molecularly-targeted administration of multiple commonly prescribed drugs with off-label anticancer indications. Significant data exists
providing evidence-based rationale for repurposed utilization of commonly administered drugs for their off-label anti-cancer indications to give additional clinical benefit for patients diagnosed with cancer.

**CONCLUSIONS:** Conventional oncology treatment can be improved by Integrative Oncology physicians and other primary care doctors, through rational, evidence-based administration of commonly prescribed drugs for their off-label anti-cancer indications. Increasing physician awareness and understanding of these evidence-based molecularly-targeted anti-cancer off-label indications can improve patient benefit by using already available pharmaceutical tools while we wait for even better molecularly-targeted anticancer treatments to come.

**Abstract 80 – Oral Session: Yoga**

**YOGA-BASED BREATH TRAINING EXERCISE FOR THE REDUCTION OF CHRONIC DYSPNEA: A SINGLE-ARM PILOT STUDY**

G Deng1, L Benusis1, D DeRito1, M Colenton1, M Feinstein2, D Stover2, B Cassileth1, Integrative Medicine Service, 2Pulmonary Service, Memorial Sloan Kettering Cancer Center, New York, NY, USA

**BACKGROUND:** Management of chronic dyspnea in cancer survivors remains challenging. Yoga-based breathing techniques strengthen respiratory muscles, promote relaxation and were shown to reduce dyspnea in COPD patients.

**METHODS:** Adult patients with diagnosis of a chronic pulmonary disorder and moderate dyspnea (Baseline Dyspnea Index (BDI) score ≤6) despite standard of care treatment, who were not undergoing active cancer treatment, were taught a yoga-based breathing technique in a 30-minute in-person session, followed by twice daily 15-minute home practices for 6 weeks. Dyspnea (BDI, Transition Dyspnea Index (TDI)), Six Minutes Walk Test (6MWT) and Hospital Anxiety and Depression Scale (HADS) were evaluated at baseline and after 6 weeks of home practice.

**RESULTS:** Twenty-one patients were enrolled over 24 months. Among them, 3 withdrew; 18 provided BDI/TDI scores; 17 provided 6MWT results and 13 completed 75% of home practice sessions. Seventy-two percent (72%, 13/18) improved in dyspnea scores, 11% (2/18) worsened, 17% (3/18) were unchanged. Twenty-four percent (24%, 4/17) had ≥50% improvement in 6MWT distance, 24% (4/17) had ≥10% improvement, 35% (6/17) ≤10% improvement and 18% (3/17) worsened.

**CONCLUSION:** A yoga-based breath training regimen that involves no equipment and minimal costs can lead to both subjective improvement in dyspnea and objective improvement in physical performance among cancer survivors with persistent chronic dyspnea. A single in-person session followed by twice daily home practice is a feasible treatment regimen as a majority of the patients were able to be compliant.

**Abstract 85 – Oral Session: Mind-body Medicine Neurofeedback as Treatment for Chronic Chemotherapy-Induced Peripheral Neuropathy (CIPN)**

Sarah Prinsloo1, Diane Novy1, Larry Driver1, Lois Ramondetta1, Cathy Eng1, Gabriel Lopez1, Rich Lee1, Randall Lyle2, Lorenzo Cohen1

1The University of Texas MD Anderson Cancer Center, Houston, TX, USA
2Mt. Mercy University, Cedar Rapids, IA, USA

**Background:** CIPN is a common side effect of chemotherapy, leading to impairment in daily activities and diminished quality of life. Neurofeedback (NF) is a brain-training paradigm that induces neuroplasticity to modulate brain activity and therefore may improve CIPN symptoms.

**Methods:** Seventy-one (62 female; mean age=63; 52 breast, 8 gynecologic, 11 other; average length of symptoms=24 mos) cancer survivors ≥3 months from completing chemotherapy who reported ≥3 on the NCI’s neuropathy rating scale, were randomized to a NF group (35) and underwent 20 sessions of EEG NF or a wait-list control group (WL; 36). We used quantitative electroencephalography (qEEG) neural imaging to determine any EEG patterns unique to CIPN and then provided NF to change aberrant brain signatures. The Brief Pain Inventory (BPI), the Pain Quality Assessment Scale (PQAS), and the Brief Symptom Inventory (BSI) were completed and EEG collected at baseline and after 10 weeks. EEG analysis was done using qEEG and Low
Intensity Electromagnetic Tomography (LORETA) imaging.

**Results:** 89% of the participants who were randomized completed treatment and 100% of participants who started NF completed treatment. qEEG patterns showed cortical activity characterized by elevated beta frequencies in parietal and frontal lobe sites and decreased alpha in parietal lobe sites compared to a normal population. After controlling for baseline levels, NF significantly reduced pain (NF=3.5 vs WL=5.7, p=.003), numbness (NF=2.9 vs WL=5.6, p=.001), intensity (NF=3.5 vs WL=5.3, p=.003), and unpleasantness (NF=3.4 vs WL=6.0, p=.001), with no significant changes in the BSI. Post EEG analyses showed increased alpha and decreased beta power after NF, where protocols were based on increasing alpha and decreasing beta, with no changes noted in the WL group.

**Conclusion:** NF clinically and significantly reduced pain and other symptoms associated with CIPN. Further, patients with CIPN exhibited specific and predictable EEG signatures that changed with NF.

**Abstract 86 – Oral Session: Yoga HOW DOES YOGA PRACTICE IMPROVE TREATMENT RELATED SIDE EFFECTS AND WELL BEING IN CANCER PATIENTS POST TREATMENT?**

C.F. Brown1,2, D. Jacobson1,3

1Cancer Support Community of the San Francisco Bay Area, Walnut Creek, CA, USA, 2Piedmont Yoga Community, San Leandro, CA, USA, 3Public Health Institute, Oakland, CA, USA

**BACKGROUND:** To assess standardized yoga protocols as a complementary approach to improve post-treatment side-effects in cancer patients and correlate change in well-being based on which protocols practiced.

**METHODS:** Cancer survivors participated in eight, 90-minute sessions and used the Healing Yoga for Cancer Survivorship (HYCS) protocol. HYCS protocol included intention setting, chanting, mudra, reclining, seated, kneeling, standing and restorative yoga, pranayama, body scan, and relaxation. A DVD and booklet of the protocol was provided for voluntary home use. Yoga participants were asked to report daily on which HYCS protocols were practiced, medication changes, and well-being factors (physical, functional, emotional, spiritual) using an online assessment form based on validated FACT-G and FACT-Sp questionnaires. The primary outcome was to correlate change in well-being factors based on which HYCS protocols used as measured by the questionnaires. Control group reported weekly on medication changes and well-being factors.

**RESULTS:** Yoga group completion rate=89% (17 ppl), control completion rate=50% (2 ppl), 86% women, 13% men, mean age=54 years, mean time post-treatment=39 months. Yoga well-being increase by domain: functional=6.6%, physical=8.8%, emotional=10.3%, spiritual=13.9%. Control data not analyzed due to small sample size. Mean days HYCS protocols used: body scan=7, chanting=8, kneeling yoga=8, standing yoga=10, restorative yoga=10, seated yoga=12, mudra=13, pranayama=16, intention setting=19, relaxation=36.

**CONCLUSION:** Yoga positively affected 76% of well-being factors measured with the greatest increase among emotional and spiritual domains. Participants used mudra, pranayama, intention setting and final relaxation at home most frequently. The findings support a need for further investigation into how contemplative and meditative practices may further increase emotional and spiritual well-being. Yoga Nidra, which includes intention setting, pranayama and relaxation, is one such contemplative practice that would explore how emotional and spiritual well-being could be increased among cancer survivors.

**Abstract 95 – Oral Session: Mind-body Medicine Measurement of psychological and physical benefits in metastatic cancer patients using Tibetan Singing Bowls. A pilot study in an Italian Oncology Unit.**

L. Bidin1*, L. Pigaiani, M. Casini, P. Seghini2, L. Cavanna1

1Oncology Unit, Department of Oncology and Hematology, 2Epidemiology and Risk Comunication Unit, Ospedale Civile Guglielmo da Saliceto, Piacenza, Italy

**BACKGROUND:** Sound is a physical pervasive phenomenon: it passes through...
objects, inducing resonance and producing various effects on animated and inanimated structures. Recently, biologists have studied sound waves produced by specific cells; the influence of vibrations in cell metabolism is a fascinating field of research. Interactions between sound and human body result in particular effects mediated by bodily water. Tibetan singing bowls help to reach a state of mindfulness that is experienced as a state of well-being, that is difficult to express and to appropriately measure.

METHODS: 12 metastatic cancer patients were included in the study. Each patient underwent 6 individual sessions of a 1 hour treatment with Tibetan Bowls, in 3 months. Objective and subjective measurements were performed before the first and after the last session. Objective measurement included: ecg-derived parameters, cutaneous conductance, and eeg-derived parameters. Subjective measurements included validated questionnaires (QOL, Anxiety, Depression, Distress, Fatigue). This is a pilot study with primary end point being feasibility in terms of recruitment, attendance, compliance to the treatment and to measurements. Secondary end point is the amelioration in qol parameters, anxiety, adjustment to stress.

RESULTS: Study is being completed at the end of June 2015 and the results will be statistically analyzed for presentation.

CONCLUSION: to be drawn by August 2015

Abstract 98 – Oral Session: Literature Reviews CIRCADIAN ANGIOGENESIS: A REVIEW AND UPDATE
K.I. Block1; P.B. Block1; C. Gyllenhaal1
1Block Center for Integrative Cancer Treatment, Skokie, IL, USA

BACKGROUND: Shift work causing disrupted circadian rhythms is a probable carcinogen. Research on the physiology and biochemistry of circadian disruption and cancer is a fast-growing field. Recent research shows several pathways by which internal circadian clocks regulate angiogenesis, potentially affecting the pathological angiogenesis of cancer. This narrative review presentation summarizes and updates research on circadian angiogenesis.

MAIN CONCEPTS: Specific genes and transcription factors control circadian rhythm in cells. Angiogenesis is now known to be linked to these transcription factors as well as to circadian-regulated hormones. Circadian-disrupting conditions in cancer patients are now being demonstrated that may further affect angiogenesis.

DESCRIPTION: All cells contain the circadian-regulated transcriptional activating factors Bmal1 and CLOCK. Along with genes in the Period and Cryptochrome families, which act as transcriptional repressors, this clock-work produces a temporal loop resulting in circadian control of multiple physiological functions. Angiogenic factors including VEGF have binding sites for the transcriptional activating factors. VEGF levels are elevated during the dark, and lower during the light in some animal and human settings, suggesting potentials for research on chronomodulation of antiangiogenic drugs. Melatonin and cortisol, which have marked circadian regulation, also have effects on tumor angiogenesis. Circadian-disrupting conditions are being elucidated in cancer patients. Presurgical breast cancer patients with high distress and avoidance have disrupted circadian rhythms and flattened diurnal cortisol response. Disrupted sleep-wake cycles and elevated morning cortisol levels are linked to a pattern of biomarkers high in VEGF, TGF-β and MMP-9, all implicated in angiogenesis. In chronic lymphocytic leukemia patients, expression of clock genes and melatonin levels were found to be abnormal, with larger disruptions in patients doing shift work.

SIGNIFICANCE: Physiological and clinical observations suggest that a multi-focal and multi-targeted approach to the regulation and therapeutic manipulation of circadian angiogenesis may yield innovative approaches for managing cancer.

Abstract 104 – Oral Session: Yoga for Lung Cancer Patients: Issues, Dilemmas & Creative Solutions
Judith M. Fouladbakhsh, PhD, PHCNS, BC, AHN-BC Author1, Jean E. Davis, PhD, RN,FAAN Collaborator2, Hossein Yarandi, PhD Collaborator3
1College of Nursing, Oakland University, School of Nursing, Rochester Hills, Michigan, USA. 2 School of Nursing, Barnes Jewish College, St. Louis, MO. 3 Wayne State University, College of Nursing, Detroit, MI.

**Background:** Although more than 7 million U.S. cancer survivors use complementary and alternative therapies, only a small percentage (4%) use yoga as a self-care practice. Feasibility and effectiveness of yoga for improvement in sleep, stress/mood, and quality of life (QOL) is noted but clinical trials are lacking among individuals with lung cancer. Symptom burden remains a significant problem in this population as survivorship increases. Aims: This NIH funded two-group randomized controlled study aims to determine the effects of a 12-week standardized yoga intervention as compared with exercise on breathing ease, mood, sleep, stress and quality of life of lung cancer patients.

**Methods:** Adults (21 years of age and older) with Stage I-IIIA non-small cell lung cancer are eligible for enrollment. Recruitment continues at two NCI affiliated cancer centers and community hospitals. Outcome measures include dyspnea (Borg, pulse oximetry & spirometry), sleep quality (PSQI & Acuwatch data), stress (PSS & diurnal salivary cortisol), mood (POMS-brief) & QOL (FACT_L & MOS SF-36). Patients assigned using adaptive randomization to standardized yoga or gentle exercise classes; analysis will ensue following data collection using SPSS 21 and SAS software, and bio-measure analysis.

**Results:** 25 participants recruited with 23 completing interventions to date (year 2 of funding). Extensive expansion to community sites has occurred to deal with in-hospital recruitment difficulties and to ease intervention planning. Nursing students at two universities are actively involved to stimulate research interest and support study goals. Patient and student interest remains very high with low participant drop-out rate.

**Conclusions:** Recruitment issues, creative strategies, methodological changes and innovative approaches for student involvement will be discussed. Patient interest/response to yoga and ongoing evaluation of outcome measurements will be presented.

**Abstract 108 – Oral Session: Natural Products: Preclinical MICRONA SIGNATURE IN THE CHEMOPREVENTION OF BREAST CANCER BY ACTIVE HEXOSE CORRELATED COMPOUND (AHCC): THE INVOLVEMENT OF TUMOR SUPPRESSOR MIR-335**

E. A. Graham1, J. Mallet2, K. Homma3, C. Matar1,2
1Faculty of Health Sciences and 2Faculty of Medicine, University of Ottawa, Ottawa, ON, Canada
3AHCC Research Association, Sapporo, Hokkaido, Japan

**BACKGROUND:** Currently, there is considerable interest in integrative and nutritional interventions targeting key deregulated niche signaling pathways in breast cancer. Clinical and experimental studies have shown that Active Hexose Correlated Compound (AHCC), a nutritional supplement produced from cultured Basidiomycete mushrooms, exhibits protective effects against many types of cancer. We have provided evidence that AHCC decreases the formation of breast cancer stem cells (CSCs), a subset of highly tumorigenic cells that drive tumor growth and metastasis. MicroRNAs have emerged as critical regulators of CSCs. We therefore postulated that AHCC would induce epigenetic-specific changes by modulating miRNA regulatory networks and inhibiting CSC-dependent survival/stemness pathways. We aimed to gain a comprehensive understanding of the molecular mechanisms by which AHCC epigenetically modulates CSCs in mammary carcinoma in vivo, in vitro and ex vivo settings.

**METHODS:** MicroRNA profiling and CSC formation were studied in different breast cancer cell lines. Tumor formation and stemness were monitored in animal models. MicroRNA validation studies were performed after knock-down and overexpression experiments and transfection followed by RT2-qPCR.

**RESULTS:** Our results showed that AHCC is able to inhibit the CSC formation, in vitro cell lines and in ex vivo culture of
primary CSCs from mice tumors. Several miRNAs associated with different clinical-pathological characteristics of breast cancer such as stemness, invasion and chemoresistance were differentially expressed after AHCC administration. We revealed an over-expression of tumor-suppressor mir-335.

CONCLUSIONS: AHCC may influence several miRNA involved in breast cancer metastasis pathways. In particular, miR-335 has been shown to suppress tumor invasion and metastasis. This novel study has important implications for breast cancer chemoprevention by AHCC, and provides a basis for clinical evaluation in adjunct therapy to reduce cancer resistance, relapse, and metastasis in breast cancer survivors.

Abstract 111 – Oral Session: Multimodality Therapy and Program Development
THE B.O.L.D. INITIATIVE: DEVELOPMENT OF A PATIENT-CENTERED CANCER WELLNESS PROGRAM IN AN URBAN, UNDERSERVED COMMUNITY
A. Moadel-Robbie, E. Kolidas, L. Ortiz, F. Camacho
Integrative Oncology Program, Montefiore Einstein Center for Cancer Care, and Albert Einstein College of Medicine, Bronx, NY, USA

BACKGROUND: Interest in integrative cancer care in the U.S. spans patients of all ethnicities, socioeconomic levels, and medical needs. We describe the development and evaluation of the Bronx Oncology Living Daily (B.O.L.D.) Program, a cancer wellness program founded on the psychosocial needs of patients from one of the most underserved urban communities in the U.S.

METHODS: Ongoing psychosocial needs assessments begun in 2007 reaching 1,450 Bronx cancer patients/survivors (45% Hispanic, 38% African American) identify the following major interests: mind-body therapies (96%), health promotion (72%), creative arts (57%), peer support (53%), volunteering (44%), and counseling (25%). Guided by these needs, the BOLD Wellness Program was launched in 2008 at the Montefiore Einstein Center for Cancer Care (MECCC), supported by internal and external funds and volunteers, under the direction of a health psychologist and Bronx Community Cancer Coalition.

RESULTS: BOLD group offerings include mind-body therapies (e.g., yoga/meditation), fitness/nutrition, and creative expression (e.g., crochet). A “BOLD Buddy” Program and Psychosocial Oncology Internship provide peer support and counseling services. To ensure cultural responsiveness and sustainability, services are free with travel stipends available, open to family members, in English and Spanish, at multiple locations, and involve community volunteers/interns. There are up to 15 groups per month, 10 active BOLD Buddies, and 4 counseling interns collectively serving 130 patients/family members per month. Among 922 participants evaluated, 81% were patients of which 35% were on treatment and 55% had a breast cancer diagnosis. Half were African American, 25% were Hispanic, and 95% were female. Most (87%) felt service met their needs and 89% wanted it to continue. Referrals came from staff (24%), flyer/media (31%), other patients/friends (25%).

CONCLUSIONS: The BOLD Program serves as a model for bringing patient-centered, culturally aligned, and sustainable complementary medicine services to an underserved population. Program refinement will focus on enhancing staff referral, and reaching more men.

Abstract 121 – Oral Session: Clinical Practice and Usage
PREVALENCE OF CAM PRACTICES IN US CANCER SURVIVORS
Diana Kachan PhD1, Ashwin Mehta MD MPH2, David J. Lee PhD1,2
1Department of Public Health Sciences, University of Miami, Miller School of Medicine, Miami, FL 33136; 2Sylvester Comprehensive Cancer Center, University of Miami, Miller School of Medicine, Miami, FL 33136

BACKGROUND: The prevalence of complementary and alternative medicine (CAM) practices among cancer survivors in the United States has not been extensively studied. We examined the likelihood of engagement in these diverse practices “for health purposes” in cancer survivors vs. those with no history of
cancer after adjustment for sociodemographic status.

**METHODS**: This study pooled data from the 2002, 2007, and 2012 CAM Supplement from the National Health Interview Survey (age 18+, n=85,004) to examine lifetime and 12-month engagement in a variety of CAM practices. Multivariable logistic regression analyses were adjusted for the survey design, survey year, age, sex, race/ethnicity, and educational attainment.

**RESULTS**: Lifetime CAM practices were significantly more common among cancer survivors for acupuncture, herbal supplement use, chiropractic care, massage, biofeedback, guided imagery, progressive relaxation, deep breathing exercises, hypnosis, yoga, and meditation (range of significant odds ratios: 1.14-1.61). There were no CAM practices that survivors were significantly less likely to engage in. Engagement in CAM practices in the 12 months prior to the interview was significantly more common in cancer survivors for herbal supplement use, massage, guided imagery, deep breathing exercises, meditation, and energy healing (1.10-1.58), while use of special diets for health was significantly less likely among survivors (0.82).

**CONCLUSIONS**: US cancer survivors are more likely to engage in a variety of CAM practices for health purposes. Clinicians treating these survivors should inquire about these practices and be prepared to discuss their risks and benefits. Systematic study is needed to better understand what these risk and benefits are for those living beyond cancer.

**Abstract 126 – Oral Session: Acupuncture**

A Pilot Study of Laser Acupuncture

**BACKGROUND**: Women with a family history of breast cancer are at increased breast cancer risk. Modifiable health behaviors may affect risk. Complementary and alternative medicine (CAM) use is higher among U.S. women, yet data are limited on CAM use among women at higher breast cancer risk.

**METHODS**: From 2003 to 2009, the Sister Study enrolled women (n=50,884) with family histories of breast cancer. Eligible participants were 35 to 74 years old, resided in the U.S. or Puerto Rico, had no personal history of breast cancer, and had ≥1 sister with breast cancer. Baseline questionnaires evaluated past year use of 25 individual CAM modalities. Breast cancer risk was assessed using relative and absolute Gail breast cancer risk scores. Relative risk regression models examined the association between CAM use and breast cancer risk score.

**RESULTS**: CAM use was high with 78.8% of women reporting use of vitamin and mineral supplements, 41.4% reporting use of mind/body practices, 31.5% reporting use of manipulative and body based practices, and 22.8% reporting use of botanicals. For all categories, use was higher among older women and residents of the western region of the United States. Asian women were the highest users of 12 of the 25 individual CAM modalities. Non-Hispanic whites and Hispanics were the highest users of once-a-day multivitamins (60.8% and 60.2%, respectively). Native American/other/unknown were the highest users of vitamins B6 (8.7%), magnesium (12.2%), zinc (12.7%), flax seed oil (8.4%), and homeopathy (9.5%). Blacks were the highest users of iron (12.1%) and spirituality/meditation (45.9%). Hispanics were the highest folic acid users (12.5%). CAM use was not associated with Gail score.

**CONCLUSIONS**: Among a large cohort of women with a family history of breast cancer, CAM use is high. Use is not associated with estimated breast cancer risk but is associated with region of residence and race/ethnicity.
Treatment for Breast Cancer Related Lymphedema
Mingzi Jin1, Ting Bao2, Lizhen Wang3*
1 College of Acupuncture-moxibustion and Tuina,
Shanghai University of Traditional Chinese Medicine, Shanghai, China
2 Integrative Medicine and Breast Medicine Service,
Memorial Sloan Kettering Cancer Center, New York, USA

BACKGROUND: Breast cancer related lymphedema (BCRL) is a treatment toxicity associated with surgery or radiation treatment for women with breast cancer. Laser acupuncture is a technique that instead of needling, using low-level laser to stimulate acupuncture points.

Objective: We conducted a pilot study to evaluate the feasibility of laser acupuncture to treat chronic upper-limb lymphedema for women after surgery for breast cancer.

Methods: This is an open-label single arm trial. We enrolled 14 women with stage I-III breast cancer and with a clinical diagnosis of BCRL. Participants received He-Ne laser radiation on ten certain acupoints twice a week for 6 weeks. The acupoints prescription includes 10 acupoints. Six are on the affected arm: HT1, LI15, LU5, PC3, LU4, SJ2. Two are on the lower limb of the same side: SP9, ST36 and two are on the abdomen: CV6, CV9. Each acupoint was radiated for 5 minutes. Affected arm circumference was measured before and after the treatment. Paired t-test was used to evaluate pre-post differences.

Results: All the patients completed the study. There were no adverse events and no infection or severe exacerbations during 12 treatment sessions. The affected arm circumference before (1282.14±71.57mm) and after treatment (1269.86±71.95mm) was statistically significant (P<0.01).

Conclusions: Our pilot study suggest that laser acupuncture is safe and potentially effective for BCRL. This preliminary data requires the justification of a randomized controlled trial of adequate sample size to evaluate the safety and efficacy of laser acupuncture for BCRL.

Abstract 127 – Oral Session: Acupuncture Moxibustion for Cancer-related Fatigue in Patients with Colorectal Cancer: a Randomized,

Double-blinded, Placebo-controlled Pilot Study
Menghu Guo1; Jun J. Mao2.3.4; Huijuan Mao1; Ke Cheng1; Xueyong Shen1.2
1 College of Acumox and Tuina, Shanghai University of Traditional Chinese Medicine, Shanghai, China
2. Department of Family Medicine and Community Health
3. Center for Clinical Epidemiology and Biostatistics and Department of Biostatistics and Epidemiology
4. Abramson Cancer Center
Perelman School of Medicine at the University of Pennsylvania, Philadelphia, PA, USA

BACKGROUND: Cancer-related fatigue is a common and debilitating symptom affecting patients with colorectal cancer. This pilot study aims to evaluate the preliminary safety and efficacy of moxibustion for cancer-related fatigue (CRF).

METHODS: We conducted a randomized, double-blinded and placebo-controlled pilot study among 25 early stage colorectal cancer patients diagnosed with CRF. The recruited participants were randomly assigned into two groups, receiving either active moxibustion (n=12) or sham moxibustion control (n=13) at acupoints Zusanli (ST 36) bilaterally and Guanyuan (CV 4) three times a week for 4 weeks. Patients were taught how to correctly locate the acupoints and treat themselves at home with the moxibustion devices provided by the physician. The primary outcome was measured by changes in the Brief Fatigue Inventory – Chinese (BFI-C) between two groups after 4 weeks treatment and a follow-up at Week 6 for durability of the intervention.

RESULTS: Among 25 participants, average age 62.10±6.91, 60% were females. 20 (80%) completed the intervention and follow-up. Patients receiving active moxibustion had more reduction in fatigue score in comparison with those who received sham treatment at the end of 4 weeks treatment (1.09±0.95 vs. -0.13±1.41, p= 0.186); however by Week 6 follow-up, greater reduction in fatigue score was observed in active moxibustion group (1.79±1.62 vs. 0.11±1.60, p= 0.044). Only one patient in the active moxibustion group reported mild blistering after treatment, which resolved in one week without medical intervention.
CONCLUSIONS: Our preliminary data suggested that moxibustion has potential efficacy in the treatment of CRF in patients with colorectal cancer. Based on the effect size observed, an adequately powered RCT with long-term follow-up is needed to definitively demonstrate the efficacy and safety of moxibustion for CRF in patients with CRC.

Abstract 131 – Oral Session: Yoga Randomized trial of Tibetan Yoga in Breast Cancer Patients Undergoing Chemotherapy

A. Chaoul1, K. Milbury1, A. Spelman1, R. Engle1, B. Arun2, Q. Wei1, C. Harrison3, G. Perkins4, V. Valero2, G. Babiera2, T. Wangyal1, L. Cohen1
Departments of 1Palliative, Rehabilitation, and Integrative Medicine, 2Breast Medical Oncology, 3Behavioral Science, 4Radiation Oncology, 5Surgical Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX; 6Ligmincha Institute, Charlottesville, VA

BACKGROUND: The diagnosis and treatment of breast cancer are associated with significant changes in quality of life. This study assessed the effects of Tibetan Yoga (TY) on sleep and fatigue for women with breast cancer undergoing chemotherapy.

METHODS: Breast cancer patients undergoing chemotherapy were randomly assigned to a TY, Stretching (SG) or a Usual Care (UC) group. Participants in TY and SG participated in four, 90-minute classes. Measures of sleep (PSQI) and fatigue (BFI) were obtained prior to randomization and 1 week, 3, 6 and 12 months after the last intervention session.

RESULTS: Participants completed baseline and at least one follow-up (n=227). Average age of participants was 49.5 years. Stage of disease ranged from Stage I-III (22.1%, 56.8%, and 21.1%, respectively). Mixed-model analyses revealed a significant group main effect for PSQI-Daytime Dysfunction (LSM: TY= 2.4, SG=2.9, UC=2.6; p=0.01), with the TY group reporting lower levels than SG. TY participants who practiced more than twice weekly had significantly better sleep efficiency (PSQI SE: 0.53 vs. 1.48, p=0.01) and overall sleep quality (PSQI Total: 5.26 vs. 7.68, p=0.03) at 6 months compared to those who practiced twice or fewer times weekly. Comparing TY participants who practiced more than twice weekly to UC participants revealed that sleep efficiency at 6 months (PSQI SE: 0.45 vs. 1.37, p=0.03) and daily disturbances at 3 months (PSQI DD: 1.97 vs. 2.56, p=0.02) were significantly better for the TY group. There were no significant differences in fatigue scores across groups.

CONCLUSIONS: Women with breast cancer undergoing chemotherapy who engaged in a regular Tibetan yoga practice had improved sleep outcomes. This suggests that frequency of practice is an important consideration when prescribing mind-body interventions during and after cancer treatment.