

13th International Conference of the Society for Integrative Oncology November 5-7, 2016 in Miami, FL, USA

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Abstract 9 – Oral Session: Traditional Oriental Medicine Chinese Botanical Isolates and Injectables in Cancer Treatment

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Chinese herbal medicine (CHM) is attracting significant interest in the treatment of cancer and its side effects. Historically, classic Chinese Medicine (CM) used herbal formulations based upon 'pattern discrimination'. Increasingly scientific research is providing another basis for the use of particular CHMs. Meanwhile, contemporary CHMs are using herbal compounds or isolates-the active medicinal components of the herbs- with a wide variety of isolates commercially available, manufactured to GMP standards. These have advantages of being easier to measure (as interventions) and being significantly more efficacious than whole herbs. Herb-drug interactions are also easier to identify.

The therapeutically efficacious components of plants are the secondary metabolites produced by the plants when they become environmentally stressed. However, modern agricultural techniques reduce these stressors thereby reducing the secondary metabolites. The use of isolates, which are extracted, standardized and identified using high performance liquid chromatography, allows targeted interventions. In treating cancer and its side effects, this allows a more specific and measured treatment, including, for example, lowered doses of chemotherapeutic drugs and radiation. These isolates still maintain to a greater or lesser degree many of the traditional components discussed in CM classical literature, maintaining their yin or yang qualities: for example, they are 'Hot' or 'Cold' in nature, many 'move' or 'tonify' qi or 'disburse' blood. Having these traditional qualities and understanding their pharmacodynamics/pharmacokinetic properties opens up new areas of cancer treatment.

This presentation will examine the scientific evidence in relation to several isolates and injectables, including emodin, berberine,

ursolic (UA) and betulinic acid (BetA), oridonin, and ginsenosides, used either alone or in combination with radio/chemotherapies in the treatment of cancer and its side effects. In particular, the use of isolates in combination, such as BetA, andrographolide and tanshinone IIA in triple negative breast cancer cell lines, has demonstrated efficacious results, and will be discussed.

Abstract 14 – Oral Session: Implementation and Dissemination Request for complementary and alternative medicine (CAM) in German patients with breast cancer: a cross-sectional survey

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BACKGROUND: To improve patient-centered care, this study aimed at investigating breast cancer patients' request for an integrative oncology treatment.

METHODS: N=710 breast cancer patients (age: 55.8 ± 12.1; 98% female; staging I-III) was recruited between 2011 and 2015 at an integrative Breast Care Center in Germany. All patients who gave their informed consent received a questionnaire assessing social demographics, medical history, prior CAM use and request for the integration of CAM therapies into conventional cancer care. Analyses included descriptive statistics and logistic regression modeling

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on characteristics of patients requesting CAM.

RESULTS: Prior use of CAM therapies, also independent of their cancer treatment, was reported by 75.2% of the sample.

Overall, 90.6% are interested in integrating at least one CAM therapy into their current cancer treatment. With 32.8%, the offer of integrative cancer care was even decisive in their choice of a hospital. The most requested therapies were exercise (71.5%), nutrition (68.2%), relaxation (66.8%), and CAM self-help strategies (65.8%), followed by acupuncture (31.8%), yoga (23.4%), mistletoe (14.4%), and massage therapy (13.2%). Herbal medicine, Ayurveda, homeopathy, nutritional supplements, fasting, neural therapy, and hydrotherapy were reported by less than 10%.

Characteristics significantly predicting CAM request were younger age (for exercise and yoga), higher education (for hydrotherapy), relapse (for mistletoe, fasting and neural therapy) and higher grading/staging (for acupuncture and mistletoe), prior experience with CAM (for CAM self-help strategies), higher levels of anxiety (for exercise, yoga, relaxation and massage), and less depression (for massage).

CONCLUSION: Many breast cancer patients reported experience with and request for CAM therapies. Given the risk of conventional and CAM drug interactions on the one hand and the chance of improvement in symptoms and quality of life by adding CAM to conventional care on the other hand, CAM counseling and therapies should be provided more often already in inpatient settings.

Abstract 15 – Oral Session: Natural Products Randomized pharmacokinetic cross-over study comparing two curcumin preparations in plasma and rectal tissue of healthy human volunteers

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BACKGROUND: Curcumin has been evaluated for prevention of colorectal cancer, and its poor absorption has stimulated interest in new formulations. Differences in the pharmacokinetics of new curcumin formulations may affect target tissue concentration.

METHODS: In this randomized, crossover study we evaluated steady-state plasma and rectal tissue curcuminoid concentrations between standard and phosphatidylcholine curcumin extracts. Participants took curcumin for seven days prior to pharmacokinetic sampling over 48 hours and rectal mucosal pinch biopsy one hour after final curcumin dose. All participants received both curcumin preparations: 4 grams C3 extract (Sabinsa Corp) and 2 grams Meriva (Indena, SpA), a phosphatidylcholine complex formulation. Deconjugated curcuminoids were quantitated using validated methods, and comparisons were made using non-compartmental methods.

RESULTS: Twelve participants completed both PK assessments. Mean (SD) age was 30.8 (12.5) years, 67% were female, 75% were white, and mean (SD) BMI was 25.0 (3.0) kg/m². Although standard extract contained 10-times greater curcumin per dose, geometric mean (90% CI) plasma curcumin AUCs were similar (C3: 1205 [689-1720] ng*h/mL vs Meriva: 1098 [494-1701] ng*h/mL, dose-adjusted bioequivalence 8.8 [90% CI 5.0-15.4]). Phosphatidylcholine curcumin extract yielded only 20-30% plasma demethoxycurcumin and bisdemethoxycurcumin conjugates compared to standard extract, yet yielded 20-fold greater hexahydrocurcumin. Median tissue curcumin concentrations (IQR) were 27.1 (18-58) ng/mg (standard) and 12.9 (2-34) ng/mg (phosphatidylcholine) (p=0.08).

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CONCLUSIONS: Differences in absorption and bioavailability between preparations may not be uniformly distributed among individual curcuminoids. While the standard extract dose was 10-fold higher than the phosphatidylcholine extract, curcumin plasma exposures were similar, yet rectal tissue concentrations of standard extract were twice those of the phosphatidylcholine extract. Curcumin formulations characterized by slower absorption may be better suited for colorectal cancer chemoprevention and treatment trials.

Abstract 18 – Oral Session: Natural Products The effect on Triple Negative Breast Cancer Cell MDA-MB-231 with Petroleum Ether Extracts of Curcuma zedoaria

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BACKGROUND: Curcuma zedoaria is a commonly prescribed Chinese herb with anti-cancer potentials. This study assessed the effects of Petroleum Ether Extracts of Curcuma zedoaria (PECZ) on Breast Cancer cell MDA-MB-231, including cell proliferation inhibition, cell cycle regulation, cell chemokines, adhesion factor and the change of methylation.

METHODS: It was assayed by CCK8 for MDA-MB-231 cellular viability with various concentrations, cell cycle analyses by Flow Cytometry, RT PCR analyses for mRNA of chemokines molecules and adhesion molecules, MS-HRM analyses for p16 promoter and E-cadherin promoter. Epirubicin and NS were used as control for the study.

RESULTS: 1. Compared with the blank control group, MDA-MB-231 cells were inhibited by PECZ and Epirubicin ($p < 0.05$) . 2. The result of cell cycle phase distribution demonstrated that PECZ and Epirubicin produce a significant G0/G1 cell cycle arrest ($p < 0.05$) . 3. Compared with the blank control group, (RT-PCR) analysis demonstrated that the E-cadherin mRNA, SDF-1 mRNA and E-selectin mRNA expression level were increased and the CXCR4 mRNA expression level was decreased 24h after treated with PECZ at the concentrations of 300 $\mu\text{g/mL}$ ($P < 0.05$).

4. Compared with the blank control group and low-dose group (100 $\mu\text{g/mL}$), high-dose (300 $\mu\text{g/mL}$) PECZ can reduce levels of methylation on p16 promoter and the adhesion molecules E-cadherin promoter.

CONCLUSIONS: This study suggests that PECZ can inhibit the proliferation of breast cancer cells and produce a significant increase in the number of MDA-MB-231 cells in G1 phase. PECZ may inhibit the Metastasis and invasion of breast cancer cells possibly by upregulating the expression of E-cadherin. In methylation level, PECZ has some demethylation function on p16 promoter and E-cadherin promoter.

Abstract 22 – Oral Session: Natural Products Antitumor and antimetastatic properties of Hops (Humulus lupulus) hydroethanolic extract in brain tumor cells

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Brain tumors are one of the most common neoplasms in children comprising about 25% of all pediatric cancers. Morbidity and mortality are quite high in children with brain tumors, especially gliomas. Chemotherapeutic options for brain tumors are limited mainly because of blood brain barrier and drug resistance. Also there are only a limited number of cancer drugs for treatment for brain tumors. Therefore, identification of potential novel molecules for their eventual use in brain cancer treatment is very much required in oncology research. Cytotoxicity analysis of Hops (Humulus lupulus) hydroethanolic extract (HL) containing 33% humulones (alpha acids), 8-20% lupulones (beta-acids) and 1-3% xanthohumol by HPLC, showed that HL has a very good cytotoxicity profile with IC₅₀, IC₇₅ and IC₉₀ values of 3.72, 22.93 and 43.87 $\mu\text{g/mL}$, respectively in U-87MG human glioblastoma cell line. Further, zymography studies have indicated that very low quantities of Hops extract (1 $\mu\text{g/mL}$) could

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inhibit the MMP2 and MMP9 activities significantly, the two biomarkers very much involved in the metastasis of cancer cells. When combined with supercritical extracts of mango ginger (*Curcuma amada*) HL showed synergism for cytotoxic effect in brain tumor cells with combination index values of <1 at IC50, IC75 and IC90 levels. HL modulates expression of genes associated with apoptosis (Bax, Bcl-2, BNIP3, mutant p53, p21 and caspase 3) and metastasis (MMP2, MMP9 and c-met) as analyzed by RT-PCR and western blot hybridization in glioblastoma cells. These results indicate the anti-tumor and antimetastatic properties of Hops hydroethanolic extract, which have to be confirmed by further in vivo studies.

Abstract 28 – Oral Session: Natural Products ANTI MUC1× CD3-CBD: AN ANTIBODY-DRUG CONJUGATE FOR THE TREATMENT OF SOLID TUMORS

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BACKGROUND: Antibody-drug conjugates (ADCs) are an emerging novel class of cancer targeted therapy agents that combines the selectivity of targeted treatment with the cytotoxic potency of conjugated drugs. Cannabinoids are a family of unique compounds synthesized by *Cannabis sativa*. Cannabidiol (CBD) as an active component of Cannabinoids possesses anticancer activity. In this project a bi-specific Anti MUC1× CD3 antibody, which produced in our last project, has been linked to the CBD. Bi-specific antibodies are engineered in order to target a tumor cell and simultaneously bind to a receptor on T-cytotoxic cell, like CD3. Overexpression of the MUC1 in human cancers has made them highly attractive targets for the development of immunotherapy and inhibitor drugs.

METHODS: We generated an ADC consisting of a bi-specific anti MUC1× CD3 antibody conjugated to the CBD with a stable linker. Apoptosis assay has been done by means of MTT assay and flowcytometry. MC4L2 cell line of breast triple positive adenocarcinoma has been grafted into bulb/c mice.

RESULTS: Anti MUC1× CD3 - CBD was broadly effective in killing assays on cancer cell lines (78% apoptosis in test group while 2% apoptosis in control group). Also, the immunomodulatory effect of antibody was achieved using Jurkat T cells, which overexpresses CD3. We also show that Anti MUC1× CD3 - CBD was capable of inducing complete tumor regression in adenocarcinoma mouse models (tumor size in test group has been reduced 47.8% while it has been increased 87.6 % in control group after 3 weeks).

CONCLUSION: Anti MUC1× CD3 - CBD offers the promise of increasing both the anti-cancer effect of chemotherapeutic regimens by directing drugs specifically to tumor targets, and increasing the therapeutic window of potent chemical drugs that be used systemically.

Abstract 31 – Oral Session: Mind-body Medicine Osteopathy for the management of Post-Mastectomy Pain Syndrome (PMPS) in early breast cancer (EBC) patients: a pilot study in an Italian Oncology Unit

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BACKGROUND. Osteopathy consists in manipulations to relieve pain and strengthen the musculoskeletal framework. PMPS after EBC procedures is a chronic neuropathic pain due to nerve injury. RT and taxanes exacerbate PMPS. Chronic pain affects daily activities, sleep, mood, social function, QoL and induce an economic burden.

MATERIALS AND METHODS. 12 EBC pts with PMPS, NED at mean 52,6 mo. (8-156) from surgery, were recruited in this pilot study. Median age 53 (33-80); 7/12 (58%) mastectomies; 10/12 (83%) axillary lymphadenectomies; 8/12 (67%) RT; 7/12 received taxanes. 7/12 used drugs for PMPS. Treatment: 6 weekly bilateral manipulations(T0-T5), followed by 3 monthly reinforcements(T6-T8). Specific cranial, fascial and articular techniques were used. Pain and QoL were assessed at

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T0/T5/T8 with VAS and SF-36; ROM (degree of abduction and extra-rotation) was manually collected with a goniometer in all sessions. Posture was tested by a computerized stabilometric platform at T0/T5/T8. End point as a pilot study: feasibility (recruitment, attendance, compliance); hints: benefits (pain, QoL, motion and balance). Statistical analysis: Student T-test, two-way for pair data:VAS/SF36; Student T-test, two-way for unpaired data:stabilometric platform. Linear mixed-effects model or testing the ROM during the 5 weekly sessions together. For analysis:STATA software. Hypothesis:to meet feasibility: enrollment velocity<2weeks; attendance= \geq 4/6; compliance to tests>80%; to suggest efficacy:at least a trend in the amelioration in the scores of VAS, SF36, ROM and stabilometric platform data.

RESULTS. 12 pts recruited in 2 weeks; 12/12 attended at least 4 sessions, T0 and final tests; 12/12 evaluable for efficacy; 10/12 (83%) attended the 1st and 2nd reinforcements; 6/12 (50%) completed the 3rd reinforcement. VAS mean values indicated a decrease in pain from T0 (4.5; 95%CI: 3.1-5.9) to T5 (2.6; 95%CI: 1.5.-3.8) ($p=0.0014$) and from T0 to T8 (2.2; 95%CI: 0.9-3.4) ($p=0.017$). QoL score-physical improved from T0 to T5 ($p=0.003$) and from T0 to T8 ($p=0.043$); QoL-mental mean scores improved from T0 to T5 ($p=0.032$) but not from T0 to T8 ($p=0.7$). Due to PMPS affected arm vs healthy showed a worse ROM at baseline (T0); bilateral ROM were similar at T5. At T5 a clear improvement in the ROM of the affected arm was observed both in abd. (2.83; 95%CI: 0.72-4.94; $p=0.008$) and in extra-rot. (5.12; 95%CI: 2.26-7.98; $p<0.0005$). At T6-T8 the amelioration from baseline was still significant in abd. (6.4; $p=0.09$) and extra-rot. (11.8; $p=0.019$). Smaller changes were observed in the healthy arm in ROM from T0 to T8. Stabilometric platform values indicated a significantly better balance of the whole body.

CONCLUSIONS. In our pilot study with osteopathy in PMPS pts, a good attendance to intensive phase and at reinforcement sessions was seen, with hints of benefit in

pain, physical QoL, movement and balance, to be confirmed in larger studies.

**Abstract 38 – Oral Session: Symptom Management and Quality of Life
The Effect of Acupuncture for Head & Neck Cancer Patients with Xerostomia due to Radiotherapy**

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Radiotherapy demonstrated a significantly higher response rate in head & neck (H&N) cancer patients, but xerostomia which is likely to happen (90%) after radiation caused the different kinds of adverse effects such as dysphagia, swallowing, caries and taste disorder. The purpose of this study is to investigate the safety and effectiveness of electro-acupuncture on xerostomia. Twenty two patients (19 male, 3 female) were enrolled in this study. They had epi- (2), meso- (9), hypo-pharyngeal (4), and laryngeal (2) cancer and others (5). Radiation dose was between 39.6 and 70 Gy. Acupuncture, once a week, 8 times, started from 2-13 months after the radiotherapy. Acupoints were as follows, ST7, TE17, ST5, ST6, and SI17. Electro-acupuncture was performed with low frequency (2Hz) between ST7 and TE17. The results were analyzed by VAS regarding symptoms (thirst, mastication, swallowing and taste), QOL-RTI, XI (Xerostomia Inventory) and composition analysis of saliva (IgA, amylase, cortisol, IL-1, IL-6 and CRP).

No adverse effects were observed during this clinical trial. Some sensations such as thirst, swallowing and taste were significantly improved in VAS evaluation. In terms of QOL, significant improvement was obtained in both QOL-RTI and XI. Saliva secretion significantly increased from 1.07 \pm 0.6 to 1.43 \pm 0.75 g by Saxon test. In the analysis of saliva composition, amylase tended to increase. Taken together, it is suggested that electro-acupuncture might improve symptoms and QOL due to xerostomia for H&N cancer patients after radiation therapy.

Abstract 39 – Oral Session: Mind-body Medicine Impact of preoperative mind-

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body and exercise interventions on anxiety and stress in women with newly diagnosed breast cancer

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Anita Gobble-Hurder, Dana-Farber Cancer Institute

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Elizabeth Frank, Dana-Farber Cancer Institute
Anne McTiernan, Fred Hutchinson Cancer Research Center

Melinda Irwin, Yale Cancer Center

BACKGROUND: The Pre-Operative Health and Body (PreHAB) Study tested the impact of exercise and mind-body interventions upon on anxiety, stress, and other outcomes in women with newly diagnosed breast cancer.

METHODS: Women with Stage I-III breast cancer were enrolled through Dana-Farber Cancer Institute and Yale University prior to surgery. Participants were randomized to an exercise intervention (EI) or mind-body intervention (MBI), focused on relaxation and visualization, and participated in the interventions between enrollment and the time of surgery. Measures were collected at enrollment and \geq one day prior to surgery.

RESULTS: A total of 49 women were randomized (27 EI and 22 MBI). Mean time between enrollment and surgery was 4.2 weeks. At baseline, 34% and 68% of participants reported at least moderate anxiety and stress, respectively. EI participants significantly increased minutes of weekly exercise vs. MBI participants (203 vs. 23, $p < 0.0001$). MBI participants engaged in the intervention on average 69% of days during the intervention period. Evaluation of changes in the proportion of women reporting at least moderate anxiety and stress demonstrated that the MBI alleviated baseline anxiety, and both programs reduced the proportion of women who reported stress.

CONCLUSIONS: Brief pre-operative interventions led to reductions in anxiety and stress in women with newly-diagnosed breast cancer; more work is needed to develop programs to help reduce distress in the critical time between cancer diagnosis and surgery.

Table: Prevalence of anxiety and stress in PreHAB participants

	Baseline		Post-Intervention		P value***
	Exercise	Mind-Body	Exercise	Mind-Body	
Anxiety*	8 (31%)	8 (38%)	6 (24%)	1 (5%)	0.01
Stress**	15 (58%)	17 (81%)	11 (44%)	12 (60%)	0.02

*Hospital Anxiety and Depression Scale score ≥ 11

**Perceived Stress Scale-10 score ≥ 14

***Cochran's Q for differences by intervention

Abstract 40 – Oral Session: Traditional Oriental Medicine The Efficacy and Safety of Jaungo, a Traditional Medicinal Ointment, in Preventing Radiation Dermatitis in Patients with Breast Cancer: A Prospective, Single-Blinded, Randomized Pilot Study

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BACKGROUND: This study was performed to evaluate the efficacy and safety of Jaungo (Shiunko) in preventing radiation dermatitis in patients with breast cancer.

METHODS: Thirty patients were prospectively enrolled and randomly assigned to receive Jaungo or general supportive skin care. Radiation dermatitis and pain were examined at daily intervals from the start of radiotherapy until 4 weeks after its onset of radiation dermatitis, duration of radiation dermatitis, and maximum pain score.

RESULTS: Jaungo reduced the incidence of grade ≥ 2 (46.7% versus 78.6%) and

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grade 3 radiation dermatitis (20.0% versus 50.0%) in comparison with general supportive skin care. Jaungo also delayed the onset of grade 2 dermatitis (35 days versus 30 days). In terms of time to onset of grade 3 dermatitis, duration of dermatitis, and maximum pain score, Jaungo showed results comparable to those achieved with general supportive skin care. No patients experienced adverse effects caused by Jaungo administration.

CONCLUSIONS: Jaungo minimized radiation dermatitis in patients with breast cancer without causing adverse effects. Further randomized studies with a larger sample size are required to assess clinical use of Jaungo.

Abstract 49 – Oral Session: Traditional Oriental Medicine *Yin-cold* or *Yang-heat* Syndrome Type of TCM was Associated with the Efficacy of EGFR-TKIs in Patients with NSCLC

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BACKGROUND: In our previous study, we have proved that NSCLC patients with traditional Chinese medicine (TCM) *Yin-cold* (YC) syndrome type have more chance with EGFR gene mutation than those with *Yang-heat* (YH) syndrome type. The purpose of this study was to identify the relationship between the TCM syndrome type and the efficacy of EGFR-TKIs in NSCLC patients.

METHODS: From March 2013 to September 2015, we prospectively studied all the patients in our department who were initially diagnosed with NSCLC or those with recurrence with an interval of more than 6 months from last anticancer therapy. According to the recorded symptoms and signs which can help for the TCM syndrome type diagnosis, the YH or YC syndrome type were diagnosed respectively by three TCM experts of our hospital. Patients with sensitive EGFR gene mutation treated with

EGFR-TKIs were followed up with an interval of 2 months, until May 2016.

RESULTS: A total of 256 consecutive patients were enrolled, with 153 (59.77%) YC and 103 (40.23%) YH patients according to the TCM theory. In the 245 patients with EGFR gene tested, 63.70% of the YC (93/146) and 40.40% of the YH (40/99) were with EGFR gene mutation ($p < 0.001$). Only 84 of the 133 EGFR mutated patients accepted EGFR-TKIs. In these patients, the median PFS time of YC and YH patients were 11.30 and 18.73 months, respectively ($p = 0.0359$, Fig. 1). The TCM syndrome type were significantly correlated with the PFS in the multivariate COX regression model, adjusted by age, gender, smoke history and pathology ($HR = 0.43$, 95% CI [0.19, 0.95], $p = 0.038$). No significant difference was seen in OS between the YC or YH groups ($p = 0.4674$, Fig. 2).

CONCLUSIONS: EGFR mutated NSCLC patients with YH TCM syndrome type may achieve better PFS than those with YC syndrome type, when treated with EGFR-TKIs.

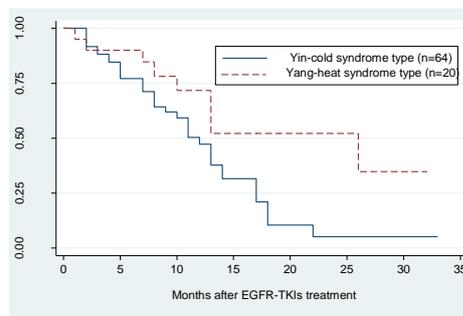


Figure 1. Kaplan–Meier estimates for PFS for EGFR mutated patients treated with EGFR-TKIs.

Abstract 51 – Oral Session: Integrative Oncology Care Delivery Effects of Spirituality and Gender on Patients' Health around Cancer Diagnosis and Treatment

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BACKGROUND: Cancer diagnosis is life-changing, stressful, and provokes

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existential and spiritual concerns. Less is known regarding the extent to which spirituality relates to the patients' health around the time of cancer diagnosis and onset of treatment, and whether gender moderates the associations. This study aimed to extend current knowledge by investigating both subjective (patient-reported outcomes) and objective (neuroendocrine) markers of patients' functioning and testing effects of spirituality components by gender.

METHODS: Patients who were recently diagnosed with colorectal cancer (Stage I-IV) participated in the study (N=64; 58% female; M=54 years old; 63% Hispanic; 3 months post diagnosis). Self-reported spirituality (FACIT-Sp: peace, meaning, and faith) and mental and physical functioning (MOS SF-12) were assessed. Cortisol from collected saliva samples was assayed, area-under-the-curve (AUC) involving four time points per day, and difference between wake-up and bedtime values were calculated. Age was a covariate.

RESULTS: Patients reported moderate to high levels of spirituality ($M_s > 2.75$ on a 1-4 scale in all three components). No gender differences in spirituality components were found ($p_s > .24$). General linear modeling predicting self-reported mental and physical functioning, and salivary cortisol simultaneously revealed that greater meaning related to better mental functioning ($B=4.02$, $p < .05$). Additionally, greater faith related to larger decrease in cortisol from awakening to bedtime among female patients ($B=1.97$), whereas greater faith related to less decrease in cortisol among male patients ($B=-4.21$), $p < .05$. Peace was not significantly related to any outcomes.

CONCLUSIONS: Findings provide preliminary evidence of the differential role of faith and meaning in predicting physiological and self-reported health outcomes. Findings suggest that in the face of stress during early cancer survivorship phase, meaning- or faith-based interventions may facilitate health-promoting adjustment. Findings also warrant further investigation for factors accounting for the nuanced roles of diverse components of spirituality and gender in

cancer patients' health across the illness trajectory.

Abstract 54 – Oral Session: Natural Products INTEGRATIVE MUCOSITIS PROPHYLAXIS PROGRAM FOR CANCER PATIENTS UNDERGOING HEMATOPOETIC STEM CELL TRANSPLANTATION – A CASE SERIES

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BACKGROUND: Oral mucositis occurs in approximately 80% of patients receiving high-dose chemotherapy conditioning for hematopoietic stem cell transplantation. In an effort to reduce incidence of secondary infections, reduce need for opioid analgesics, improve nutritional status, and improve quality of life for this patient population, an evidence-based integrative mucositis prophylaxis program was initiated in our stem cell inpatient unit. This program was coordinated across disciplines, including medical oncology, naturopathic medicine, speech therapy, and nursing. To date, there are no published reports of other integrative mucositis prophylaxis programs in inpatient stem cell units.

METHODS: The medical records of three patients who adhered to the mucositis prophylaxis program are reviewed in detail for this report.

RESULTS: The records of a sixty year-old female with T-cell prolymphocytic leukemia, a fifty year-old female with IgA kappa multiple myeloma, and a thirty-five year old male with testicular seminoma were reviewed. Patients were treated with a variety of high-intensity chemotherapy regimens, including fludarabine/cyclophosphamide/TBI, melphalan, and etoposide/carboplatin. All patients adhered to the mucositis prophylaxis program, which included salt and baking soda mouthwash, chlorhexidine rinse, L-glutamine, zinc carnosine, probiotic rinse, and low-level energy laser therapy. One patient maintained Grade 0 mucositis through engraftment. The other patients developed transient Grade 1 oral mucositis (NCI-CTCAE v4.1), which resolved prior to engraftment and discharge.

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CONCLUSIONS: To our knowledge, this is the first report of an integrative mucositis prophylaxis program for patients undergoing stem cell transplantation. Given the results in this case review, we recommend prospective clinical trials to assess feasibility and efficacy.

Abstract 58 – Oral Session: Mind-body Medicine Use of Heart Rate Variability (HRV) Biofeedback for Symptom Management among Cancer Survivors at the Greenville Health System (GHS) Cancer Institute Center for Integrative Oncology and Survivorship (CIOS)

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BACKGROUND: Cancer survivors suffer from pain, depression, fatigue, stress, and insomnia, each related to autonomic dysfunction. Heart rate variability (HRV) is a valid, noninvasive measure of autonomic function. HRV biofeedback (HRV-B) is a procedure whereby patients engage in paced breathing to increase HRV coherence and restore autonomic balance. Previous research indicates that HRV-B may improve the above symptoms. This study assesses HRV-B in cancer survivors.

METHOD: Twenty cancer survivors were enrolled in a randomized, waitlist controlled, clinical trial. Participants in the intervention arm received weekly HRV-B training up to six weeks. Outcome measures assessed at baseline and week six included HRV coherence and the: Brief Pain Inventory (BPI), Multi-Dimensional Fatigue Inventory (MFI), and the Beck Depression Inventory II (BDI-II).

RESULTS: The two groups did not differ in baseline values of these outcome variables. Complete HRV data were available for 6 in the intervention arm (A) and 8 in the control arm (B). Pre to post-training HRV coherence levels in arm A increased from 0.43 to 1.09 ($p=.01$) and in arm B were 0.50 and 0.48 ($p=.47$), indicating improved HRV in the intervention arm. Baseline pain severity was low and did not change in either group at post-assessment. Pre to

post MFI scores in arm A decreased from 11.0 to 8.9 ($p=.03$) and in arm B were 14.1 and 13.3 ($p=.21$), indicating a decrease in fatigue in the intervention arm. Pre to post BDI-II scores in arm A decreased from 8.0 to 2.5 ($p=.01$) and in arm B were 15.1 and 12.7 ($p=.12$), indicating a decrease in depression in the intervention arm A. HRV, fatigue, stress and depression improved ($p\leq 0.05$) in arm A compared to B at post- assessment.

CONCLUSION: This pilot study provides preliminary evidence that HRV-B for cancer survivors improves HRV and reduces symptoms. Further research is indicated.

Abstract 61 – Oral Session: Symptom Management and Quality of Life A Randomized Pilot of a Multi-Modal Mind-Body Intervention (Positive Affect Skills + Mindfulness) for Women with Metastatic Breast Cancer

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BACKGROUND: We conducted a randomized trial to examine the feasibility and efficacy of a 5-week, multi-modal mind-body intervention (positive affect skills + mindfulness) (LILAC) for women with metastatic breast cancer. An additional goal was to compare the efficacy of online vs. in-person delivery of the intervention.

METHODS: Women with metastatic breast cancer ($N=39$) were randomized to one of three conditions: in-person intervention, online intervention, or an in-person control. Depression (CES-D); positive and negative affect (DES); cancer-specific quality of life (MQOL-CA), mindfulness (FFM-SF), positive-affect skill use, and self-compassion (SCS-SF) were assessed at baseline, 1-week post-intervention, and 1-month post-intervention.

RESULTS: The LILAC intervention showed good feasibility and retention (69%). As online delivery had equivalent results to in-person delivery, the two groups were combined for analyses. We conducted multilevel mixed-modeling analyses to

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examine longitudinal change in psychological well-being. LILAC participants fell below the clinical threshold for depression (scores > 16) by the 1-month follow-up ($M=11.61$, $p=.03$) whereas control participants remained above threshold ($M=17.10$, $p>.83$). LILAC participants also showed reduced negative affect ($p=.02$), increased mindfulness ($p=.056$), increased self-compassion ($p=.07$), and increased positive-affect skill use ($p=.08$) by the 1-month follow-up, whereas control participants did not change in these outcomes (all $ps>.13$).

CONCLUSIONS: The LILAC intervention, regardless of delivery method, holds promise as a feasible and effective mind-body intervention for promoting psychological well-being in women with metastatic breast cancer. The efficacy of the online delivery suggests the potential for widespread dissemination of the intervention over the internet.

**Abstract 62 – Oral Session: Symptom Management and Quality of Life A
Randomized Controlled Trial of Long-term Chamomile Treatment for Generalized Anxiety Disorder**

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BACKGROUND: Generalized Anxiety Disorder (GAD) is one of the most common psychological disorders among cancer survivors and their family members, yet current therapies have limited efficacy and substantial side effects. We evaluated long-term chamomile (*Matricaria recutita*) use for prevention of GAD symptom relapse in a non-cancer population to lay the groundwork for future research in cancer populations.

METHODS: After 12 weeks of open-label therapy with chamomile (1500 mg, pharmaceutical grade extract) for moderate to severe GAD, treatment responders were randomized to receive 26 weeks of either

continuation chamomile or placebo in a single-center, double-blinded, placebo-substitution design. The primary outcome was time to relapse during continuation therapy, analyzed using Cox proportional hazards.

RESULTS: We enrolled 179 participants between March 1, 2010 and June 30, 2015. Of those, 93 (51.9%) were responders and agreed to randomization. A numerically greater number of placebo-switched participants ($n=12$ of 47; 25.5%) versus chamomile-continuation participants ($n=7$ of 46; 15.2%) relapsed during follow-up. The mean time to relapse was 11.4 ± 8.4 weeks for chamomile compared with 6.3 ± 3.9 weeks for placebo, and the hazard of relapse was non-significantly lower for chamomile (hazard ratio 0.52, 95% confidence interval 0.20–1.33, $p=0.16$). Chamomile participants maintained significantly lower GAD symptoms compared with placebo during follow-up ($p=0.0032$), in addition to a significant reduction in body weight ($p=0.046$) and reduced mean arterial blood pressure ($p=0.0063$). Both treatments had similar low rates of adverse events.

CONCLUSIONS: Long-term chamomile use was safe and associated with significant benefits for reducing moderate to severe GAD symptoms, but it was not associated with a significantly reduced rate of relapse. Given that GAD is common among cancer survivors and family members, the possible superiority of chamomile compared with placebo requires further examination in future large-scale studies in these populations.

**Abstract 65 – Oral Session:
Implementation and Dissemination
Trends in online search of herbal
information and research publications:**

An analysis of “ABOUT HERBS” website

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All of Memorial Sloan Kettering Cancer Center
BACKGROUND: Many cancer patients and survivors use herbs and dietary supplements. Patients and families often use the internet to search for information related to herbs but little is known about the commonly searched products. We sought to

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determine the top herbs searched in the "About Herbs" website and the relationship with articles published on PubMed.

METHODS: The Integrative Medicine Service at Memorial Sloan Kettering Cancer Center developed and maintains a website, "About

Herbs" (www.mskcc.org/aboutherbs) that provides objective information on 276 dietary supplements including indications, side effects and herb-drug interactions. We used Google Analytics to determine the number of hits (NOH) received on the website. PubMed searches were conducted for the top five herbs accessed using herb name + active compound + cancer as search terms.

RESULTS: Since its November 2002 launch, *About Herbs* registered 21,280,000 hits. The top ten most accessed monographs in 2006 include juice plus, lycium, reishi mushroom, aloe vera, mangosteen, turmeric, garlic, omega-3, noni and milk thistle. In 2015, the top ten searched monographs were turmeric, graviola, reishi mushroom, ashwagandha, boswellia, zeolite, zyflamend, budwig diet, chaga mushroom and active hexose correlated compound. The 10-year increase in NOH was 69.0% (turmeric); 91.7% (boswellia); 102.7% (ashwagandha). However, milk thistle received 60.6% fewer hits; reishi registered a 30.0% drop. The NOH correlated positively with PubMed articles. Turmeric was the most researched with 8,091 PubMed articles, and largely consistent increases in NOH.

CONCLUSIONS: We identified common herbs searched by the public and rates of the search correlated with research publications. Our results suggest that peer-reviewed research publications generate public interest in natural products. Further, educating healthcare professionals about popular herbs is important to help patients make informed decisions to maximize benefits and minimize risks.

Abstract 68 – Oral Session: Acupuncture Barriers to Acupuncture Use among Breast Cancer Survivors: A Cross-Sectional Analysis

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BACKGROUND: Increasing evidence suggests that acupuncture may be helpful to manage common side effects such as hot flashes, fatigue, and arthralgia among breast cancer (BC) survivors. Acupuncture usage among BC survivors remains low with very little known about the barriers to utilize this therapy. We performed a cross-sectional study to evaluate perceived barriers to acupuncture use among BC survivors and whether minority patients experience higher barriers.

METHODS: We recruited postmenopausal women with a history of stage I-III hormone receptor-positive breast cancer who were taking AI and had completed chemotherapy or radiotherapy ≥ 1 month prior from an urban academic cancer center. We used the modified Attitudes and Beliefs about Complementary and Alternative Medicine (ABCAM) instrument to evaluate patients' perceived barriers to acupuncture. We used multivariate regression analysis to determine social demographic factors associated with perceived barrier scores.

RESULTS: Among participants, the most common barriers were lack of knowledge of acupuncture (42.0%), concern for lack of insurance coverage (25.1%), cost (22.41%), difficulty in finding qualified acupuncturists (18.7%), and time constraints (16.8%). Only 7.6% reported perceiving acupuncture as a painful procedure as a barrier. Compared with whites, minority patients had higher perceived barriers to use acupuncture (beta coefficient=1.63, 95% CI 0.34-2.9, $p=0.013$). Compared with patients who did not attend college, patients with higher education had lower barriers to use acupuncture (beta coefficient = -4.23, 95% CI -5.43- -3.02, $p<0.001$).

CONCLUSIONS: BC survivors' common barriers to use acupuncture are lack of knowledge and insurance coverage, cost, difficulty finding qualified acupuncturists, and time constraints. Minority patients have higher perceived barriers while highly educated individuals have lower barriers. Addressing these barriers systematically

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will increase access and provide equitable integrative medicine services to breast cancer patients from diverse backgrounds.

Abstract 74 – Oral Session: Symptom Management and Quality of Life Mindfulness Intervention to Improve Symptomatology among Cancer Survivors at the Greenville Health System (GHS) Cancer Institute Center for Integrative Oncology and Survivorship (CIOS)

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BACKGROUND: Cancer survivors suffer with stress, fatigue, and sleep complaints. Cultivating Mindfulness in Cancer Survivorship (CMCS) is a four-week standardized mindfulness program, adapted from Mindfulness Based Stress Reduction (MBSR). CMCS techniques include conventional mindfulness meditation and practical mindfulness during daily activities. Mindfulness interventions may mitigate select symptoms. This study assesses CMCS in cancer survivors.

METHOD: Forty cancer survivors were randomized to an intervention or control arm. The intervention arm received the four-week CMCS program. The control arm received a single class in breathing exercises. Outcome measures assessed before and after included the Mindfulness Attention Awareness Scale (MAAS), Pittsburg Sleep Quality Index (PSQI), and the Perceived Stress Scale (PSS).

RESULTS: Complete data were available for 19 in the intervention arm and 17 in the control arm. Pre- and post-MAAS scores in the intervention arm were 4.39 to 4.40 ($p=.58$) and in the control arm were 4.15 to 4.01 ($p=.22$). Using the mixed models approach with random factors to predict the final MAAS score, the intervention arm p -value was .07, suggesting a trend toward increased MAAS in the intervention arm. Pre- and post-PSQI scores in the intervention arm were 8.26 and 6.76 ($p=.10$) and in the control arm were 6.19 and 6.29

($p=1.00$), suggesting a trend of improved sleep in the intervention arm. Pre- and post-PSS scores in the intervention arm were 13.2 and 13.6 ($p=.91$) and in the control arm were 18.3 and 15.8 ($p=.11$). Analyses of actigraph data, blood inflammatory markers, and salivary cortisol levels are underway.

CONCLUSION: CMCS may enhance symptom management and quality of life among cancer survivors. This pilot study affirms the feasibility of intervention implementation, participant engagement, and regime compliance. The CMCS outcomes observed warrant securing a larger study population. An enhanced sample size may subsequently affirm statistical significance of the favorable trends observed in this study.

Abstract 75 – Oral Session: Integrative Oncology Care Delivery Opening the Door to Integrative Oncology Practices: How an Online Education Program is able to Enhance Clinical Engagement and Discussions between Cancer Patients and Health Care Providers

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BACKGROUND: Almost 50% of cancer patients report using complementary therapies (CTs) since their diagnosis. Growing evidence supports the use of CTs during cancer treatment; however, both patients and health care practitioners (HCPs) lack knowledge about their benefits and potential adverse effects. Previous research indicates there is insufficient engagement and discussion between patient and HCPs. Therefore, this study examined whether delivering a 3-module online CT education program could improve HCPs attitudes towards CTs and increase patient-provider engagement and discussion.

METHODS: One-hundred and five HCPs affiliated with the Tom Baker Cancer Center in Calgary Canada expressed interest in a three-module online course. Prior to completing the modules, all consenting

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HCPs completed a baseline assessment measuring attitudes towards CTs as well as CT-specific clinical practice behaviours with patients over the past 30 days. Two months after baseline or following completion of the online modules, all HCP's were invited to complete a follow-up assessment (regardless of whether they had completed the modules).

RESULTS: In total, 83 HCPs enrolled into the study and 73 completed all assessments. Most (n=61) also completed all three modules. Descriptive statistics examined changes over time, comparing HCPs who completed the modules and HCPs who did not. Both HCP who completed the course and those who did not reported an increase (+10% and +80%, respectively) in the frequency of asking their patients about CAM use. However, only the group that completed the modules followed through by providing more information (+11.5% vs -16.7%) and more recommendations (+14.7% vs 0%) about CTs. Similarly, discussions about the level of evidence supporting CTs increased in the group that completed all modules (+18.1%) but declined in the non-completion group (-8.3%).

CONCLUSIONS: The introduction of the education course appeared to create a cultural shift with more HCPs asking patients about their CT use. However, only those that completed the modules were able to have more complex conversations and provide specific information, review evidence, and have meaningful discussions with patients about how to use CTs safely.

**Abstract 78 – Oral Session: Acupuncture
Electro-acupuncture combined with
extended-release (ER) opioid for cancer
pain in advanced non-small cell lung
cancer, a randomized controlled trial**

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BACKGROUND: Lung cancer is the most common cancer in China. The incidence and mortality rates of lung cancer have been ranked the number one cancer in China for many years. It is estimated that 800,000 annual diagnoses and 700,000 annual deaths can be expected by 2020. Many advanced lung cancer patients suffer from cancer pain that requires effective pain management to improve their quality-of-life. Acupuncture has been widely used in medical practice for pain management. However, it remains unclear whether acupuncture could improve cancer pain in advanced non-small cell lung cancer (NSCLC). We conducted a randomized controlled trial to determine whether electro-acupuncture combined with oxycodone ER reduces pain and dysfunction in patients with NSCLC. The secondary objective was to assess the safety and tolerability of the combination treatment.

PATIENTS and METHODS: Patients from a community hospital in China with advanced NSCLC and cancer pain were randomly assigned to daily electro-acupuncture combined with oxycodone ER (the combination arm) and usual care with oxycodone ER therapy alone (the control arm) for 14 days. Outcomes were measured using the Numerical Rating Scale for Pain (NRS); the number of patients who had equal or greater than 25% dose reduction of oxycodone ER at end of the study; the frequency of breakthrough pain (BP); the final mean maintenance dose of oxycodone ER. The safety and the tolerability of the combination therapy were assessed by measuring adverse reactions. Statistical significance between means were analyzed using Student's t-test. Count data used χ^2 test.

RESULTS: From March 2015 to January 2016, sixty evaluable NSCLC patients were accrued and randomly assigned to the treatments (n=30 in the combination arm, n=30 in the control arm). Among them, fifty-two percent were female. There were no differences between the two arms in mean age, course of disease (months) and NRS scores at baseline (64.8 ± 9.4 vs. 62.1 ± 14.7 , $p > 0.05$; 32.57 ± 19.65 vs. 26.23 ± 17.23 , $p > 0.05$; 2.96 ± 0.55 vs. 3.03 ± 0.61 ,

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p>0.05, respectively). At day 14, the mean NRS scores were significantly lower in the combination arm than that in the control arm (2.23 ± 0.77 vs. 2.66 ± 0.54 , $P=0.014$); the rate of oxycodone ER dose reduction ($\geq 25\%$) was significantly higher in the combination arm than that in the control arm (40% vs. 16.7% , $p=0.045$); the mean maintenance dose (mg) of oxycodone ER was significantly lower in the combination arm than that in the control arm (46.92 ± 32.74 vs. 69.60 ± 42.08 , $p=0.036$). During the study, the mean number of BP was significantly less in the combination arm than that in the control arm (3.70 ± 3.08 vs. 6.00 ± 4.57 , $p=0.026$); the rate of oxycodone-related side effects such as constipation and nausea/vomiting were significantly less in the combination group than that in the control arm (16.7% vs. 66.7% , $p=0.001$; 26.7% vs. 56.7% , $p=0.018$, respectively). No serious acupuncture-related adverse reactions were reported.

CONCLUSION: Significant reductions in cancer pain were observed in patients with advanced NSCLC with cancer pain received electro-acupuncture combined with oxycodone ER versus usual care with oxycodone ER treatment. These data support the potential role of electro-acupuncture in addressing cancer pain in NSCLC patients. A long-term study is needed to confirm these findings.

Abstract 92 – Oral Session: Integrative Oncology Care Delivery Will Chinese Oncologists Refer Cancer Survivors to Traditional Chinese Medicine for Survivorship Care? A Cross-sectional Survey

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BACKGROUND: In China, many cancer survivors seek Traditional Chinese Medicine (TCM) therapy after active cancer treatment; however, little is known about Chinese oncologists' attitudes towards referring their patients to TCM for cancer survivorship care.

METHODS: We conducted a cross-sectional survey amongst oncologists during the 18th annual meeting of the Chinese Society of Clinical Oncology (CSCO, September 16th - 20th, 2015), in Xiamen, China. Participants voluntarily completed a questionnaire measuring their demographics, occupational information, and understanding of cancer survivorship care. The outcome variable was willingness to refer cancer survivors to TCM. We used a multivariate logistic regression model to evaluate the factors associated with willingness to refer TCM to cancer survivors.

RESULTS: Amongst 351 responders (88% response rate), 53% were male, with a mean age of 38 years. Many oncologists (221, 72%) were willing to refer their patients to TCM as part of survivorship care. Physicians over 40 years old were more likely to recommend TCM than their younger colleagues (75% versus 61%, $p=0.009$). Oncologists who showed greater concern for cancer survivors' psychological ($p=0.007$), pain ($p<0.001$), functional ($p=0.02$) and social problems ($p=0.003$) were more likely to refer them to TCM. In a multi-variable regression model, controlled by gender, education level, concerns for psychological and functional problems, older physicians (Odds Ratio [OR] 1.8, $p=0.04$) and those who showed great concern for survivors' pain (OR 4.3, $p=0.02$) were associated with willingness to refer their patients to TCM.

CONCLUSIONS: Many Chinese oncologists were willing to refer their patients to TCM as a part of survivorship care. By further educating Chinese oncologists about TCM and survivorship care, we can help develop a multidisciplinary survivorship care model that integrates TCM into the conventional health care delivery system to address Chinese survivors' needs.

Abstract 93 – Oral Session: Traditional Oriental Medicine Factors Related to Willingness to Use Traditional Chinese Medicine in Survivorship Care among Chinese Cancer Survivors – A Cross-sectional Survey

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BACKGROUND: The population of Chinese cancer survivors is rapidly increasing due to earlier disease detection and treatment advances. Survivorship care aims to help cancer survivors maintain their health and recover from disease related treatments. Although many Chinese cancer survivors receive traditional Chinese medicine (TCM), the factors that impact their willingness to use TCM are unknown.

METHODS: We conducted a cross-sectional survey with Beijing Anti-Cancer Group (a non-profit patient support group) in Beijing, China. Independent variables were socioeconomic status, disease information, and perceived needs for survivorship care on 7 aspects: psychological, functional, nutritional, social, body image, pain, and symptom. The outcome variable was willingness to use TCM for survivorship care. We used a multivariate logistic regression model to evaluate the factors associated with willingness to use TCM during survivorship care.

RESULTS: During September and October of 2015, 525 responders were surveyed (87.5% response rate). Eighty-four percent of participants were female with a mean age of 60 years. Major disease groups were breast (48%), lung (12.5%), and gynecological (12.0%). Most responders reported perceived nutritional (365, 72%), symptom (317, 65%), and psychological (270, 54%) needs. Amongst all participants, 387(80%) were willing to use TCM for survivorship care. Responders who completed higher levels of education ($p=0.004$) and shorter-term cancer survivors ($p<0.001$) were more likely to choose TCM. In a multivariable regression model, nutritional (Odds Ratio [OR] 2.6, $p<0.001$), functional (OR 1.7, $p=0.047$), and symptom (OR 2.1, $p=0.004$) needs were independent predictors of willingness to use TCM for survivorship care.

CONCLUSIONS: The majority of Chinese cancer survivors preferred to have TCM as a component of their survivorship care, especially those with nutritional, functional, and symptom needs. By further investigating Chinese cancer survivors' attitudes toward survivorship care, an integrative health service delivery model incorporating TCM can be developed to meet patients' needs.

**Abstract 96 – Oral Session: Acupuncture
An Efficacy Study of Laser Acupuncture
Treatment for Breast Cancer-related
Lymphedema**

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BACKGROUND: Breast cancer related lymphedema (BCRL) is a common toxicity associated with surgery or radiation therapy in breast cancer survivors. Laser acupuncture is a technique that uses low-dose laser to stimulate acupuncture points instead of using acupuncture needles. Our pilot study has demonstrated the feasibility and safety of using laser acupuncture to treat BCRL. We conducted a follow up randomized controlled study to evaluate the efficacy of using laser acupuncture to treat chronic BCRL.

METHODS: From November 2014 to March 2016, we enrolled 31 women with history of stage I-III breast cancer and with a clinical diagnosis of BCRL. Participants were randomized to two groups at the ratio of 1:1. Group A is intervention arm with the patients received laser acupuncture treatment right after enrollment. Group B is wait list control (WLC) arm with patients received laser acupuncture treatment 10 weeks after enrollment. During intervention phase, He-Ne laser radiation was applied on ten acupoints twice per week for 6 weeks. Six points 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. Laser applied to each acupoint for 5

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minutes. The arm circumferences between affected and unaffected arms were measured at weeks 0, 3, 6 and 10. Reduction in circumference difference between affected/unaffected arms, was assessed at weeks 3, 6 and 10. Repeated measures data ANOVA was used to evaluate the changes of the arm's circumferences differences.

RESULTS: Fifteen patients were randomized to intervention arm and 16 to WLC arm. Among the 15 patients in the WLC arm, all but 4 received 6 weeks intervention after 10 weeks' wait. Four patients in group B dropped out due to cancer metastasis or out of contact. One patient in group A dropped out after her finishing the first treatment due to personal reason. Thus, data from 28 patients received laser acupuncture and 16 patients in WLC reported here. There were no adverse events such as infection or BCRL exacerbations during 12 treatment sessions. The reduction in circumference difference between affected and unaffected arms at the level of armpit were 23.6 ± 13.8 mm at week 0, 19.2 ± 13.8 mm at week 3, 17.4 ± 14.0 mm at week 6 and 17.6 ± 14.2 mm at week 10 in Group A, and 20.3 ± 13.8 mm at week 0, 25.3 ± 15.7 mm at week 3, 22.6 ± 12.1 mm at week 6 and 22.6 ± 11.5 mm at week 10 in group B. The intergroup difference of the reduction percents in circumference was statistically significantly different between the two groups at week 3 ($P=0.0029$), week 6 ($P=0.0051$) and week 10 ($P=0.0034$).

CONCLUSIONS: Laser acupuncture is safe and may be effective to treat BCRL. Given it is an open-label trial, placebo effect of laser acupuncture cannot be ruled out. Double-blinded RCT is in plan.

**Abstract 106 – Oral Session: Integrative
Oncology Care Delivery REFINING
BEHAVIOURAL INTERVENTIONS
FOR A PRAGMATIC TRIAL OF
INTEGRATIVE ONCOLOGY CARE
FOR THORACIC CANCER**

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BACKGROUND: The Thoracic Peri-Operative Integrative Surgical Care Evaluation (POISE) Trial has the goal of improving thoracic cancer care. The trial requires designing a multi-agent integrative care program for delivery by naturopathic doctors (NDs) in conjunction with standard care for thoracic cancer patients undergoing curative surgery. Subsequent stages will evaluate impact in a multi-centre randomized controlled trial. Three of the intervention domains, mental/emotional, physical and nutritional, involve behavioural recommendations.

MAIN CONCEPTS: A systematic process was used to establish consensus among a multidisciplinary team of health care providers and researchers on the mental/emotional, nutritional and physical interventions considered.

DESCRIPTION: Domain leads with relevant clinical experience (mental/emotional: psychologist, physical: physiotherapist, nutritional: ND) and research staff scored potential interventions on practical usage, safety, goals, feasibility/scalability and evidence base. The trial's Steering Committee then selected interventions to pilot test. The interventions were further adapted to the different phases of standard care (neo-adjuvant, peri-operative, adjuvant and long-term maintenance) based on consultations with multidisciplinary health care providers working in thoracic cancer. The mental/emotional domain includes audio-recordings with psycho-education, visualization, breathing exercises, mindfulness, gentle movement and meditation. The physical domain includes moderate intensity aerobic exercise plus resistance exercises 5 days/week. For patients with impaired pulmonary function, inspiratory muscle training will be

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prescribed preoperatively. The nutritional domain supports incorporation of a base Mediterranean diet with additional targeted recommendations (e.g. cruciferous vegetables, low glycemic index). Recommendations will be individualized based on current diet and clinical status. Adherence will be monitored by weekly diaries, a validated food-frequency questionnaire and a validated physical activity questionnaire.

SIGNIFICANCE: The multidisciplinary approach to designing the behavioural integrative care intervention has expanded a strong collaboration between naturopathic and conventional medical practitioners. The approach has identified recommendations likely to benefit patients receiving care for thoracic cancers that will be used in the Thoracic POISE trial.

**Abstract 107 – Oral Session: Nutrition
Impact of a Weight Loss Intervention
upon Cancer-Related Biomarkers**

Jennifer Ligibel, Rachel Yung, Laura Shockro, Nancy Campbell, Jocelyn Kasper,
Keelin O'Connor, Ann Partridge, Anita Gobble-Hurder
All of Dana-Farber Cancer Institute

BACKGROUND: Obesity is linked to increased risk of developing and dying from malignancy. The biological pathways through which excess body weight impacts cancer are not well understood, but hypotheses suggest that metabolic and inflammatory pathways could mediate this relationship. The Healthy Living After Cancer Trial evaluated the effect of a multifaceted lifestyle intervention on metabolic and inflammatory biomarkers.

METHODS: Cancer survivors with a BMI ≥ 25 kg/m² at the Dana-Farber Cancer Institute were enrolled and randomized 1:1 to immediate or delayed participation in a 15-week group-based weight loss program focused on caloric restriction, healthy eating and increased physical activity. Fasting blood and anthropometric measures were collected at baseline and after the 15-week intervention.

RESULTS: Sixty participants were randomized (30 intervention and 30 control). Median age was 52 and BMI was 31.8 kg/m². Eighty percent of participants were women with breast cancer. Immediate intervention group participants lost 5.3% of baseline weight at 15 weeks vs 0.2% weight gain in controls (P<0.001). Biomarker analysis demonstrated that intervention participants experienced significant reductions in insulin and leptin vs. controls. (Table).

CONCLUSIONS: A weight loss intervention in cancer survivors resulted in a reduction in biomarkers linked to cancer risk and prognosis, providing insight into the biological basis of the relationship between obesity and cancer. Further work is needed to explore the pathways through which insulin and other metabolic markers could impact cancer risk and prognosis.

TABLE:

	Baseline			Change over 15 weeks		
	<i>Intervention</i>	<i>Control</i>	<i>P value</i>	<i>Intervention</i>	<i>Control</i>	<i>P value</i>
Insulin	8.5 (15.0)	8.0 (5.6)	0.14	-5.4 (16.8)	2.3 (5.0)	0.004
Leptin	430.9	384.6	0.57	-127.9 (269.2)	-22.3 (286.4)	0.04
Adiponectin	99.2 (43.5)	92.7 (41.3)	0.67	14.7 (51.6)	-11.5 (54.8)	0.09
CRP	28.4	41.0 (33.0)	0.16	-8.5 (44.1)	1.5 (44.2)	0.40
IL-6	2.2 (1.2)	2.4 (1.5)	0.60	0.3 (1.6)	-0.3 (1.3)	0.24

**Abstract 111 – Oral Session: Mind-body
Medicine Reducing the Effects of Active
Surveillance Stress, Uncertainty, and
Rumination through Engagement in
Mindfulness Education (REASSURE
ME): Overview of a New NCI Funded
Trial for Men on Active Surveillance for
Prostate Cancer and their Spouses**

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David Victorson, Northwestern University Feinberg School of Medicine

Stephanie Schuette, Northwestern University
Bruriah Gutierrez, Northwestern University Feinberg School of Medicine

Evelyn Cordero, Northwestern University Feinberg School of Medicine

Carly Maletich, Northwestern University

Todd Morgan, University of Michigan

Alexander Kutikov, Fox Chase Cancer Center

Charles Brendler, NorthShore University Health System

BACKGROUND: Although active surveillance (AS) is becoming an increasingly adopted treatment paradigm for the management of very low risk prostate cancer, many men and their partners can face many psychosocial stressors related to this approach. This can include anxiety and fear of progression, both of which can negatively affect short and long term psychosocial adjustment and contribute to early withdrawal from AS to seek definitive therapies such as surgery or radiation. This presentation describes a new NCI-funded trial, which seeks to examine the efficacy of mindfulness training compared with a time/attention-matched health promotion control condition in a large, culturally diverse, and geographically generalizable sample of men on AS and their spouses.

METHODS: Using a randomized, placebo-controlled, partially double-blinded study design, we will examine mindfulness training (mindfulness-based stress reduction) over a 12 month period (n=120 men on AS & 120 spouses), compared with a health promotion control (n=120 men on AS & 120 spouses) that has been matched for time and attention. Baseline measures (e.g., anxiety, fear of progression, quality of life, mindfulness) will be administered just prior to randomization to the two study arms (T1), followed by repeated assessments at 2 months (T2), 6 months (T3) and 12 months (T4).

RESULTS: This presentation will provide a detailed overview of this new research protocol, including hypotheses, study design, interventions, and outcomes.

CONCLUSION: This study has the potential to offer men and their partners facing the stressors of AS with specialized emotional, cognitive, and physiological self-regulatory

skills to cope with and possibly extend adherence to physician recommended AS protocols.

Funding Support from a grant from the National Cancer Institute
1R01CA193331-01A1

Abstract 113 – Oral Session: Implementation and Dissemination Continuity of care for survivorship: time saving tips to transition your patient from active cancer treatment to primary care

S. Agarawal¹

¹Helpsy Inc.

BACKGROUND: The majority of US cancer centers face challenges with administering cancer survivorship care plans to their cancer patients. These challenges include the fact that developing survivorship plans takes time, that patients are moving across multiple departments during their care, and that resources and outside referrals are often not readily available to the cancer center staff. This leads to gaps in care when patients transition off active cancer treatment and issues when survivors look to begin surveillance and symptom management. The purpose of this talk is to provide a general plan on how cancer centers can create and administer survivorship care plans and how a smooth hand-off to the primary care physician (PCP) can be made.

MAIN CONCEPTS: 1) How cancer patients can be efficiently transitioned to primary care
2) How cancer centers can provide survivorship plans and better continuity of care
3) How technology and other tools can aid with the above

DESCRIPTION: The topics discussed will include the new regulations associated with cancer survivorship care plans, the items needed to provide survivorship care, as well as practical tips when building a survivorship program for the first time. In addition, various tools will be introduced which can be used to significantly decrease the time required to create survivorship plans and increase patient satisfaction.

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SIGNIFICANCE: These topics serve to educate about the creation of survivorship care plans for cancer patients and how cancer survivors can be handed off to their PCP with as little gap in care as possible. The Commission on Cancer's new requirements for accreditation require cancer centers to start providing survivorship care plans for their patients.

Abstract 114 – Oral Session: Mind-body Medicine Mindfulness-Based Stress Reduction in the Improvement of Chemotherapy-Induced Nausea and Vomiting among Cancer Treatment Patients

J. Bosley-Smith

Integrative Sciences Department, Maryland University of Integrative Health, Laurel, Maryland.

BACKGROUND: Patients undergoing chemotherapy often encounter a number of adverse side effects, including cytotoxic drug-induced nausea and emesis. CINV, and specifically anticipatory nausea and vomiting (ANV), frequently result in dose delays and/or dose reduction. Reducing the optimal dose or delaying treatment during the course of chemotherapy can lead to detrimental consequences including prolonged intervention, reduced probability of relapse-free survival, and reduced probability of overall survival. This study is designed to evaluate the efficacy of a standardized, mindfulness-based stress reduction program in the reduction of CINV in patients undergoing primary chemotherapy compared to commonly prescribed antiemetic drugs.

METHODS: The study will be randomized utilizing computer allocation concealment and consist of two treatment arms: Treatment Arm 1 (active intervention): patients receiving primary chemotherapy along with standard antiemetic intervention and MBSR.

Treatment Arm 2 (control group): patients receiving primary chemotherapy along with standard antiemetic intervention.

The active intervention will consist of the structured Mindfulness-Based Stress Reduction program originated by Jon Kabat-Zinn and consists of eight weekly group meetings lasting 2.5 h each, plus 1 full day (6.5 h) during week 6 of the course.

Assessment of nausea, vomiting and overall symptom response to the intervention will be derived from use of the MASCC Antiemesis Tool (MAT) and the Edmonton Symptom Assessment Scale (ESAS).

RESULTS: N/A

CONCLUSIONS: Due to the potential effects of CINV on treatment effectiveness and survival rates, the need for an adjunct/replacement intervention void of adverse effects could reduce CINV in patients by alleviating symptoms and ensuring appropriate dosing for improved outcomes. MBSR boasts considerable evidence in the scientific literature supporting its benefit in the improvement of depression, anxiety, stress response/resilience, and neuroplasticity, thereby serving as a cost-effective adjuvant intervention with excellent safety profile.

Abstract 118 – Oral Session: Integrative Oncology Care Delivery The Evolving Role of Family Centered Care in an Integrative Complementary Alternative Medicine Program Serving Pediatric Oncology Patients

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INTRODUCTION: In 2001, oncologists and neurosurgeons at the Children's Hospital of Orange County (CHOC) began referring oncology patients for outpatient Complimentary Alternative Medicine (CAM) therapies to a private Traditional Chinese Medicine (TCM) practice. This practice delivered Family Centered Therapy, emphasizing the importance of providing care for both patients and their caregivers. This community championed the effort of bringing CAM practices into CHOC. Supported by MDs, hospital administration and staff, a new clinical entity was defined and added to enhance the inpatient experience. Treatments offered included acupuncture, acupressure, massage, reiki therapy, guided-imagery and aromatherapy. In 2002, CHOC officially launched a physician-driven consult program for inpatient CAM, allowing patients to

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seamlessly flow between inpatient and outpatient settings.

OBJECTIVE: The objective of this presentation is to describe the ongoing evolution of the family centric care model, describing the spontaneous development and implementation of TCM services, which have exceeded the expectations of both Traditional Western and Chinese Medicine practitioners at a pediatric hospital.

RESULTS: In 2015, 356 TCM consults were ordered by CHOC physicians, 171 were specific to oncology patients. Over 35% of these families received outpatient services in the TCM family centered care clinic. TCM treatments are offered to support quality of life, treating symptoms such as nausea, emesis, anxiety, neuropathy and feeding intolerance. The family centered care model aims to alleviate the symptoms of the patient while simultaneously addressing anxiety, grief, sleep disturbances, etc. for the parents and siblings. A community of support amongst oncology families has spontaneously developed within the inpatient/outpatient program. Many families unpredictably chose to be treated in an group setting, rather than private treatment rooms, thus fostering an environment where parents/caregivers freely shared experiences and services they found beneficial and thereby supported each other during these group clinic sessions and/or through social media. Mentorships develop as experienced families take a newly diagnosed child "under their wing" to guide them

CONCLUSION: The family centered care TCM model has proven especially beneficial in the care of pediatric oncology patients. The unexpected evolution of care-giver driven, highly effective patient and family support groups has further advanced our program objectives and thereby increased value to patients' lives. This model of care provides unparalleled support to patients and their loved ones. We strongly recommend encouraging this scope of patient and family participation.

Abstract 126 – Oral Session: Nutrition

Vitamin J eradicates Circulating Tumor Cells (CTCs) completely from the blood of cancer patients in vivo.

App, Ernst-Maria (1), Pachmann, Ulrich (2), Pachmann, Katharina (2) and King, Malcolm (3) (1) Medical Research Consulting (MRC), Freiburg, Germany (2) Transfusionsmedizinisches Zentrum Bayreuth (TZB), Bayreuth, Germany (3) CIHR Institute of Aboriginal Peoples' Health, Simon Fraser University, Burnaby, BC, Canada

BACKGROUND: Metastatic disease is the most common cause of cancer-related death in patients with solid tumors. Cells escaping from the primary tumor are called Circulating Tumor Cells (CTCs).

Study objectives: An acute Vitamin J infusion therapy 3-5 hours duration was performed in 12 cancer patients (breast, pancreas, stomach, melanoma and sarcoma). Vitamin J is a combination of Choline, Vitamin C, L-Arginine and Vitamin D3.

METHODS: Prior to and following each Vitamin J infusion, serum and EDTA blood samples were analyzed for circulating tumor cells (CTCs) by MainTrac-Method and standards such as liver-, kidney- and metabolic values. Vital parameters (RR, pulse, O2Sat, ECG, temp.) were determined every quarter-hour prior to, during and subsequent to infusions. Depending on dose, infusion therapy was applied for 3-5 hours. During and subsequent to infusions, no patient showed relevant changes in vital parameters. MainTrac-Method: 1-ml blood mixed with 10-ml lysis buffer (Quiagen) was spun 10-min at 700g at room temperature. Epithelial cells were detected using EpCAM (CD326) conjugated with fluorescein isothionate (FITC). Dying cells were detected using propidium iodide (PI), which stains only the nuclei of dying cells. Cells were characterized as follows: 1) Live blood cells appearing only in transmitted light with no fluorescence staining. 2) Dead blood cells where the membrane had become permeable to PI, staining the nucleus orange-red fluorescent. 3) Live epithelial (presumably tumor) cells staining with green fluorescence due to reactivity with FITC-conjugated anti-EpCAM. 4) Dead CTCs with simultaneous green and red fluorescent staining, resulting in either a

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clear green cap with red nucleus, or later during disintegration with an orange combination stain. Quantitative analysis was performed using the ScanR (Olympus) image system, allowing repeated scanning of the same area.

RESULTS: CTCs were reduced by 57% on average in only 3 to 5 hours of treatment with Vitamin J. In 3 cases CTCs were completely erased after Vitamin J infusion. These 3 patients had CTCs between 1,000 and 10,000 per ml prior to therapy. In one patient with liver cancer this eradication even continued for more than 4 weeks without any further treatment. This clearly indicates continuity of action beyond the acute treatment interval.

CONCLUSIONS: Vitamin J infusion therapy is generally very well tolerated. Vitamin J infusion therapy is a very effective antitumor therapy, reducing circulating tumor cells in the blood of cancer patients. Vitamin J killing activity continues over at least four weeks. After only a few intravenous administrations, patients undergoing Vitamin J therapy regularly report a significant improvement in their health condition as well their physical resilience.

**Abstract 127 – Oral Session:
Implementation and Dissemination
Community Cancer Connections: An
Online Integrative Approach to
Survivorship**

Mary Koithan, Michael Principe, Both of University of Arizona, College of Nursing

Today over 14 million persons diagnosed with cancer live in the U.S. Globally, there are 32.6 million people surviving more than five years and those numbers continue to grow (CDC, 2016; NCI, 2016). Patients want an array of treatment choices that include conventional biomedical as well as complementary/integrative therapy options. For persons affected by cancer, the complexity of these choices and decisions increase dramatically and the long-term stakes are high. Patients and families are often left to sift through materials found online, recommendations by friends and family members, and product advertisements (Caspi et al, 2004; Koithan, et al, 2007). Once decisions have been made, patients then face the daunting task

of identifying qualified providers in disciplines that have widely variant credentialing (licensure/certification) standards. Community Cancer Connections (www.uacommunitycancerconnections.org) at the University of Arizona is a web-based resource center developed to facilitate whole person/whole systems wellbeing for all those affected by cancer. Based on an in-depth needs assessment and using a community partnership model and integrative approach to survivorship, CCC supports evidence-informed decision making across all phases of the survivorship experience. Our collection includes multiple resource directories, symptom management and treatment decision guides, and educational materials that have been skillfully vetted and thoroughly researched by an interprofessional team of healthcare professionals. We are currently tailoring information for specific indigenous/tribal populations in Arizona, including digital resources in native languages. This presentation will focus on the processes used to (a) identify need, (b) professionally vet the various resource directories including integrative therapy providers, (c) create evidence-informed decision guides that are focused on symptom management and health promotion; and (e) evaluation strategies and outcomes. Current analytics indicate that the website is viewed by more than 500 people/day that most frequently access the cancer resource directory, integrative therapy instruction guides and symptom management guides.

**Abstract 129 – Oral Session:
Acupuncture A Feasibility Study of
Moxibustion for Treating Anorexia and
Improving Quality of Life in Patients
With Metastatic Cancer: A Randomized
Sham-Controlled Trial**

So Jung Park

OBJECTIVE: The aim of this study was to determine the feasibility, acceptability, and safety of using moxibustion for treating anorexia and improving quality of life in patients with metastatic cancer. Methods. We conducted a randomized sham-controlled trial of moxibustion. Sixteen patients with metastatic cancer were

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recruited from Daejeon, South Korea. The patients were randomly placed into a true or a sham moxibustion group and received 10 true or sham moxibustion treatments administered to the abdomen (CV12, CV8, CV4) and legs (ST36) over a 2-week period. Outcome measures included interest in participating in the trial, identification of successful recruitment strategies, the appropriateness of eligibility criteria, and compliance with the treatment plan (ie, attendance at treatment sessions). Clinical outcomes included results of the Functional Assessment of Anorexia/Cachexia Therapy (FAACT), answers on the European Organization for Research and Treatment of Cancer 30-item core quality of life (EORTC QLQ-C30) questionnaires, scores on the visual analogue scale (VAS), and the results from blood tests and a safety evaluation.

RESULTS: Moxibustion was an acceptable intervention in patients with metastatic cancer. Compliance with the treatment protocol was high, with 11 patients completing all 10 treatments. No serious adverse events related to moxibustion occurred, but 4 patients in the true moxibustion group reported mild rubefaction, which disappeared in a few hours.

CONCLUSION: This study suggests that moxibustion may be safely used to treat anorexia and improve quality of life in patients with metastatic cancer. However, further research is needed to confirm this result.

Abstract 136 – Oral Session: Symptom Management and Quality of Life Effects on Quality of Life of patented enteric-coated cranberry extract during radiotherapy for prostate adenocarcinoma

A. Bonetta 1, F Di Pierro.2

1Radiotherapy Dept., ASST Cremona. 2Scientific Dept. of Velleja Research, Piacenza, Italy

BACKGROUND: Vaccinium macrocarpon have been suggested to decrease incidence of urinary tract infections (UTI), preventing bacterial attachment to host bladder mucosa. In a previous work on 370 consecutive patients treated with external beam radiotherapy (EBRT) for prostate

carcinoma (CaP) we have described a positive effect of a type of enteric-coated cranberry extract (VR370®; Ressuro®) to prevent UTI (Cancer Manag Res. 2012; 4:281-6). Now we report our observational study performed along nine consecutive years.

METHODS: From February 2007 to October 2015, we have followed 924 subjects treated with radiotherapy for CaP. 489 of them received Ressuro® and 435 served as control group. Risk factors (diabetes, previous surgery, age, performance status, median dose to the bladder, V50 and V60) had a similar distribution between the two groups. Therapy started when a bladder catheterization was performed. During the EBRT (6-7 weeks), all patients were submitted to weekly examination, recording urinary tract symptoms and performing urine analysis.

RESULTS: No adverse effects and no drop out due to Ressuro® were observed. Ressuro® reduced UTI ($p = 0.002$). In the treated group we recorded 54 UTI out of 489. In the control group 106 UTI out of 435. In the treated group use of anti-inflammatory and pain killer drugs was reduced in 113 subjects out of 489 versus 202 subjects out of 435 of the control group. This was due to a lower incidence of dysuria, nocturia, urgency and pelvic pain.

CONCLUSIONS: In our new study Ressuro® significantly reduced the incidence of UTI, the use of antibiotics and pain killers. Moreover, Ressuro® seemed to increase tolerance to EBRT, reducing urinary tract symptoms and improving the quality of life of subjects with CaP.

Abstract 138 – Oral Session: Nutrition Pilot trial on supplemental B vitamin complex to reduce the onset and severity of chemotherapy-induced peripheral neuropathy [CIPN].

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Clinical trial registration:

ACTRN: 12611000078954

Human Research Ethics Protocol Number: UH2010000749

Original Research: All information on this clinical trial is original research conducted by the authors through the University of Queensland at the Princess Alexandra Hospital.

Funding: Funding for this clinical trial was through the Centre of Integrative Clinical and Molecular Medicine at the University of Queensland, Prof Luis Vitetta.

BACKGROUND: CIPN is a debilitating side effect resulting from the administration of neurotoxic chemotherapy agents. It is estimated that a third of all patients undergoing chemotherapy experience CIPN, with a third of those progressing to a permanent neuropathy. Patients experiencing moderate to severe CIPN report reduced quality of life, chronic discomfort and disruption of physical abilities for general life activities. Moreover, CIPN can lead to a dose reduction or possible cessation of treatment, which may adversely impact disease outcomes.

METHODOLOGY: In a randomised placebo-controlled trial, newly diagnosed patients undergoing chemotherapy treatment with paclitaxel or vincristine were assessed for the safety and efficacy of an oral B group vitamin to reduce the incidence of CIPN. The primary outcome was the TNS and secondary outcomes included B vitamin pathology, EORTC QoL, Brief Pain Inventory and PNQ.

RESULTS: A total of 71 subjects were randomised from 121 evaluable patients (B vitamin n=38; placebo n=33). Participants between groups were matched for gender, chemotherapy agents, age and BMI. No statistical significance was found for the prevention of CIPN from vitamin B

supplementation through total TNS score ($p=0.73$). Statistical significance was recorded for sensory peripheral neuropathy in the PNQ (12 weeks $p=0.03$; 24 weeks $p=0.005$; 36 weeks $p=0.021$). The risk estimate for the PNQ was also statistically significant with an OR=5.78, 95% CI = [1.63-20.5].

CONCLUSION: B vitamin supplementation throughout chemotherapy administration was not superior to placebo ($p>0.05$) for the prevention of CIPN. Patient perception of reduced sensory peripheral neuropathy with B vitamin supplementation over placebo was statistically significant. Although not significant a trend was observed for the prevention of the onset and severity of CIPN throughout chemotherapy with B vitamins supplementation over placebo. Furthermore, patients with moderate to severe CIPN may have a vitamin B12 deficiency that may lead to a worse symptomatic presentation.

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Abstract 142 – Oral Session: Nutrition Suboptimal Vitamin D Levels Among Adult Survivors of Childhood Cancers

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BACKGROUND: Vitamin D is a fat soluble vitamin that plays an important role in many bodily systems. Of particular significance is the increasing evidence suggesting that vitamin D may be important for the prevention of chronic diseases and cancer. The identification of vitamin D levels in childhood cancer survivors becomes particularly relevant, given that optimizing levels may help to contribute to the

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prevention of secondary malignancies and chronic diseases.

METHODS: A retrospective analysis of vitamin D levels among childhood cancer survivors over 18 years of age seen in the Pediatric Long Term Follow-up Clinic (n=139) at Roswell Park Cancer Institute was performed. Independent variables included gender, race/ethnicity (non-Hispanic white versus other), cancer site (leukemia, lymphoma, sarcoma, CNS, other), year of diagnosis, past medical history, past surgical history, prior radiation therapy; prior chemotherapy, residence zip code, age at diagnosis, age at last clinic visit, year of last clinic visit, height, weight, body mass index at last visit, and vitamin D supplementation/use of multivitamins.

RESULTS: Overall, 34% (5-19.9 ng/ml) of survivors were vitamin D deficient, 39% (20.1-30 ng/ml) were classified as insufficient and 27% (30.2- 96.6 ng/ml) were classified as having sufficient vitamin D levels. Despite vitamin D supplementation in 41 patients, 68.3% continued to have insufficient or deficient vitamin D levels. Vitamin D levels did not vary by age group, race, ethnicity, cancer diagnosis, or years since diagnosis. Seasonal variations in vitamin D levels were not observed. Participants with a BMI >25 had statistically significant lower levels of vitamin D (p<0.05).

CONCLUSIONS: Given the growing awareness of the role of vitamin D and the documented late effects of treatment for childhood cancers, the high prevalence of Vitamin D deficiency within the childhood cancer survivor population is of significant concern.

*This abstract was presented at the 14th Annual International Conference on Long-term Complications of Treatment of Children and Adolescents for Cancer, 2015, and has been accepted for publication (in-press) at the International Journal of Cancer Therapy and Oncology (IJCTO).

**Abstract 146 – Oral Session:
Acupuncture Acupuncture Improves
Certain Aspects of Sleep in
Hematopoietic Stem Cell Transplantation
Patients: A Randomized Controlled Trial**

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INTRODUCTION: Hematopoietic stem cell transplantation (HSCT) is a potentially curative treatment for many hematological malignancies. It is often preceded by high dose chemotherapy which is associated with numerous side effects, including disturbed sleep, especially in the inpatient setting. Previous studies suggest that acupuncture is effective in improving sleep quality. However, it is unknown if acupuncture can improve the negative sleep side effects for patients receiving HSCT and whether the setting of HSCT (inpatient vs outpatient) influences the outcomes.

METHODS: Sixty-three multiple myeloma (MM) patients undergoing inpatient and outpatient HSCT were randomized to either true acupuncture or sham acupuncture once daily for 5 days beginning the day prior to stem cell infusion. Length and quality of sleep were assessed with a validated Actigraph Sleep Monitor, which records the number of awakenings, wake time after sleep onset, total sleep time, sleep efficiency percentage, and sleep-onset latency. Data was evaluated by repeated measures ANOVA.

RESULTS: Over 32 months 35 inpatients (17 randomized to true and 18 to sham acupuncture) and 28 outpatients (14 to true and 14 to sham acupuncture) were enrolled. In the inpatient setting, sleep-onset latency time in the true acupuncture group (mean=26 min) was significantly less than sham acupuncture group (mean difference=22 min, SD 9 min, p=0.019). Additionally, within the inpatients, sleep efficiency in the acupuncture group (mean=76.1%) was significantly higher than the sham acupuncture group (mean difference=9.1%, SD 3.6%, p=0.016). Within outpatients, there were no significant changes between the two arms. Between-group differences in other sleep related variables were not statistically significant.

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CONCLUSION: Acupuncture reduces onset latency time and improves sleep efficiency for inpatients receiving stem cell transplantation when compared with sham acupuncture. By further studying on patient report outcomes, we can help elucidate acupuncture's role in improving sleep quality during HSCT treatment.

**Abstract 148 – Oral Session: Nutrition
The effects of dietary sugar on the efficacy of chemotherapy in breast cancer**

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BACKGROUND: Identifying contributors to breast cancer (BCa) development and barriers in BCa treatment is a continuing focus of BCa research. An increase in the consumption of added sugars has been identified as a pivotal contributor to BCa. However, how dietary sugar affects the efficacy of the chemotherapy in BCa has not been examined. In current study, we investigated the impact of glucose or sucrose on the therapeutic effects of chemo agents, especially doxorubicin, in BCa cells or tumor growth.

METHODS: BCa cell (human MDA-MB-231, SUM159, T47D, BT474, MDA-MB-468 and MCF-7) proliferation was assessed in 3-D culture system. NOD SCID gamma mice was used in studying the effects of doxorubicin and sucrose diet on BCa tumor growth.

RESULTS: Among six human BCa cells tested, only MDA-MB-231 and SUM159 cell growth was promoted by glucose (30 mM) for 2.5 and 3 fold, respectively, in 3-D culture. Glucose treatment abrogated doxorubicin-induced cell apoptosis in BCa cells including human MDA-MB-231 and SUM159, and mouse 4T1 cells. Additionally, the apoptotic effects of epirubicin, 5-FU and cyclophosphamide in MDA-MB-231 cells were also blocked by glucose. Furthermore, microarray analysis demonstrated that glucose treatment significantly altered gene profile of doxorubicin-treated MDA-MB-231 cells, e.g. increasing anti-apoptotic gene expression of PEA15 and NFKB. Finally, in mice

bearing MDA-MB-231 cell derived tumors, doxorubicin (4 mg/kg weekly for 4 weeks) inhibited the tumor growth by 50% compared to that in mice without doxorubicin treatment. Doxorubicin only reduced the tumor growth by 15% in mice fed with sucrose diet as opposed to control diet fed mice, suggesting that dietary sugar negatively impacted doxorubicin effect in BCa cells.

CONCLUSION: Our study indicated that sugar altered BCa responses to doxorubicin in vitro and in vivo. Therefore, dietary sugar may potentially interfere with the efficacy of chemotherapeutic agents in BCa patients which warrants further investigation.

**Abstract 157 – Oral Session:
Implementation and Dissemination
KNOWoncology.org: a clinical tool for evidence informed decision-making in integrative oncology**

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BACKGROUND: Integrative cancer treatment requires coordination of multidisciplinary teams. Providing access to the evidence base of integrative oncology via a searchable web tool enables clinicians to efficiently develop shared knowledge for optimal and safe care of cancer patients.

MAIN CONCEPTS: We are a group of North American integrative oncology providers who conducted systematic literature searches in EMBASE and MEDLine to identify human studies evaluating integrative oncology. Inclusion criteria required use of natural therapies for treatment in oncology or secondary prevention. Records were screened and those included were tagged and summarized according to a PICO model using population, intervention, comparator and outcome data. In addition, each article was meta-tagged according to study design, tumor type, cancer treatment side effect, natural intervention, evidence for interactions, and adverse effects. Through

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this process, peer-reviewed curated abstracts are searchable in a tool called: KNOWoncology.org.

DESCRIPTION: A beta version of this clinical tool was established with curated abstracts categorized according to tumor type, side effect and intervention. Topics completed to date incorporate examples from each category including: breast cancer, thoracic cancers, chemotherapy-induced neuropathy (CINP) and Curcumin. We will provide an overview of this clinical tool, the methods used to develop it and demonstrate its practical value by reviewing 2-4 cases where clinical decision-making and safety were impacted with use of this web-based resource.

CONCLUSION: KNOWoncology.org provides a means for clinicians to quickly search and access pertinent human level data for informed decision-making. Knowoncology.org supports development of a shared knowledge base in integrative oncology for multidisciplinary teams. It has potential application in clinical work, in identifying research gaps, in teaching, in integrative guideline development and in data synthesis. This web resource could advance global knowledge of informatics in clinical integrative oncology.