

Cancer Therapies: Quantum-level Contribution of Ayurveda and Yoga Highlighted Significant Health Tech Data Exchange in Harvard meet

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Caveat about this Rapporteur's Report

This is an account of the main deliberations of the International Conference on Integrative Medicine – Role of Yoga and Ayurveda in the Management of Cancer and Palliative Care held at Harvard Medical School's Joseph Martin Conference Center, June 22-24, 2018. The Conference was unique in the annals of integrative medicine with professionals from different modalities like allopathy, ayurveda, yoga, and related fields coming together, and in the process leaving behind their respective professional silos, and examining seriously the prospects of borrowing best practices from other modalities in health care. Comparative performance-effectiveness and cost-effectiveness too were considered. The aim, *inter alia*, of the meet was one of highlighting the capabilities of Ayurveda and Yoga techniques and thereby help them gain more currency as efficient, if not sounder means to deploy against cancer and other grave threats to wellness. A caveat: This is a synopsis of the proceedings and covers just a digest of presentations and discussions about Ayurvedic and yogic treatment of cancer *per se*. There were other valuable presentations which however did not directly deal with treatment of cancer, and so they are not enumerated here. The exception to this caveat has been the inaugural session in which some presentations were generic too. For all details the reader is advised to contact one of the organizers: Indo-US Health Initiatives, (email: info@indoushealth.com), or the platform paper presenters.

The Inaugural Session

The inaugural program chaired by President of S-VYASA Dr. HR Nagendra, included a welcome by the Director of Indo-US Health Initiatives Mr. Kanchan Banerjee, introductory remarks by the Director, Benson-Henry Institute of Mind Body Medicine Dr. Greg Fricchione, a special address by the Founder of Yoga in Daily Life Paramhans Swami Maheshwaranda, a speech by Consul General of India, New York Sandeep Chakravorty on "Sustainability inside out: The Significance of the Culture of Yoga." In his keynote address at the inaugural session Dr. Vikas Sukhatme, Dean, and Emory University Medical School addressed questions related to "Affordable Medical Innovation: Untapped Opportunities for Cancer Treatment." He made a persuasive case for switching from pharmaceuticals to herbal nutraceuticals and dietary manipulations for two reasons: the former is not affordable. Cancer drugs are expensive. They can shrink even well off patients into "financial orphans," thanks to corporate concerns for return on Investments

(ROI) whereas herbal options are amazingly affordable. Second, herbal options have proved more effective in terms of remission in severity of cancer. Invariably it boosts the patient's immune makeup, the first defense against cancer cells, some of the battle against cancer getting won right there.

Need for Expedient Approval of Ayurveda Drugs

Dr. Sukhatme underlined that like in the case of HIV, it is the patients that are driving the agenda for alternative affordable treatment for cancer. This is more so in treatments emphasizing strengthening of the immune systems of cancer patients. When immune cells are not compromised and are tough, they should be, and are the first charge against cancer cells. Immune cells routinely go after cancer cells and finish them. Immune therapies such as oncolytic virus treatment are proving themselves effective because the virus captures cancer cells and destroys them without harming normal cells. Similarly dendritic cell therapy is being deployed for using dendritic cells as mediators for vaccination of patients with cancer. The procedure though relatively new has proved to be safe with about a quarter century of clinical research in this specialty to back it up. Dr. Sukhatme mentioned that while dozens of immunotherapy are available, just two of them have so far been approved. A mere 2 to 3 percent of the cancer patients are eligible for trying out the new therapies. This delay in intervention with the new remedies could be life threatening.

Up- Or Down Regulation of Meditative Gene

President of S-VYASA, Dr. Nagendra in his stirring address as Chair of the Inaugural Program, spoke about the philosophy that underlies yogic cure. He underlined the advantage of an integrated therapeutic program for dealing with any chronic sickness. Rationally speaking, in the Ayush system less seems to be more. There is virtue in austerity and under-treatment rather than the other way around. Austerity invokes more rigors in the whole system which transmutes into a more holistic system. Even genes can be subjected to down- or up-regulation, as needed, through simple method of guided meditation by the patient. Dr. Nagendra went into the analytics of "Omkaara or the bijamantra," and the next morning he demonstrated its high-power deployment for terminating the chatter in the brain, and for channeling it under meditation. Yoga helps to look at an individual as a single energy field that can sustain a focused assault on unhealthy cells. The universal energy field is summoned in the shanti

mantra: “*Poornamidam poornamadah poornath purnamudachute, Poornasya poornamadaya poornamevava shishyate*” The whole is born out of the whole, when the whole is taken from the whole, the whole remains, like when infinity is subtracted from infinity, infinity remains. Treatments are best that incorporate *Sampurna Jnana* or comprehensive knowledge.

Patanjali cautioned against *viparyaya* or wrong knowledge which results in *prajnya* aparadha or wrong notion. Not just the physical body but the entire human organic configuration consisting of koshas such as *Annamaya kosha*, *Pranamaya kosha*, *Manonmaya kosha*, *Vijnanamaya kosha* and the *Ananda maya kosha* should be pulled together for integral functioning to serve the goal of overcoming cancer cells. They embrace both the innate and the adaptive immune configurations including lymph nodes, spleen, bone marrow producing white blood cells, and other constituents.

This has a much better probability of success than just the micro quantifiable deductive approach. Robustly healthy human's lack nothing in their defense system. Synergy comes into play in a big way. This approach to cancer treatment calls for resoluteness or “*sankalpa*” on the part of the patients with no inadequacy in their immune structure. This integral process overwhelms the cancer cells. Mental resolve of this kind would actually help substantially in buttressing the immune system. Patients should have a dogged faith in the capabilities of their immune logic to face the cancer challenge and overpower the bad cells. Several subsequent presenters confirmed the awesome potency of the immune system together with homeostasis that helps maintain the dynamic equilibrium in biological systems.

Integrated Cancer Project Protocols

Dr. Nagendra elaborated on the integrated cancer project in India. The project has developed protocols that simulate similar protocols for treating diabetes. The next morning at 7:30 Dr. Nagendra coached the congregation in performing yogic breathing even while chanting the *Omkara* mantra in step and style with inhalation, holding and exhalation. He elucidated the meaning of AUM: *Srushti*, *sthithi* and *laya* or creation, preservation and recycling respectively which are represented by A, U and M in *Omkara*. When it is chanted synchronously with deep abdominal breathing musing over the three facets of the universe, there is a unique sense of oneness with the Creator or with innate intelligence, followed by complete serenity and silence. Many that participated in the exercise experienced it. These steps immensely toughen and support the immune cells.

Ayurveda Vaccine

Dr. Manoj Nesari, Advisor, AYUSH Ministry, Government of India chaired the first post-inaugural symposium on application of Ayurveda in Oncology and Palliative Care. Dr. Bhushan Patwardhan, Director, Center for Complementary and Integrative Health, Interdisciplinary School of Health Sciences, Pune spoke about Network pharmacology of Ayurveda formulation *Triphala* with special reference to anti-cancer property. Vaccines of that kind are thought of for conditions such as malaria and tuberculosis. The anti-cancer vaccine could be derived through *rasayana* or experimentation with *asvagandha* which effectively charges T cells to kill cancer cells without harming normal cells. He explained the connotation of *Ayush* as genetics or genomics dealing with the sequencing and analysis of the genome containing in one cell the entire DNA of an organism. The role of yoga as adjuvant to cancer therapies was dealt with.

Tibetan Sowa Rigpa

Dr. Manoj Sharma, Professor, Department of Radiotherapy, Maulana Azad Medical College, and New Delhi deliberated on the question of whether ayurveda, Tibetan (*Sowa Rigpa*) or herbal medicine had a role in primary therapy for cancer patients. His conclusion was that they do not fit into primary therapy, but certainly there is scope for their use in adjuvant therapy. Ayurveda-based therapeutic adjuncts could counter side effects of chemotherapy and improve quality of life. The recovery from aggressive chemo-radiation severe outcomes was a satisfactory 67/100 in the Study Group as compared to 35/100 for the Proxy Group. In the case of post treatment residue healing within six months, it was a satisfactory 92/100 for the Study Group and 39/100 for the Proxy Group. Tibetan medicine had shown remarkable improvement in Stage III C ovarian cancers with suboptimal surgical clearance where survival rates are dismal with available modes of therapy in Indian settings. Tibetan medicine strengthens the immune system by correcting the *vata* (neurohumoral), *pitha* (bile and digestive) and *kapha* (cardiovascular) conditions. Dr. Sharma also recommended *septillion* (medicine) for repair, recovery, recuperation, and prolonging life after lymphomas. On a sidebar Dr. Sharma spoke about the plethora of ontological evidence in India stretching over four decades. He highlighted the exceptional management of clinical observations. He called for numerous improvements in administrative matters so that rapid progress becomes possible in drawing lessons from clinical evidence for future cancer treatments.

Dr. P.R. Ramesh Varier, Head of Clinical Research, Arya Vaidya Shala, stressed that in India just one percent of the population has access to pain and palliative care. Ayurveda and yoga provide affordability, accessibility as well as applicability, they being so indigenous and Ayurvedic drugs being of high quality too. But the fact remains that the rest of the population suffers from life-limiting diseases. A health care system fully integrated with Ayurveda and indigenous systems alone can attend to this massive health care challenge.

The next technical symposium on the Genomics of Integrative Care was chaired by Dr. Dinesh Patel, Former Chair, Board of Registration in Medicine and Emeritus Chair, Arthroscopic Surgery, MGH. A well-researched paper on integrative analysis of gene expression and upstream methylation changes by Dr. Manoj Bhasin, Co-Director, Genomics, Proteomics, Bioinformatics and Systems Biology Center, BIDMC was the highlight of the session. He discussed the significant question of whether yoga and meditation that affect analogous genes provide beneficial effects. Surprisingly, both during treatment and follow up periods, direct gene based depiction showed little overlap in differently expressed genes. Cellular processes are regulated by consensus DNA sequences. Five protein complexes bind to these DNA sequences. The transcription factors that create the protein complexes constitute the nuclear factor kappa-light chain enhancer of activated B cells (NF- κ B). The beneficial effects are: 1) RR modified up regulation of mitochondrial energy production by means of up regulation of ATPase and insulin function. 2) RR blunt down inflammation by down regulating up- and downstream molecules of NF- κ B molecules. NF- κ B and other pro-inflammatory cytokines were the key molecules for ascribing beneficial effects of meditation. This is inferred from out of 21 meta-analysis studies. Big Data analysis of cancers and multiple myeloma bring out that RR effectively down regulates NF- κ B associated with progression and resistance of multiple cancers.

Personalized Medicine

Prof. Shyam Mohapatra, University of Southern Florida, spoke about the huge increase in the number of cancer patients in the US and Europe from 40 million in 2010 to an estimated 70 million in 2020. There is much reduced cure for cancer per se unless it is precision medicine. In Ayurveda each patient is unique. Normality is what is appropriate for such a patient. Whereas in Western medicine patients are generalized and normality is what is appropriate for a majority of patients. Ayurveda offers personalized medicine based on a patient's own individualized data. Ayurvedic bhasmas are personalized according to *puta* or quantum of heat. When some of the bhasmas are examined under a microscope they are known to have the characteristics of nanocrystalline materials that are biodegradable, biocompatible and non-antigenic, not unlike nanoparticles in the body, though it is too early to exult if this is a marriage made in heaven.

Thus there is scope for nanotechnology when combined with traditional modalities enabling a perspective on tomorrow's future today. There is a long way to go before such technology can become actionable. Tumoroid technology would involve four steps: 1) Get patient's cells either through biopsy or discarded tumor 2) Grow on FiSS (Feline injection Site Sarcomas) for 3-4 days 3) treat with drug(s) for three days 4) Check which drug kills tumor best. This is the world of Cell genomics. Tumor-based efficacy assay with three patients with breast cancer showed encouraging results. There was mind-boggling complexity in diseases and they are multi-genic (Cancer = 650). Because of this, gene expression is not equal to gene function. All doctors may not get trained in gene-tests and their complexities, making it more difficult to understand the tests/mechanisms and implications.

The Keynote Session on Ayurveda and Yoga was chaired by Dr. Darshan Mehta, Medical Director, Benson-Henry Institute for Mind-Body Medicine, MGH. In his keynote address Dr. Marc Halpern, Founder-President, California College of Ayurveda, spoke on the "Role of Ayurveda in Integrative Oncology." He introduced the audience to basic Ayurvedic cancer terminology such as *gulma* or bush, cluster or clump referring to pelvic tumors, *Arbuda* or malignant cancer, *Granthi* or bulb or knot referring to masses close to the surface of the body but under the skin and include skin cancers, myomas and their like, and cysts. He also discussed *dwiarbuda* meaning metastatic carcinoma. This introduction helped the audience appreciate that the ancient science of ayurveda had already dealt with cancers such as these. Ayurveda etiology or *nidana* includes poor health practices that result in low *ojas*, practices that reduce host resistance or repair mechanisms, traditional "bads" such as suppression of natural urges, grief, illness, drinking cold water when feeling hungry as well contemporary concerns such as smoking, drinking, poor diets, lack of exercise, environmental toxins, and stress. In Ayurveda cancers are regarded as *tri-doshic* disturbances. Dr. Halpern discussed the range of classical treatments such as internal herbal medicines, topical applications of pastes, *panchkarma* and surgery. In Integrative cancer treatment the ayurveda doctor would come up with the following actionable items: a) Enhance drug therapy with, for example, dandelion root with Tamoxifen for breast cancer b) Maximize the body's immune system with diet, herbs, life style changes, harmonious living and yoga nidra c) Reduce chemotherapy side effects by administering specific herbs d) Administer deep relaxation with *shirodhara*, yoga nidra, and meditation e) Undertake psycho-emotional development through

shifting from anger to compassion, fear to faith, control to non-control attachment f) Consider alternative strategies in the case of poor prognosis. Clinical evidence was cited for the curative properties of dandelion roots for cancer such as slowing down cancer growth and promotion of apoptosis in leukemia cells. The evidence with regard to apoptosis properties of curcumin was presented.

Invoking Relaxation Response

"Yoga Therapy in Cancer and Palliative Care" was the topic of the next symposium and it was chaired by Dr. N.K. Manjunath, Director of Research, S-VYASA. Dr. Neha Vapiwala, Radiation Oncologist, University of Pennsylvania, a leader in Genito-Urinary Oncology, emphasized the need to trust team communications which would make up for deficiencies if any in individual modality. One conviction she had was that yoga helps in distress tolerance. It is great in invoking the relaxation response so essential for cancer patients. The patient should make an educated guess in this respect and this could be helped by the doctor trying out a trial baseline eligibility for a potpourri of yoga and exercise protocols. It must be added that humans needlessly feel inadequate one way or other such as for instance that the immune system is not strong enough to overwhelm cancer cells. This diffidence arises out of unawareness of the capabilities of the immune system or homeostasis or taking the body's defense too lightly. She presented the results of 15-minute oncology massages to breast cancer patients during chemo in the infusion suites. All measured factors, nausea, anxiety, fatigue and pain decreased significantly [1]. In another case of (Iyengar) yoga practice comparative results for the yoga group and the control group showed significant declines for yoga group in Brief Fatigue Inventory (BFI) Global score, BFI impact, BFI severity, and International Prostate Symptom Score (IPSS). The same study showed increases for the yoga group in FWB score, Functional Analysis of Cancer Therapy (FACT), Social Well-Being (SWB) and Sexual Health Inventory for Men (SHIM) scores [2,3].

Dr. Suzanne Danhauer, Wake Forest University, PA, a psychologist by training, spoke about yoga in the clinical setting for women with cancer. She explained her research experience in reducing symptoms such as fatigue and negative emotions of patients. The overwhelming need for hard-wearing social connections that would ameliorate patient wellness could not be overemphasized. The summary results were that there was significant improvement for depression, negative effect, and health-related quality of life besides reduction in fatigue. In an earlier non-randomized pilot study of yoga for women with ovarian and breast cancer it was found there were significant improvements for depression, negative effect, anxiety, an QoL [4].

The participants in the yoga program liked the new knowledge to use body-mind together, learning the relaxation techniques, relaxed peaceful feeling after yoga class, using breathing skills during MRI and the like. The study was not powered to detail group differences. However the decline in QoL for the yoga group was minimal. There were similar yoga choices for colorectal cancer patients and women with gynecologic surgery for malignancy. In general yoga skills in cancer cases helped with pain management. The strongest support from yoga was in alleviating anxiety, distress and mood. Moderate support was felt in sleep, fatigue and QoL. The preliminary support was in managing side effects, cognitive functions and spiritual well-being. Dr. Danhauer's Table of outcomes of RCT (Randomized Controlled Trails) is a useful reference to clinicians. It was a good

idea to offer a choice between cognitive behavioral therapy and yoga skills training, and build that choice into the design of clinical trials.

Bypass Monocultures

Dr. Raghavendra Rao, Senior Scientist, Clinical Research, Health Care Global, Bangalore presented a thoughtful paper: Effect of yoga in palliative care and symptom management. He presented the results of a clinical yoga program on mood states, quality of life, and toxicity in breast cancer patients receiving conventional treatment. This was a randomized control trial. There were significant results such as decrease in depression and distress in the yoga therapy group compared to the control group though both had similar baseline scores. The improvement in overall quality of life was by about 30 points compared to control group, proving that yoga as a psychotherapeutic intervention has considerable value for those cancer patients undergoing conventional treatment with improvements in psychological outcomes, reduction in symptom clusters and toxicity (p-value: <0.01), improved sleep and improved QoL. Dr. Rao spoke about some of the basics in health matters which are ignored or taken for granted, such as breathing. Most persons are into inefficient breathing and thereby are not helping blood deliver oxygen to the trillions of cells in the body. Complementary medicine which is often based on ancient practice, but has done successfully in clinical trials and otherwise highly efficacious, is now on the rise, and on the map of healing systems. Cochrane Reviews are coming up with favorable appraisals of Ayurveda notwithstanding faulting the clinical studies for methodological inadequacies. Two examples of Cochrane Reviews for Ayurvedic treatment of schizophrenia and diabetes are shown in Endnotes [5,6]. In the case of women with a diagnosis of breast cancer, under Cochrane Reviews, yoga therapy is highly recommended [7]. It serves both the medical professionals and the patients themselves if there is wider awareness of these facts.

Holistic In Treatment, Reductionist in Case Evaluation

Dr. Darshan Shankar, Vice-Chancellor, Transdisciplinary University (TDU), in his remarks as Commentator as well as the Keynoter the next day of the Symposium spoke, *inter alia*, on the deep insights and limitations of molecular biology which now covers awesome new pathways and variations. The area poses new challenges in that correlations do not hint causations because of enormous complexity at the systemic level disabling linear extrapolations. Holistic understanding of biology is still in its infancy. It has not been possible to explain the extraordinary outcomes in traditional but non-mainstream modalities of India and China. Lack of adequate research into the traditional modalities is also to blame for this. That is the rationale for trans disciplinary (TD) platforms and the Trans Disciplinary University (TDU), Bangalore. The 21st century TD platform based on yoga and ayurveda concepts would comprise bio-banking and bio-assays, mind-body clinics, synthetic biology, biome, immune-modulation, omics, and their like. Potential outcomes of a TD research would be immune modulation, pharmacogenomics and nutrigenomics, regulating microbiome, bioregulation and homeostasis, wellness science, theory of disease progression and so forth. The epistemology and ontology of non-western knowledge systems integrated with modern science and technology is the strategy for social transformation as well as pushing the frontiers of comprehension in the 21st century. In the realm of health science, yoga and ayurveda biology is the forerunner of needed change.

Ayurveda Tatva Ironcast, But Shastra Protocols Not Static

Dr. Shankar traced the historic growth of yoga and ayurveda. In

ancient times Ayurveda spread to neighboring regions, first to Persian Empire and then Greece too. Alexander came to know about wellness benefits of Ayurveda. Modern medicine follows ayurveda in borrowing herbs for various cures. No single modality has all the solutions or remedies for numerous ailments, and hence choice of pluralism amongst patients. Traditional medicine is ancient, but does not stay static, but keeps evolving over millennia. Nor is knowledge a function of time. However, in Ayurveda the tatva or the principle does not change, such as the tridoshas. With tatva comes shastra or the codes and protocols of Ayurveda. This is followed by the *vyavahara* or application (practice) of Ayurveda. Ayurveda is more of a holistic discipline rather than a structuralist or reductionist maneuver. It does operate at the molecular level too. Thus it seems to be aware of molecular changes following a structuralist treatment. When holism embraces the molecular-level happenings, it would be a day worth celebrating!

Modern medicine is witnessing a paradigm shift and getting as micro as it could, with a single molecule as the target for treatment and study. There is also a shift towards combinatorial chemistry enabling production of large numbers of different compounds in a single process. All this demands systemic holistic understanding of healing. Without such perception, evidence based medicine would lose its justification and there is also the hazard of fragmentation of data. The need for meta-analysis is very much there although such analysis itself may not be foolproof. Thanks to synergy and other advantages of synchronization, the whole will also be greater than the sum of parts. The whole and the part are related but not on a one to one basis. A drug in one modality has a different connotation for the same drug in ayurveda modality.

It is essential to find pathways for cross-cultural learning and leaving behind monocultures which seem to dominate everywhere. Extraordinary outcomes from other knowledge systems are possible. Dr. Shankar announced a research investment of \$2 million for non-allopath intelligence and erudition.

Don't fall in love with your own hypothesis!

The Plenary Session on Saturday June 23 got off to a good start with introductory remarks by Dr. John Denninger, Director, Benson-Henry Institute for Mind-Body Medicine, MGH. Dr. Denninger spoke about the significance of invoking the relaxation response to manage stress which is the culprit for some 80 percent of all sickness including cancer. Wellness depends very much on how well stress is managed with the least dependence on the fight or flight condition. Dr. Denninger emphasized the importance of documentation of failure and success in Ayurvedic or yogic clinical evidence like in any other modality. It is advisable not to “fall in love with one’s own hypothesis” and instead maintain impartiality which would improve wider acceptance. The high quality of Mind Based Stress Reduction (MBSR) studies was mentioned as an example [8].

Swami Maheshwaranda went into the cosmic aspects of Vedas, Ayurveda and Yoga. There is much scientific knowledge that underlies Big Bang. He explained the meaning of Brahmanda or the initial egg of creation of the universe and its relation to Ayurveda and yoga, through the 25 panchabutas as per Sankya philosophy, and their full recognition in the ancient system of medicine. He drew attention to the manifest objective and ever-changing world and the unmanifest never-changing aspect inside us. It is advisable that cancer persons do not come to Ayurveda and yoga as the last

resort, after using up all energies and resources in chemotherapy and radiation right up to the frustration point. Yoga makes a dysfunctional part functional when enabled as such. Old life styles and old *samskaras* may still be there in the neural networks. And yet lifestyle change can occur with *sankalpa*. This is the ability of the brain to build new synoptic connections particularly after some reeducation or injury, as it happens in neuroplasticity which at any age can create its own neural pathways. Daily yoga practice is a great prophylactic as well as a cure for many health problems. It is always advisable to learn from a guru, rather than from a video or TV. The practice can be modified to suit the student's special needs. Props and other help can be taken as long as there an earnest desire to get away from them.

Yoga and Epigenetics

Dr. Purnima, Founder and Chair, Health is Wealth Foundation, related her own personal experience in dealing with health issues such as TB infection, lymphoma, barely loaded tumor and so forth. She turned out to be a feisty fighter and survivor. Soon she learned that it is not wise to regard cancer as the enemy, but something you learn to live with. There was the usual chemotherapy and she recovered. There were even 17p deletions. And yet there was a feeling that you are winning the battles, but not the war. Then there was bone marrow transplant together with conspicuous expenses, and then the spiritual turn of mind, with prayers all night. Yet, the bone marrow effort failed. Suspense and efforts continue.

Ayurveda: The Science of Epigenetics

This was when appropriately enough, Dr. Hari Sharma, Professor Emeritus, Pathology, Ohio State University, spoke on "Application of Ayurveda in Modern Healthcare System." He is also the coauthor with Dr. James Meade of milestone research work: *Dynamic DNA: Activating Your Inner Energy for Better Health*. This work presents Ayurveda as the science of epigenetics. The link between yoga and DNA is explained. Dr. Sharma elucidated the ayurveda approach to cancer and described how it is not a fight, but a management of cancer enabling a person to live with it, if it cannot be gotten rid of. In a way Ayurveda is comprehensible to the west for it talks of Ayush or longevity. When there is fusion of the three dimensions of human personality of body, mind and spirit, the whole becomes greater than the sum of the parts due to synergy and organic interaction. The transcendental aspect begins to emerge. This situation is beyond the five senses. Meditation alone can get there. Yoga is transforming. The main conclusions of Dr. Sharma were that a) Ayurvedic lifestyle, diet and nutrition, herbs, stress management and environmental factors manage epigenetic factors b) Ayurveda is the science of epigenetics, affect both phenotype and genotype and it is a complete and comprehensive science of life c) It is possible to create a disease-free society integrating Ayurveda in totality with the current medical system. One of the interesting slides by Dr. Sharma evidenced that good sound (Sama Veda incantation) decreases malignant cell growth. It showed a 25.3% in reduction in brain malignant glioma cell growth, 16.9 % reduction in breast adenocarcinoma, 19.9% reduction in colon adenocarcinoma, 22.4 % in lung carcinoma, and so forth on listening to Sama veda (p-value < 0.005, ANOVA) [9]. Some of the work in epigenetics is made possible with the aid of electro-photo imaging (EPI) which reads photon emissions from the finger tips. Yoga too uses the same paradigm of neuroplasticity to reverse any abnormal condition.

What is complementary and what is mainstream?

Dr. Darshan Shankar (mentioned earlier) keynoted on the imperative to create a harmonious trans-disciplinary platform for advancement of health sciences in the 21st century. Dr. Shankar also called it a paradox that ancient mainstream healing systems get termed 'complementary' and a relatively new modality like allopath gets to occupy a leading position in today's health care system, calling all the shots. He also clarified how 95% of Tibetan medicine or Sowa Rigpa (science of healing) tallies with Ayurveda thanks to the interchange between Tibet and India beginning as early as 14th century or even earlier. (Other details covered above)

Yoga as Fully-Fledged Medicine

In Workshop 1 on Yoga Therapy and Cancer, Dr. Timothy McCall, Researcher, author and Contributing Medical Editor, *Yoga Journal*, recalled how yoga has successfully evolved as a mere exercise system into a fully-fledged treatment modality in its own right. It is getting institutionalized. It has emerged as an exposition of wellness. There are two aspects to modern yoga practice: first, as a mainstream technique it is under serving the populace and second, in the process of diffusion and common practice, it is not been conforming to authentic yoga. As such there is concern as regards treatment employing yoga techniques and secondly its survival in terms of principles and practice of yoga in health care. *Inter alia*, yoga also helps with fascia tissues that enclose muscles and separate them from internal organs.

At the outset of his presentation Dr. McCall mentioned the case of metastatic cancer cells in the lymph nodes of his own neck and his visit to an Ayurvedic therapist in Kerala, India. This was not as much for a cure, as for feeling more 'rested and balanced' before undergoing heavy-duty treatment such as chemo radiation. But lo and behold, after Ayurveda therapy the tonsil in his throat looked more pinkish healthy, and the lymph nodes shrunk, the size of the tumors slightly decreasing. After chemo radiation, Dr. McCall had a "complete clinical response," meaning lack of any evidence of cancer cells in his mouth or lymph nodes. Ayurvedic treatment prior to the heavy duty treatment made his body "hardier." This is the 'path of holism' [10].

Left Side Domination

When it comes to treatment of cancer per se, yoga has proved itself more holistic, moving more into the mind-body environment culture. Yoga is best learnt in the guru-shishya tradition. Yoga looks into various imbalances and aims treatment towards the para-sympathetic system. Yoga treatment also tailors the treatment to the needs of the patient and his/her level of fitness. It includes breath and then involves the psychological aspects. There is left-side domination of yoga emphasizing mindfulness and also core strength which could serve as a prophylactic for osteoporosis. It is possible that some of the exercises could elicit the placebo effect, which by itself is not a fault. Dr. McCall listed 45 ways yoga heals. Just for illustration, it increases flexibility, strengthens muscles, improves balance and posture, improves lung function, slows and deepens breathing, uses imagery to effect change in body and relieve pain, lowers need for medication, leads to healthier habits, and encourages patient's own involvement in healing. He also mentioned the popular vernacular axiom in India of the three health choices all people have in life: *yogi*, *bhogi* (one who is pleasure-oriented) and *rogi* (or the sick due to indulgences.)

Dr. McCall's concluding points were: a preliminary evidence shows that yoga can improve sleep, psychological well-being, Quality of Life, and possibly immune function in cancer patients, both during and after treatment. b) Yoga can improve risk factors or reduce probability of disease, something useful to cancer patients. c) Yoga therapy does not conform to the standardized sequences used in medical studies d) Yoga therapy tailored to individual needs are more effective than standard protocols e) Future studies should incorporate the suggestion above for research purposes f) A wider number of cancer patients should be administered yoga interventions, now that benefits of such interventions as well as the low costs are confirmed. Yoga promotes wellness in a micro sense of personal wellness and second, in a macro way by promoting social harmony.

Dr. Anusha Sehgal, President, Boston Ayurveda Inc. dwelt on the need to standardize Ayurvedic education. Standardization cannot be with respect to innovations and experimental medicine, but with regard to historicity, customization of diagnosis and treatment, and basic concepts and *tatva* such as the *tridoshas*. Scalability is possible with standardization where possible though it may go against the grain in ayurveda. However in the matter of treatment, there will have to be much individualized medicine. Without standardization of education there is likely to be unnecessary hardships promoting greater application of ayurveda modalities. This will also delay fuller integration of health education.

Aswagandha, Neem and Turmeric for Cancer

In Workshop 2: Ayurvedic Nutrition in Cancer, Dr. Sivarama Prasad Vinjamury, Southern California University, explained why ayurveda considers cancer is of metabolic origin, as confirmed in research in molecular biology. In ayurveda metabolism is named bio-*Agni* or the fire that burns the calories. Environmental change that strengthens mitochondrial cells would help fight cancer cells more forcefully. Neem, Aswagandha, turmeric and other herbs are used in a variety of ways to help destroy cancer cells the ayurvedic way. Dr. Vinjamury made a resounding case for ayurvedic intervention in cure, management as well as prevention of cancer. He gave the connotations of *granthi* (lump that could become malignant), *apache* or multiple lumps mostly malignant and *arbuda* or malignant lumps. He said invariably most allopathic interventions have side effects, mostly adverse. In order to manage them ayurvedic remedies are being used specifically at the Regional Cancer Center, Thiruvanthapuram, and Kerala. Use of curcumin in breast cancer patients with radiation therapy improves the efficacy of the therapy by apoptosis mediated through DNA fragmentation. Similar is the case with the use of *mulethi* (*Glycyrrhiza glabra*) in colon cancer, piper longum in lung cancer chemotherapy; *tripphala*, mulethi or chirayata gargle for neck and head cancer radiation therapy to avoid mucositis, and so forth. *Pachakarma* improves therapeutic efficacy of chemo-radiation, but needs to be protocol-administered. *Boswellia serrata* reduces solid tumor size. An extract made from it has a tumor regression capability. In this it is better than cisplatin which is toxic whereas the extract is zero-toxic. Boswellic acid has shown effect in reducing brain tumor size. Sleep medication for cancer patients can be avoided through shirodhara. Dr. Vinjamury explained Ayurvedic understanding of tumors and cancer.

The Hall-Singh Cap Model

On the second day the Symposium on Policy Impact on Future of Ayurveda and Yoga was chaired by Dr. Bal Ram Singh, Chairman, Boston Center of Excellence for Health and Human Development.

Dr. Singh stressed the need for policy makers to act with right choices because technology on its own cannot get it right. Policy makers need to take a good look at the choices available and make wise trade-offs with reference to treatment-effectiveness and cost-effectiveness. He said five interrelated actions can spur competition in health care: putting patients' interests first, not rewarding volume, standardizing methods to pay for value, make data outcomes transparent, creating choice for both patients and providers. The Hall-Singh cognitive affective pyramid (CAP) model displays the step-by-step learning ladder for the three teaching approaches of ideals/concepts, contemplative practice and the integrated approach, eventually attaining a grasp of the scientific way. He also traced the policy development cycle in the health area.

Ayurvedic doctor and researcher Dr. Suhas Kshirsagar stressed on life style changes are often called for to overcome health problems. There is a wide-spread poverty in relation to time resource. Stress caused by such a rushed daily schedule can trigger growth of cancer cells. Time is worshipped by some, aggravating stress. Stress is the root cause of much disease. Kshirsagar explained why Ayurveda is the original lifestyle medicine. The Yoga Sutras advise "Avoid misery before they arise." The Bhagavad Gita exhorts "*yuktahara viharasya*" *Charaka Samhita* states that there are two kinds of physicians: the superior ones that promote prana and destroy roga, and the inferior ones that pursue disease (roga) and destroy prana..." The human body is not a structure, but a process. The human body is an information and energy field. Genes are deterministic, but as owner of the body, and with yoga expertise one can turn them on or off. The telomeres can be lengthened and one can change brain structure. Our relationship with time can be changed. We can transform and reinvent ourselves.

Sticking To the Circadian Rhythm

Dr. Kshirsagar brought out the cancer hazards of ignoring health norms such as being as close to nature as possible, consuming appropriate nutrition, resting as nature intended and related issues. He underlined the fact that the American Cancer Society itself states that 90% of cancers are of environmental origin, with toxic chemical exposure, poor diet, drugs, radiation, stress and negative emotions contributing to genomic instability. According to the EPA our homes are 5 to 7 times more toxic than toxic waste dumps. 287 chemicals are found in new born babies according to the Environmental Working Group 2005. Some 400 cosmetic products are unsafe and some of the ingredients in them are banned in many countries. Averages of 100 pharmaceutical medicines are found in significant quantities in public drinking water (US Geological Survey.) Dr. Kshirsagar reminded that WHO calls the night shift for ladies in particular as the carcinogenic shift. According to *Meta Analysis: Cancer Epidemiology, Biomarkers & Prevention*, night shifts account for 19 percent of all cancers, 41% of skin cancer, 32% of breast cancer and 18% of GI cancer. Cancer risk for nurses doing night or swing shift increases by 58%. Sleep itself a miracle drug and we ignore it at our own peril. And so is fasting. The critical significance is brought out by the fact that there are peak times for numerous bodily functions. For instance cortical catecholamine surge occurs in the morning between 6 and 9 AM. Plate adhesiveness and blood viscosity occurs around midday. Insulin is most produced between 5 and 6 PM. Eating, working, resting and other daily activities need to be informed of the peak time of metabolic activities for wellness sake. Ayurveda thus keeps an integrated 360 degree perspective on wellness that encases cure, maintenance and prevention.

Research Deficiency

Dr. Geetha Krishnan, Technical Officer, Traditional Complementary and Integrative Medicine, World Health Organization (WHO) critiqued the inadequacy and even lack of technical information regarding Ayurveda and other traditional health care practices. Not enough research is being undertaken to back the claims so that the traditional practices are more acceptable in the west. WHO is making good on this deficiency so that such health care modalities may be more easily tried elsewhere in the world. Under AYUSH auspices a consultative expert group has come up with a document on Ayurvedic terms together with morbidity codes. Mr. Krishnan mentioned Maharani Ayurveda which treated 50,000 people during a six-day program in which different modalities were considered, including the *panchkarma* technique. Dr. Krishnan walked the audience through a labyrinth of information on Ayurveda about cancer and how to use the information which included most aspects of cancer management, cure and prevention. There is also know-how about enhancing the effects of cancer therapeutics. The main reason patients approached the Integrative Medicine (IM) unit was to inquire if IM had techniques to improve the outcomes of chemo and radiation therapies already undergone, to reduce pain and side effects like edema caused by such therapy and seek any Ayurvedic breakthrough in cancer treatment.

Cancer Stigma

Under TED-Style Talk chaired by Dr. Mark Halpern, Dr. Shuvendu Sen, Director, Medical Student Education, Raritan Bay Medical Center, Meridian, NY took up the question of clinical evidence in yoga and ayurveda, both mental and physical. He mentioned the case of leprosy which had carried a stigma. The healing aspects can be well brought out by better data management and processing. Simple public health topics like stress which is considered the point of entry for numerous diseases need to be highlighted. It damages those parts of the brain like the hippocampus affecting recognition, cognition, awareness and so forth. This could be Alzheimer's, the terminal end of the patient resulting in hospice care in which there is no drug care. This is good rationale to introduce programs to educate the public regarding stress.

An interesting presentation was of Dr. Gregor Kos, and Former Secretary General, Ministry of Education, Science and Sport, Republic of Slovenia, Secretary of Yoga in Daily Life, Executive Director Sri Swami Madhavananda World Peace Council. He explained the spread of integrated medicine and how his Peace Council and Yoga in Daily Life are promoting it in Europe. He mentioned that the University of Maribor is a leading research place in integrative medicine. The Swamiji's Ashram was established in Vienna and ever since it has been spreading Yoga in pregnancy for improving the quality of life.

Consciousness-Based Medicine

One of the informative presentations on the second day was by Mr. Lothar Pirc, Maharshi Group, Germany and of the Escuela de Medicina Integrativa, Universidad Maharshi de Latino America y el Caribe (UMLAC.) The evidence produced showed impressive results at UMLAC using ayurveda and yoga techniques such as Transcendental Meditation (TM,) Maharishi panchakarma treatment for cholesterol decrease from 203.5 milligram to 179.5 over 10 days (n = 82) with a mean reduction of 10.5 percent, decreased hospital admissions in all categories of disease, *shatkriya kalam* for cancer a la ancient *Shushruta Samhita*. *Shatkriya kalam* is defined as the

accumulation of metabolites or wastes which in turn hinders natural processes occurring. Such a state is called '*Ama*' which triggers most diseases. The presenters also claimed that ayurvedic therapy of *Uro tarpan*, *Uro pchu* and *Rookshaswdam* are being used with excellent results for neuralgia or pain caused by surgical scar pains after thoracic surgery. The presenters introduced the audience to Ayurvedic terms such as *Sanchayam* meaning "etiological factors leading to diffuse individual cells developing characteristics of malignancy (reversible by apoptosis and selective killing)," *Prasaram* meaning malignant cells causing widespread conversion/uncontrolled proliferation of nonmalignant cells into malignant nature," *Bhedam* or Metastasis and others. The success of herbal medicine akin to ayurveda in Latin America was highlighted by Mr. Lothar Pirc. Some 36 ethnic groups there deploy transcendental meditation as mainstream medicine. There is backing for integrative medicine and there is a search for the unified field natural law. This is also known as consciousness based medicine. Details of these treatments and outcomes may be available from a few of the websites listed by the UMLAC presenter: www.ayurveda-rmany.com, www.lotharpirc.com, www.internationalayurvedacongress.com and www.imavf.org.

New Frontiers in Palliative Care

As Chair of the TED Style Talk session, Dr. Marc Halpern, California College of Ayurveda traced the concerns of cancer victims. Often, they feel that is the end of life and it shuts down. They are unable to decide whether to go for traditional radiation and chemotherapy or for some other integrated modality. It is misleading to call it complementary, whereas it is more like taking up the best practices in molecular medicine. This is what nature would dictate, how nature would solve a problem like cancer. Harmonious living with nature is the beginning. Psycho-sensual and emotional counseling could help greatly. Reflections in a quiet place and more reliance on homeostasis would perhaps lead to far better outcomes.

Dr. Mihir Kamdar, Associate Director, Division of Palliative Care, and Director, Mass General Cancer Pain Clinic, said that there is death in all illness, but somehow it is different in cancer, the prognosis more often than not being the hang out in a hospice. The silver Tsunami or the aging workforce as it is referred to, has an option to cancer confrontation: consistent yoga practice, which has been upheld by Cochrane reviews, especially for comfort in cancer treatment. Yoga is especially unmatched in the prevention of the emergence of the environment that entertains cancer.

Disease-Based Ambience

Dr. Satbir Singh Khalsa, Harvard Medical School, believed that the cancer risk factors were modifiable. 30 to 50 percent of all cancers are preventable with healthy life styles and eschewing smoking, alcohol and sedentary habits. Like Alexander R. Green perceived, it has become a "disease-based" approach to health care on account of critical and conflicting challenges: a) cultural diversity in population that is being served, b) constraint imposed by the managed care system that regulates practice c) fears of litigation and d) boom in medical technology. In this same disease-based ambience cancer treatment is also being verbalized. The medicines for treatment of cancer are too strong. Yoga health care can meet some of these challenges. Yoga can also be introduced in all work places.

Dr. Shuvendu Sen, Director of Medical Student Education, Raritan Bay Medical Center, author of "Why Buddha never had Alzheimer's"

elucidated the “Holistic Treatment Approach through Meditation, Yoga and the Arts.” There was a kind of stigma attached to cancer like in the case of leprosy making it more difficult to cure cancer-related issues. Stress causes some haplessness. It damages critical parts of the brain and that is the entry point for disease. There are five pillars propping up integrated treatment of cancer and palliative care for it: 1) Recognize it as a problem 2) Take into account the cognition issues with cancer 3) Promote awareness of it 4) Discuss the not-always terminal risk 5) Don’t underestimate the magnitude of the problem. Yoga’s neuroplasticity capability was also stressed by Dr. Sen.

Dr. Darshan Mehta, Mind-Body Medicine, MGH chaired the next closing session. Dr. Ariana Vora, Spaulding Rehabilitation Network, Harvard Medical School, made a compelling case for integrated medicine. Western medicine has technologically advanced in diagnosis and eastern health modalities excel in holistic treatment. There is a real and urgent need for the two systems to exchange ideas and go for best practices.

Which Brain Wave to Invoke – Alpha Of Course

Dr. Indranill Basu-Ray, Cardiologist and Interventional Electro physiologist, Chi St. Vincent Infirmiry, Arkansas, presented the view that heart-related and cancer issues continue to dominate much of medical discussion. In the transformation to integrated medicine it is essential that the profession plays a role in the change currently handling but one modality. Most often circumspection is called for in ayurveda or yoga intervention and every step needs documentation. This will in come in handy in several ways including as a successful a cure for a given condition. If it did not help, it helps to conclude why there was no success. The scientific method needs to drive any inquiry and scrutiny. If the goal is to induce relaxation then optimize factors that would elicit alpha waves. If light meditation ambience is needed theta waves may be induced. Generation of extreme brain waves such as Delta (speed 0.5 – 40.0 Hertz or cycles per second and Gamma 40 -100 Hertz) need to be minimized to avoid mental health issues. Each one of the waves has a specific purpose and function. Thus after a stress causing event Delta waves recorded in the frontal cortex enable osteoblast in which a cell secretes a matrix for bone formation. Mention of osteoblast in medical literature has increased dramatically in recent decades.

These remedies apparently obfuscate issues when yoga can help generate the much-required Alpha waves (7.5 – 14 Hertz) so much more effortlessly through breathing exercises and relaxation poses. It is an insult to yoga to treat tension and stress with cardiology medicine. Meditation has also had proven success in reducing tension. Yoga was successful in 5 out of 7 cases. Life style changes too would immensely help. Besides changes in genetic sequence, gene function can be changed by yoga and life style changes. Genes can be turned off or on without changing the sequence.

There is evidence of that and more of it is being brought up for review. Such changes brought about by yoga or any other means can have impact on a person’s health, disease or behavior. Dr. Basu-Ray suggested holistic evaluation of these research findings for further application on a wider scale. Available data sets in this area need to be shared in good faith in order to advance science. One surprise speaker on the 22nd and the 23rd was Dr. Shiva Ayyadurai, the tech expert from MIT Dr. Ayyadurai, Scientist and Entrepreneur, called for a systems approach to health care which demands group

cooperation, and breaking down silos.

Cancer Success Stories

The Plenary Session on the third day, June 24, was chaired by Dr. Satbir Singh Khalsa, Harvard Medical School. Yogi Coudoux, France, gave a interesting account of his personal journey in the search for yoga. Ms. Gautami Tadimalla, an actress from India gave a vivid description of her own cancer and what is being done to improve awareness of preventive steps. Mr. Dayashankar Vidyalankar, Yogacharya and Assistant Vice Consul, Consulate General of India, narrated different plans to promote yoga and improve public health. The Symposium of Integrative medicine and the role of Information Technology was chaired by Mr. Pramit Maakoday, Director, Indo-US Health Initiatives. Dr. Richard Fletcher, Lead Research Scientist, MIT Mobile Tech Lab, making an interesting presentation on “Emerging Technologies for Health and Wellness” urged building up human capacity for robust health, and not just treat for any disease or health problem. The preconditions that would make it happen are excellent mentors and advisors, an appropriate health platform, passion for a bigger cause, and field experience. Mobile apps can help with diagnosis and treatment, as well as launch of new treatments. Technology can be leveraged for scalability, data traceability, inclusion, and extendibility. Technology would also help with affordability of treatment, accessibility, correlation of symptoms and intervention, and traceability of quality of treatment.

Tech Platform for Cancer

Mr. Shrikanta Bhaskara, Solution Architect, Infosys, Bangalore underscored the critical contribution of technology for both diagnosis and data analysis. Tech platforms are being created for every major health problem including cancer. Dr. Haimanti Banerjee, Boston Children’s Hospital looked at different challenges that Info Tech poses in the areas of privacy, safety, rights of the hospital that generates the data, the nightmare of hacking data and medical error. The strict regulatory system is not fully able to cope with these issues. Coming up with suitable guidelines and safeguards would make IT more user friendly. The next symposium on “Health Care Policy in India – Healthy Smart Villages and Cities” was chaired by Dr. Pratibha Shah, Council on Ayurvedic Research, USA and formerly Chief Medical Officer, AYUSH Ministry, Government of India. Dr. Manoj Sharma referred to several shortcomings in the implementation of scientific systems to guide decisions at the highest levels. For some of the health issues such as cancer, advance planning is needed. After the onset of a health problem not much can be done effectively other than deal with the disease.

National Cancer Registry and IT

Mr. Rajesh Khullar, Principal Secretary, Haryana State narrated numerous steps taken by the Haryana Government for maintenance of accurate medical records, including electronic health data. Mr. Ajit Kesari, Principal Secretary, Madhya Pradesh Government, Bhopal began by giving the example of the Bhopal Gas tragedy as an egregious case that could have been avoided with a functioning information system that would alert public health authorities and all concerned about the impending release of highly toxic gases and cleared the city of population and thereby save lives. Mr. Kesari listed much of the preemptive organizational tasks completed or under completion such as the national registry of cancer. Similar registries are being built up for other diseases. Elaborate statistical database is being organized for most health issues for notifiable diseases like TB, but there are privacy issues in cancer matters,

which are being overcome. Thus we know in India 700,000 cases are coming up every year, but 60% of the cases are not known. Only the treated cases are registered, but not the others.

Ecosystem to Boost Immune Capacity

The Valedictory session was chaired by Dr. Jay Glaser, Faculty, University of Mass Medical School. Dr. H.R. Narendra delineated on the contribution of yoga to treatment of cancer as well as to cancer prevention by means of bringing up an ecosystem that strengthens the immune system. This would overpower the cancer cells and prevent their pointless multiplication. Mr. Amrit Desai, Founder, Amrit Yoga Institute spoke on the medical wonders that yoga can achieve.

The closing session of the 3rd Conference was chaired by Mr. Kanchan Banerjee, He traced the growth of the idea of promoting indigenous systems of medicine so that they could play a significant role in the mainstream of modern health care, instead of bobbing in the backwash as a complementary modality that would be hardly resorted to by traditional health care.

Good Progress in Ayurveda Deployment

Presenting a carefully drafted synopsis of the 3-day deliberations, Dr. Bal Ram Singh, Institute of Advanced Sciences, Dartmouth, MA felt that the current immense interest in Ayurveda and Yoga is heartening and is reminiscent of the cultural and religious renaissance in Europe a few centuries ago. Hinduism and Indian culture are perhaps unique in the manner the scientific tempo is adumbrated including entertaining the idea of the absence of a “God” per se. There is a careful study of human behavior as predetermined by one’s genes in terms such as *karma* and *prayaschitta* (price to pay for bad karmas done.) The effectiveness of ayurvedic and yogic techniques for both physical and mental problems was being increasingly realized. It is hoped that like in India, elsewhere to the practical uses of bovine by-products such as *panchagavya* (*desi* cow’s excrements), would be realized. Humans, in whatever stage of progress they may be, can return to nature for the benefit of all mankind.

This was the motivating force for spreading awareness of ayurveda and yoga modality in the West. Resolutions were passed to embody these objectives. One of them called on investors and venture capitalists to encourage, support and fund innovations such as integrative health clinics, and also help transform the health care industry [11].

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