

Book Review**Integrative Approaches for Health: Biomedical Research, Ayurveda and Yoga****Bhushan Patwardhan, Gururaj Mutalik and Girish Tillu; 2015, Elsevier/Academic Press****ISBN: 978-0-12-801282-6, pp. 357, Price: US\$ 99.95**

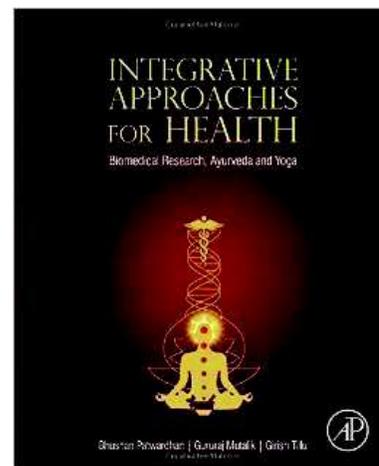
Authors of this book, as noted in the authors' introduction, "represent the three generations of scientific progress" and "bring a unique blend of domain expertise in each of the three components of this book *Biomedical Research, Ayurveda and Yoga*". This book's main thesis is that the traditional knowledge based systems of health-care need to be, and can be, integrated with the modern experimental research-based medical system so that populations receive holistic "health care" rather than only "medical care". As indicated by title of the book, authors believe that integration of the traditional health care system of India, encompassing Ayurveda and Yoga, with contemporary bio-medical science would provide the much needed holistic health care for improving individual and population health.

The 12 chapters cover a wide range of health care issues across the globe, the similar and contrasting features of traditional and modern medical systems and possible ways in which these can be integrated. Each chapter carries extensive references and illustrations. An Annexure provides a primer on Ayurveda and Yoga. The book begins with a chapter on advocacy for integration, followed by chapters on evolution of medicine, concepts of health and disease, evidence-based Ayurveda, systems biology and holistic concepts, lifestyle and behaviour, food and diet, health supplements, drug discovery and Ayurveda, longevity, rejuvenation and Rasayana, and personalized approaches for health. It ends with a chapter on integrative approaches for future. Each chapter provides a fairly detailed background on historical aspects as well as the contemporary bio-medical perspective related to the theme and compares the

same with the traditional systems and philosophies, especially the Ayurveda.

While advocating the need for integration of modern with traditional health care strategies,

the chapter 1 elaborates evolution of health care system in human societies, the current diversity of health related challenges in different countries/societies, the remarkable advances in biomedical sciences in recent times, the traditional and complementary medicine systems in different parts of world and the need for integration of modern medicine, Ayurveda and Yoga. It brings out the maladies of "medicalization of society" by the pharmaceutical industry driven market forces. The health care systems have evolved with time but unlike the European Greek and Latin medical care traditions which have been replaced by scientific evidence-based modern medicine, the traditional Indian Ayurveda and Yoga have largely remained unchanged and untested for centuries, thus remaining neither proven nor disproven. It is suggested that the traditional and complementary systems (T&CM) are "Experience-based medicine" in contrast to the modern "Evidence based medicine". Authors advocate that there is need for an "inclusive system



involving the drugs, pharmaceuticals, and surgeries, which can be drawn from modern medicine while diet, nutrition, lifestyle modifications, Yoga, meditation, acupuncture and such interventions can be drawn from T&CM”.

Chapter 2 traces the evolution of medicine in the different traditional health care systems across the world. An interesting point made in this chapter is “even today, the notion continues that medicine and doctors are for sick people. However, this is not so. Rather this should not be so. Doctors should actually help people remain healthy”. While comparing the development of science/philosophy in west and east, authors believe “Western mind and philosophy seems more restrictive, reductive, quantitative, calculative, and analytical—relying more on empirical, measurable parameters within the understanding or experiences of human sensory organs, or from instruments as their extensions” while “Eastern mind and philosophy seem more open, inclusive, holistic, qualitative, creative, and intuitive in approach, and not restricted to sensory experiences, but often marked by transcendence involving body/mind, and spiritual insights”. They suggest this difference to be due to domination of left brain on Western philosophy and of the right brain on Eastern philosophy. However, much more evidence and analyses are needed before any such generalization can be made or accepted. The figure 2.1 showing the western and eastern hemispheres of earth paralleling the presumed dichotomy between left and right human brain, therefore, appears more figurative than revealing any factual correlation.

The 3rd chapter on “Concepts of health and disease” discusses the fine distinctions between health and disease, health care and medical care and between holistic medicine and holistic health. This chapter also considers factors that determine health, quality of life and well-being. Authors believe that the commercialization of “wellness as a package is actually against the ethos and might take it down an exploitative path. Wellness is a very individual experience. To achieve a state of wellness, it is important to empower the individual”. They further state “Ayurveda and Yoga empower individuals with the knowledge, attitude, and behavior for positive

health and wellness; modern medicine provides objective tools for health assessment. The concept of health promotion in Yoga and Ayurveda are quite comprehensive. Ayurveda advocates for health promotion through advice on diet and lifestyle”. In relation to assessment and promotion of health, authors conclude “the importance of health promotion and disease prevention can no longer be overshadowed by disease treatment and therapeutics. Therefore, while an idea of integrative medicine is often promoted, this book advocates approaches for integrative health”.

The 4th chapter on “Evidence-based medicine and Ayurveda” considers the nature of “evidence” in the context of medical practices, its relation with cause and effect, the quality and levels of evidence and whether the traditional and complementary medicine systems meet the criteria to be “evidence-based medicine”. Authors argue that the principles of evidence-based medicine may have limitations in the assessment of traditional medicine systems since in these systems the treatments are “individualized according to the *Prakriti* and geoclimatic seasons”. This chapter also discusses the case of Homeopathy in light of concepts of i) hormesis, which in toxicology implies “low-dose stimulation and high-dose inhibition”, and ii) faith healing due to placebo and nocebo effects. While considering the evidence for Ayurveda and Yoga, authors admit that evidence from clinical practice and scientific research are grossly inadequate because in “India’s current regulatory scheme, no scientific or clinical data is required for the manufacture and sale of classical Ayurvedic medicines. Technically sound pharmacopoeia, good manufacturing practices, quality control, and pharmaceutical technologies for Ayurvedic medicine are still evolving”. Ayurvedic principles and practices are not backed by systematic drug discovery, development with the help of randomized controlled trials, and statistical analysis to show that the prescribed drug prevails over a placebo. However, the authors argue that the typical evidence-based medicine approach of the Western biomedical standards may not be typically applicable to Ayurveda, which “has a holistic approach based on thousands of years of experience. It is an integrated system that

considers body, mind, and spirit. Ayurvedic therapeutics is not restricted to the mere use of drugs. While herbal drugs are used, lifestyle modification remains the bedrock of Ayurvedic therapeutics. Lifestyle modification prescribed by Ayurveda is not just diet and exercise, but encompasses the entire process of personality—including mental attitude and personal philosophy”. However, I think that various Ayurvedic concepts and practices that were enunciated thousands of years ago also need to go through contemporary evidence-based validations. The last section of this chapter, named “High evidence low ethics”, brings home the point “while EBM aspires to reach a higher level of scientific evidence, practice of medicine has suffered from declining values and ethics”. The reason for prescription drugs being “the third leading cause of death worldwide” primarily lies in the vested interests which push unsafe drugs. Concluding this section, authors suggest need for “a balance of scientific medicine, EBM, and traditional experience-based medicine”. They hope that traditional knowledge and ethos can help to resolve the current impasse. As they state, drug discovery “should be curiosity- and research-based approach where passionate individuals are committed to serve the humanity by developing affordable effective treatments. Present drug discovery is viewed as a pipeline process, which has been outsourced to mechanical productions where evidence is seen as a commodity, which can be manufactured”. This state of affairs is indeed to be considered seriously.

The 5th chapter on “Systems Biology and Holistic Concepts” traces the reductionist and holistic approaches in various fields of science and medicine, and the emergence of Systems Biology in recent decades. Relevance of the systems approach to medicine is also discussed, taking the example of diabetes. Finally, parallels between the holistic Ayurvedic philosophy and Systems Biology are considered. A relationship between parts and whole is exemplified with the Vedic concept of *Pinda* (microcosm) and *Brahmanda* (macrocosm); they go on to find a remarkable visual similarity between a computerized model of universe and image of a neuron (Fig. 5.5) as an evidence for the *Mahabhoota* theory of commonality of primordial elements like earth,

water, fire, energy, air and ether in *Pinda* and *Brahmanda*. It is further stated that the number of neurons in human brain is the same as the number of stars in the galaxy and this is taken as an evidence for interconnection in the entire universe and is stated to be one of the fundamental principle of Indian philosophy and Ayurveda. One would like to agree that Ayurvedic principles consider the body, health and disease in a holistic manner, which is also the goal of Systems Biology. However, I think that such unfounded visual comparisons of universe and neurons or the number of neurons in brain and stars in galaxy (which galaxy?) and accepting the imagined similarity as a fact and an evidence that supports the “fundamental principle of Indian philosophy and Ayurveda” is taking circular arguments too far and indeed reflects the common malady of the belief held by many traditionalists that anything written in classical literature is beyond question.

Lifestyle and behavior are discussed in Chapter 6 in the context of the current epidemic of lifestyle diseases and how the traditional Ayurveda and Yoga suggested regulated life style and behavior can help reduce their burden. The various sections in this chapter include body, mind and consciousness, role of Yoga and meditation, mindfulness, the Yogic exercises, *Swasthviritta* (dealing with advice on diet and lifestyle), lifestyle and behavioral medicine, *Panchkarma* etc. This chapter also includes an interesting discussion on “Salutogenesis”, a term coined by Dr. A. Antonovsky from Israel to consider relation between health, stress and ways of coping with stress. Authors claim that the concept of salutogenesis draws substantially from Yoga and that the lifestyle and behavioral measures of Ayurveda and salutogenesis prevention strategies share a common perspective. The final section in this chapter discusses spirituality, which is a much discussed and much misunderstood word and concept. As the authors state, the meaning and concept of spirituality differs in different regions, religions and cultures varying from religious ideals to its being independent of religion and to be any blissful experience. Some equate spirituality with compassionate behavior. Emphasizing the Ayurvedic concept of *Sadviritta* or good behavior, they conclude “unless a positive change is brought about

in lifestyle and behavior, prevention and treatment of many diseases will not be possible”.

The next chapter on food and diet begins with an historical account and goes on to discuss food and nutrition, digestion and gut health, diet therapy, nutrigenomics and personalized diet and the Ayurvedic concepts of nutrition, bringing out the relation between Ayurvedic concept of *Prakriti* and digestion/metabolism. Fasting, which in many cultures around the world is considered useful for health promotion, disease prevention and for therapeutic purposes and also taken as a spiritual practice, is suggested to facilitate meditation and enlightenment. Thus consumption of natural foods and fresh vegetables/fruits, restriction of calories and mental state of the person are believed to positively influence health and longevity.

Chapter 8 on health supplements discusses the significance and relevance of nutraceuticals, non-nutritional supplements, antioxidants, vitamins, minerals, phytochemicals, lipids, probiotics, fibres etc. in disease prevention and good state of health. Taking the various aspects together, it is suggested that the utility of nutritional supplements is uncertain, and the high popularity of such supplements may be an outcome of high profits rather than high evidence. In conclusion, authors remind of Hippocrates' advice “Let the food be your medicine rather than “Let the medicine be your food”.

The contemporary drug discovery process and its relevance to Ayurveda are considered in chapter 9 of the book. After discussing the history of drugs and the contemporary changes in drug discovery process in modern medicine and impasse and failures in the same, authors discuss how the traditional knowledge may be utilized. They “hypothesize that a strategic mind-set shift from *drug discovery* to *formulation discovery* to *therapeutics discovery* will open up entirely new avenues to integrative health and medicine”. They go on to discuss some examples of classical phytopharmaceuticals and Ayurvedic formulations which may be exploited for innovative formulation discovery and network pharmacology for the integrative approaches. With a view to encourage such exploitation of natural products, this chapter ends

with a Vedic statement “Everything found in the universe has utility. There is no shortage of resources in nature, but what is rare is the talented strategist who can make the best use of available resources, who can innovate ethical, and viable options in the best interest of people”.

The next chapter on longevity, rejuvenation and *Rasayana* emphasizes the point that ageing itself is not a disease but the process of ageing or senescence increases vulnerability to many diseases and thus what we need is “healthy ageing”. Rejuvenation repairs, delays or reverses the ageing-related damages. The Ayurvedic concept of ageing accepts that the body (*shareera*) is an entity that decays and withers but the ageing and lifespan are influenced by the three *Prakriti* (*Kapha*, *Vata* and *Pitta*) types. Among the eight major branches of Ayurveda, *Rasayana* comprises lifestyle, diet and plant, mineral and/or animal products which are stated to have defined properties to promote growth, improve immunity and tissue regeneration and thus improve lifespan. Effects of some specific *Rasayana* therapies on ageing and immunomodulation, free radical scavenging, neuro-cognitive improvement, radioprotection, regeneration etc. are described. Evidence for activities of some *Rasayana* formulations as aphrodisiacs or anti-ulcer/anticancer agents are also discussed in light of contemporary experimental evidences. In the context of current excitement about stem cells, authors suggest that a better understanding of the Ayurvedic concept of *Dhatu* (tissue) specific *Rasayana* may help directed differentiation of pluripotent cells into specific tissues and organs. Therefore, they suggest a systems approach to study effect of *Dhatu*-specific *Rasayana* on adult and embryonic stem cells. In support of the hypothesis that *Dhatu*-specific *Rasayana* would promote stem cell differentiation into specific tissue types, evidence is cited to show that *Medhya Rasayana* promotes stem cell differentiation into nerve cells. As part of *Rasayana* therapy, *Kayakalp* (a regime for total rejuvenation of the body) is also discussed. This process involves confinement of the individual in a specially designed cottage (*Kuti*) with regimented body purification protocols of *Panchakarma* and other processes, including fasting and administration of individual-

specific *Rasayana* diet. *Kayakalp* is presumed to prolong the lifespan. However, real experimental evidence for the presumed effects is missing. Experimental evidences which show extension of life span in experimental model systems by some of the *Rasayana* formulations or calorie restrictions too are discussed. Authors refer to a website which claims to have described steps toward human immortality. However, I would emphasize that such websites and the material therein cannot really be taken as acceptable evidence. Finally, effects of Yoga on lifespan and potential areas for future research are discussed. The support by WHO to “adding life to years” rather than “adding years to life”, seems to echo the old Vedic philosophy to live a healthy life with purpose and accept death fearlessly and with dignity. However, the mechanism of actions of traditional Ayurvedic *Rasayana* has remained largely unexplored.

The chapter on personalized approaches for health reviews human typology, diversities and classifications in relations to health and disease. Following a discussion of types of human constitutions in different traditional and modern systems from the viewpoints of health, psychology, behaviour, somatotypes, genomics, metabolomics and epigenetics, the concept of personalized medicine in Ayurveda is discussed from the perspective of *Prakriti*. Possible experimental evidences from genetic and genomic studies to support the validity of Ayurvedic *Prakriti* classification are briefly considered. The discussion goes on to consider “*Prakriti* programming” of progeny from the epigenetic perspective and to raise the possibility that such knowledge may be used for genetical programming for better health. It is further suggested that a good understanding of the nature and basis of *Prakriti* can help in better understanding of physiological variations, improved diagnosis, and the chronobiological rhythms in different individuals. The various “omics” and computational techniques need to be applied to understand Ayurvedic concepts of *Dosha*, *Prakriti*, *Guna*, *Srotas*, *Agni* etc.

The final chapter on integrative approaches for the future first lays the foundation for need of

integration so that medicine shifts from “illness to wellness, from treatment to prevention and early diagnosis and generalized approach to personalized medicine”. Authors’ model of integration requires broader vision and open mindedness so that neither the modern medicine nor the traditional systems like Ayurveda and their respective practitioners remain isolated. As they say “Ayurveda and Yoga professionals cannot continue to position themselves as ancient traditions anymore. They cannot exist merely on pride, and past glory; nor can they remain dogmatically ritualistic. They must learn the methodology of science, and the understanding of evidence. They must come out of relying on unproven anecdotal evidence, and embrace scientific research attitude. They must be open to questioning, and experimentation. While retaining their pride in their heritage, they must move with the times to contribute to the further development and growth of their ancient wisdom”. Likewise, the biomedical professionals “should not monopolize medical care or health care”.

This book draws on expertise of the three authors in different disciplines of health care and thus provides insights into diverse health-related issues that all populations across the globe are facing. This book serves an important point of drawing attention to the negative side of contemporary health care systems and practices and suggests the importance of integrating the best of modern and “ancient” wisdoms. From this point of view, the book would be of wider interest, not only to medical practitioners of various types but also to general public. It would facilitate a wider appreciation of the need of holistic health care and of the need to understand that prevention is better than cure. Prevention requires maintenance of homeostasis as well as homeodynamics of the biological system that our body is. It is here that the age-old experience-based classical systems of health care can contribute immensely if followed with a critical and rational understanding. Authors are to be congratulated for bringing the very diverse ideas and practices together.

The vast area covered in this book is a rich source of information relating to the different ancient and traditional health care systems as well as to

contemporary biomedical research and its application in modern medicine. This should stimulate serious thinking. However, the reading is not as smooth as desirable. Besides some typos and awkward sentence constructions, the very wide canvas projected in each chapter occasionally becomes a little “heavy” to follow because of some discontinuity between different sections and sub-sections in a chapter and because of occasional repetitions. The other critical point concerns the generally unquestioning acceptance of what has been stated in ancient texts as the gospel truth. Authors suggest re-enquiry about the classical Ayurvedic concepts only in very limited cases while most of the ancient beliefs, practices and statements are taken as fact. I think this is a major roadblock for a wider acceptance of the concepts and practices of traditional health care systems, including Ayurveda. There are numerous examples in all disciplines of modern science where “experimentally proven and well established facts” were found to be in error by subsequent studies. Thus a critical re-examination of philosophies and practices enunciated in *Charak Samhita* and other classical texts, supposedly written several thousands of years ago, is not to be taken as

an insult to the wisdom of these great sages. With passage of time and especially when the texts have been transmitted across generations through the oral rather than written route, there are always possibilities of “mutations” as well as local and temporal variations. There is indeed an urgent need to re-examine them in entirety without any bias towards proving their correctness and supremacy. Some of the many figures in each chapter present speculative aspects in a form that gives the impression as if they have been established. Moreover, the extensive text in some of the figures is in too small a print to be readable. I do hope that the next edition of this book would be prepared soon to address these issues so that this interesting book presents a more balanced and critical appraisal of the traditional and the contemporary modern medicines in a more reader-friendly manner. That would not only better frame the necessity of their integration but would also more clearly define the path for integration. An Indian edition of the book, with much less cost than the present international edition, would also help a wider readability.

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