

Ayurveda and the battle against chronic disease: An opportunity for Ayurveda to go mainstream?

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INTRODUCTION

One of the most significant developments of 2009, indeed, medically speaking, of the millennium, has been the formation of the Global Alliance for Non-Communicable Diseases.^[1] The Alliance has been established by agreement between the heads of the world's top agencies directing publicly funded medical research: the US National Institutes of Health, the UK's Medical Research Council (MRC), similar agencies in Canada, Australia and China, and most importantly for J-AIM, the Indian Council of Medical Research.

According to Sir Leszek Borysiewicz, Chairman of the United Kingdom's MRC, the Global Alliance will fund research on non-communicable diseases, particularly chronic disease, aiming to identify effective means of prevention,^[2] presumably meaning those that can be implemented most reliably and cost effectively.

The reason for the formation is simple. Non-communicable diseases now account for more than 60% of mortality worldwide, of which developing countries like those in South Asia carry 80% of the burden. More specifically, it arose out of a study^[3] of their preventable mortality rates in the developing world, now more than twice the preventable mortality rates of infectious diseases. Among the major goals identified by the study were the need to engage with local communities to better understand local impact and involve local business; to reduce the impact of significant risk factors; to recognize the impact of poverty and unplanned urbanization i.e. shanty towns and, to reorient health systems' capacity from communicable to non-communicable diseases i.e. chronic disease care.

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For those who deeply understand Ayurveda's capacities, this news reads like a carte blanche to write a prescription for involvement of Ayurveda in global health care – and at the very level where it is best suited to contribute its utmost. Here is an opportunity that those with expansive vision of Ayurveda's potential and capacity have been waiting for, a chance to offer its virtues in service of humanity, so that it may contribute to the betterment of quality of life world-wide.

Unfortunately, it is not that simple. Things rarely are. Few of the agencies concerned have extensive knowledge of Ayurveda and despite the advent of such publications as the WHO Global Atlas of Traditional Complementary and Alternative Medicine,^[4] there is little appreciation among policy makers that Ayurveda is now understood both experimentally and theoretically, well enough to justify serious contention for funding. What is needed is a marketing drive to clarify the potential that Ayurveda offers to help solve the global crisis in chronic disease.

Other Thought Leadership articles in this issue have treated validation of Ayurveda treatments, and its use to reduce drug development costs and lead times – things of concern to many industries and scientists. Each J-AIM Editorial Board member is offering leadership in the field they know best. This article concerns fundamental concepts in Ayurveda, and how translating them into terminologies that biomedical scientists can accept, may be a significant way to assist its acceptance as a means to tackle the global chronic disease problem.

AYURVEDA AND MODERN SCIENCE

One uncomfortable fact about Ayurveda is that its knowledge system is so very different from that of biomedicine. As Shankar points out,^[5] at its root, it is holistic: Ayurveda never loses sight of the whole, while biomedicine remains primarily concerned with parts of the system. Ayurveda begins with properties of the whole organism, starting from the whole system, and moving to smaller and smaller subsystems, so to speak. Biomedicine, on the other hand, being reductionist, is wedded to the idea that, if cause and effect theories are

to be properly articulated, tiniest components must be considered most fundamental, then building larger structures out of smaller ones. The primary objective of the former is to describe integration of systems, of the latter, structural components, and their individual function.

Thus we arrive at two complementary view points: one concerned with the whole person, including 'Body, Mind and Spirit' as an inherently 'integrative' system; the other regarding inanimate molecules and supra-molecular structures as fundamental, and wondering as a result, where its definition of life has disappeared to. Clearly, translating between these two very different conceptualizations of 'organism' and 'life' presents a substantial challenge.

It is also scientifically intriguing: how could a good, self-consistent account of human physiology have arisen that is apparently such a challenge to understand in terms of modern science? Especially when its validity is established in the complex tasks of accurately diagnosing pathology, and providing the basis for prescription - of usually highly efficacious treatments for chronic diseases.^[6]

The proof of a pudding is in the eating thereof. In truly digesting what initially seems like a 'pudding of Ayurveda', students find a rich and an invaluable system of medicine.^[7] Nevertheless, even for motivated students, Ayurveda initially seems a mysterious 'pudding' indeed. For some of us, its mystery proved bewitching, the challenge to elucidate it, beguiling.

The challenge of the mystery has one possible implication. In the very differences making Ayurveda and western thought so different may lie its ability to restore health to those chronically ill. Indeed, Ayurveda's potential for treating chronic diseases, even cure them, provides strong motivation to try to make progress on the problem.

The central questions are therefore, firstly, 'How can fundamental concepts of Ayurveda be translated into modern scientific terminology?' And, secondly, 'If that were accomplished, would the translations still reflect some value of wholeness?'

AYURVEDA AND CHRONIC DISEASE

In its own terms, expertly practiced Ayurveda can definitely yield reliable, efficacious results when applied to all manner of chronic diseases. Its etiological theory must be robust. This theory is based on the concept of 'Tridosha',^[6] the three doshas, Vata, Pitta and Kapha, their roles in system, subsystem and organ function and the sequence of processes occurring as they are driven 'out of balance' in a general sequence known as 'Shad kriya kala',^[8] the six

stages of dosha imbalance. As several articles in this issue emphasize, this is the winning point of Ayurvedic theory, allowing it to tackle chronic illness - a 'Trojan Horse' transporting the guardians of health into the camp of disease.

The reason why biomedicine can not treat chronic disease as effectively as Ayurveda lies in its apparent lack of any knowledge structures equivalent to Ayurveda's Tridosha and Shad kriya kala. Were this lack remedied, it would be able to do so, provided that it also adopted Ayurvedic diagnostics and approaches to treatment; the whole system is needed, not parts in isolation. That is why the whole structure of Ayurveda *dosha* theory needs to be laid out and 'decoded' – what exactly is it telling us?

DECODING AYURVEDA

Before proceeding we must lay down caveats. Meulenbeld, the great Dutch scholar of Ayurveda, has asserted that we should not even attempt translating Ayurvedic concepts into scientific terms, for that would risk degrading them. In keeping with this, Ayurveda must, at all costs be accorded its own integrity; as Shankar explains (see pages 3-5) not to explain its features in reductionist terms, for that would be merely to equate them to parts. Worse still, it would attempt to 'explain them away'.

And to those who may suggest we should provide 'definitions' of Ayurvedic terms, I offer this caution: we should be beware of attempting to 'define' any Ayurvedic concept, particularly in terms of modern scientific terminology. Each Ayurvedic term transcends limits of different areas of modern science; trying to 'define' that concept in particular scientific terms, is effectively trying to restrict it to areas of application defined in reductionist terms, which do not apply to it! The Ayurvedic terms themselves usually 'know not' such restrictions. The same term may apply to a bewildering variety of areas – as Gadgil emphasizes (pps 77-80). It is up to us to elucidate these, establish their connections and hopefully show that what seem to us unusual extensions are natural in light of the complexity of inter-system interactions. Bearing these thoughts in mind, let us proceed. Considered in detail, doshas are apparently very general concepts: Ayurveda applies them to elephants,^[9] horses^[10] and cows,^[11] its contributions to veterinary science are well known; some apply them to birds,^[12] *doshas* apply to reptiles. In an article on *Drosophila melanogaster*,^[13] Priyadarshini applies them to insects. They seem universal properties of organisms throughout the animal kingdom.

Others apply tridosha to plants, and to plant disease. Once seen as common properties of the plant and animal

kingdoms, the idea comes that doshas may be universal properties of all living organisms. It is suggested that they constitute systems properties of every organism, present in the earliest cells.^[14,15] The attraction of identifying doshas as systems properties is that systems' thinking is inherently holistic. The idea that Ayurveda inherently describes holistic organism function is therefore maintained. The first caveat required of 'Decoding Ayurveda' and its fundamental concepts is therefore satisfied; the concepts into which we first translate Ayurveda's basic concepts are not familiar, anatomically based and reductionist. They are less familiar, more holistic systems concepts.

The approach extends easily to subdoshas. For *Shadkriyakala* a related approach is required. It hinges on the following: (i) *dosha* imbalance occurs when the organism faces too great a challenge, and (ii) an organism can only respond to challenge by switching, or finely tuning, some regulated process. Hence theories of system regulation lie at the heart of understanding *dosha* imbalances and *Shadkriyakala*.

Fortunately, regulation is obviously connected to what we now know of *doshas*. Organism efficiency and competitiveness require regulating all fundamental functions: all systems functions associated with doshas must be closely regulated. *Doshas* are identified with regulated systems processes.^[15] Similarly, subdoshas become connected to subsystem regulation. The following picture emerges: as evolution unfolded, and increasingly complex organisms developed, their systems of regulation also had to evolve to regulate increasingly complex subsystems, with organs of increasing complexity.

Thus Ayurveda's system of *doshas*, initially a simple, single cell regulatory system, progressively developed into our own doshas, subdoshas and organ *doshas*, able to regulate organisms of ever increasing complexity. Without their regulatory systems, the organisms concerned would not have been viable, so the evolution of the two is irrevocably linked. Regulatory system evolution, something that bioscience has almost completely neglected, is in fact key to evolution itself: it is part of 'Complexity', a still poorly appreciated development of the past quarter century.

Major ideas have emerged from studies of complexity, however.^[16] One is that complex environments and competition induce highly unusual strategies of control in competing agents. Their regulatory systems become richer in structure, capable of 'modeling' their environments: in particular they become hierarchical. Such hierarchical regulatory structures are inherently *holistic*.

Holistic, hierarchical structures of regulation of the kind

envisioned through 'decoding Ayurveda' are therefore completely natural. Complexity-driven evolution has transformed each original *dosha* into an hierarchy of connected regulatory processes, each layer responsible for guiding the one underneath it - as seen, for example, in the psycho-neuro-endocrine axis.

Such a structure cannot be reduced to individual components without losing some essential interconnected function.^[17] Once again, to understand Ayurveda fundamental concepts, an holistic structure has been invoked: Ayurveda's holistic nature is not being violated. Rather, a serendipitous, holistic model of Ayurvedic fundamental concepts emerges: Shankar's and Meulenbeld's strictures are satisfied.

Shadkriyakala's central concept of 'Doshas going out of balance' thus involves regulatory failure in hierarchical systems of regulation: successive stages of imbalance are represented by sequential stages of departure from equilibrium.

CONCLUSIONS: THE OUTLOOK FOR RESEARCH

The above sequence of ideas may seem promising, but it needs completing with clearly thought out research programs. The theory of tridosha should then be extended to include other Ayurveda fundamental concepts; the 5 mahabhutas, 7 dhatus and 13 agnis. A massive program of theoretical research can justifiably be implemented. The aspiration to decode Ayurveda theory will then have been fulfilled, a theoretical basis for Ayurveda Integrative Medicine developed.

Modern biomedical sciences are becoming increasingly systems oriented. Analyzing regulatory and information processes plays an increasingly important role in understanding the nitty-gritty of biological function,^[18] particularly in complementary medicine.^[19] The understanding of Ayurveda that is emerging, is *mirabile dictu*, entirely compatible with the directions being taken by modern 21st century theoretical biology.

With this promise, surely it is time to explore integrative practice of Ayurveda to treat chronic disease. The Global Alliance for Chronic Disease^[1] reveals an almost inevitable defeatist sentiment in espousing Daar's sixth and final goal,^[3] namely 'to develop the capacity to build chronic care models.' When the world of biomedicine is locked into a vision that the best it can do for the chronic disease crisis is to let millions languish in the pain and misery of 'chronic care', are Ayurveda, or Yoga and other traditional AYUSH systems, going to sit by in a state of apathy? Is it not rather our call and our duty to offer the

best of our knowledge and skills to assuage the crisis with which our world is now faced?

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