

Lecture Series

Second World Ayurveda Congress (Theme: Ayurveda for the Future)—Inaugural Address: Part II

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Ayurvedic Research: Scientific Questions to Address

At the Science Congress we held here in this same Pune University Campus, Noble laureate Professor Richard Ernst lectured on work using the latest advances and tools in high-resolution solid-state NMR, to gain understanding of the Chinese system of Acupuncture at the molecular level. He referred to papers in the Proceedings of the US National Academy of Science (1). You see, while western scientists are scientifically probing the ancient practices of the East, our own Indian research is invariably focused on the West's leftover problems. That is unfortunate: it is a great, great pity indeed.

As I have said, Ayurveda is the 'Science of Life'. The period 600 B.C.–800 A.D. has been called the 'Ayurvedic period' (2). At that time, developments in Ayurveda led to fundamental advances in chemistry, and in our ancient forms of botany and zoology, as well as its own discipline of medicine. Today, however, Ayurveda gets equated only with herbal products. That is not only unfortunate, but also it is just plain wrong. It presents a vision of Ayurveda through the spectacles of molecular medicine and pharmacology, and excludes the greater proportion of its substantial scientific value. Dravyaguna, Ayurvedic knowledge of herbs, forms only a small part of the whole system.

Similar to the way that Nobel laureate Richard Ernst was looking at Acupuncture and the science behind it by probing with high resolution solid-state NMR, much of Ayurveda requires fundamental physical investigation. For example, Ayurvedic etiology is couched in terms of the concept of Dosha Prakriti, as are physician's strategies of treatment. It is scientifically very important to decide whether Prakriti has a genomic basis (3), as Patwardhan has suggested (3), or if they are only phenotypes. We are only beginning to address this question, and future developments may be very

important (4), since establishing a full scientific basis for Tridosha would be of the utmost significance.

Valiathan also addresses (5) several other similar questions. If we investigate Panchakarma, that powerful tool to detoxify the body, does it alter the patient's biological and immunological profiles? This has not yet been investigated. Then there are the Rasayanas. What do they do? Do they accelerate repair of damaged DNA? Can any show improvements in mouse models of Alzheimer's, such as inhibition of beta-amyloid accumulation? These questions have not been addressed. There have not been any studies on them; they are virgin territory where we can make major applications and advances.

I would go as far as saying that just as we have cellular biology, molecular biology and structural biology, there must be an 'Ayurvedic biology' that we should start talking about. I must give credit to Dr Valiathan for coining this phrase (5,14). The more I think about it, the more I believe in it. What has India given to the rest of the world? Did we give cellular biology, molecular biology or structural biology? Did we give structural genomics, functional genomics or pharmacogenomics? No, but we can give Ayurvedic biology (14) and Ayugenomics (3) to the world alright. We need to think really seriously about that.

CSIR Involvement: The New Millenium Indian Leadership Initiative

It makes me very happy to see that systems that used to be immune to traditional medicine are getting integrated. As Director General of CSIR, I am very happy that we have instigated major programs of research. Getting the program going was very tough. I still remember, Arya Vaidya Shala, Kottakal, where I went with Dr Warriar to sign our Memorandum of Understanding, and how, because of some sort of mutual suspicion, it took us

almost an year to get together. Dr Warriar is a very great visionary and Dr Valiathan managed to bring us together. I well remember how, when we had signed the memorandum, Dr Valiathan said, 'This is a holy place for me, because there are two rivers meeting here. One is the river of traditional knowledge, Arya Vaidya Shala, and the other is the river of modern knowledge represented by CSIR'. 'Sangam' is the word he used.

I only wondered why it had taken so long for this 'Sangam' to take place, but now that it has done so, an unbelievable program has developed. There are 19 CSIR laboratories, 21 universities, Arya Vaidya Shala and a whole range of people working together. It has evolved into a great program. The CSIR programs include:

- identification of target therapeutic areas
- selection of extracts
- discovery of active fractions
- molecular description of active fractions
- optimization through mixing of fractions
- understanding mechanisms of action
- toxicological studies
- clinical trials

A whole range of things are beginning to happen.

I am particularly happy to recognize the presence here today of Dr Ashok Vaidya, the Director of SPARC, and Professor Bhushan Patwardhan, Director of the University of Pune's Department of Interdisciplinary Health Sciences. They have both been instrumental in driving the CSIR Program, which forms part of the 'New Millennium Indian Technology Leadership Initiative' (7). The program was started at the beginning of the new millennium, hence its name, which means those areas where India can take a lead—where we have sustainable advantage. Ayurveda is one area where we really have sustainable advantage, and which we can offer to the world to fulfil many crucial needs in world medicine (9). Many scientists have been working on it together. On what?

- establishing the pharmaco-epidemiological evidence base for Ayurvedic medicines(8)
- the practice and development of standardized herbal formulations (9)
- randomized controlled clinical trials for rheumatoid and osteoarthritis (10,11)
- hepato-protectives (12)
- diabetes (13)
- hypolipidemic agents (14)
- asthma (15)
- Parkinson's disease (16)

and many other disorders and the Ayurvedic medicines prescribed for them.

There has been remarkable progress, and I especially want to thank Professor Bhushan and Dr Vaidya, and the others who have been spear-heading this program that is such a great Indian initiative; something I could

not have talked about 5 years ago, something I could not have visualized when I was standing here as President of the Indian Science Congress in the year 2000. At that time, it had not happened, it did not exist. You see how a whole movement can take place!

In that science congress I remember my presidential address (18) on five new proposals, a 'Panchsheel', for the new millennium. There were:

- child-centered education
- woman-centered family
- human-centered development
- knowledge-centered society and
- innovation-centered India, in that knowledge-centered society.

In getting it all together, I had had to redefine knowledge, not just scientific knowledge, but traditional knowledge and spiritual knowledge as well. On January 3, 2000, it was just a dream, and I am so happy to see the dream coming true. Vice-Chancellor, what I have found in my life is that you have to dream. People will call you crazy. That makes no difference. That is why when all of us sat together on the 2nd of this month, we were dreaming about Pune University. All of us must have that dream, and it will come true. Like myself today, you will stand here one day, and you will talk about how our dream came true. Let us keep on dreaming. Our dreams will come true.

Intellectual Property and Ayurveda

I want to touch on a couple of other points. One is the issue of intellectual property rights, which will be discussed in the afternoon. Among the many things this country can be proud of is the fact that we raised our voice when our traditional knowledge was being hypothecated. Wound healing properties of turmeric are well known. I remember reading about them in the 'Times of India' the morning that the news about the patent was announced. I said to myself, 'Come on, this cannot be. My mother knows about it'. That my mother knew about it was evident to me because right here in Pune at the National Chemical Laboratory, we were sitting one evening—me, my wife, my son Ameya and my mother—when a bird came and fell down. It had suffered a severe injury, a broken wing. I remember my mother ran down and made a paste of turmeric powder, 'haldi', and applied it to the bird. The beauty here, by the way, is that not for a single moment did she think, 'Will what is applicable to a human being also be applicable to a bird?' That is India, alright! I also remember how, when the bird died after a couple of hours, we all cried as we gave it a grand burial.

The *Times of India* article reminded me of that. I said, 'How come?' There and then we decided to challenge it.

My problem was that although I am Director General of CSIR, which gives me all the freedom in the world, I am also Secretary to the Government of India, which takes away all that freedom. So in the evening, with P. N. Haksar presiding over my lecture, when I announced I was going to challenge it, I had forgotten my role as secretary. I should have requested permission because the Department of Industrial Policy and Promotion was responsible for those patents. In the end, CSIR decided to fight, and within 14 months we had won the case.

It was no small case, by the way. It was the first time that a developing nation had protested that you cannot do such things. Later, we found out why it had happened: not because US wanted to steal it, NO!! It was simple. I went and sat in the US patent office and spent a full day seeing their systems. They showed me how, when a patent like this is applied for, they search on the words 'turmeric', 'wound healing' and 'powder', and see what comes on the screen. What came on the screen? Nothing. Nothing came on the screen! Why? Because it was all in our heads, or in some ancient books, to which they had no access.

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