

# Sri Ramachandra University

## IX Convocation

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### Shaping India's Health Destiny

Convocation Address

By

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2007 marks the 60<sup>th</sup> anniversary of independent India's, "tryst with destiny", to quote Jawaharlal Nehru. Nehru's vision of an independent India included freedom from poverty, illiteracy, malnutrition and ill health. Shri N P V Ramasamy Udayar, the legendary Founder Chancellor of this University shared this vision when he established the Sri Ramachandra Medical College and Research Institute in 1985. Within a short span of 22 years, this institution has become world famous for its excellence in health care and concern for health equity. I congratulate all taking their degrees today for choosing this great institution committed to the goal of "health for all and forever" as their *alma mater*. In your professional life, you should always keep in mind the Mission of your *alma mater* that through health care and research, you should enrich humanity at large. You in the Medical profession can particularly make a difference in the lives of the economically and socially under-privileged sections of our Society, by following Mother Teresa's principle enshrined in the following words,

"My work may be a drop in the ocean; but the ocean will be less without that drop".

Even after 60 years of independence, our country is still characterized by extensive child and adult malnutrition, high maternal and infant mortality rates, skewed sex ratio and pandemics like malaria, tuberculosis, diabetes and HIV/AIDS. Each one of you, inspired by the example of the Founder-Chancellor of this University, should work to become a

transformational agent in taking the country towards the goal of health equity and security.

This century began with remarkable achievements in science and technology, particularly in the area of molecular genetics. Human genome mapping has been completed and more than 50 hitherto unknown disease genes, including ones responsible for epilepsy, deafness, colour blindness and muscular dystrophy, have been identified. The human genome map has also revealed that all members of the human family have in common nearly 99.99 percent of their genetic information. Thus, there is no scientific basis for discrimination on the basis of race, colour, caste, class or gender. It is a matter for shame that the sex ratio continues to be unfavourable to women in our country. In part, this is due to the abuse of new technologies which help to identify the sex of the child in the early stages of pregnancy, thus facilitating female foeticide. As the power of technology grows, the ethical responsibility of the medical profession will also increase.

For example, the use of stem cells derived from embryonic cells is a thorny issue. Embryonic stem cells have medical promise because they have the capacity to become any one of the more than 200 cell types making up the human body. Geron, the most advanced of the firms that are studying these cells, has worked out how to lead embryonic stem cells to turn into seven different types of normal cell line, which may be used to repair damaged tissue (heart, muscle, pancreas, bone, brain in Parkinson's disease, spinal injury, and liver)

At the Department of Experimental Surgery at Berlin's Charité Hospital, scientists have developed a small bioreactor containing a matrix of hundreds of membranes, within which they have coaxed human adult liver stem cells to grow into complex living tissue remarkably like a healthy liver. When the researchers feed a patient's blood through the bioreactor, the cultured liver cells take over all the normal, healthy functions of the patient's own diseased organ. Jörg Gerlach, who heads the Charité Hospital's team, hopes to use the liver's regenerative capacity to make many transplants unnecessary in the future by hooking patients up to the reactor so their own livers can take time off and recuperate.

Type-1 diabetes affects 5 million people worldwide, but type-2 diabetes affects 150 million people. As you very well know, the key distinction is that type-2 diabetes is characterized by the inability to utilize the insulin produced by the body, whereas type-1 diabetes is an autoimmune disease in which the body's immune system attacks the islet cells in the pancreas that produce insulin. In the technique developed by James Shapiro in Canada, known as the Edmonton Protocol, islet cells from the pancreas are implanted into the liver, where they stimulate blood supply and begin producing insulin. Previous attempts to transplant islets were successful in only 8 percent of cases, but with this new method 89 percent of patients were still producing insulin after three years.

On 12 February 2004, 14 biologists working in different scientific research institutions in South Korea and led by Woo Suk Hwang and Shin Yong Moon from Seoul National University announced on the website of the periodical *Science* that they had produced the first human cloned embryo, as well as stem cells from this embryo that are capable of differentiating into somatic cells. These claims have subsequently repudiated and discredited. The issue of reproductive cloning raises serious ethical issues. While there should be no objection to therapeutic cloning, reproductive cloning has serious moral and spiritual implications.

Gene therapy, which aims to cure illnesses such as cystic fibrosis, is in fact a type of genetic modification, although admittedly one that is not passed from parent to offspring. It generally meets with high social acceptance, especially when there is no cure and it is the last recourse.

For instance, a treatment for Parkinson's disease via gene therapy was tested for the first time on humans on 18 August 2003. The experiment was carried out on a 55-year-old patient at the New York Presbyterian Hospital with the approval of the US Food and Drug Administration. It was pursued in the following weeks on 11 other patients. It consists of an injection into the brain of a virus carrying the gene for the synthesis of dopamine (whose lack is the cause of the disease). The scientific community was divided about this gene therapy approach, which some neurologists considered highly risky.

Social acceptance of medical biotechnology and related ethical issues emphasise that reliance should be placed not through a ban on basic research but on the normal checks

and balances, both legal and ethical that prevail in democratic societies. Rapid advances in this field require a rethink on the apportionment of responsibility among researchers, citizens and political and spiritual leaders.

There are thus uncommon opportunities for medical graduates inclined to take to a career in medical research and drug development, to embark on an exciting adventure to find effective and affordable cures for the important diseases affecting our children, women and men, including Parkinsons and Alzheimer diseases. Generic and customized biochips are being developed for disease diagnosis, monitoring of drug treatment and analysis of mutations. DNA micro arrays or genome chips have started helping in the areas of gene discovery, drug discovery and epidemiological and toxicological research. Also, nanotechnology, a molecular-precision manufacturing technology, is close to realisation. When this technology is perfected, doctors will be able to keep desktop sized computers which contain the raw processing power of one million human brains. While the scientific world is witnessing such extraordinary progress in medical technology, interest in research and technology development is still poor among our young scholars.

Even when outstanding research of relevance to the control of common diseases is carried out in our country, the linkage between *lab to patient* is poor. This is an area which requires serious attention. In my view, the Sri Ramachandra University can show the way. For this purpose, it will be useful to introduce a separate course on research methodology and on cutting edge developments in medical research in the MBBS course. Such a course on research methodology could be linked to undertaking research projects in suitable institutions belonging to both the public and private sectors, during summer vacation. This will not only help the young medical scholars to experience the excitement of science but will also foster cross-fertilization of ideas, linking clinical problems with basic research in a symbiotic manner.

A proud achievement of independent India is the doubling of average life expectancy since 1947. Life expectancy is now nearly 65 years and it is higher in Kerala and Tamil Nadu. This improvement has resulted largely from improved availability and intake of food, since the benefits of advanced medical technology are available only to about 10 percent of the population. The universal nutritious noon meal programme for school children first introduced in Tamil Nadu nearly 25 years ago was an important step in the

upgrading of the nutritional status of children. While we have been successful in improving the nutritional status of the population during the last 50 years, success in combating low birth weight, anemia and poverty-induced endemic hunger has been only marginal.

Low birth weight children start their lives with handicaps including impaired brain development. Four major interventions are urgently called for. These are: attention to the nutrition of pregnant and nursing women, equitable distribution of available food among members of a household, better child rearing practices and prompt attention to infection. Studies in Kerala have shown that equitable distribution of food between income groups and within families, introduction of complementary food to breast-fed infants, and early diagnosis and effective management of infections in childhood, have been responsible for the low IMR and the better nutritional status prevailing in the State.

Research on health care delivery systems has not so far received adequate attention. For example, food distribution through ICDS is not an answer to meeting the nutritional needs of infants in the age group of 6 to 12 months. The young child needs to be fed about five times small quantities of semi-solid in addition to breast milk. Unfortunately, this age group is not reached by ICDS programmes. It would be useful to train two elected members of village *Panchayats* – one woman and one man – in improving child rearing, feeding and health management practices in the community. This University can run non-degree short duration training programmes for members of such Panchayat level **Community Health Corps**.

Hidden hunger caused by micronutrient deficiencies like iron, iodine, zinc and Vitamin A can be overcome through a food-cum-fortification approach. For Example, *Moringa Oleifera* contains 4 times the calcium in milk, 7 times the Vitamin C in Oranges and 4 times the Vitamin A in carrot. We should introduce horticultural remedies for nutritional maladies.

Millions of farm households and consumers are exposed to dangerous levels of pesticides. Pesticides with long residual toxicity like DDT are still being used in our country. A large body of experimental evidence based on *in vitro* and *in vivo* models suggests that many of the pesticides damage the immune system. Several organo-

chlorine, organo-phosphate, carbonate and metallic pesticides are immunotoxic. The major pesticide companies should have a responsibility to ensure that the products they sell do not pose a threat to the human immune system. Environmental pollution and carcinogens, and hospital wastes pose threats to human health. Lack of environmental hygiene and water pollution are major causes of the poor biological utilisation of food in the body among children as well as adults living in poverty as well as among those living under sub-human conditions in slums. More and more people are dying in urban India due to high levels of pollutants in the air. Tiny toxic particles in the air damage public health. Improving the quality of the environment and of drinking water will make substantial contributions to improving human health. We are indebted to our far-sighted judiciary for their commitment to ensuring that the basic human right of access to clean air and water is met. Environmental damage to health can be rectified only through an integrated package of education, social mobilization and regulation.

In 1981, I chaired two National Committees which were set up by the Government of India to suggest strategies for eradicating leprosy and preventable blindness by the year 2000. Multi-drug therapy has helped to reduce the incidence of leprosy substantially. We are yet to take the final steps needed to by linking nutrition support with the provision of drugs to achieve the goal of a leprosy-free India. Preventable blindness is also receiving much greater attention now and more community-oriented eye care centres are getting established. Sri Ramachandra University can become a leader in eliminating all diseases for which there is dependable and affordable cure. For this purpose, the University could establish a virtual college linking the University to the Primary Health Care Centres for attending to the preventive, curative and social dimensions of diseases of importance to Tamil Nadu. This University has already taken the lead in tele-medicine. Modern information and communication technologies will help in last mile and last person connectivity in access to relevant health care.

Our indigenous health traditions, enshrined in the Ayurvedic, Unani and Siddha systems of health care, need greater attention. We have 6000 years of leadership in Ayurveda. The basic approach to health care in the Ayurvedic system is a holistic one, ranging from attention to diet and lifestyle to the use of plant based drugs and therapeutic exercises. We should bring about blends of traditional health care practices and modern medicine.

Without an extensive revitalisation of our time-tested health traditions, the goal of “health for all” cannot be achieved.

A disturbing trend in modern health care systems is the rising cost of medical help, including the price of drugs. South Africa and Kenya have decided to introduce legislation to allow their countries to import cheaper generic drugs for AIDS treatment. With the expansion of proprietary science involving patents and other forms of intellectual property rights, orphans are likely to remain orphans in the area of health care, unless steps are taken to strengthen public good research and community hospitals. Reaching the unreached and including the excluded should be the goal of all medical practitioners. The Voluntary Health Services, established by the late Dr KS Sanjivi, helps to get the best medical care for the rural poor. Dr Sanjivi in one of his articles referred to the need for convergence and synergy among numerous ongoing Government programmes in order to provide effective rural medical relief at affordable cost. To quote him, **“More than finance, what is urgently required is reorganization of existing facilities on a sensible basis, with no consideration other than that of maximum benefit to maximum numbers. For example, once taluk center A is made an orthopedic center, B a surgical center, and the necessary equipment is provided, there should be no scope for the administrative head posting the square man to the round hole”**.

It will also be appropriate to quote the views of Dr K S Sanjivi, founder of the Voluntary Health Services (VHS) expressed over 40 years ago on medical ethics, since they are even more relevant today. **“Recent availability of CAT scan throws further responsibility on the profession on using it with proper indications only. It is essential that the correct image of the medical profession in the eyes of the public should be maintained at all times and the public should not at all doubt that any equipment is used needlessly simply because it is available. The relative expenditure between providing a CAT scan in every district headquarters hospital and providing nutrition to children and pregnant mothers, iron to the millions suffering from simple iron deficiency, etc., should be dispassionately considered”**.

One in 8 persons living in our planet with HIV resides in India. India’s HIV/AIDS population of 5.2 million is next only to South Africa. Fortunately, both the National

Aids Control Programme and the **Avahan** (Sanskrit for “call to action”) programme of the Bill and Melinda Gates Foundation are now able to reach the high risk behaviour groups vulnerable to HIV/AIDS. In treating diseases like HIV/AIDS, tuberculosis and leprosy, it is important to adopt a food cum drug approach in the treatment, since many of the affected persons suffer from under- and mal-nutrition.

A healthy population over a sustained period of time confers multiple benefits to a nation, as reflected by economically measurable indicators. It is hence a matter for satisfaction that the Union Finance Minister has provided substantial funds in the budget for 2007-08 for the following innovative programmes.

- The National Rural Health Mission covering all the districts of the country. Nearly 320,000 Associated Health Activists (ASHAS) are involved in this programme. You can help to enhance the professional and practical competence of ASHAS.
- Control of the spread of HIV/AIDS
- Elimination of Polio by December 2007.
- Integrated Child Development Services. Synergy between the public, private and academic institutions will help to hasten the process of ensuring that every child born in our country has an opportunity for a productive and healthy life.

You are aware that the causes leading to climate change necessitate that we must opt for environment friendly sources of energy. The nuclear energy option is therefore receiving greater attention world wide. This can also enhance health hazards.

Caffeine (1,3,7 trimethyl xanthine) a major component of coffee protects organisms against lethal doses of low LET ionizing radiations (X- and Gamma rays) and it also significantly reduces the cigarette tar-induced carcinogenesis. The work done over the last three decades at the JNU, New Delhi and at BARC, Mumbai by Prof P C Kesavan has established that caffeine dramatically reduces the radiation damage especially the oxygen-mediated pathway of damage (referred to as “oxygen effect in radiobiology”). This therefore has also implications for cancer radiotherapy since the deep-seated tumor cells are relatively more radio resistant by virtue of their containing much **less** oxygen than the well-oxygenated neighbouring normal cells. Their findings are that caffeine effectively removes the free radicals (hydrogen radicals, electrons) which react with oxygen to form highly harmful and extremely reactive, oxygen species. Further caffeine also effectively scavenges hydroxyl radicals which damage the DNA and other

macromolecules by abstracting electrons from them. So, caffeine is really a dietary antioxidant.

During the past two decades several studies have shown that coffee has over one thousand antioxidants such as caffeine, chlorogenic acid, phenols etc., and these not only **protect** the humans against radiation damage, but also against diabetes type 2, and cancers of colorectum, liver and pancreas. The Harvard Medical School, USA is primarily responsible for having carried out a long-term study involving 1,26,000 people for as long as 18 years and conclusively showing that coffee consumption effectively reduces risk to diabetes type 2. These studies are also supported by similar investigations during the past few years from Sweden, Finland, The Netherlands. There are also studies elucidating the mechanisms.

India can assume leadership in the area of developing coffee strains with much higher levels of caffeine and chlorogenic acid. The two cultivated species **C. arabica** and **C. robusta** differ widely in their content of caffeine and exhibit opportunities for further improvement by conventional and modern plant breeding technologies. It is this kind of research that Genome Entrepreneurs can undertake.

The Founder Chancellor, Shri N P V Ramasamy Udayar was a born innovator and achiever. He was committed to bringing about synergy between science and technology and spirituality. The various Centers of Excellence in the Sri Ramachandra Medical College and Research Institute represent the power of modern medical science and technology. At the same time, the Lord Vaidyanatha Swamy and Thaiyal Nayaki Amman Temple in this beautiful campus represents the eternal power of spirituality. Medical technology is helping to add years to life, while spirituality helps to add life to years. Spirituality in the medical profession implies a commitment to social inclusion in access to life giving and life saving medical care. I wish you all a life of joy and fulfillment as transformational agents spearheading a movement for a happy health destiny.