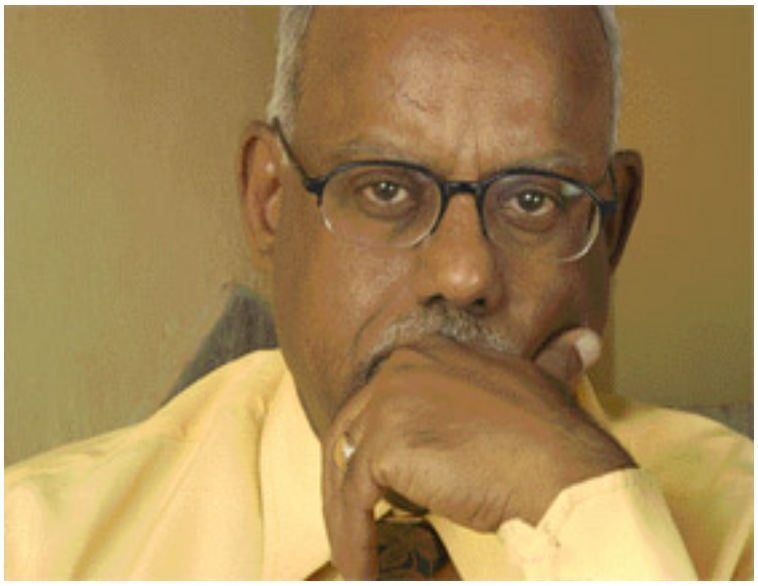

## Brief Profile of Prof. K. Kannan

Prof. K. Kannan has been regarded, as one of the pioneers of Biotechnology in India and his contributions has been significant in School education, College education, Industry and National laboratories of CSIR. Recently one of the International magazines did a major feature on Prof. K. Kannan (Dec . 24, 2004). The details of which may be seen in the following website:

http://www.gulf-news.com/Articles/FeaturesNF.asp?ArticleID=144991

Some of the other recent reports, especially, his path breaking contribution on the molecule ubiquitin is often quoted not only in India but also in USA and Europe. One of the recent releases is mentioned below:

Indian chemist missed Nobel by a whisker – PTI Release, Friday, October 15,2004 (appeared in the leading newspapers like – The Hindu, The Hindustan Times, and other leading newspapers in Hindi and English)

New Delhi: Mr Krishnamoorthy Kannan, a protein chemist at the Guru Gobind Singh Indraprastha University in Delhi, may have missed his share of this year's Nobel Prize in Chemistry by a whisker because of the Government's failure to recognize a discovery he made 12 years ago.

See the work of Prof K Kannan as Vice Chancellor in the following website : www.nagauniv.org.in

Prof. Krishnamoorthy Kannan is currently the Vice Chancellor of Nagaland University (A Central University) since August 2006. This appointment was made by His Excellency the President of India Dr. APJ Abdul Kalam in his capacity as Visitor of Nagaland University.

The Second Annual Convocation held on 15th March 2007 in presence of His Excellencythe President of India Dr. APJ Abdul Kalam, where 13021 students were awarded their respective degrees.

Established the first ever School of Engineering and Technology with five branches of Information Technology, Computer Science and Engineering, Electronics and Communication, Biotechnology and Agricultural Technology ( AICTE recognized and Fully Residential)

Established the first School of Management in Nagaland (AICTE recognized and fully residential).

MOU signed with IIITM (Kerala) with an objectiveto improve the quality of education in the NU and to closely and jointly work to develop, innovate, establish and commission various systems, processes and conduct capacity building exercises related to effective deployment and practice enhanced learning and teaching

First University to implement National Program on Technology Enhanced Learning (NPTEL) of MHRD, Govt. of India.

Recognition by ICAR of Nagaland university for under graduate , post graduate and research program.

MOU with Department of Social and Cultural Anthropology, University of Oxford, UK and Museum Der Kulturen, Basel, Switzerland to jointly work to develop and establish courses in Social and Cultural Anthropology based on a modular set up offered as Certificate, Diploma, Masters or M. Phil/ PhD courses.

Promoting livelihood income generation for children who could not complete school education. Carpet weaving program initiated with a micro credit financier, Jaipur Rugs and Nagaland University.

Confirmation of 207 employees who were on contract for more than a decade.

The number of Schools went up from 4 to 6; Teaching faculty went up from 125 to 160, a growth of 30 % .

Prof K Kannan accomplishments in less than one year and eight months is significant considering the fact that Nagaland University is established in a largely ST community and is under Article 371 A .The state is represented by 16 major tribes with their own social , egalitarian set up, unique to the people of Nagaland. It is the only university with three campuses at Lumami( 185 Km from Kohima), Kohima (interim campus) and Medziphama (50 Km from Kohima. Further being an affiliating university has 51 colleges. Being a hilly region, only mode of travel is by road and it rains at least seven months in a year.

Prof Kannan did B.Sc (Hons) in Chemistry from Delhi University, M.Sc Chemistry from IIT(Bombay) and PhD( Biochemistry) from Mysore University. He is a recipient of the prestigious National Science Talent Scholarship in the year 1970. Worked on buffalo milk proteins and developed the first protein sequencing laboratory in India at CFTRI, Mysore during 1975 to 1978. As a Ph.D. student, he built a very sensitive amino acid analyzer to detect at femtomolar range when other similar machines did at nano molar levels internationally. He developed protein characterization techniques using less than 1mg of protein in the 70's.

In the year 1979, he was awarded the prestigious Govt. of India scholarship for studies abroad and this enabled him to work at the prestigious Imperial College of Science and Technology (London). Here he learned sequencing on automated machines as well as large scale preparations and running fermentation plant, downstream processing to purify the enzyme Rhodanese. He has purified enzyme on a pilot plant level using 70Kg bacterial paste, way back in 1980, one of the earliest attempts at commercial level biotechnology based production internationally. He was also the Convenor of the Biochemical Society at Imperial College of Science and Technology, London where he organized over 30 lectures in a year . Many of the speakers were Nobel Laureates. Highlight of his organizational capability was to invite Dr Fred Sanger (Twice Nobel Laureate) to deliver his Nobel lecture before it was formally delivered at Stockholm. He was a regular visitor to the Royal Society and has interacted with over 40 Nobel Laureates during his three year stay in London.

In the year 1982 he was invited to join directly as Scientist C at the newly established Centre for Cellular and Molecular Biology(Hyderabad). During 1982 to 1986,he established the state of the art protein sequencing lab comparable to the best in the world. This facility was equipped with Applied Biosystem sequenator, LKB amino acid analyzer and 5 HPLC's . Since 1982 initiated the Biochemical education for students and teachers (BEST program) at the national level under the banner of Society of Biological Chemists, India. Later moved to the city of Poona to establish one of the first post graduate program in Biotechnology in India.

At Poona,(1986-1988) created one of the finest academic programmes and produced several outstanding scientists, many of whom went on to win young scientist awards of India and some are working at senior position at top biotechnology companies in USA such as Amgen, Genentech, Affymatrix etc.In the year 1987, the biotech program had the unique distinction of achieving 100% result at the CSIR-UGC Net scholarship examination when all 22 students passed with scholarship.

In the year 1988 moved to Industry and again created the first M.Sc. Medical Technology program in 1989 with support from Diagnostic Industry. Simultaneously developed and improved several diagnostic products. Developed in-house commercial scale production of bacteriological media. Had a large team of researchers and established the area of Stem cell biology and application in the diagnostic industry way back in 1990. One of the outcome of this work was the discovery of a novel marker for hematopoietic stem cells using a protein called Ubiquitin which was reported in the prestigious British Journal of Haematology. Incidentally this was the first evidence of extracellular role of Ubiquitin in the world. This has been cited all international reviews and has become integral part of Hematology text book in USA.

Later in 1993 he moved to the biggest Indian pharmaceutical industry, Ranbaxy, a global player and established the biotechnology R& D in industry. Developed the first, highly sensitive kit to detect AIDs in 1994. In 1997 moved as advisor to Dairy and Genomics area. Developed the first commercial product called whey protein concentrate from buffalo milk from 0.6 million litres of milk in 1998.

In the year 1999 he moved back to academics as the first Professor and Dean, Biotechnology of the newly established Indraprastha University(Now known as Guru Gobind Singh Indraprastha

University) . He was also appointed as the Dean of Students Welfare. He excelled in both the roles as a Dean of School of Biotechnology and Students Welfare. Currently School of Biotechnology is the most popular program of the university as well the festival Anugoonj is the most popular cultural mega event of the university for the last 8 years where over 15000 students participate.

Since 1999 to make education more purposeful, he has been popularizing the life and work of Dr Yellaprgada SubbaRow", as a role model for students of Biotechnolgy as Dr SubbaRow has developed and commercialized 10 drugs, which are still being used even after his untimely demise in 1948! He has been actively involved in organizing the Indian Pharmaceutical Congress since 1994.These work of his has been mentioned in the recently released picture album on the" Life and Works of Dr Yellaprgada SubbaRow", recently released by DST on the eve of Science Day 2003. He was also the organizing Secretary of the international congress of FAOMB at Bangalore in December 2003.

In the year 2000 he was invited by the Australian Vice Chancellor's Committee to be a visiting Professor at the University of Sydney, Australia .

In the year 2006, he became Vice Chancellor of Nagaland University (Central University) and has established the first professional course in Nagaland. School of Engineering and Technology and School of Management was inaugurated in October 2007. His Excellency Dr A P J Abdul Kalam graced the second convocation on March 15th 2007.

Since 2002 , actively involved in promoting Biotechnology at the school level and is currently the Convenor of courses for Biotechnology for Central Board of Education. He has been Editor and contributor of "A Text Book of Biotechnology" for class XI and XII. The books have been greatly appreciated by several people in India and abroad. Highlight has been the appreciation from Sir Aaron Klug, Nobel Laureate and former President of Royal Society, London.

In the year 2005 , he published a single author text book of Biotechnology for class XI and in 2006 for class XII under the Foundation book series of Cambridge House, New Delhi. This is also prescribed by Jammu and Kashmir state board of school education vide notification no F-52 (CDRW-EVS/Bio.Tech) B/06 dated 25/03/06..

In 2005 he has been elected as a Fellow of the Bhoovigyan Vikas Foundation and promotes the concept of Sustainable Development and Sustainable Lifestyles through Science and Technology for school and college children

Very popular in the media and has been regularly in the leading News papers such as Times of India, Hindu, Hindustan Times, Business India, Business Week etc; Talks on All India Radio, Doordarshan, Star TV etc; inaugurating and delivering keynote addresses etc. He has been featured in Business India as one of the Technology Leaders in India and his work on Stem Cells appeared as a full page work in Business India in 1994.Besides holds the biggest student festival in Delhi, known as Anugoonj. A multidimensional person with productive output in academics, industry, research as well cultural activities.

A firm believer in contributing to nation building and make India a developed nation by 2020.

# RESUME

**Name Prof. K. Kannan**

Date of Birth 2nd October 1952

Vice Chancellor
Nagaland University
Kohima – 797 001
Nagaland
Tel: **91-370-2290488 (O)
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vicechancellornu@yahoo.com
Website : www.nagauniv.org.in

## ACADEMIC QUALIFICATIONS:

| DEGREE | YEAR | UNIVERSITY/ INSTITUTION | GRADE |
|---|---|---|---|
| Higher Secondary | 1970 | Central Board of Secondary Education New Delhi | First Class with distinction in Maths, Physics & Chemistry |
| B.Sc. (Hons.) | 1973 | Delhi University | First Class with Merit |
| M. Sc. (Chemistry) | 1975 | Indian Institute of Technology, Bombay | First Class |
| Ph.D (Biochemistry) | 1980 | Central Food Technological Research Institute, CSIR, Mysore | |
| Government of India National Scholar | 1979-82 | Biochemistry Department Imperial College of Science & Technology, London, U.K. | |

## PROFESSIONAL CAREER

| | |
|---|---|
| **Vice Chancellor** | Nagaland University (August 2006 till date.) |
| **Ex- officio Chairman** | Executive Council<br>Academic Council<br>Planning Board<br>Finance Committee |
| **Director** | School of Engineering & Technology (Since October 2007)<br>Dimapur, Nagaland University |
| **Director** | School of Management studies (Since October 2007)<br>Dimapur, Nagaland University |
| **Finance Officer (I/C)** | Nagaland University (Since January 2007) |
| **Chairman** | Research advisory Committee<br>Central Muga Eri Research & Training Institute,<br>Central Silk Board, Ministry of Textiles, Govt. of India<br>Lahdoigarh- 785 700,Jorhat, Assam |
| **Chairman** | Scientific Advisory Committee<br>Krishi Vigyan Kendra, Lumami, Zunheboto<br>Nagaland University |
| **Member** | Society, G B Pant Institute of Himalayan Environment & Development, (An autonomous institute of Ministry of Environment & Forests, Govt. of India), Kosi-Katarmal, Almora 263 643, Uttaranchal,India. |
| **Member** | Governing Council, Institute of Bioresources and Sustainable Development, Imphal |
| **Professor & Dean** | School of Biotechnology (1999-2003)<br>G.G.S. Indraprastha University, Delhi (July Aug 2006) |
| Director | Wisec Global Ltd. A Biotech Company,( since 2005)<br>B - 6/6 Commercial Complex,<br>Safdarjung Enclave, New Delhi |
| Member | ICMR Stem Cell Group, (2005-2008) |
| Member | International Society for Stem Cell Research, USA<br>( since 2005) |

| | | |
|---|---|---|
| **Elected Fellow** | Bhoovigyan Vikas Foundation, (Sustainable Development and Sustainable Lifestyles through Science and Technology for school and college children), New Delhi. (2005) | |
| Life Member | Association of Clinical Biochemist, India (1992) | |
| Life Member | Society of Biological Chemist, India (1982) | |
| Director/ Dean | Students Welfare, GGS Indraprastha University (1999 -2006) | |
| Librarian | GGS Indraprastha University (2001- 2006) | |
| Member | AICTE Inspection Team, 2005 | |
| Member | Board of Studies, Jamia Hamdard, (2004-2007) | |
| Member | National Task Force of Stem Cell Research. Dept. of Biotechnology, Govt. of India. | 2003-2005 |
| Member | Board of Management, GGS Indraprastha University | 2002-2003 |
| Organizing Secretary | Federation of Asian and Oceanic Biochemists and Molecular Biochemists Meeting, Bangalore | 2002-2003 |
| National Convener | CBSE Biotechnology Programme | 2002-2008 |
| Member | DOEACC program on Bioinformatics | 2003-2004 |
| Member | Board of studies, Biotechnology, Punjab University | 2002-2005 |
| Member, Scientific Services | 54$^{th}$ Indian Pharmaceutical Congress Committee ,Poona | 2002 |
| **Visiting Professor** | University of Sydney, Australia | 2000 |
| Consultant | Olympus India Pvt. Ltd New Delhi | 1997-99 |
| Consultant | Mahaan Proteins, New Delhi | 1997-99 |

| | | |
|---|---|---|
| **Associate Director** (Biotechnology) | Ranbaxy Research Labs New Delhi | 1994-97 |
| General Manager (Biotechnology) | Ranbaxy Research Labs New Delhi | 1993-94 |
| **SPAN Group, Surat** | | 1988-93 |
| Research Director | Span Research Centre, Surat | 1988-93 |
| Joint Director/Principal | Institute of Medical Technology, Surat | 1988-93 |
| R&D Manager | Span Diagnostics Pvt. Ltd., Surat | 1988-93 |
| **Reader** Biotechnology Training Programme | Department of Zoology Poona University, Poona | 1986-88 |
| **Scientist - C** | Centre of Cellular & Molecular Biology Hyderabad | 1982-86 |

## MAJOR RESEARCH ACHIEVEMENTS/ PUBLICATIONS

### Papers Related to Stem Cell & Ubiquitin

- **Ubiquitin: An early acting growth factor for bone marrow stem cells.** Neeraj Kumar Satija and K Kannan. Accepted for poster presentation at the 3rd Annual Meeting of the International Society for Stem Cell Research to be held from 23rd to 25th June, 2005 at San Francisco, USA.

- **Exogenous Ubiquitin differentiates human leukemic cell lines HL-60 and K-562 into mature cells.** Bhavana M and K Kannan. Accepted for poster presentation at the 3rd Annual Meeting of the International Society for Stem Cell Research to be held from 23rd to 25th June, 2005 at San Francisco, USA.

- **"Is Ubiquitin a new growth factor for haemopoeisis?"**
  Abstract presented at the 10th International Immunology Conference, New Delhi 1998.

- **"Demonstration of an ubiquitin binding site on murine haemopoietic progenitor cells: implication of ubiquitin in homing and adesion"** by Parakh K.A. and Kannan.K. (1993), British Journal of Haematology, 84**, 212-218,**

### Papers Related to Bioinformatics

- **Comparative study of low sequence complexity proteins from complete genome sequences of eukaryotes**. Kumar Saurabh, Tannistha Nandi and **Krishnamoorthy Kannan**. Accepted for poster presentation at the 9th German conference on

Bioinformatics (GCB '04) held from 4th to 6th October 2004 at Bielefeld University, Bielefeld, Germany.

- **Alu repeat analysis in the complete human genome: trends and variations with respect to genomic composition**. Deepak Grover, Mitali Mukerji, Pankaj Bhatnagar, K. Kannan and Samir K. Brahmachari (2004), Bioinformatics: Vol. 20 no. 6, 813-817.

- **Comparative Analysis of Protein Sequences from Complete Genomes using a Novel Tool *ScanCom*.** T.Nandi, K. Kannan, S.K. Brahmachari, C. Ramakrishnan, S. Ramachandran, (2003). 17th Symposium of the Protein Society, July 26-30, 2003, Boston, Massachusetts, USA. **Was selected in the 20 best posters and awarded Finn World Travel Award (2003)**. Tannishtha Nandi, Institute of Genomics and Integrative Biology, Delhi University Campus.

- **A Novel Complexity Measure for Comparative Analysis of Protein Sequences from Complete Genomes.** T. Nandi, D. Dash, R. Ghai, C.B. Rao, **K. Kannan**, S.K. Brahmachari, C. Ramakrishnan, S. Ramachandran (2003). Journal of Biomolecular Structure & Dynamics, USA. Volume 20, 1-11.

- **The low complexity proteins from enteric pathogenic bacteria: Taxonomic parallels embedded in diversity.** T. Nandi, K. Kannan, S. Ramachandran. (2003). In Silico Biology, USA. Volume 3, 1-9.

- **Species and strain-specific patterns of low-complexity proteins in *Escherichia* and *Mycobacteria.*** Tannistha Nandi, Krishnamoorthy Kannan and Srinivasan Ramachandran (2003). Current Science, Vol. 85, No. 2.

**Papers Related to Protein Purification & Characterization**

- **"Ubiquitin with a non-ATP-dependent slow intrinsic proteolytic activity: A Mild and rapid purification procedure"**, Parakh K.A. and Kannan. K. (1992) Indian Journal of Biochemistry & Biophysics, **29**, 303-305.)

- **"Purification and characterization of glucose (xylose) Isomerase from Chainia Species**". Biochemical Biophysical Research Communication Pawar , H.S.,Kannan, K.,Srinivasan, M.C.,and Vartak,H.G.( 1988) Biochemical and Biophysical Research Communications**,155** 411-417 .

- **"Comparison of tryptic peptides profiles of alcohol dehydrogenase from Drosphila-melanogaster at different ages: a rapid procedure using high performance liquid chromatography"** Subramanyam,D, **Kannan.K**.,Reddy, A.R..(1984) Journal of Biochemical and Biophysical Methods 10 153-162.

- "**Further characterization of the Sialic Acid-Binding Lectin from the Horseschoe Crab Carcinoscorpius rotunda cauda"** Tambi Dorai,D, Bishayee,S. ,Bachhawat, B.K **Kannan.K** and Rajagopal Rao,D. (1981). Archives of Biochemistry and Biophysics, USA**, 209** 325-333.

- **"Studies on the K-casein from Bubalus bubalis"Kannan.K.** and Rajagopal Rao.D. (1978) Milchweissenchaft **33**, 500-502

**Papers Related to Development of Techniques**

- **A simple method for functionalization of cellulose membrane for covalent immobilization of biomolecules.** Utpal Bora, **Krishnamoorthy Kannan** and P. Nahar (2005) Journal of Membrane Science 250**, 212-222**

- **Heat-mediated enzyme-linked immunosorbent assay procedure on a photoactivated surface**. Utpal Bora, Krishnamoorthy Kannan, Pradip Nahar. Journal of Immunological Methods 293: 43– 50, 2004.

- **Fluorescene in-situ hybridization: application for Preimplantation Genetic Diagnosis**– K. Kannan. (2000) (Molecular & Cellular Endocrinology 164, 274).

**Papers Related to Natural Products**

- **Radioprotective mechanism of *Podophyllum hexandrum* during spermatogenesis.** N. Samanta, K. Kannan, M. Bala and H. C. Goel. *Molecular and Cellular Biochemistry* **267:** 167–176, 2004.

- **Structure and Biological Activity of Vepaol a new insect antifeedant of terpenoidal nature from Azadirachta Indiaca".** Sankaram,A.V.B., Marthandamurthi,M., Bhaskaraiah,K., Subrahmanyam,M.,Sharma,H.C., **Kannan,K**.,and Johnson,R.E.C(1983) 2nd International Neem conference under natural products as a growth regulator.

**Paper Related to Sustainable Development**

- **Sustainable Development: A New Social Contract for Science & Technology** – K. Kannan & K. Rajeshwari (2002) chapter 18,195-232.in a text book on **Reshaping our earth view, creative thoughts and alternative futures,** edited by K.V.Sundaram and M.Moni, Tata McGraw-Hill.

**Paper Related to Patenting**

- **Procedural Aspects including Definitions & Patentability of Living forms:- A Case** study K. Kannan (2000). Publication of the Department of Biotechnology, Govt. of India.

**Paper Related to Biochemical Engineering**

- **"Simulation of the Enzyme Denaturation Phenomenon in a Fixed-Bed Reactor: Application of a Combined External and Axial Dispersion Model"** Korde,V.M., Kannan,K., Shankar,V., Jayaraman,V.K. .(1989) Indian Chemical Engineer**, XXXI** 71-75.

**Contribution to School Biotechnology National Programme for Class XI and XII**

- **National convener** for the committee to launch Biotechnology course in Central Board of Secondary Education (CBSE). .Contributed in writing unit 1 and partially unit 2 of Text Book of Biotechnology for class XI and edited and wrote in class XII text book of Biotechnology for CBSE, 2002.
- **Biotechnology Class XI and XII By K Kannan , published by Foundation Books, Cambridge House. Published in 2005 and 2006.**

**INTERNATIONAL CONFERENCES**

- Presented poster on "Ubiquitin as a novel tool to study morphological changes during early neural development with chick embryos as a model system" at Neurizons (Interdisciplinary Ph.D. student symposium on current topics of the Neurosciences), Goettingen University, Germany during $12^{th}$ to $14^{th}$ November 2004. Anjana Nityanandam and K. Kannan. 2004.

- Presented poster on "Computational analysis of Low Complexity Proteins in Eukaryotics Genome" at German Conference of Bioinformatics, Bielefeld University, Germany during $4^{th}$ to $6^{th}$ October 2004. Kumar Saurabh and K. Kannan.

**Ph.D. Awarded students**

- **Biochemical, immunological and biological studies on ubiquitin. Submitted by Mr. K.A. Parakh, South Gujarat University, Surat. 1994.**

- **Purification, characterization and biological application on Apolipoprotein A-, Submitted by Mr. J.S. Vasi, South Gujarat University, Surat. 1995**

- **Computational studies of protein sequences across various genomes. Submitted by Tannistha Nandi, School of Biotechnology, GGS Indraprastha University. 2004**

- **Functional Significance of simple and complex repeats in human genome organization. Submitted by Deepak Grover, School of Biotechnology, GGS Indraprastha University. 2004**

- **Photolinker mediated immobilization of biomolecules on different matrices and their applications in Diagnostics. Submitted by Utpal Bora, School of Biotechnology, GGS Indraprastha University. 2004**

**M.Phil awarded students**

- **Studies on ubiquitin and its physiological effect on chick embryos. Submitted by K.A. Parakh, Dept. of Zoology, University of Poona, Pune. 1990.**

- **Dissertation: Protein engineering : Its role in the elucidation of the structure-function relationships of proteins. Submitted by K.A. Parakh, Dept. of Zoology, University of Poona, Pune. 1990.**

- **Examination of blood groups in tribal populations. Submitted by Mr. A. Samad. 1994,Institute of Medical Technology, Udhna, Surat.**

- **Ubiquitin: Isolation and Biological Study. Submitted by Ms. A. Gupte. 1995. Institute of Medical Technology, Udhna, Surat.**

- **Purification, characterization and Kinetic studies on Horse Radish Peroxidase. Submitted by Ms. H.C. Desai. 1995. Institute of Medical Technology, Udhna, Surat.**

**M.Sc. project students**

- **Experimental and theoretical approaches for the study of immobilized enzymes. Submitted by Mr. V. Korde, University of Poona, Pune. 1987.**

- **Some aspects of microbial amylase production. Theoretical and experimental aspects. Submitted by Ms. A. Bhide, University of Poona, Pune. 1987.**

- **Isolation and characterization of kappa-casein. Submitted by Ms. M.S. Nath, University of Poona, Pune. 1988.**

- **Purification and characterization of Jacalin from Jack fruit seeds. Submitted by Ms. D.N. Shukla, Institute of Medical Technology, South Gujarat University, Surat. 1991.**

- **Development of urine based latex test for the detection of microalbuminuria in renal diseases. Submitted by Ms. M.T. Patel, Institute of Medical Technology, South Gujarat University, Surat. 1991.**

- **Determination of kinetic parameters and optimization of enzyme assays. Submitted by Ms. S.D. Desai, Institute of Medical Technology, South Gujarat University, Surat. 1991.**

- **Isolation, purification and characterization of Apolipoprotein A-1 from human plasma. Submitted by Mr. J.S. Vasi, Institute of Medical Technology, South Gujarat University, Surat. 1991.**

- **Spectrophotometric and immunological studies on peroxidase. Submitted by Ms. H.C. Desai, Institute of Medical Technology, South Gujarat University, Surat. 1992.**

- **Purification and characterization of Manganese Superoxide dismutase from human liver. Submitted by Ms. F.A. Vashi. 1993.**

- **Purification and characterization of acid phosphatase from bovine erythrocytes. Submitted by Ms. M.A. Dixit. 1993.**

- **Purification and characterization of alkaline phosphatase from bovine intestine. Submitted by Mr. M.A. Jariwala. 1993.**

**M.Tech. Project students**

- **Optimization of fermentation conditions for glucose oxidase production by Aspergillus niger and downstream processing. Submitted by Mr. Vivek Bhatnagar, Biotechnology and Biochemical Engineering, I.I.T. Delhi. 1994.**

- **Optimization of parameters for development of ELISA for pregnancy. Submitted by Mr. Samiksh Nagalia, Biotechnology and Biochemical Engineering, I.I.T. Delhi. 1994.**

- **The effect of extracellular ubiquitin on regulation of fate of murine bone marrow cells in-vitro. Submitted by Neeraj Kumar Satija, School of Biotechnology, GGS Indraprastha University. 2004.**

- **Effect of exogenous ubiquitin on human leukemic cell lines HL-60 and K-562. Submitted by M. Bhavana, School of Biotechnology, GGS Indraprastha University. 2004**

- **Functional analysis of low complexity proteins across various eukaryotic genomes. Submitted by Kumar Saurabh, School of Biotechnology, GGS Indraprastha University 2005**

- **Development of ELISA for the estimation of Ubiquitin in cell lysates and serum samples. Submitted by Anjali Gaur GGS Indraprastha University 2006.**

- **Biotechnology- An Indian Perspective. Submitted by Sandeep Dochana, School of Biotechnology, GGS Indraprastha University 2006**

**B.Tech. Project students**

- **Isolation and characterization of Ubiquitin from Goat Erythrocytes. Submitted by Neeraj Kumar Satija, School of Biotechnology, GGS Indraprastha University. 2003.**

- **Isolation and Characterization of Ubiquitin. Submitted by M. Bhavana, School of Biotechnology, GGS Indraprastha University. 2003.**

- **Computational analysis of Low Complexity Proteins in Eukaryotics Genome. Submitted by Kumar Saurabh, School of Biotechnology, GGS Indraprastha University. 2004.**

- **Darwinian evolution of ubiquitin conjugating enzymes. Submitted by Kumar Sandeep Shiromani, School of Biotechnology, GGS Indraprastha University. 2004.**

- **Study of Amino Acids around the Ubiquitinated Proteins. Submitted by Shohini Mukherjee, School of Biotechnology, GGS Indraprastha University. 2004.**

- **Effect of commercially available Ubiquitin on head and somite development in chick embryo. Submitted by Nivedita Patra, School of Biotechnology, GGS Indraprastha university. 2005**

- **Expression of selected genes involved in differentiation of K – 562 leukemic cell line using exogenous ubiquitin. Submitted by Sandeep Dochana. School of Biotechnology, GGS Indraprastha university. 2005**

- **Modeling of interactions of substrates with ubiquitinating enzymes. Submitted by Neha Bhat, School of Biotechnology, GGS Indraprastha university. 2006.**

- **Partial isolation of Ubiquitin receptor/ binding protein from human peripheral blood mononuclear cells. Submitted by Gaurav Bhardwaj, School of Biotechnology, GGS Indraprastha university. 2006.**

- **Partial isolation of Ubiquitin receptor / binding protein from human leukemic cell line- K 562 Submitted by Mayur Choudhary, School of Biotechnology, GGS Indraprastha university. 2006.**

**.**

## CITATIONS

- **Nature-Structural & Molecular Biology, 2004.**

- **Proc. Natl. Acad. Sci, USA. 2004**

- **Williams Hematology, 5th Edition, McGraw-Hill, USA, 1995.**

- **Annual Review of Nutrition, USA, 1995.**

- **Journal of Immunological methods, USA, 1994.**

- **European Journal of Biochemistry Review, 1995.**

- **Biochemical and Biophysical Research Communications, USA, 1995.**

- **Annual Review of Biochemistry, USA, 1986.**

## INTERNATIONALLY RECOGNIZED ORIGINAL CONTRIBUTION IN THE WORLD

Dr. K. Kannan made a significant contribution in the area of **hematopoietic stem cells,** while working in Surat, Gujarat by publishing his original findings in the prestigious British Journal of Hematology in 1993. He was the first person who developed a probe to identify the hematopietic stem cells under a microscope without using either a monoclonal or polyclonal antibody. The probe was a small protein molecule of 8541 dalton, called **UBIQUITIN.** This was a new finding and was least expected as everybody till then believed that Ubiquitin only had an intracellular role. He went on to demonstrate that this is the most important molecule for keeping the stem cells in the bone marrow till they completely differentiate into RBC, WBC and platelets, a phenomenon known as **ADHESION**. It was further shown that this was also involved in homing of stem cells to the bone marrow during bone marrow transplantation. Later studies by him went on to show that Ubiquitin itself may be a novel growth factor and could potentiate the activity of other cytokines like Erythropoietin, G-CSF which are all currently billion dollar molecules . Some of this original were presented at the International Immunology Conference in 1998. With the discovery of embryonic stem cells in late 1998, he has spend time in studying techniques like FISH, CGH and DNA array technology in fertilized embryos. He presented some of this work at the International conference on reproductive biology and the abstract has appeared in Molecular & Cellular Endocrinology, 2000.

Dr. Kannan started as a **biotechnologist** and during the last 15 years has been successful in developing whole new area of research in the field of stem cells without any formal training abroad in this area and the paper in British Journal of Hematology has become a classic paper and has become an integral part of American text book and the work is cited along with the work of I.L.Weissman, who is the leader in stem cells. Some of the reports are highlighted below.

❖ **Demonstration of a Ubiquitin Binding Site on Murnie Haemopoietic Progenitor Cells: Implication of Ubiquitin in Homing and Adhesion by K.A. Parakh and K. Kannan BRITISH JOURNAL OF HAEMATOLOGY (1993), 84, 212-218**

**Major Citations:**

- **Williams Hematology (1995)**, fifth edition Text Book (USA)
  **"Interaction of Stem cells with L-Selecting is supported by three observations:** L-Selectin is ubiquitinated, **ubiquitin inhibits hemopoietic homing and binding to marrow stroma**, and the CD34 sialomucin protein expressed on endothelial cells and hemopoietic progenitors is a ligand for L-Selectin."

- **Annual Reviews** in Nutrition (USA) 1995, 15:162-89
  Roles of ubiquitinylation in proteolysis and cellular regulation
  "Ubiquitinylation may also be involved in **extracellular** events for example, monoclonal antibodies to ubiquitin decorate the surface of cells: a ubiquitin binding site has been on hemopoietic progenitor cells; and lymphocyte homing can be blocked by ubiquitin or antibodies to ubiquitin."

- **Journal of Immunological Methods (1994) 173,** 93-101
  "Ubiquitin may have a regulatory role during the cell cycle, signal transduction and **cellular recognition**".

❖ **Ubiquitin with a Non-ATP-Dependent Slow Intrinsic Proteolytic Activity: A Mild and Rapid Purification Procedure by K.A. Parakh & K. Kannan INDIAN JOURNAL OF BIOCHEMISTRY & BIOPHYSICS (1992) 29, 303-305**

**Citations**:

- **European Journal of Biochemistry (Review) (1995), 231, 1-30**
  **Ubiquitin and the enigma of intracellular protein degradation.**

  "Another function which has been attributed to ubiquitin is an intrinsic proteolytic activity. Such an activity may sometimes be associated with a protein of totally different function such as in the case of intrinsic proteolytic activity found in lysozyme. However in contrast to lysozyme there is in ubiquitin no equivalent in the primary structure to a potential active site. In addition, the activity appears much lower than originally described and if present at all plays no biological role."

- **Biochemical and Biophysical Research Communication (1995)** 213, 24-31
  Ubiquitinylation of the rat uterine estrogen receptor dependence on estradiol.

  "Uteri, liver, kidney and diaphram were excised from the different groups of rats and ubiquitin was isolated from 250 mg tissue in each case follwing the procedure of Parakh **and Kannan**"

## Visits abroad

**U.K, U.S.A, Germany, Israel, Russia, Spain, Australia, France, Greece**

**Was a member of North East Indian delegation of Chief Ministers to USA in September 2007 as part of the Indo –US business opportunities.**