CV of Prof. Samit Chattopadhyay
FTWAS, FNA, FASc, FNASc, FAScT, FMASc

Director, CSIR-Indian Institute of Chemical Biology, Kolkata

-- Highlights --

1. **30 years of research experience in wide fields of research including**;

   Founding Director of advanced research at CSIR-IICB-TRUE (Translation Research Unit of Excellence), Salt Lake, Kolkata. Setting up ambience for doing best research on disease and diagnostics. Bringing large number of mission mode projects and FTPs (**Fast Track Projects**) for immediate translatable products for India. Achievement towards developing application oriented research between Biology and Chemistry. Advanced knowledge in developing target based drugs based on basic science knowledge. Understanding molecular basis of gene regulation and epigenetics in cancers and other diseases; Molecular biology work on HIV transcription and latency; Immune responses upon Mycobacterial infection; Role of Nuclear matrix proteins in DNA damage repair, Splicing etc.; Structure function relation of MAR binding proteins; Role of miRNA in cancer and other diseases. Plant genetics, plant molecular biology; Chromosome Techniques, Karyotyping and Cytogentics,, Handling Cholera Bacteriophages and their physical mapping; Role of RNA-protein interaction in Viral transcription; Immuno-biology and T helper Cell Differentiation.

2. **Members/ Fellow of Academies:**

   Fellow of The World Academy of Sciences (**TWAS**), 2015
   Sir J C Bose National Fellow, DST, 2013
   Fellow of Indian National Science Academy (**FNA**), Delhi, 2013
   Fellow of Academy of Science (**FASc**), Bangalore, 2011
   Fellow of National Academy of Science (**FNASc**), Allahabad, 2006
   Fellow of West Bengal Academy of Sciences-WAST (**FAScT**), 2016
   Fellow of Maharashtra Academy of Science (**FMASc**), 2000

3. **Trained/ guided more than 80 students:**

   Guided more than 30 Ph D students of which 20 got Ph D degree from this lab
   Teaching molecular biology for ACSIR at CSIR-IICB
   Taught courses at NCCS, Pune University, Calcutta University, Vidyasagar University
   Trained university students and students from Indian Academy of science (IAS).
   Given lectures in more than 200 conferences in India and abroad
   Arranged symposiums in Developmental Biology and Transcription, convenor GRC, 2014
   Guided students from many Institutes and Universities as a part of collaborative work

4. **Publications**: Published more than **92 high impact international papers in journals with more than 7000 citations; H-index: 28; i-index: 50; Published more than 15 book chapters**

   Published papers in world class premier journals like **Immunity**, Cell Press; **EMBO Journal**, **Mucosal Immunology**, NPG; **Scientific Reports**, NPG; Proceedings of National Academy of Sciences (**PNAS**); **Since Signaling** (AAA); **Molecular and Cellular Biology** (MCB), **Nucleic Acids Research** (NAR), **Journal of Immunology** (JI), **Journal of Biochemistry** (JBC); **Journal of Molecular Biology** (JMB), **International Journal of Biochemistry and Cell Biology** (IJBCB); **Virology**, PLoS One, BBRC, BBA Acta Review, International Journal of Nanomedicine; Nanoscale; Chemical Communications etc.

5. **Reviewer of several specialized journals like:**

   Virology, Journal of Biomedicine and Biotechnology, Cell Biology International, Elsevier, International Journal of Cancer, Journal Bioscience, International Journal of Biochemistry and Cell Biology, Cellular and Molecular Life Sciences, FEBS Journal, PloS journals, Scientific Reports etc.

6. **Administrative role**:

Director at the Indian Institute of Chemical Biology, CSIR-IICB, Kolkata from August, 2015; Founder Director of Translation Research Unit of Excellence (**TRUE**), Salt Lake, Kolkata, 2016; Ex-Associate Dean of NCCS; Introduction of Aadhar based Biometric system of attendance at CSIR-IICB, Kolkata; Teaching several courses; Introduction of new model of course work for the Ph D students; Active member and expert for the Ph D students at the Calcutta University; Council member of DY Patil Medical College, Pune; Chairman and member of various selection committees at NCCS and other Institutes and Universities; Task Force member of Cancer Research, DBT; Animal Science and Biotechnology, CSIR; Task Force Member DST-PAC; Member of Scientific Advisory Committee (SAC), National Institute of Chemical Biology, New Delhi; Chairman, Stores and Purchase, NCCS for last 10 years, Earlier in-charge of making Annual Report, NCCS, Writing Patents, Expert consultant scientist of Pharmaceuticals like Piramal Life Sceince, Mumbai; Amrita Therapeutics, Gujarat. Convener, Guha Research Conference, 2014. Sacientific Advisory Committee member of NII, New Delhi; Expert member of institutional recruitments of CDFD, Hyderabad; IICT, Hyderabad; Convener of sectional committee nof Indian Academy of Science Fellows (INSA), 2017 onwards.

7. **Recent activities**:

Current Goals: After joining as Direcotr of IICB, I started our new campus at Salt Lake as the centre of Translational Research Unit of Excellence (TRUE) that was inaugurated on February 8th, 2016 by the Hon'ble Union Minister for Science & Technology Dr. Harsha Vardhan. A number of new laboratories with excellent facility are already started in between in the same campus. Now we have one of the best laboratories in Bioinformatics and Proteomics with most modern facilities. A very good Incubation centre is created and this will be another good center to provide facilities for the small companies. This is going to be another center like NCL venture center, Pune that with a incubation center for other CSIR institutes as well as other companies. As a part of Fast track projects, we have created *Leishmania* detection from blood and urine and also early detection of Rheumatic Heart disease using dip-stick concepts. Some of these low hanging projects are strongly supported by the CSIR. This center will help making Infrastructure development for the spin-off companies and making bridge between the various medical centers at Kolkata. I also started a major program with Mayo Clinic, USA. We have now enough potential to bridge between the IITs, Medical centers like TMC, Kolkata, TMH Mumbai and other places like Mayo Clinic, MIT, Harvard, etc.

Short History of Life and Future Goals of **Prof. Samit Chattopadhyay**: A short interview by Rajyasabha TV, September, 2016 (http://iicb.res.in/Eureka_samit.html)

------ Detailed CV -------

Prof. Samit Chattopadhyay

1. Broad Subject Area	Biochemistry and Molecular Biology
2. Area of specialization	Epigenetics, Cancer Biology, Immunology, Developmental Biology, Virology, Gene Regulation etc.
3. Name:	**Prof. Samit Chattopadhyay**, **FTWAS**, **FNA**, **FASc**, **FNASc**, **FAScT**, **FMASc**
4. Current position:	**Director** **CSIR-Indian Institute of Chemical Biology**
5. Mailing Address	CSIR-Indian Institute of Chemical Biology 4, Raja S. C. Mullick Road Kolkata-700 032 Ph: 033 24171157; Mob: **09823409155** Fax: 033 2473 5197 Email: samit@iicb.res.in/director@iicb.res.in
6. Date of birth	25th December, 1959

7. Educational Qualification

Degree/ Diploma/ Certificate	University/Institute	Year	Subjects
Post Doctoral Research	Massachusetts Institute of Technology (MIT), Boston	1995-1998	Chromatin remodeling at TCRβ locus during T development. Role of *cis* elements in V(D)J recombination and allelic exclusion using knock-out mouse model
Post Doctoral Research	University of Connecticut, Farmington, USA	1989-1995	Viral transcription, Transcription elongation through RNA-protein interaction

Doctorate	Jadavpur University, Kolkata, WB	1989	Ph D in Biochemistry, Jadavpur University, Calcutta (Physical mapping of *Vibrio. Cholera* bacteriophage *eltor-4* genome and characterization of phage encoded tRNAs).
Master's Degree or Equivalent	University of Calcutta, WB	1984	Botany with Cytogenetics as special subject
Bachelor's degree	University of Calcutta, WB	1981	Botany Honours with Cytogenetics as special subject, Zoology, Human Physiology

8. Details of professional training and research experience, specifying period

Major field of the highest degree	• Ph D in Molecular Biology, mapping and characterization of novel tRNA genes from Cholera phages
Highest degree, Specialization and Subjects	• Ph D in Biochemistry, Jadavpur University, Kolkata (Physical mapping of *V. Cholera* bacteriophage *eltor-4* genome and characterization phage encoded tRNAs)
Next lower degree	• M Sc in Botany from Calcutta University, Specialization in Cytogenetics and Molecular Biology

Additional qualification/ Training	• 1989-1995, Post doctoral fellow at University of Connecticut Health Center (UCONN), Farmington, USA, working on the molecular mechanism of viral transcription and role of RNA-protein interaction in modification of RNAP resulting transcriptional processivity (**Chattopadhyay et al**., **PNAS**, **1998a**; **PNAS 1998b**). • 1995-1998, Post-doctoral fellow at **MIT, Boston, USA** working on the chromatin changes in the TCRβ locus during T cell development. Special training in generating knock-out mice to see role of *cis* elements in the regulation of TCRβ enhancer. Role of specific *cis* elements in the regulation of V(D)J recombination. Specialized in generating knock-out mice where specific cis elements were knocked out and demonstrated for the first time how the local chromatin remodeling and accessibility changes the pattern of V(D)J recombination through specific Vβ and Dβ. We have now generated T cell specific conditional knock-out mice for SMAR1 gene and observed that SMAR1 plays a critical role in Th1-Th2-Th17 differentiation (**Immunity**, Cell Press, **JBC**, **Journal of Immunology**)
Training and research experience in last 18 years at NCCS, Pune and IICB, Kolkata	• More than 30 students carried Ph D thesis work under the PI working on various aspects including Immunobiology, Cancer Biology and epigenetics etc. More than 100 students were trained as a part of summer project and six months project. Teaching M Sc students at Departments of Biotechnology, Zoology, Department of Bioinformatics, SP Pune University etc.

Research experience on neurobiology	• University of Robert Dubre Hospital, Paris as a part of collaborative work (ICMR-INSERM) with Dr. Pierre Gressens. Worked on the regulation of MAR binding proteins during neuronal differentiation in rat model system. Expression of alternatively spliced form of SMAR1 in the neuronal stem cells during embryonic development.

9. Professional recognitions, awards, fellowships received

- **Director**, Indian Institute of Chemical Biology, **CSIR-IICB**, Kolkata, 2015 August onwards
- **Founder Director**, **CSIR-IICB-TRUE** Translation Research Unit of Excellence, Kolkata, 2016
- **Sir J C Bose National Fellow**, Department of Science and Technology, 2013
- Fellow of Indian National Science Academy (**FNA**), Delhi, 2013
- Fellow of Academy of Science (**FASc**), Bangalore, 2011
- Fellow of National Academy of Science (**FNASc**), Allahabad, 2006
- Fellow of West Bengal Academy of Sciences (**FAScT**), 2016
- Fellow of Maharastra Academy of Science (**FMASc**), 2000
- **Convener**, Sectional Committee, Indian National Science Academy (**INSA**) (2017 onwards)
- **Associate Dean,** Academic Cell, NCCS, Pune, 2012- 2015
- **Convener**, Guha Research Conference (**GRC**), 2014
- Member, Molecular Immunology Forum (**MIF**), 2002
- Member, American Society for Biochemistry and Molecular Biology (**ASBMB**), USA. 2004
- Member, **Society of Indian Cell Biology**, 2006
- Co-Convener, Indian Society for Development Biologists (**ISDB**), 2004
- Member and examiner **Thesis Committee**, ACTREC, Navi Mumbai, 2007-2010
- Member of Research Advisory Board at **Dr. D Y Patil Vidyapeeth**, Pune
- Member, Asian Transcription and Chromatin Biology, ChromatinAsia
- Member, Indian Association for Cancer Research (**ICAR**)
- Member, Scientific Advisory Committee (SAC), NII, New Delhi
- **Research Committee Member**, **CSIR,** Animal Sciences and Biotechnology
- **Task Force Member**, **CSIR**, Inter-agency project IAP001, IICB, Kolkata
- **Task Force Member**, **DST-PAC**, Delhi
- **Task Force Member**: Cancer Biology, **Department of Biotechnology**, Delhi
- **Chairman/ Member**, Ph D and project student selection committee at NCCS
- Opted Member, DBT-JRF Fellowship, Government of India
- Member of BIRAC, CRS, DBT, 2010 onwards
- Research Council Member, CCMB, Hyderabad, 2017-2020.
- Research Council Member, IMTECH, Chandigarh, 2017-2020.

11. Teaching Experience:

- More than **25 years of teaching experience** at different places throughout the world.
- Delivered more than **200 talks** at different seminars, conferences
- Taught M Sc and Ph D courses at the Savitribai Phule University of Pune (PU), IBB-Pune; Biotechnology Department at PU; Zoology Department at SP Pune University; NCCS-Pune, CSIR-IICB and many other institutes within India and abroad at places like MIT, Boston
- Taught on many interesting topics at different institutes especially on Molecular biology, Gene Therapy, HIV biology, Immunobiology, RNA biology, V(D)J recombination in T and B cells; MHC presentation etc.

10. Member of Other Committees (Administrative)

- NCCS Purchase committee member, 2001-2009
- **Chairman**, NCCS Purchase committee, 2010 till date
- **Associate Coordinator** of Scientific Advisory Committee, DBT-JRF Exam
- In-Charge for designing and planning of NCCS Annual Report, 2003 to 2007
- Chairman, Biosafety and Ethical Committee, NCCS (2006-2010)
- DBT Nominated Chairman of Biosafety Committee, D Y Patil Medical Institute, Pune

11. Reviewer of several specialized journals like:

A. Virology, **B.** Journal of Biomedicine and Biotechnology **C.** Cell Biology International, Elsevier, **D** International Journal of Cancer, **E.** Journal Bioscience, **F.** International Journal of Biochemistry and Cell Biology, **G**. Cellular and Molecular Life Sciences, **H**. FEBS Journal, I. International Immunology (**IMM**)

12. **Thesis work for Ph D under supervision of Prof. Chattopadhyay:**

1. **Dr. Ruchika Kaul** was awarded Ph D degree from SP Pune University. Thesis title "*SMAR-1, a novel T cell specific MAR binding protein: Possible role in V(D)J recombination and chromatin structure modulation during cellular transformation*". 2004.

2. **Dr. Asavari Kulkarni** was awarded Ph D degree from SP Pune University. Thesis title "*Role of extracellular HIV transactivator Tat in T cell activation and HIV pathogenesis*". 2004.

3. **Dr. Shravanti Rampalli** was awarded Ph D degree from SP Pune University. Thesis title "*Regulation of Retroviral and Eukaryotic Transcription through MAR sequences and MAR binding protein SMAR1*". 2005.

4. **Dr. Archana Jalota Bhadwar** was awarded Ph D degree from SP Pune University. Thesis title "*Role of SMAR1 in tumor suppression and p53 meduated cel cycle regulation".* 2007.

5. **Dr. Kamini Singh** awarded Ph D degree from SP Pune University. Thesis title "*P53 mediated regulation of SMAR1 and their co-operated role in tumorigenesis through modulation of NFκB and TGFβ target gene expression*", 2007.

6. **Dr. Pavithra Laxminarashiman** was awarded Ph D degree from SP Pune University. Thesis title "*Regulation of MAR binding protein SMAR1 under stress: Implications in cell cycle by modulation of ATM-p53-MDM2 pathways*". 2009, February.

7. **Dr. Surajit Sinha** was awarded Ph D degree from SP Pune University, Thesis title "*Role of MAR binding protein SMAR1 in apoptosis*". 2010.

8. **Dr. Sreenath K** was awarded Ph D degree from SP Pune University, Thesis title "*Regulation of viral transcription and signal transduction by a MAR binding protein*". 2011.

9. **Dr. Sandeep Singh** was awarded Ph D degree from SP Pune University, Thesis title "*To study SMAR1 interacting proteins and role of SMAR1 in cellular differentiation and tumorigenesis*". 2011.

10. **Dr. Sunil K Malonia** was awarded Ph D degree from SP Pune University, *Role of MAR binding proteins in the regulation of cytokine genes*. 2011.

11. **Dr. Sulabh C Kharbanda** was awarded Ph D degree from SP Pune University, *Identification of SMAR1 binding regions in the human genome and to study its transcription control by epidermal growth factor signaling pathway in context to breast cancer.* 2011.

12. **Dr. Kiran K. Nakka** was awarded Ph D degree in from SP Pune University. Role of SMAR1 protein in Pre-mRNA processing. December, 2012

13. **Dr. Nidhi Chaudhary** was awarded Ph D degree on from SP Pune University. Regulation of DNA damage repair by nuclear matrix protein SMAR1. January, 2014

14. **Dr. Sijo Varghese Chemmannur**, was awarded Ph D from SP Pune University. Regulation of T cell Differentiation by MAR binding protein SMAR1. June, 2014.

15. **Dr. Rahul Mirlekar** was awarded Ph D degree from DY Patil Deemed University, SMAR! Mediated regulation of Treg cell differentiation during development of Inflammatory Bowl Disease (IBD). June, 2015

16. **Dr. Jinumary Mathai,** was awarded Ph D from SP Pune University, Role of SMAR1 in the regulation of miRNA 371-373 in the context of cancer cell metastasis. May, 2016

17. **Mr. Aritra Das:** Thesis on cancer cell metabolism: Role of SMAR1 in the regulation of Acetylation of GAPDH, to be submitted this year at SP Pune University, 2016. (**Thesis submitted**).

18. **Mr. Nandaraj Taye**: Thesis submitted at SP Pune University, Pune. Role of Wnt-beta cateninin the regulation of colon cancer, SMAR1 directly regulate beta-catenin as a transcriptional repressor.

19. **Mr. Aftab Alam**: Thesis submitted at SP Pune University, Pune. SMAR/BANP regulates the expression of Calnexin and thus an important player in MHC-I presentation in cancer cells (**Thesis submitted**).

20. **Ms. Shruti Joshi**: Identification of new targeted small molecules that stabilizes BANP/SMAR1 and regulates cancer cell metastasis through perturbation of CD44 receptor alternative splicing (Synopsis being submitted).

13. Positions holding by the Ph D students from the lab:

1. **Dr. Ruchika Kaul-Ghanekar**; **Senior Scientist**, Bharati Vidyapeeth, Pune, Since 2009.
2. **Dr. Shravanti Rampalli**; **Senior Scientist and Wellcome Trust Fellow**, NCBS, InStem, Bangalore
3. **Dr. Asavari Kulkarni;** Postdoctoral Fellow, USA; Working on HIV transcription control
4. **Dr. Archana Jalota-Badhwar**; **Senior Scientist**, Piramal Life Sciences, Mumbai
5. **Dr. Kamini Singh**; Post-doctoral Fellow, Lerner Research Institute, Cleveland, USA
6. **Dr. Pavithra Sampath;** Postdoctoral Fellow, University of Cambridge, England
7. **Dr. Surajit Sinha,** PDF, Memorial Sloan Kettering Cancer Centre, New York, USA
8. **Dr. Varseish Raina, Research Scientist**, NII, New Delhi
9. **Dr. Sreenath K, Senior Project leader** at Dr. Reddy's Laboratories, Hyderabad
10. **Dr. Sandeep Singh,** Assistant Professor, Punjab University
11. **Dr. Sunil Kumar Malonia,** PDF, University of Massachusetts Medical School, USA
12. **Dr. Kiran K Nakka**, PDF, The Ottawa Hospital Research Institute, Canada
13. **Dr. Nidhi Chaudhary,** PDF**,** The Ottawa Hospital Research Institute, Canada
14. **Dr. Jinumary Mathai,** Datar genetics, Nashik, Maharastra

14. Awards Received by the Students:

1. **Kamini Singh**, Received 1st prize in the All India Cell Biology conference, 2009.

2. **Kiran K Nakka** SRF, ICMR and Chattopadhyay S. **Dr. Nakka** was selected for Oral Presentation at RNA – 2011, International Conference on Sixteenth Annual meeting of the RNA Society, Japan, 14th June-18th June, 2011, Abstract title: Regulation of pre-mRNA Splicing by Nuclear Matrix Protein SMAR1. He received Travel Award from the Organizers to attend this prestigious meeting.

3. INSA Young Scientist Award by **Dr Pavithra L Chavali** (**2013**), PhD, Department of Oncology, University of Cambridge, Cancer Research UK-CRI, Li Ka Shing Center, Robinson Way, Cambridge, CB2 0RE, UK. She identified that the tumor suppressor protein, SMARI is dysregulated in breast cancer and that its over expression arrests the cells at G1-/S phase.

4. **Dr. Shavanti Rampalli**, Scientist, In-Stem, Bangalore received prestigious Intermediate **Wellcome Trust Award**, 2012 and Faculty at INSTEM-NCBS, Bangalore.

5. **Kiran K Nakka**, INSA Young Scientist Award, 2016.

6. **Sonal Patel,** CSIR-SRF was selected for oral presentation at the 18th Australia and New Zealand Zebrafish Conference held at Waiheke, New Zealand, Jan 2017. Title of abstract: Role of SMAR1 in vertebrate embryogenesis.

** **More than 20 such prestigious awards were received by the Ph D students from the lab at different occasions.**

15. MEMBERS/ CHAIRMAN/ STUDENT'S ADVISORY BOARD MEMBER etc:

- Student Advisory Committee, NCCS, 2003-2011
- Student Advisory Committee ACTREC, Navi Mumbai, 2009-2010
- Student Advisory Committee, Indian Institute of Science, Bangalore
- Thesis Reviewer, University of Delhi, North Campus, IISc, SP Pune University
- Student advisory committee, Biotechnology Department, SP Pune University
- Session Chairperson, Cell Biology Conference, Delhi University, 2006
- Session Chairperson, Transcription meeting 2009
- Session Chairperson, Chromatin-Asia, JNCASR, December 4-6, 2010
- Co-convener, National Symposium on Indian Society for Developmental Biology (ISDB), 2001
- Member: GRC, MIF, SBC, ISDB, IACR, RNA, Asian Transcription Biology, Chromatin-Asia
- Task Force Research Committee, Animal Science and Biotechnology, CSIR, 2011
- Chairman, International Conference, carcinogenesis at Dr Ram Manohar Lohia Hospital, Post Graduate Institute Medical Education and Research, New Delhi, November 19-21, 2012.
- Chairman, 4th International Conference on Stem Cells and Cancer (ICSCC-2013): Proliferation, Differentiation and Apoptosis", 19-22 October 2013, Mumbai, India
- Chairman, DBT Cancer biology Task Force for Selection of UOE projects
- Member, DBT Basic Biology Task Force, 2017 onwards.

16. SCIENTIFIC SERVICES PROVIDED AS SUPPORT:

- Number of projects served (may also include services such as statistical and economic analysis): Working with Piramal Life Sciences on identification of anti cancer and anti-HIV compounds by screening of compound library.
- Teaching at various institutes and Departments within and outside Pune
- Guiding project students from all over India
- Guiding project students from Indian Academy of Science, KVPY etc.
- Task Force Research Committee, Animal Science and Biotechnology, CSIR, 2011

17. SCIENTIFIC COLLABORATORS:

- Dr. Pierre Gressens, Hospital Robert Debre, Paris, France
- Dr. Olivier Cases, Hospital Robert Debre, Paris, France
- Dr. Nilanjana Maulik, UCHC, Farmington, USA
- Dr. Siddhartha Roy, Ex-Director, CSIR-IICB, Kolkata
- Dr. Tapas K Kundu, JNCASR, Bangalore
- Dr. Subeer Majumdar, NII, New Delhi
- Dr. H. K Prasad, AIIMS, New Delhi
- Dr. U. D Gupta, NJIL & OMD, Agra
- Dr. Uday Kumar Ranga, JNCASR, Bangalore
- Dr. Debasish Mitra, NCCS, Pune
- Dr. Tanya Das, Bose Institute, kolkata
- Dr. Kishore Paknikar, ARI, Pune
- Dr. Mahendra Sonawane, NCRA-TIFR, Pune
- Dr. J. K. Pal, Pune University
- Dr. B. G. Hajra, NCL, Pune
- Dr. Pankaj Poddar, NCL, Pune
- Dr. Gaurisankar Sa, Bose Institute, Kolkata
- Dr. K M Paknikar, ARI, Pune
- Dr. Saumitra Das, IISc, Bangalore
- Dr. S. Chandrasekhar, IICT, Hyderabad
- Dr. Tapas K Hazra, Galveston, USA
- Dr. Amitava Das, Director, CSIR-CSMCRI, Bhabnagar, Gujrat
- Dr. Subhrangsu Chatterjee, Bose Institute, Kolkata

- Dr. Soumen Basak, National Institute of Immunology, New Delhi

*** There are several DBT and DST funded projects in which Dr. Chattopadhyay was a principal investigator along with other scientists as Co-PI. In these projects scientists from all over India and abroad were involved as a part of joint co-investigators.

18. Membership in Institutional Committees:

- Associate Dean, Academic Cell, NCCS, Pune, India (2012-2015)
- Member/ Chairman, Stores and Purchase Section (2007-2015)
- Coordinator and Faculty In-charge; Scientific Advisory Committee (NCCS-SAC)
- Selection committee of six months project and JRF students for doing Ph D at NCCS till 2015.
- Member of Ph D thesis presentation at the Department of Biotechnology, Calcutta University.

19. Organizing Seminars and Symposia:

- In-charge of arranging seminars and symposiums at NCCS. Organized more than 20 talks from Indian and scientists from abroad.
- Co-convener, National symposium on Indian Society for Developmental Biology (ISDB), 2001.
- Advisory Committee member, society for Biological Scientists (SBC), NCCS, 2010.
- Arranged more than 30 seminars at NCCS in last few years and formal in-charge for the same.
- Convener, GRC-2014, Held at Khajuraho, MP, December 6-10, 2014
- Organized several seminars at the CSIR-Indian Institute of Chemical Biology, Kolkata

20. LIST OF PUBLICATIONS:

1) **Chattopadhyay S**, Taye N, Alam A, Ghorai S, Chatterji DG, Parulekar A, Mogare D, Singh S, Sengupta P, Chatterjee S, Bhat MK, Santra MK, Salunkhe PB, Finston SK (**2018**) SMAR1 inhibits Wnt/β-catenin signaling and prevents colorectal cancer progression**. Oncotarget**. Apr 20;9(30): 21322-21336.

2) **Chattopadhyay S** , Bhagat PN, Jadhav SH, , Paknikar KM (**2018)** Carbon nanospheres mediated nuclear delivery of SMAR1 protein (DNA binding domain) controls breast tumor in mice model. **Nanomedicine** (Lond). 2018 Feb;13(4):353-372.

3) Mirlekar B, Gautam D, **Chattopadhyay S**. (**2017**) Chromatin Remodeling Protein SMAR1 Is a Critical Regulator of T Helper Cell Differentiation and Inflammatory Diseases. **Frontiers in Immunology**. 2017 Feb 9;8:72. doi: 10.3389/fimmu. 2017.00072. eCollection 2017. (**IF: 5.7**)

4) Patel S, Choksi A, Pant R, Alam A and **Chattopadhyay S**. (**2017**) Nutritional programming of metabolic syndrome: Role of nutrients in shaping the epigenetics. **A Handbook of nutrition, diet and epigenetics**. Springer International Publishing AG 2017. DOI 10.1007/978-3-319-31143-2_42-1

5) Paul D, Ghorai S., **Chattopadhyay S**., Dinesh US, Shetty P and Santra MK (**2017**) Cdc20 directs proteasome-mediated degradation of the tumor suppressor SMAR1 in higher grades of cancer through the anaphase promoting complex. **Cell Death and Disease**, NPG, In press. (**IF: 5.4**)

6) Sengupta P, **Chattopadhyay S**, Chatterjee S., (**2017**) G-Quadruplex surveillance in BCL-2 gene: a promising therapeutic intervention in cancer treatment. **Drug Discovery** 2017 May 12. pii: S1359-6446(17)30245-3. doi: 10.1016/j.drudis.2017.05.001. (**IF: 5.6**)

7) Chatterjee B, Banoth B, Mukherjee T, Taye N, Vijayaragavan B, **Chattopadhyay S**, Gomes J, Basak S. (**2016**) Delayed IκBa synthesis insulates TLR4 induced canonical RelA/NFkB pathway from non-canonical LTbR signaling in myelomonocytic cells. **Science Signaling**, AAAS, 2016 Dec 6;9 (457): ra120, (**IF**: **7.5**)

8) Ramu V, Aute S, Taye N, Guha R, Walker MG, Mogare D, Parulekar A, Thomas JA, **Chattopadhyay S** and Das A. (**2017**) Photo-induced cytotoxicity and anti-metastaticactivity of ruthenium(II)–polypyridyl complexesQ1 functionalized with tyrosine or tryptophan. **Dalton Transaction**. 2017 May 5. doi: 10.1039/c7dt00670e. [Epub ahead of print] (**IF: 4.6**)

9) Agarwalla H, Mahajan PS, Sahu D, Taye N, Bishwajit Ganguly B, Mhaske SB, **Chattopadhyay S**, Das A. (**2016**) A Switch-On NIR Probe for Specific Detection of Hg2+ Ion in Aqueous Medium and in Mitochondria. **Inorganic Chemistry**. (**IF: 4.82**)

10) Anila HA, Ali F, Kushwaha SA, Taye N, **Chattopadhyay S**, Das A. (**2016**) A Cysteine Specific Fluorescent Switch for Monitoring Oxidative Stress and Quantification of Aminoacylase-1 in Blood Serum. **Analytical Chemistry**. 2016 Dec 20; 88 (24): 12161-12168. doi: 10.1021/acs.analchem.6b03066. (**IF: 5.7**)

11) Mathai J, Mittal SP, Alam A, Ranade P, Mogare D, Patel S, Saxena S, Ghorai S, Kulkarni AP, and **Chattopadhyay S**. (**2016**) SMAR1 binds to T(C/G) repeat and inhibits tumor progression by regulating miR-371-373 cluster. **Scientific Reports** (NPG) 2016 Sep 27;6:33779. doi: 10.1038/srep33779. PMID: 27671416. (**IF: 5.3**).

12) Chemmannur SV, Bhagat P, Mirlekar B, Paknikar KM and **Chattopadhyay S**. (**2016**) Carbon nanospheres mediated delivery of nuclear matrix protein SMAR1 to direct experimental autoimmune encephalomyelitis in mice. **International Journal of Nanomedicine** (12;11:2039-51. doi: 10.2147/IJN.S93571. (**IF: 4.4**).

13) Ali F, A AH, Taye N, Mogare DG, **Chattopadhyay S**, Das A. (**2016**) Specific receptor for hydrazine: mapping the in situ release of hydrazine in live cells and in an in vitro enzymatic assay. **Chemical Communications** (Cambridge). 2 (36): 6166-9. doi: 10.1039/c6cc01787h. Epub 2016 Apr 14. (**IF: 6.8**)

14) Pal S, Ramu V, Taye N, Mogare DG, Yeware AM, Sarkar D, Reddy DS, **Chattopadhyay S**, Das A. (**2016**) GSH Induced Controlled Release of Levofloxacin from a Purpose-Built Prodrug: Luminescence Response for Probing the Drug Release in Escherichia coli and *Staphylococcus aureus*. **Bioconjugate Chemistry.** 21;27(9):2062-70. doi: 10.1021/acs.bioconjchem.6b00324. Epub 2016 Aug 26. (**IF: 4.6**).

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7. Srivari Chandrasekhar, Togapur Pavan Kumar, Prathama S Mainkar Samit Chattopadhyay, Shruti Joshi, Chippala Venkataraju. Isothiocyanate compounds as SMAR1 stabilizers. Application File No: 201611028762. Filing Date: 24.08.201.

OUTLINES OF MAJOR RECENT PROJECTS:

The eukaryotic interphase chromatin is a highly organized structure. Specific scaffolding proteins form complexes with DNA and play pivotal role in DNA packaging. An important feature of DNA packaging involves folding of the chromatin into loop domains, which are periodically attached to the nuclear matrix through binding to specialized DNA sequences called Matrix Attachment Region or MARs. We study how proteins that specifically bind to MARs regulate genomic DNA organization and nuclear functions such as transcription, recombination, splicing, repair etc.

Past several years our lab has been engaged in understanding the role of nuclear matrix and associated proteins in pathophysiological processes. We have focused on one such novel matrix associated protein SMAR1 that is down regulated in human breast cancer (**Singh et al., PLoS-One, 2007**). It acts as a global repressor for many genes including Cyclin D1, IκBα, CK8, Bax and Puma by directly recruiting HDAC1-mSin3a dependent repressor complex (**Rampalli et al., MCB, 2005; Singh et al., PLoS One, 2007; Singh et al., JBC, 2009**). Our findings reveal that SMAR1 functions in two different ways to regulate global gene expression. First, it acts as a transcriptional repressor and second by modulating the transactivation potential of transcriptional co-activators like NF-κB, p53 and p300. While NF-κB regulates plethora of cytokine and chemokine genes involved in tumor metastasis and angiogenesis, the tumor suppressor p53 on the other hand regulates the fate of tumor cells through selective activation of Bcl-2 family proteins. Additionally, p300 acetylates various transcription factors like p65 and c-Myc which are involved in oncogenic transformation. These cofactors globally affect various signaling pathways leading to activation of genes that onset the process of tumorigenesis. Thus, a change in the level of SMAR1 as is seen during cancer progression is inversely correlated to the oncogenic activities of these three cofactors.

Major Work in Progress:

Regulation of CD44 gene: Implication in cancer
Function of SMAR1 in adipocyte differentiation relating to fat deposition
Control of T_H1-T_H2- T_H17 and T-reg differentiation: Major implication in inflammatory diseases
SMAR1 mediated regulation of miRNA miR371-373: possible role in cancer cell metastasis
Understanding cancer cell metabolism: Role of DNMTs and their alternative splicing
Genome wide RNAi screening for SMAR1 target genes in cancer and cancer stem cells
Identification of anticancer compounds that modulate SMAR1 function
BANP/SMAR1 plays an in Zebra Fish Embryo Development effecting cardiac edema

Regulation of CD44 gene: Implication in cancer

Transcription and pre-mRNA splicing have emerged as highly coordinated processes. Alternative pre-mRNA splicing is indispensible for post transcriptional gene regulation. We first identified that nuclear matrix protein SMAR1 interacts with splicing co-activator SRm160 which is known to regulate Ras dependent CD44 alternative splicing and also enhances constitutive splicing. Alternative exon usage is dependent on the extracellular stimuli. Inclusion of variable exons in CD44 mRNA is dependent on MAP kinase signaling pathway. CD44 has 10 constant exons and 10 variable exons residing between constant exon 5 and 6. Higher levels of CD44 variants confer strong metastatic potential to tumors. In the context of SRm160, present study deals with the regulation of CD44 alternative splicing by nuclear matrix protein SMAR1 in an ERK dependent manner. Knock down of SMAR1 enhances the inclusion of CD44 variable exons. We found SMAR1 interacts with Sam68 endogenously, another protein of Signal Transducer and Activator of RNA splicing (STAR) family, and MAP kinase mediated activation causes post translational modification of SMAR1 by ERK and mediates the translocation of protein from the nucleus to cytoplasm. In a signal independent manner SMAR1 is found to enhance constitutive splicing of the β-globin pre-mRNA. Over expression of SMAR1 has found to increase the constitute splicing of β-globin pre-mRNA while knock down or immunodepletion of SMAR1 did not affect much of the constitutive splicing. Gel exclusion chromatography based characterization of high molecular weight protein complexes had shown that SMAR1 is part of the splicing complex containing SC35. Studies show that SMAR1 levels are down regulated in advanced stages of cancer. This implies that in these cancers the abnormal alternative splicing of CD44 and the generation of CD44 splice variants will not be prevented due to low levels of SMAR1 and this will cause an increased tumor metastasis and invasion. We are now investigating that whether a dual control of CD44 expression exists; one via upregulation of p53 by certain anticancer drugs, wherein p53 transcriptionally inactivates the expression of CD44 and secondly whether this p53 can bind to the SMAR1 promoter, increasing its expression and thereby preventing the abnormal alternative splicing of CD44, in higher grades of cancer (**PNAS, 2015**).

SMAR1 mediates DNA damage repair through deacetylation of Ku70

Matrix attachment region-binding proteins (MARBPs) are unique class of proteins that bind to specific non-coding sequences in the genome termed as scaffold/matrix attachment regions (S/MARs), and globally modify the topology of chromatin. Previous studies have established the importance of SMAR1 in helping DSB repair. Further we extended our study and reveal for the first time that NM-associated proteins play a key role in cellular response upon IR-induced DNA damage. SMAR1 imparts a critical role in the cell fate decision upon DNA damage by maintaining Ku70 in a deacetylated state via HDAC6. Deacetylated form of Ku70 is enriched in the damage-associated chromatin fraction for efficient repair and also controls mitochondrial translocation of Bax. Furthermore, SMAR1 is a novel target of ATM kinase upon IR and regulates G2/M checkpoint. Phosphorylation of SMAR1 at Ser 370 residue increases upon IR in an ATM-dependent manner and such post translational modification increases the activity of SMAR1. Recruitment of SMAR1 on chromatin was also studied as chromatin-bound fraction contains all the repair associated proteins. SMAR1 gets recruited to chromatin upon DNA damage and this recruitment is ATM dependent as found by decreased recruitment when cells were pretreated with ATM

inhibitor KU55933 and PI3K inhibitor caffeine. Acetylation status of Ku70 decides the cell's fate and it was found that SMAR1 modulates the acetylation of SMAR1 by favoring the deacetylation of Ku70 through its interaction with HDAC6. *In silico* analysis showed that SMAR1 binding interactions with Ku70 are predominantly dependent on several key salt bridge interactions, such as (A) VAL-157(Ku70) : ARG-335(SMAR1), (B) ASP-156(Ku70) : LYS-322(SMAR1), (C) LYS-114(Ku70) : ASP-185(SMAR1), (D) SER-96(Ku70) : ARG-316(SMAR1), and (E) SER-155(Ku70) : ARG-335 (SMAR1). The trimeric model of SMAR1 bound to HDAC6 and Ku70 revealed that 240-350 residues of SMAR1 interact to the N-terminal region of Ku70 through various inter residual salt bridge formation. *In silico* analysis of HDAC6-SMAR1-Ku70 docked model revealed that Ku70 is bound to SMAR1 adjacent to HDAC6-binding site. It was observed that C-terminal domain (CTD; residues 248-371) of SMAR1 is sandwiched between Ku70 and HDAC6. Deacetylated Ku70 interacts with pro-apoptotic protein Bax and inhibits the translocation of Bax from cytoplasm to mitochondria. Interaction studies between Bax and Ku70 were done and it was discovered that SMAR1 inhibits the release of Bax from Ku70. Knockdown of SMAR1 causes weak interaction between Bax and Ku70. Localization of Bax was also studied upon SMAR1 over expression and knockdown. SMAR1 favors the Bax localization in the cytoplasm and thus inhibits apoptosis. By inhibiting apoptosis, SMAR1 regulates the cell survival also. It was found that SMAR1 causes better cell survival, both endogenously and post IR. All such results strongly suggest the crucial role of SMAR1 in DNA damage repair and cell's fate decision making (**Cell death and Disease, 2014**).

Control of cytokine genes for T_H1-T_H2- T_H17 and T-reg differentiation

Regulation of T cell lineage commitment is of high importance as it influences the adaptive immune responses. Naïve CD4 T cells can differentiate into distinct effector T cells up on encountering antigens. IFNγ secreting Th1 cells and IL4 secreting Th2 cells are the most predominant of T cell subtypes. Specific transcriptional factors and cytokines demarcate these cell types. Expression of Th1 cell-specific transcriptional factor T-bet is induced in Th1 cells by IFNγ signaling in combination with IL12. In the case of Th2, another transcriptional factor GATA3 is induced by the downstream signaling from IL4. Recently, apart from the traditional Th1 and Th2 cells, a novel subset of IL17 secreting Th17 cells were have been identified which have important role in inflammatory responses. In response to TGFβ and IL6 signaling, the naïve T cells differentiate to Th17 pathway. The combination of this signaling leads to the induction of RORγt which is the Th17 specific transcriptional factor. RORγt, along with other signaling molecules activate IL17 gene expression which is the signature cytokine of Th17 cells.

We are working on a matrix attachment region binding protein (MARBP) SMAR1 that globally regulates gene transcription through recruitment of HDAC1-Sin3 complex at various promoters. Previous results from our lab suggested a critical role of SMAR1 in the differentiation of T helper cells to Th1 and Th2 subtypes by the regulation of T-bet promoter (**Varghese et al**., **Mucosal Immunology, 2015**). We have studies the role of SMAR1 T ell responses upon ***Mycobacterium tuberculosis*** infection in animal model and found that while the transgenic mice is more susceptible to the infection, deletion of SMAR1 makes the mice more resistant. Thus, manipulating such masregulators may control infection and further disease progression. SMAR1 mediated regulation of T cell lineage elucidated on yet another function of SMAR1 in regulating Th17 differentiation. The expression level of SMAR1 is downregulated in naïve T cells polarized

in-vitro towards Th17. Induced expression of SMAR1 inhibits Th17 polarization by binding to the MAR regions on the IL17 locus. Research on SMAR1 further assumes it to be a global regulator of gene transcription having multifarious functions in the regulation of other cytokine genes that drives specific T cell lineages. Th17 cells are the most important candidate for the immune responses against inflammatory conditions. Hence, regulation of Th17 by a cell intrinsic factor can be a potent regulator of inflammatory responses. Understanding the regulation of the inflammatory responses by SMAR1 will be accessed using over-expressed and T cell specific conditional knock-down mice. In this regard, chemically induced **colitis** and **rheumatoid arthritis** models are under study to better understand the function of nuclear matrix proteins in T cell differentiation and thus in immunity through T cell polarization (**Mirlekar et al., Mocosal Immunology (b), 2015**). In future, these studies will be extended in human patients where expression of SMAR1 in both synovial fluid and blood samples will be checked in arthritis patients and find possible correlations.

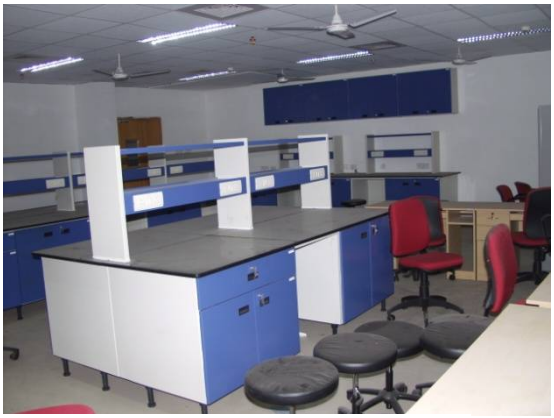
Genome wide RNAi screening to identify SMAR1 targets in cancer and cancer stem cells

Considering the multifaceted role of SMAR1 in maintaining chromatin structure integrity and global regulation of gene transcription, we are studying the involvement of SMAR1 in regulation of miRNAs. Microarray data from our lab suggests that SMAR1 can regulate many miRNAs including miR-34a, miR-34b, miR-373 and miR-302c. These miRNAs are involved in breast cancer metastasis. Interestingly, genome wide analysis of SMAR1 binding sites by ChIP on Chip has revealed many genes involved in cancer metastasis and angiogenesis that could potentially be regulated by SMAR1. Software analysis predicted the possible involvement of miR-320 in regulating SMAR1 expression. Custom synthesized miRNA promoter chips will be made to study the factors that can possibly regulate various miRNA clusters. These studies will be extended in clinical samples to study expression analysis of several miRNAs implicated in disease condition. We aim to generate miRNA database wherein all the miRNAs that are affected in stage specific manner can be placed and can then used as prognostic or diagnostic marker (**International Journal of Nanomedicine, 2016).**

CSIR - IICB Translational Research Unit of Excellence (TRUE)
Salt Lake, Kolkata

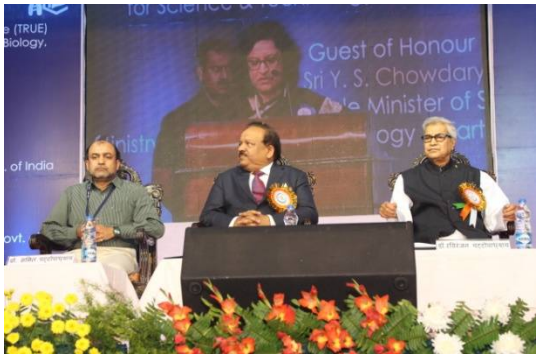
CSIR-IICB, Jadavpur, Kolkata is engaged in research on diseases and certain biological problems of global interest. CSIR-IICB is one of the major institutes in India which initiated, right from its inception, multidisciplinary concerted efforts for conducting basic research on infectious diseases, specifically leishmaniasis and cholera, along with the development of technologies for the diagnosis, immunoprophylaxis and chemotherapy of the diseases. The institute is paying substantial attention in developing drugs from indigenous and natural resources like native Indian plants.

TRUE – Front View

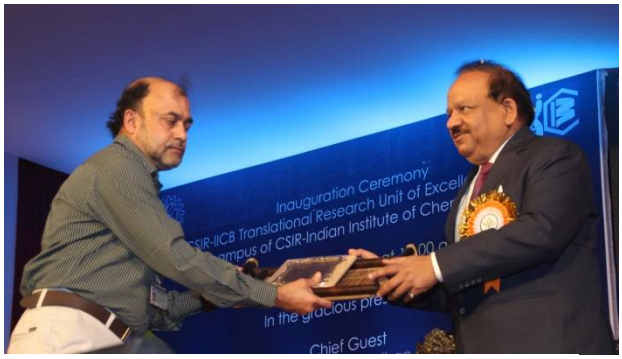


Inside a Lab in TRUE

In order to strengthen the basic research and to attain translational objectives, a second campus comprising of a four storey building was constructed at Salt Lake, Kolkata. The unit is named CSIR-IICB Translational Research Unit of Excellence (TRUE), the overall mandate of it being development of state-of-the-art fundamental innovation and translation of indigenous innovations into affordable technology. At the nascent stage of the TRUE unit, CSIR-IICB has planned to adopt a three way program - facilitation, incubation and translation, for meaningful transfer of research output into successful technology and subsequent contribution towards economic growth of the country.



Director sharing dais with the Ministers

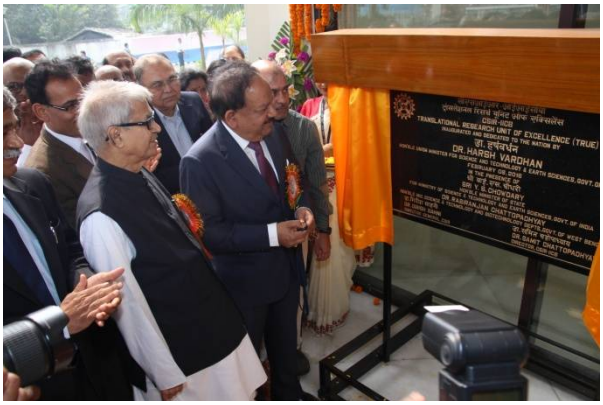


Director presenting memento to Union Minister

On February 08, 2016 CSIR-IICB TRUE was inaugurated by the Chief Guest, Dr. Harsh Vardhan, Hon'ble Union Minister for Science & Technology and Earth Sciences and Vice President of CSIR. Dr. Rabiranjan Chattopadhyay, Minister in-Charge for Science & Technology, Biotechnology, Govt. of West Bengal was present in the occasion as a Distinguished Guest. The establishment is conceived as a productive platform

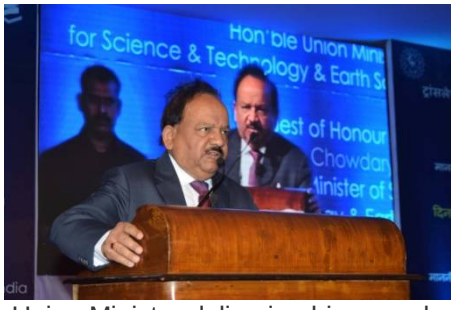
for successful industry-institute cooperation for translating previously achieved and ongoing biomedical discoveries by CSIR-IICB scientists into biomedical deliverables with a view to contribute into country's start-up movement.

Ministers lighting the lamp

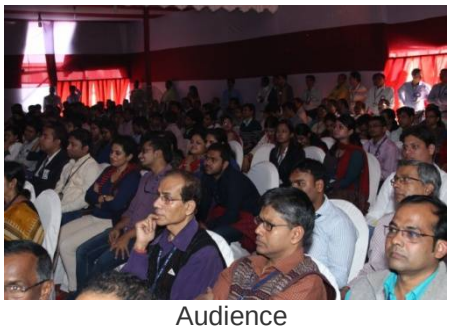


Inauguration of the facilities

The major scope and the roadmap set for the new unit includes Research facilitation by establishing advanced technological platforms, establishing a Biomedical Incubation Center for MSME start-up companies and translating discoveries made by CSIR-IICB scientists. Approximately 10,00 sq. ft area in the TRUE building is planned to be allocated for the core facility centre. Around 8000 sq. ft area (including the core facility) in the TRUE building is planned to be allocated for the incubation centre.


Union Minister delivering his speech


WB Minister


Audience

Dr. Harsh Vardhan appreciated significant contribution of CSIR-IICB in areas of Cholera and Leishmaniasis. He was also happy to know that several herbal medicines have been developed and marketed by CSIR-IICB and many more are in pipe-line to be developed soon. The minister stressed the importance of units like the TRUE, a productive platform for successful industry-institute liaison for technology facilitation and transfer. "Be it scientists or institutes, today the most important factor is innovation coefficient and our government is keen on developing this coefficient. With the impetus by the start-up movement and centres like the TRUE, we are confident of turning lab researches into solutions for the common man," he said.

Dr. Rabiranjan Chattopadhay, expressed his pleasure for creation of the unique Incubation Center for doing translational research with high end sophisticated equipments. He hoped that the State Government and this newly created CSIR-IICB TRUE would work together for the benefit of the people.

MoU signed with NRDC

CSIR-IICB Products Exhibited

The programme was followed by an Exhibition on Industry-Institute partnership where the products from CSIR-IICB were exhibited by Industries and the most promising technologies in pipeline were exhibited by the scientists of the institute.

The National Research Development Corporation (NRDC) entered into a Memorandum of Understand (MoU) with CSIR-IICB to promote entrepreneurship. Chairman and Managing Director, NRDC, Dr. H. Purushotham, Prof. Samit Chattopadhyay, Director, CSIR IICB and Dr. Suresh Kumar, Head, Business Development signed and exchanged the MoU in the presence of Dr. Harsh Vardhan and Dr. Rabiranjan Chattopadhyay. After signing MoU, Dr. Purushotham said that the partnership between NRDC and CSIR-IICB will contribute to the “Start-up India” and “**Make in India**” Missions of Govt. of India by way of promoting Entrepreneurships, Incubation, IPRs and Technology Transfer.