wellcome trust DBT

INDIA ALLIANCE

ANNUAL REPORT
2014-15

CONTENT

CEO'S MESSAGE

An Annual Report is meant to report and celebrate achievements of the year gone by. We have much to celebrate, which you will see in these pages. However, as in earlier years, I will also use this opportunity to highlight our challenges and concerns.

India Alliance owes its success to our staff and the wise counsel of our Trustees and committee members. They want to see science, especially biomedical research, flourish in India. Our common goal is to identify and support the next generation of leaders, who will transform India through their ideas, scholarship and innovation.

In the period between November 2014 and May 2015, we awarded 10 Early Career, 19 Intermediate, 4 Senior and 1 Margdarshi Fellowships, of which 9 were given to clinical and public health researchers. This brings the total number of India Alliance Fellows to 177. These researchers are based at 59 institutions across India, making us a truly pan-India organization.

Biomedical research cannot thrive in an environment in which clinicians have neither the time to ask important questions nor the skills and tools required to address these. Since 2013, India Alliance has paid special attention to this by creating mechanisms for clinicians and public health researchers to compete for the awards and enhance their research skills. The result is that 16.4% of India Alliance Fellows are now engaged in clinical and public health research, up from 9.5% two years earlier. However, the lack of dedicated research time away from clinical duties at most hospitals/medical schools, and problems of alignment and promotion faced by clinician researchers remain areas of concern.

I had expressed concern through this forum last year that our Fellows were not publishing to their potential. Many of them took this anguish seriously and the result has been an increase in the numbers and quality of publications. With 71 publications this year, we registered a 33% increase over the previous year. The work of our Fellows has also made more impact as evidenced by increased peer recognition through invitations to speak at major international conferences, write authoritative reviews, perform editorial duties, etc.

I also worried last year about not getting enough high quality applications. That continues to be so and this limits the number of awards we can make. The Early Career scheme suffers from structural issues that have more to do with attitudes in India than the scheme itself. For hiring in academic institutions, an overseas post-PhD experience is automatically considered to be better than one obtained in India, even if that is based on a highly competitive Fellowship such as ours. We will do whatever we can to assist our Early Career Fellows become more competitive. The Intermediate Fellowships remain the most popular and competitive, and Senior Fellowships continue to lag behind. The Margdarshi Fellowship conditions were again revised this year and we have a few very good applications. Stars are needed at all career stages to move India into the big league.

The biomedical research enterprise in India is growing, but there is a reluctance to be globally competitive. There is increasing reliance on "safe science" and quality is frequently compromised for quantity. These problems have underlying structural reasons. Mentorship of young scientists is woefully inadequate, institutions (especially universities) do not encourage challenging the status quo and despite suffering from a shortage of quality faculty, they do not effectively use Fellowship schemes such as ours. And despite annual promises, funding for research in India continues to stagnate at around 0.9% of GDP, compared to 2.76% in USA and 4.04% in South Korea.

Our outreach and public engagement activities did well this year. We now have a new and dynamic website that can also be accessed through mobile devices, and we are more active on social media. In January this year, India Alliance started a bimonthly newsletter, which informs our Fellows and anyone else who cares to engage with us, of our activities. The public engagement events have included the lecture series "DNA@70", which brought 4 speakers to give 10 lectures across 6 cities; and a public discussion "Voices for Cancer" at an undergraduate college in Delhi.

The India Alliance Science Communication workshops registered a phenomenal 450% growth, with about 900 PhD students, postdocs and young scientists attending these in the last two years. During this year alone, we held 14 such workshops at 11 different institutions across the country. There is an extremely encouraging response to these workshops with more invitations than we can handle. It is also a tremendously fulfilling experience.

Please review this Annual Report and share your ideas with me at shahid.jameel@wellcomedbt.org. I will look forward to it.

-Dr. Shahid Jameel
Chief Executive Officer
India Alliance

PERSPECTIVES

Unlocking the secrets of biology with "Yeast" model

"Yeast has become the go-to model for biomedical research. It is used for the discovery of novel medicinal compounds. Yeast also serves as a humanized model for determining the function and effect of mutations in human genes, and for elucidating defects in conserved biochemical pathways that cause human disease."

- Dr. Nishanth Koodali Thazath

Intermediate Fellow
IISER Thiruvananthapuram

Professor Jeremy Farrar
Director,
The Wellcome Trust,
London, United Kingdom

Director: The Wellcome Trust, London, United Kingdom

In November 2014 I had the pleasure of attending part of The Wellcome Trust /DBT India Alliance Annual Fellows' Meeting. It was wonderful to see at first-hand the excellence of the Fellows funded through the programme and see the strength of our partnership with the Department of Biotechnology.

I am particularly pleased to see the breadth of medicine now encompassed by the Alliance Fellows, with Fellowships studying all topics from molecular biology, through to clinical studies, epidemiology and public health.

I believe that breakthroughs in medical research emerge when talented researchers are given the resources and freedom they need to pursue their goals. The India Alliance Fellowships do just that and I look forward to continuing to watch their progress.

"Professor Jeremy Farrar and Dr. K. VijayRaghavan attended the India Alliance Fellows Meeting in 2014."

PERSPECTIVES ON INDIA ALLIANCE

Professor Mike Turner
The Wellcome Trust, London,
United Kingdom

Dr. Rajesh Kapur
Department of Biotechnology
New Delhi, India

The India Alliance Trustees

The Wellcome Trust/DBT India Alliance (IA) has now entered its 7th year. During this time, India Alliance has successfully created an attractive environment that welcomes talented biomedical researchers to India, and has contributed to the 'brain gain'. In addition to being popular for its flexible approach and generous support amongst basic science researchers, The Alliance has also successfully engaged clinical and public health researchers in the past two years through new initiatives.

A marked increase in the number of awards made to highly talented basic, clinical and public health researchers with a wide range of research interests has been the biggest achievement of 2014. We are also pleased to note an improvement in the reach of India Alliance to clinical institutions.

The Research Training Fellowship, a unique funding mechanism for clinicians has laid the foundation for this transition and we hope to see an improvement in the years to come.

The Margdarshi Fellowship award was also a highlight of 2014 and the changes made to this scheme will certainly allow India Alliance to support large research programmes in future rounds. A reasonable number of awards are nearing completion or have completed the grant cycle under all the categories of the Fellowship schemes.

We extend our appreciation to the Fellows for improving the trend of publications; it is getting better with each passing year.

India Alliance has been constantly making efforts in building the culture of mentorship through the highly successful and popular science communication workshops and its initiatives to promote public engagement activities are gaining the attention of diverse groups are to be applauded.

"A marked increase in the number of awards made to highly talented basic, clinical and public health researchers with a wide range of research interests has been the biggest achievement of 2014."

Professor Claudio Sunkel

Director,
Institute of Molecular and Cell Biology,
Porto, Portugal

Member: The Intermediate & Senior Fellowships Selection Committee

I have been associated with the India Alliance program virtually since it started, first as a member of the Early Career Fellowship Committee (2009-2012) and later serving in the Intermediate and Senior Fellowships Committee (2012-2015). I became interested in participating in this adventure, essentially for two reasons. First, I had previously worked with the Wellcome Trust and I admire their courage and determination in their pursuit of excellence in the Biomedical Sciences; and secondly, I had worked intensely in the development of Science in Portugal that between 1986-2010, overcame decades of scientific under development in many areas including Biomedical Sciences, a challenge that India also faced. It was obvious to me that India had made the commitment to continue to develop this area of science with the attitude of rewarding merit, promoting national cohesion and eventually becoming truly global. Thus, over the last six years I have seen the program flourish to become a truly national program. I have also seen the Fellows become more and more competitive and accordingly, Indian Biomedical Sciences has received a new breed of mostly young international scientists that have a firm understanding of the national challenges and also an international perspective of science, which will be essential for the continuous success of this fundamental area of research. High standards of evaluations have resulted in the Award of 177 Fellowships that although initially concentrated the Fellows in a few highly prestigious Indian institutions, over the following years more and more less known institutions, also became recipients of these Awardees. Currently, nearly 50 different institutions, covering 12 regions of the country, are benefiting from the top research these Fellows carry out, as well as from the clear visibility they bring to the institution. Importantly, not only have Research Institutions benefited but also Universities, which eventually need to continue their path in the search of excellence in research. The productivity of the Fellows has, as expected, increased steadily and publications continue to rise steadily both in terms of quantity and quality. In the next five years, it is expected that more top young Indian scientists who are developing their highly successful careers in the Biomedical Sciences abroad, will be willing to continue their work back in India with the support of the Alliance, so that solid basis that have been built so far can continue to expand.

> “Productivity of the fellows has, as expected, increased steadily and publications continue to rise steadily both in terms of quantity and quality.”

Professor KM Venkat Narayan

Ruth and Hubert Chair of Global Health
Professor of Medicine & Epidemiology
Emory University, USA.
Director, Emory Global Diabetes
Research Centre.

Member: The Clinical and Public Health Selection Committee

As a member of the clinical and public health committee of the India Alliance, I first want to applaud the scheme for creating unique opportunities to train a new generation of world-class clinical and public health scientists for India. India faces huge health challenges, with major unfinished agenda of under-nutrition, high child and maternal mortality, infectious diseases, on the one hand, and the rising burdens of noncommunicable diseases (diabetes, obesity, cardiovascular diseases, cancers, poor mental health, injuries), on the other. Yet, in each of these areas, original, independent research from India is miniscule, and grossly disproportionate to the disease burdens – for example, over 15% of the world's diabetes burdens are in India, but less than 0.5% of the world's diabetes-related research output emerges from India, and often the impact of this research, in terms of citations and other metric, is low. This lack of research capacity in India needs to be corrected, especially as the country aspires to be a "knowledge power". The India Alliance is one initiative toward helping to improve India's research infrastructure.

Researchers with clinical and public health backgrounds are critical for India, and often, talented people do not have the opportunity to pursue high-quality original science due to lack of time, inadequate support systems, and heavy load of other duties. The India Alliance scheme offers a huge opportunity for motivated clinicians and public health scientists to get funded for protected research time, resources for research, and other kinds of training support. Based on my two years of experience with the India Alliance, I think a sizeable number of researchers will benefit from the scheme, and can become the nucleus of a new generation of independent investigators in the country.

I have been especially impressed with the high level of ethics and processes India Alliance employs in the selection process, giving independence to the selection committees, and for ensuring fairness. There has also been considerable attention given to being sensitive to the challenges of research in India, to the relatively weak infrastructure, and to the need for flexibility (e.g., allowing researchers to keep some amount of clinical commitment, permitting travel to overseas locations for training). The annual meetings also offer the researchers the opportunity to present their work, get critical feed-back and mentoring, and to form networks. As the initiative moves forward, I would recommend several strategies: **(a)** help build research infrastructure (hard and soft) at selected institutions, and encourage them to cost-share to ensure commitment, and also to evolve a research culture; **(b)** develop intensive courses in epidemiology, biostatistics, grant-writing for current and future fellows; **(c)** help create networks of researchers; **(d)** start training courses for mentors; **(e)** provide awards and recognitions for researchers, mentors, and institutions; **(f)** promote cross-disciplinary collaborations between basic and clinical/public health scientists; and **(g)** promote global science originating from India.

Congratulations to India Alliance, and the impact of this program will be felt in 10 years' time when the researchers and institutions who have benefited from this will start making fundamental contributions to science in India and worldwide.

Professor Helen Skaer
University of Cambridge,
Cambridge, United Kingdom

Member: The Early Career Fellowship Selection Committee

The India Alliance has proved itself to be a unique and remarkable funding organisation for biomedical sciences in India. I have been involved with two of its funding streams – initially with the Intermediate and Senior Fellowship panel (for four years) and with the Early Career Fellowship panel since 2013.

While the Intermediate Fellowship scheme took off rapidly with an excellent set of applications from the start, the ECF scheme has taken longer to settle, taking time for applicants to appreciate the high standard required. However, even for the senior programme, which provides very generous funding, the Alliance has had to work hard to make the scheme known and to attract applications from adequately qualified candidates, both within India and abroad. By 2013, the scheme had become widely known, providing a good number of high quality applications.

The ECF scheme has taken longer to become established with a lower percentage of good applications submitted, particularly in the first few years. My feeling is that the problem is not so much with the quality of the applicants themselves – many are clearly extraordinarily gifted and dedicated young scientists – but with the quality of the projects proposed. Too often they are very over-ambitious and poorly thought through. The panel has discussed this problem exhaustively, focussing on the lack of mentorship that applicants have received from the labs in which they hope to work. The culture of supporting potential postdocs, through the scrutiny of the proposal they intend to submit, needs to be encouraged and the Alliance has initiated steps to improve this component of the application process.

The continued mentorship for all 3 levels of the Fellowship scheme provided by panel members, and fostered at the annual Fellows meeting, is an invaluable aspect of the Alliance programme. The Fellows attending these meetings all seem to appreciate discussions with more senior academics, as well as the chance to network with other Fellows. Indeed several significant collaborations have come out of these meetings. Advice and mentorship continues informally between meetings, providing links that Fellows indicate is important for them.

> **“The continued mentorship for all 3 levels of the Fellowship scheme provided by panel members, and fostered at the annual Fellows Meeting, is an invaluable aspect of the Alliance programme.”**

PERSPECTIVES ON INDIA ALLIANCE

Professor Kara Hanson
London School of Hygiene
& Tropical Medicine,
London, United Kingdom

Member: The Clinical and Public Health Selection Committee

I have participated in two rounds of the Clinical and Public health competition. The India Alliance has been extremely well organised, with documentation provided in good time with clear communication about deadlines, etc. In the 2013 selection round the proposals were predominantly clinical – I recall that I elected to review only one proposal, which I judged to be within my area of expertise in public health. There were more public health studies in the 2014 round, no doubt due to the efforts by the programme secretariat, to disseminate and promote the schemes.

Prior to the 2014 call I was also involved in the efforts to revise the statement of areas that would be eligible for funding, in order to try to stimulate submission of proposals in the field of health services / systems research. However, the health systems research proposals received were not strong enough to be competitive. I believe this reveals an important gap in research capacity in India that the scheme could address. It might be worthwhile to look again at the programme descriptors for the Joint Health System Research Initiative run by the UK MRC, and examine the projects that have been funded, to find out what types of research could be encouraged in India.

I am not very familiar with the Indian research funding landscape, but it does appear to me that the Clinical and Public Health Research (CPH) and the Research Traning Fellowship (RTF) schemes address a critically important gap. I would like to see more health services/systems research proposals, rigorous “implementation research” which explore ways to strengthen service delivery, and ways to encourage multi disciplinary teams of health systems researchers to tackle key health service and public health challenges. Many of the proposals we reviewed in November 2014 had quite weak research questions and research designs. It would be interesting to explore ways of addressing this capacity gap, possibly by holding research proposal development workshops prior to submission. The addition of the RTF scheme to the suite of programmes seems to be critical to ensuring that there is a full trajectory of research support along the career path. It was also impressive that the importance of the research mentor was signalled so strongly in the application process.

This is an important initiative – it supports excellent work and can do more to strengthen the development of CPH research in India. I think it should also look even more downstream to service delivery and implementation issues and support developing research capacity in these areas.

> **“The addition of the RTF scheme to the suite of programmes seems to be critical to ensuring that there is a full trajectory of research support along the career path.”**

Professor Michael Ferguson

Governor, The Wellcome Trust,
London, United Kingdom

Member: Strategic Advisory Council & The Margadarshi Fellowship Selection Committee

First, I would like to thank and acknowledge my friend and fellow Wellcome Trust governor, Professor Peter Rigby FRS, who passed on the Wellcome Trust/DBT India Alliance baton to me towards the end of 2014. Peter served as a member of the Strategic Advisory Council since the inception of the India Alliance, and brought to it his inimitable brand of scientific incisiveness, clarity of thought, pragmatism and sound advice. I hope I can come close to continuing his good work for the next several years.

India is an extraordinary nation. The size and diversity of its population, its cultural and scientific depth and its future potential are, at once, awe-inspiring and humbling. While The Wellcome Trust/DBT Alliance can, in terms of size and scope, only be a small component of a much larger Indian scientific firmament, it aspires to be a catalytic and transformative one.

I relish my new role serving the Alliance, and I look forward to working with Dr Shahid Jameel, the Alliance Trustees, the Alliance officers, and the expert advisors that make it tick and, of course, getting to know the Early, Intermediate, Senior, and Margdarshi Fellows. The Fellows are the very life-blood of the mission of the Alliance – which is, to develop a sustainable ecosystem of rigorous scientific review, research excellence, and a network of mentorship and support.

I enjoyed the Wellcome Trust/DBT Alliance 2013-2014 Annual Report and I congratulate the team who put together that excellently produced and informative document. I was impressed by the project descriptions and scientific highlights, pleased by the quality of the events held throughout that year and delighted by the clarity and candour of the commentaries by the Alliance members and advisors. There is clearly much to celebrate about the progress of the Alliance and the successes of its Fellows and, at the same time, still much to be done to build upon the DBT and Wellcome Trust co-investment and partnership thus far. All successful organisations strive to 'do better' and since this desire appears well embedded in the Wellcome Trust/DBT Alliance, it bodes well for the future.

“The Fellows are the very life-blood of the mission of the Alliance – which is, to develop a sustainable ecosystem of rigorous scientific review, research excellence, and a network of mentorship and support.”

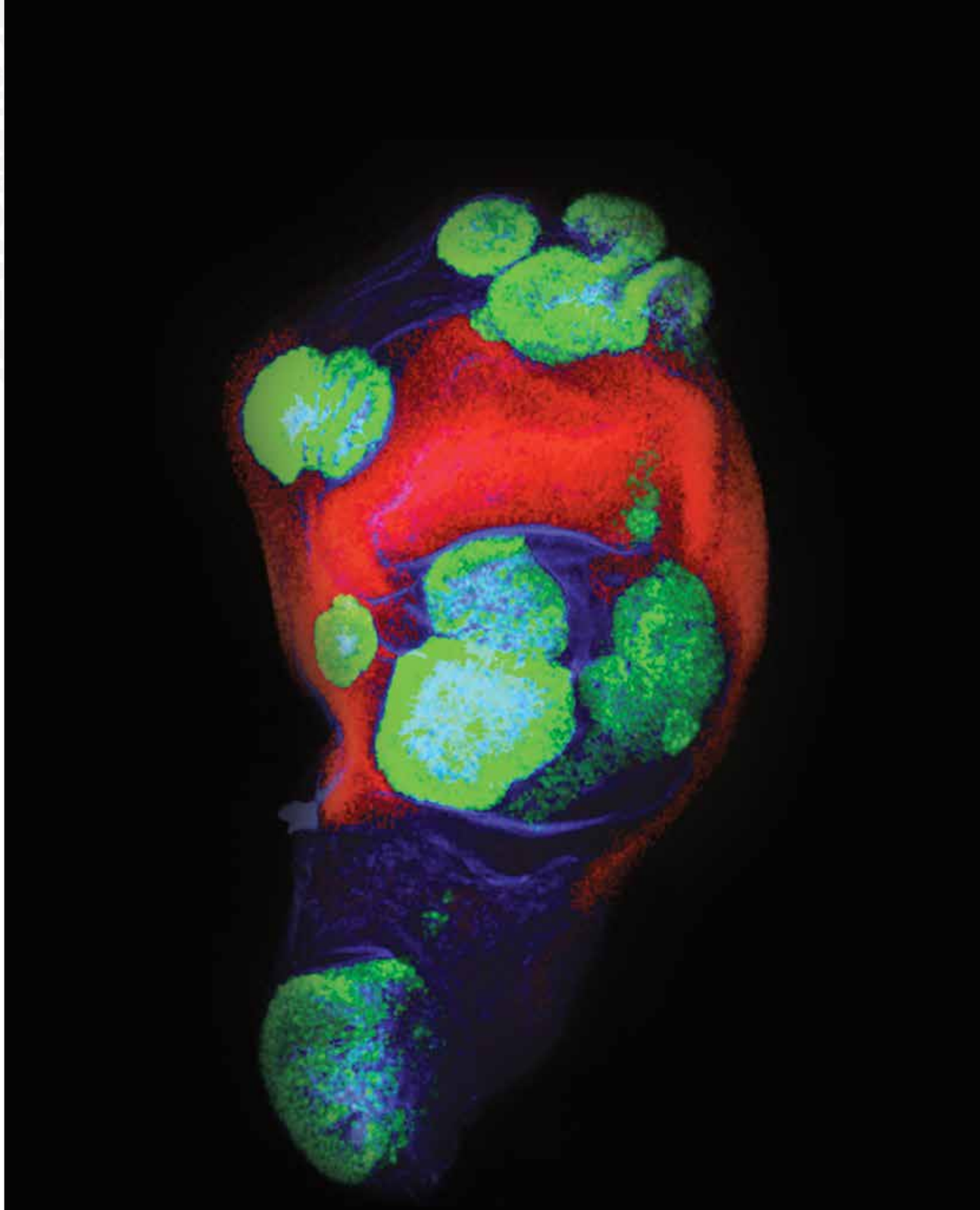


Image Courtesy: Anjali Bajpai

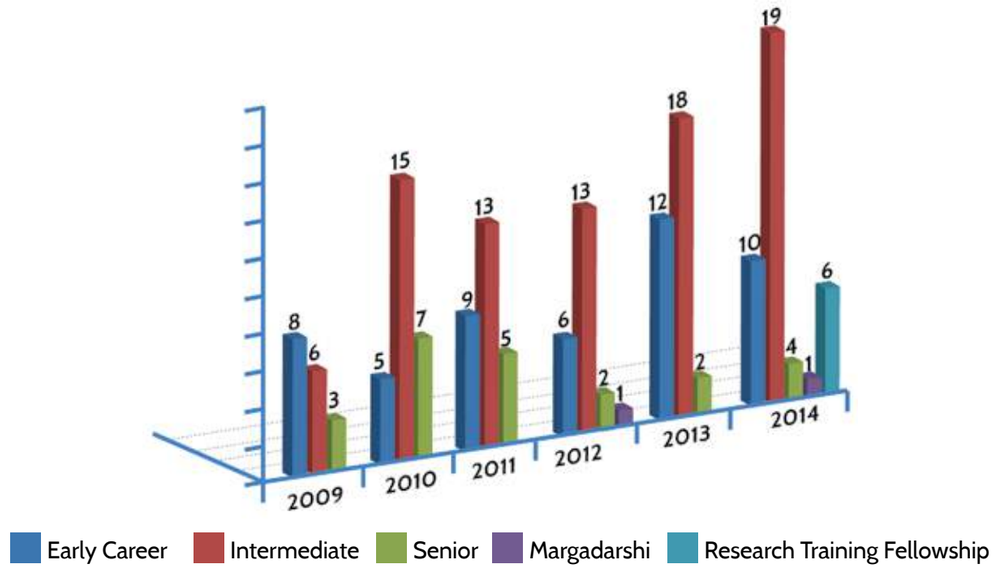
INDIA ALLIANCE FELLOWSHIP SCHEMES

Unlocking the secrets of biology with *"Hydra"* model

"Hydra, nicknamed Trembly's polyp, is a freshwater cnidarian that has long been a subject of interest in studying asexual reproduction and regeneration. In recent years it has become an important model to study pattern formation, evolution and stem cell biology. The elucidation of its genome sequence and the advent of transgenic and knock-down technology is expected to accelerate Hydra research in the years to come."

- Dr Girish Ratnaparkhi
Intermediate Fellow
IISER Pune

The Wellcome Trust/DBT India Alliance (IA) has entered into the seventh year of its operations. IA has received recognition and appreciation for maintaining the vigor with which the programme was originally conceived. In addition to being well known for its flexible and futuristic approach, among the basic research scientific community, it has been successful in gaining recognition from clinical community in the past two years. A significant rise in the number of awards and the number of clinical institutions administering the IA Fellowships can be considered as one of the most important achievements of years 2014-15. The percentage of awards recommended under clinical and public health category in a year has increased from 15.6% (2013) to 40% (2014).



Fellowships awards recommended between 2009 - 2014

The Fellowship Programme was initiated in 2009. India Alliance has recommended 177 Fellowships at 59 institutions in India.

Overview of the Awards

Rounds Completed

Early Career	08
Intermediate	12
Senior	12
Margdarshi	04
Research Training Fellowship for Clinicians	01
Total	37

Total Awards

Early Career	50
Intermediate	95
Senior	24
Margdarshi	02
Research Training Fellowship for Clinicians	06
Total	177

Completed

Early Career	07
Intermediate	04
Senior	02
Margdarshi	-
Research Training Fellowship for Clinicians	-
Total	13

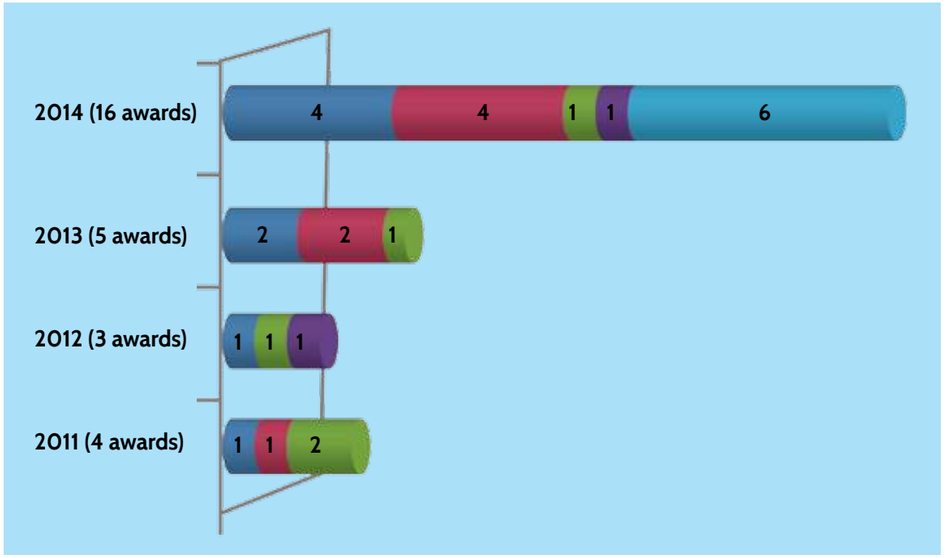
Accepted/Activated

Early Career	39
Intermediate	83
Senior	18
Margdarshi	02
Research Training Fellowship for Clinicians	05
Total	147

Total Awards Declined withdrawn and Terminated

Early Career	10
Intermediate	13
Senior	06
Margdarshi	00
Research Training Fellowship for Clinicians	01
Total	30

IA has recommended 29 awards to clinicians and public health researchers under all the categories of the Fellowship schemes it offers, which constitute approximately 16.5% of the total awards it has recommended so far. Though these statistics showcase a modest representation, the improvement in the trend of awards made in the last two years makes us believe that we are progressing in the right direction.



Trend of awards made to clinical and public health researchers between 2011 - 2014

Research Training Fellowship for Clinicians:

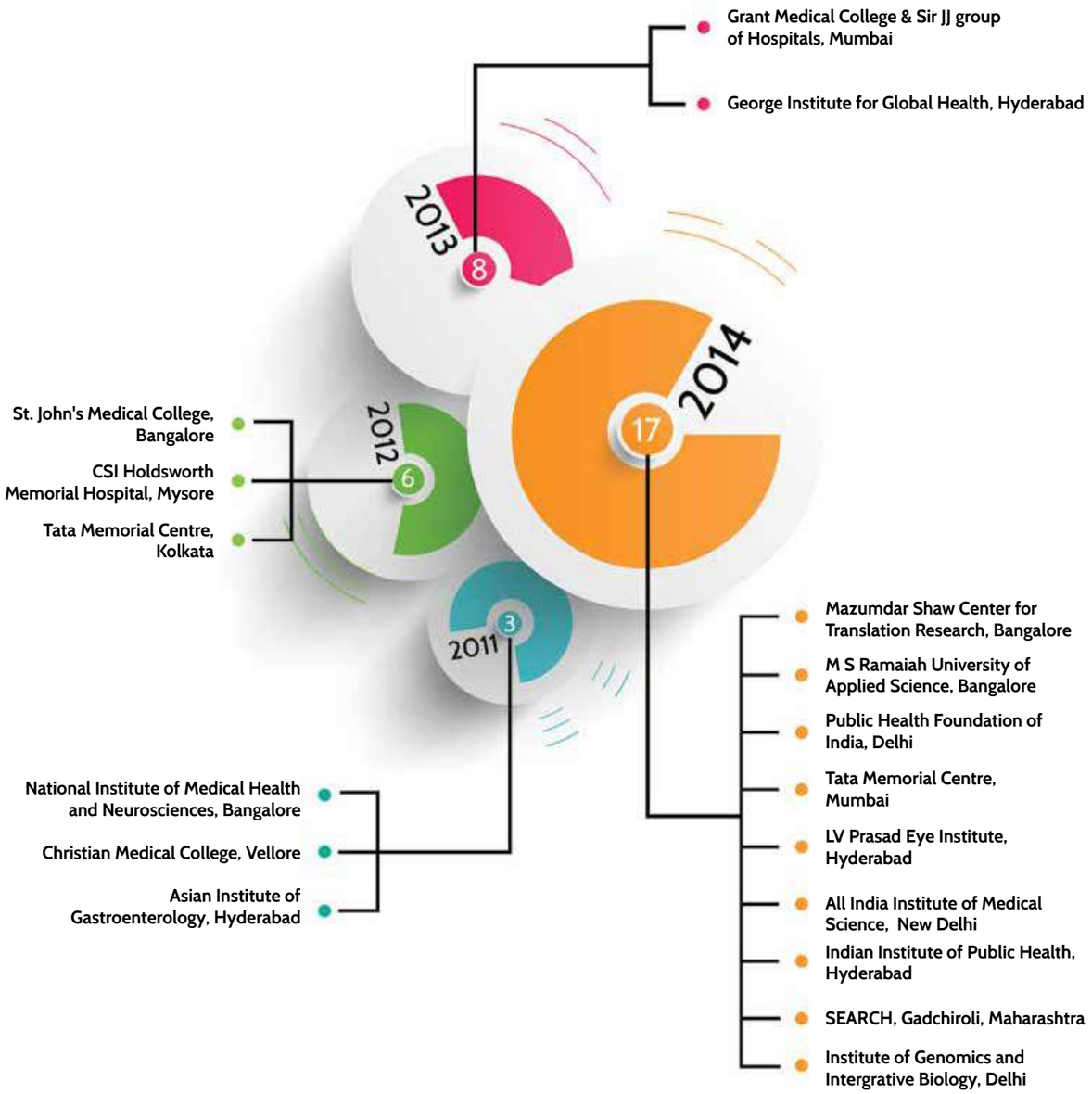
The Research Training Fellowship is a first-of-its-kind in India. It is unique in terms of the expectations it has set out for the structure of the Training programme, and the kind of involvement required from the Supervisors. The provision to get trained under the supervision of a clinician and a basic science researcher allows the clinicians and the allied health professionals to receive systematic training to conduct research. This Fellowship has been successful in creating the much - required collaborations between basic science and clinical institutions.

NIMHANS, Bangalore	InStem, Bangalore
MS Ramaiah University of Applied Sciences, Bangalore	Indian Institute of Science, Bangalore
St John's Medical College, Bangalore	National Centre for Biological Science, Bangalore
CMC, Vellore	Cancer Institute, Chennai
Mazumdar Shaw Center for Translational Research, Bangalore	Mazumdar Shaw Center for Translational Research, Bangalore

Please see Research Training Fellowship section for details.

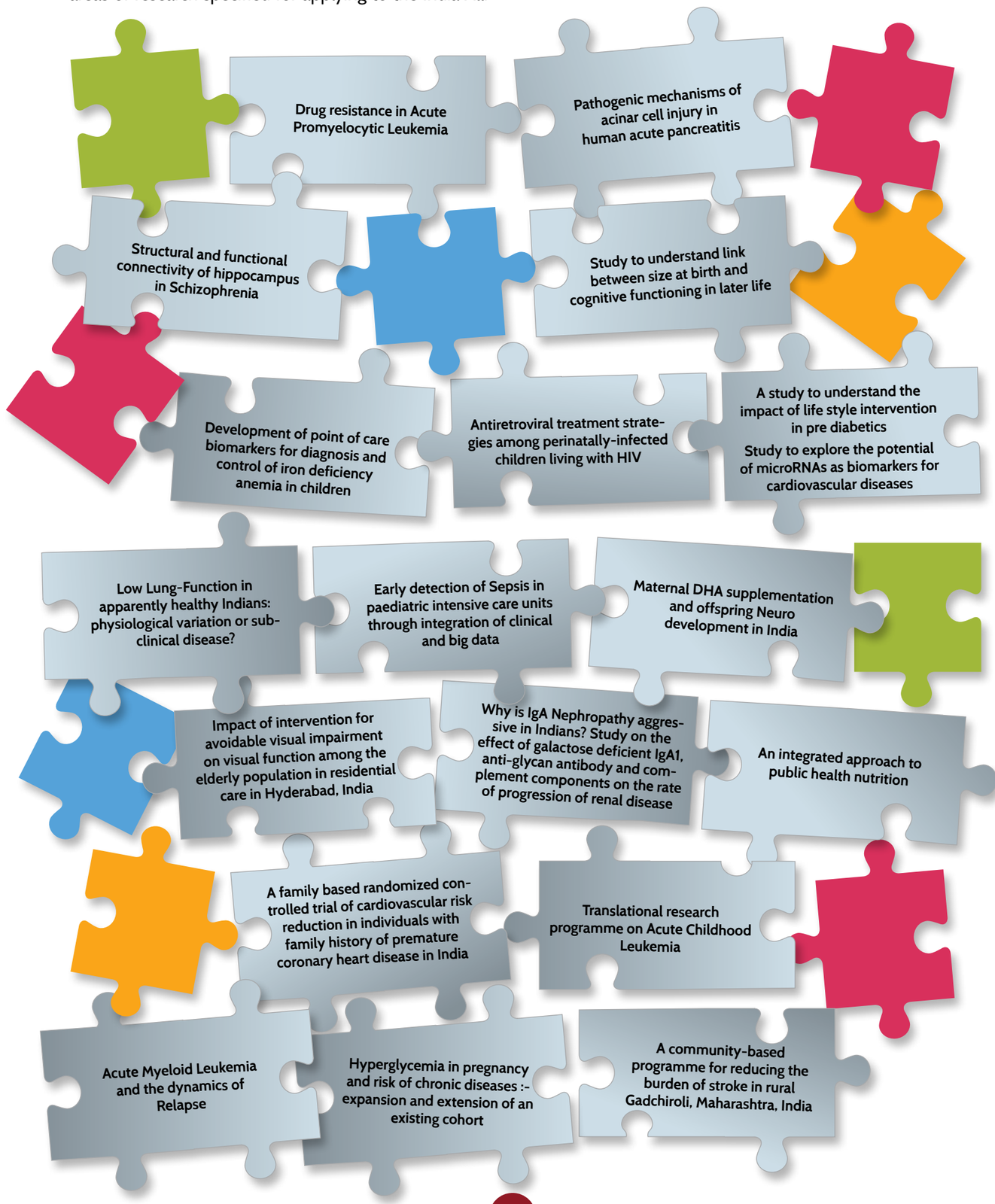
The India Alliance Clinical and Public Health Research Fellows are hosted by the 17 clinical research institutions in India and it is very encouraging to note a gradual improvement in India Alliance's reach to such a diverse range of institutions.

Expansion of the IA Fellowships to Clinical Institutions



The Margdarshi Fellowship Programme provides a unique platform and generous funding for outstanding senior scientists, to establish a unique research programme at a Host Institution in India. It is important to mention that both the awardees of this highly competitive scheme are eminent clinician scientists, which clearly highlights the potential of clinical/public health research and how the clinician scientist can bring a difference to the ecosystem of biomedical research. This year, the Margdarshi Fellowship was awarded to Professor Anura Kurpad. With his unique interdisciplinary programme to integrate public health and nutrition, he aims to generate nutritional policies under the aegis of St. John's Medical College and Hospital, Bangalore and University of Agricultural Sciences, Bangalore. Details of Prof Kurpad's research Programme are included under Margdarshi Fellowship section.

India Alliance is supporting wide range of programmes of Clinical and Public health importance. There are no thrust areas of research specified for applying to the India Alliance Fellowship Programme. A clinically relevant question supported by a feasible approach only matter.



RESEARCH TRAINING FELLOWSHIP

Dr. Maria Frances Bukelo
Research Training Fellow

Host Institution
St. John's Medical College, Bangalore

Dr. Usha Kini
Principal Supervisor

Institution
St. John's Medical College, Bangalore

Dr. Sudhir Krishna
Co-Supervisor

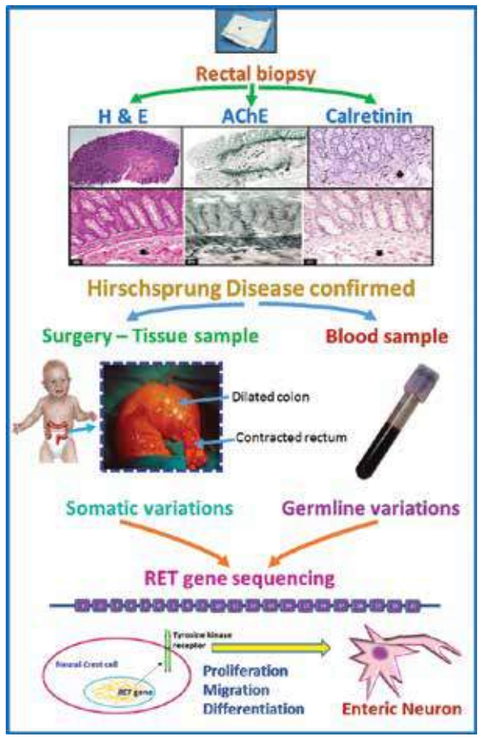
Institution
National Centre for Biological Sciences, Bangalore

Correlating patterns of the genotypic variations in RET Gene with the phenotype of Hirschsprung Disease (HD) in the Indian cohort

Medicine was an automatic career choice, for this profession gave me a sense of purpose, by providing scope to do social good while challenging me academically and hence I graduated with an MBBS degree from St. John's Medical College, Bangalore. The choice of specializing in Pathology was spontaneous, for, apart from providing answers to my curious questions on the why's and how's of most diseases, the subject is so full of color and at times so full of 'instant satisfaction' besides providing scope for teaching and research.

The research projects I have taken up so far (during Undergraduation, Internship and MD thesis) have given me a glimpse into the world of research and have sufficiently motivated me to pursue a research-based approach in my practice of Pathology. With this as a background, joining St. John's in the capacity of a Lecturer in Pathology was an instinctive decision; apart from the pleasant work environment, it nurtures budding researchers through many inspiring clinicians like Dr. Usha Kini my Principal Supervisor. Dr. Kini has over 30 years of experience as a Pathologist, and an authority in the diagnosis of Hirschsprung Disease (HD). After refining many techniques for the diagnosis of HD, we are now looking at the genetic etiology of HD in the Indian cohort, which would give us a sense of direction to go forward. I realized the need to tie up with a molecular biologist, and hence I met Dr. Sudhir Krishna (my Co-Supervisor) from the National Centre of Biological Sciences, who was willing to train me in the necessary molecular techniques.

Overall, this prestigious Fellowship award has opened many unique avenues and research collaborations, while still enabling me to keep my footing in clinical medicine.



Diagnostic modalities of Hirschsprung disease and genotypic workup to study associated RET gene variations.

Dr. Bharath Holla
Research Training Fellow

Host Institution
National Institute of Mental Health and Neuro Sciences, Bangalore, India

Prof. Vivek Benegal
Principal Supervisor

Institution
National Institute of Mental Health and Neuro Sciences, Bangalore

Dr. Ravi Muddashetty
Co-Supervisor

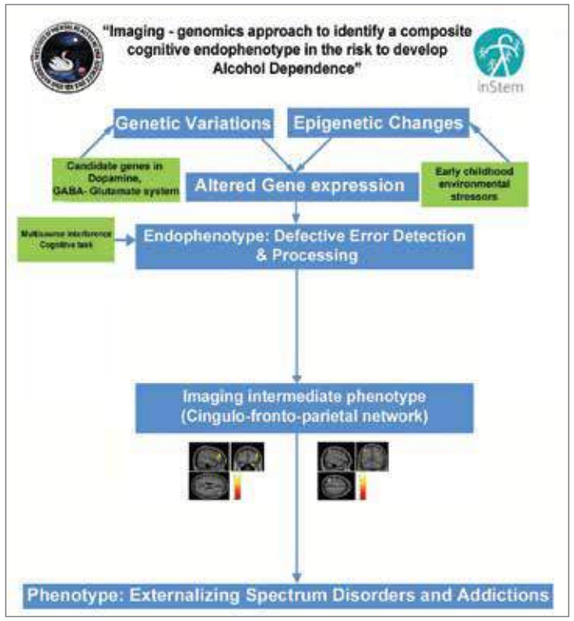
Institution
Institute for Stem Cell, Biology and Regenerative Medicine Bangalore

Imaging-genomics approach to identify a composite cognitive endophenotype in the risk to develop Alcohol Dependence

Right from the early days of MBBS in Bangalore Medical College, I was fascinated by a career in a field that involves treatment and research of neuropsychiatric disorders. I consider myself privileged to have been selected for MD Psychiatry at National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangalore, which is a premiere multidisciplinary academic, research, and health care institute in *Brain - Mind - Behaviour Axis* in India. I developed a keen interest in addiction psychiatry and did my MD thesis dissertation and post doctoral addiction psychiatry clinical fellowship under the guidance of Dr. Vivek Benegal. During this time, I also trained myself in advanced neuro-imaging analysis under the expertise of Dr. G. Venkatasubramanian.

I now want to pursue a career as a clinician scientist and train myself in basic science. I have been fortunate that Dr. Ravi Muddashetty has kindly agreed to train me at molecular genetics laboratory at inStem, NCBS, Bangalore under the Research Training Fellowship. This will provide me an opportunity to learn the basics including gene amplification, separation and detection, expression techniques and some advanced techniques like epigenetics, gene expression, proteomics, data integration, and pathway analysis. My goal is to become an independent investigator in the field of psychiatric genetics and neuroimaging, with expertise in alcoholism.

The Wellcome Trust/DBT India Alliance Research Training Fellowship for Clinicians has provided the right platform for a young clinician like me. I hope to continue with translational research and clinical work as an independent investigator after completion of the proposed Fellowship.



Investigating critical links between genetic, epigenetic, imaging findings in pathways to externalizing disorders and addiction.

Dr. Muralidhara Nagarjuna
Research Training Fellow

Host Institution
Mazumdar Shaw Center for Translational Research, Bangalore

Dr. Aditya Chaubey
Principal Supervisor

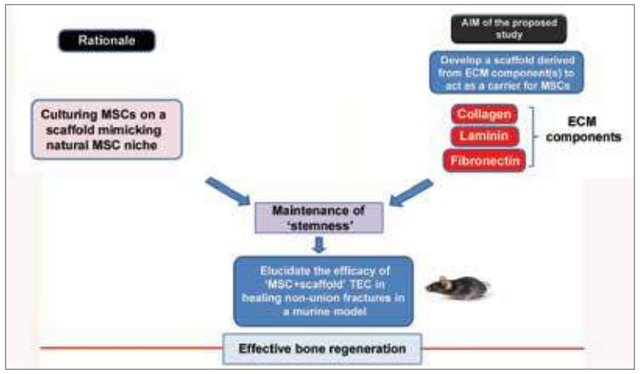
Host Institution
Mazumdar Shaw Center for Translational Research, Bangalore

Dr. Paul C Salins
Co-Supervisor

Institution
Mazumdar Shaw Medical Center, Bangalore

Role of extracellular matrix in modulating therapeutic response of mesenchymal stem cells in fracture healing

Aiming at a career in surgery, I was fortunate enough to get admission into post-graduation course in the subject of Oral and Maxillofacial Surgery at SDM college of Dental Sciences; it is the first institute in India to have a dedicated Craniofacial Surgery unit, performing over 1500 surgeries every year. Facial trauma remains one of the most common procedures performed by the maxillofacial surgeons. Bone grafting procedures are routinely undertaken to correct bony defects though these have their own limitations, which leaves the surgeon frustrated and helpless. Having seen such situations, we felt a compelling need to contribute in developing alternative techniques for bone regeneration and substitution. Joining after Mazumdar Shaw Medical Center as a Fellow in Cranio-Maxillofacial Surgery provided me the necessary niche to take this clinical problem to lab. Professor Dr. Paul C. Salins, the Chief of Cranio-Maxillofacial Services and Medical Director of the hospital encouraged me to take up basic science research in this field. Similarly, Dr. Aditya Chaubey, the Chief Scientific Officer of Mazumdar Shaw Center for Translational Research, who has been working extensively in the field of stem cells and has already developed excellent *in vivo* models for bone regeneration and scaffold designing agreed to be my to guide in starting a career in research. I feel this Research Training Fellowship will allow me to dedicate my time in this exciting field and could, in fact, provide me a better understanding of the existing clinical problems and to develop a scientific problem-solving attitude to apply the newly acquired skills in patient care.



Flow chart illustrating the study design aimed at understanding the efficacy of scaffold derived from extracellular matrix components combined with mesenchymal stem cells in fracture healing.

Dr. Sanjay K Chilbule
Research Training Fellow

Institution
Christian Medical College, Vellore

Dr. Vrisha Madhuri
Principal Supervisor

Institution
Christian Medical College, Vellore

Dr. T S Ganesan
Co-Supervisor

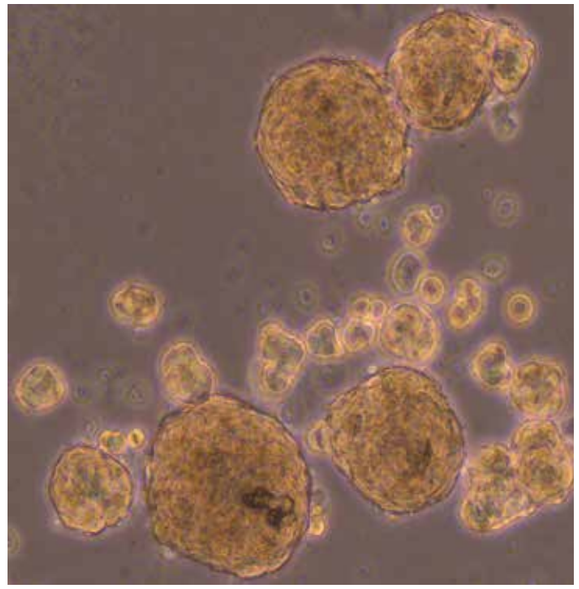
Institution
Cancer Institute, Adyar, Chennai

Isolation and in vitro and in vivo characterization of cancer stem cells from human osteosarcoma tissue and assessment of chemo sensitivity

After completing the Fellowship in paediatric orthopaedics at The Christian Medical College (CMC), Vellore, I started assisting my Principal Supervisor Dr. Vrisha Madhuri in a project to design the compliance monitored clubfoot brace (Padma Pada), which was conceived in collaboration with engineers from The Indian Institute of Science (IISc), Bangalore. It was quite inspiring to observe that the clinicians can bring in significant changes in the methods of patient management through such collaborative efforts. This project inspired me to take up research as a career option.

While working on cartilage and bone regeneration with Dr Madhuri, we planned to diversify our work by extending our focus to osteosarcoma (OS), which is the most common bone tumor in children. Since, the data available for the cancer stem cells research work for OS was limited to cell lines, we planned to work with cancer stem cells (CSCs) from patient tissues with the aim of translating this knowledge for management of the osteosarcoma, in the future. The preliminary work was done in collaboration with radiotherapy and medical oncology units at the CMC Vellore. The launch of the Research Training Fellowship scheme came across as a unique opportunity for me to take this work to the next level. We, therefore, decided to take our research forward through the Research Training Fellowship.

Dr Ganesan from Cancer Institute (WIA), Chennai (Co-Supervisor) is a medical oncologist with experience in working on CSCs for ovarian malignancy, provided guidance in planning the experiments. Similarly, intellectual inputs from Dr. Sudhir Krishna, from NCBS, Bangalore helped us immensely in putting the application together. This Fellowship is providing a unique opportunity to the clinicians like me to perform basic science research work.



Tumour Spheres formed by Primary osteosarcoma cells. (Day 4, 10x, Phase contrast)

Dr. Sivaranjani Gali
Research Training Fellow

Host Institution
MS Ramaiah University of Applied Sciences, Bangalore

Dr. Sreenivasamurty B.V
Principal Supervisor

Institution
MS Ramaiah University of Applied Sciences, Bangalore

Dr. Bikramjit Basu
Co-Supervisor

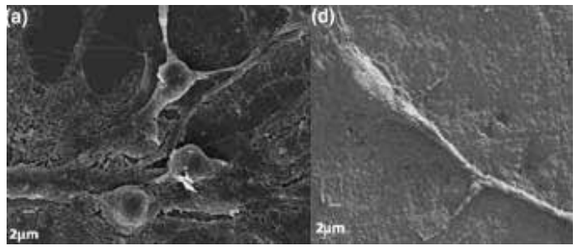
Institution
Indian Institute of Science, Bangalore

Development of novel zirconia reinforced mica glass ceramic composite for dental restorative applications

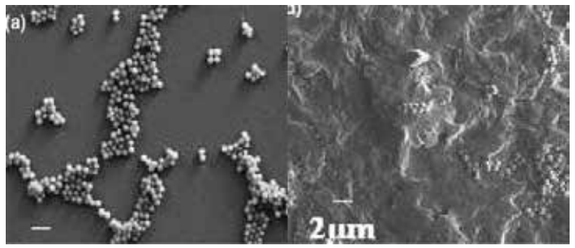
Dr. Sivaranjani Gali, the applicant and the Co-Supervisor Dr. Bikramjit Basu with the knowledge of the Principal Supervisor, Dr. BV Sreenivasamurthy have been working in collaboration at the Centre of Excellence in Biomaterials for Dental Implants. There have been several discussions between both the applicant and the basic scientist at the development of the project. During these discussions, Dr. Gali strongly felt the need to get training for pursuing research. Her exploration resulted in sending in her application for the Research Training Fellowship offered by India Alliance.

Co-Supervisor Dr. Basu's, research group has worked extensively on the glass ceramics for dental restoration and published several papers in relation to the fabrication, *in vitro* and *in vivo* biocompatibility evaluation of various glass ceramic compositions. In the last two years, Dr. Basu has been regularly interacting with the dental surgeons from M S Ramaiah University of Applied Sciences. His role as Co-Supervisor in the proposed project, therefore, is in line with his earlier research expertise/ experience, as well as close interaction with medical and dental fraternity.

In view of Dr. Gali's interest, the Principal Supervisor had conceived the proposal and applied for Research Training Program under The Wellcome Trust/DBT India Alliance. The main objective of applying the Research Training Fellowship is to train Dr. Gali in the various techniques of fabrication of dental materials, various measurement tests to be conducted, and the biocompatibility tests *in vitro*.



Scanning electron microscope micrographs of cellular adhesion and spreading on a control (a) and on glass ceramic (d).



Scanning electron microscope of the Staphylococcus epidermis bacterial colony after 4 hours of incubation on a control (a) and mica glass ceramic (b).

Image Courtesy: Arun Shukla

CLINICAL AND PUBLIC HEALTH RESEARCHERS

Dr. Shweta Khandelwal

Early Career Fellow

PhD Institution: Institute of Home Economics, University of Delhi, New Delhi, India

Post-PhD Institution:
- Public Health Foundation of India, New Delhi, India
- Emory University, Atlanta, USA
- Centre for Chronic Disease Control, New Delhi, India

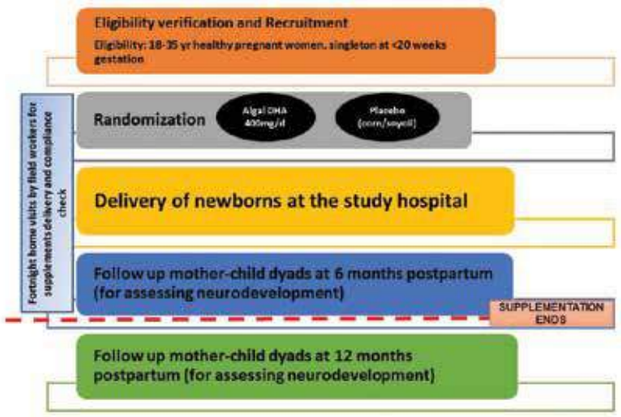
Host Institution: Public Health Foundation of India, New Delhi, India

Maternal Docosa- Hexaenoic Acid supplementation and offspring neurodevelopment in India (DHANI-2)

The prevalence of underweight and stunted children in India is among the highest in the world. Child undernutrition and stunting have enormous consequences for nations' productivity and failure to tackle malnutrition diminishes the potential for economic growth. Studies show a strong association between nutrition and cognitive development. This link is the strongest during the first 1000 days. One strategy to enhance neurodevelopment among children during these 1000 days can be maternal DHA supplementation. DHA is a structural component of human brain and retina, and can be derived from marine algae, fatty fish and marine oils. Since diets in India are largely devoid of such products, the plasma DHA levels in Indian populations are quite low. DHA is safe to consume during pregnancy and lactation. Thus we propose to supplement pregnant Indian women from < 20 weeks gestation through 6 months postpartum, to ascertain the effect of DHA on:

1. Infant neurodevelopment at 12 months.
2. Infant body size and morbidity patterns through 12 months.

In addition, we will collect biochemical indices (blood and breast-milk) from mother-child dyads to estimate net changes in their DHA levels in response to supplementation.



Maternal DHA supplementation and offspring neurodevelopment. (DHANI trial) - Study Schema

Dr. Srinivas Marmamula

Early Career Fellow

PhD Institution: University of New South Wales, Sydney, Australia

Post-PhD Institution:
- Wilmer Eye Institute at Johns Hopkins University, Baltimore, USA
- L V Prasad Eye Institute, Hyderabad, India

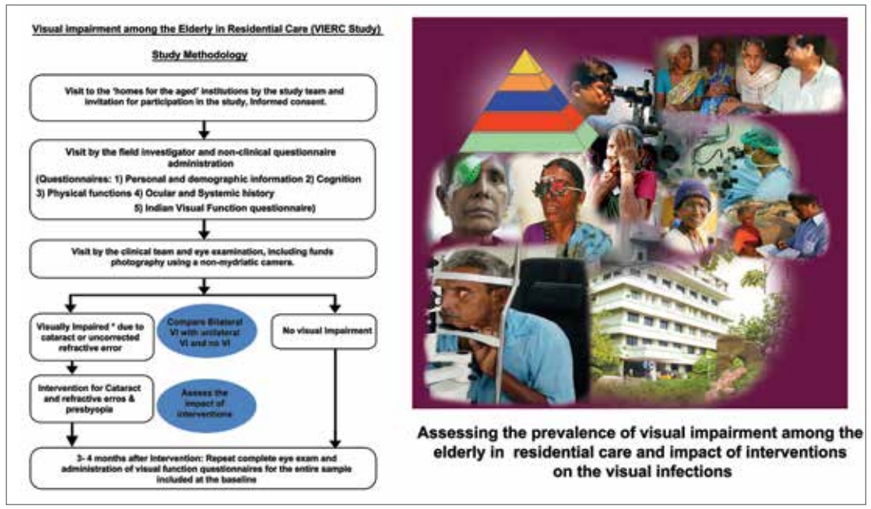
Host Institution: L V Prasad Eye Institute, Hyderabad, India

Impact of intervention for avoidable visual impairment among the elderly population in residential care in and around Hyderabad, India

Visual impairment (VI) is a public health challenge affecting millions of people worldwide. Over 80% of the VI is prevalent among those aged ≥ 50 years and nearly 80% of it caused due to uncorrected refractive errors and cataract, both of which are avoidable. VI in elderly affects all dimensions of their life such as mobility, self-care, and participation in social and religious activities, general health and in overall quality of life.

The proportion of the elderly in India is on the rise. Sociodemographics such as increasing urbanization, rural to urban migration for employment opportunities and changing social expectations regarding intra-family obligations are threatening the traditional joint family-based system. As a consequence of these, the proportion of the elderly living alone or only with their spouses is also increasing. An increase in the number of homes for the elderly is seen in many urban locations in India.

My research aims to investigate the burden of VI among elderly in residential care and assesses the impact of interventions on the visual functions. The outcomes of my research can provide insights into the current situation to enable health policy formulation and the planning of services to contribute towards 'healthy aging' in these populations.



The Study Overview – Visual Impairment among elderly in residential care.

Dr. Suceena Alexander

Early Career Fellow

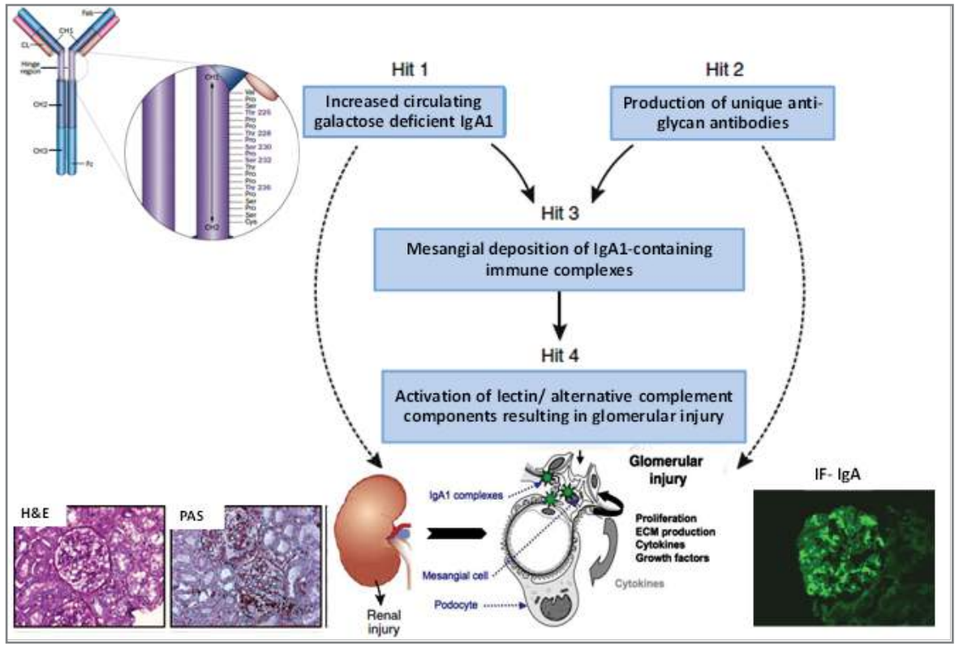
DM Institution: Christian Medical College, Vellore, India

Post-DM Institution: Christian Medical College, Vellore, India

Host Institution: Christian Medical College, Vellore, India

Why is IgA Nephropathy aggressive in South Asians? Study on the effect of galactose deficient IgA1, anti-glycan antibody and complement components on the rate of progression of renal disease

IgA nephropathy (IgAN) is the most common glomerular disease, and a frequent cause of end stage kidney disease. In India, IgAN is characterized by marked severity in a younger population. We will study a cohort of patients with IgA nephropathy using evaluation of molecular and lectin based characterization of antigen, antibodies and complements in serum and renal tissues with clinical correlation of disease progression to generate new knowledge to help establish more appropriate treatment guidelines and reduce the burden of chronic kidney disease and renal replacement therapies. This study will also help us decide whether targeted screening programs may have benefit given the rapid nature of the disease in our population.



Pathophysiology of IgA Nephropathy.

Dr. Tavpritesh Sethi

Early Career Fellow

MBBS Institution: Government Medical College, Amritsar, India

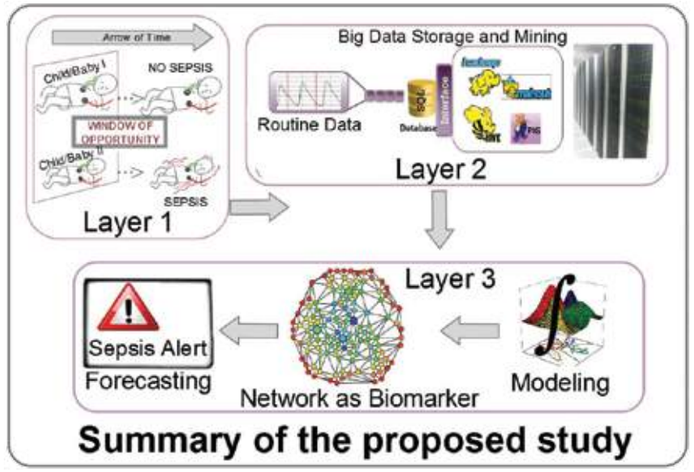
PhD Institution: Institute of Genomics and Integrative Biology, Delhi, India

Post-PhD Institution: All India Institute of Medical Sciences, New Delhi, India

Host Institution: All India Institute of Medical Sciences, New Delhi, India

Early detection of Sepsis in Paediatric Intensive Care Units through integration of clinical and big data

Computational decision-support can save lives of critically ill patients through early recognition of actionable events. The discovery of such events from the deluge of Big Data requires interdisciplinary efforts and bridging expertise. A highly devastating condition in the paediatric and neonatal Intensive Care Units (ICU) is 'sepsis' and the primary goal of this project is its early detection through computational integration and modeling of routine ICU data. Further, striking a balance in the patient management plan is highly critical. On one hand, delay in the recognition and treatment of sepsis leads to mortality-rates as high as 50% in India, while on the other, over-aggressive antibiotic therapy is a risk factor for death itself. Stratification of suspected sepsis into sub-classes is expected to guide treatment plans. Thus, the overarching theme of this project is to use Big Data analytics in combination with domain expertise to derive models and assist patient management plans. This would be carried out without disrupting the clinical care, using routinely generated multi-dimensional data. The collaborative effort between AIIMS, IIT-Delhi and Stanford School of Medicine (amongst other partners) is not only aimed at discovery but to also to fuel crosstalk and translation at the interface of medicine and data-science.



The window of opportunity is proposed to lie in the network of subtle-physiological and clinical parameters. This may lead the clinical manifestations of the disease by hours, even days. This network shall be mined, modeled and exploited using techniques of Artificial Intelligence, Machine Learning and the Big Data ecosystem. The end goal is to obtain patient-centric interpretable models to save lives and to spur new knowledge in the septic response.

Dr. Giridhara R Babu

Intermediate Fellow

MBBS Institution: Manipal University, Manipal, India

MPH Institution: University of California, Los Angeles, Los Angeles, USA

PhD Institution: University of California, Los Angeles, Los Angeles, USA

Post-PhD Institution: Public Health Foundation of India, New Delhi, India

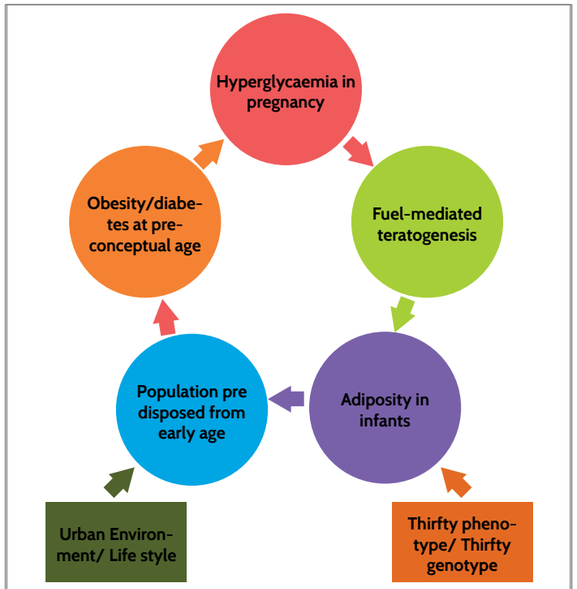
Host Institution: Public Health Foundation of India, IIPH-Hyderabad, Bangalore campus, India

Hyperglycemia in pregnancy and risk of chronic diseases in children - establishing a birth cohort in Bangalore, India

Modification in the parenteral milieu can have adverse effects on infants and subsequent development of diseases. High glucose levels in pregnancy can increase the risk of adiposity and Type 2 Diabetes Mellitus (T2DM) in children. In addition, compensatory adaptive changes such as storing excess energy as fat may occur subsequent to confrontation with undernutrition as a fetus and child. Irrespective of the mechanism, the severity and form of changed intrauterine environment may have distinct role in the development of childhood obesity and T2DM in adult life.

The impact of lesser degrees of glucose intolerance in Indian mothers on child outcomes is yet to be adequately understood. The objective of our research is to study the effect of any degree of glucose levels in pregnant women on skinfold thickness (adiposity) and other early markers of Non Communicable Diseases (NCDs) in childhood.

We piloted the feasibility of setting up the birth cohort in public health facilities in Bangalore, enrolling more than 900 pregnant women. Currently, we are expanding the birth cohort to multiple centres and plan to store specimens for identifying early markers for NCDs. The research aims to harness life course perspectives on development of NCDs and contribute towards early prevention.



Model incorporating the 'thirfty phenotype'. the 'thirfty genotype' and the 'fuel-mediated teratogenesis' hypotheses in the etiology of type 2 diabetes

The figure describes potential mechanisms of development of Type 2 Diabetes Mellitus (T2DM). The 'fuel-mediated teratogenesis' hypothesis identifies deleterious effects of high intrauterine glucose on child outcomes. The 'thrifty phenotype' hypothesis represents adaptive mechanisms due to child undernutrition result in T2DM epidemic. Increasing urbanization and ensuing lifestyle modifications also contribute to predisposition of T2DM at an early age.

CLINICAL AND PUBLIC HEALTH RESEARCHERS

Dr. Jeemon Panniyammakal

Intermediate Fellow

MPH Institution: Sree Chitra Tirunal Institute of Medical Sciences and Technology, Thiruvananthapuram, India

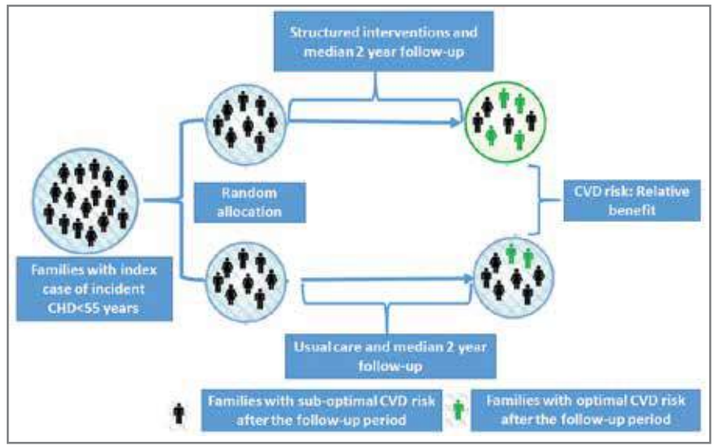
PhD Institution: Institute of Cardiovascular and Medical Sciences, University of Glasgow, Glasgow, UK

Post-PhD Institution: Public Health Foundation of India and Centre for Chronic Disease Control, New Delhi

Host Institution: Public Health Foundation of India, New Delhi, India

A family based randomized controlled trial of cardiovascular risk reduction in individuals with family history of premature Coronary Heart Disease (CHD) in India

The overall goal of the study is to test the effectiveness and sustainability of an integrated care model for managing cardiovascular risk in individuals with family history of premature CHD. This care model involves 1) screening for cardiovascular risk factors, 2) providing lifestyle interventions for prevention and management of cardiovascular risk factors, 3) providing a framework for linkage to appropriate primary health care facility and 4) active follow-up of intervention adherence. Initially, a formative qualitative research component will gather information on understanding of diseases, barriers to care, specific components of the intervention package (for example, context specific ways to enhance physical activity and to reduce prolonged sitting time, ways to improve diet etc.) and feedback on the intervention strategies (lifestyle education, care and linkage coordination). Then a randomized controlled trial involving ~900 families and 1800 participants will be used to determine whether an integrated care model is effective in reducing or halting the progression of CHD risk factors and risk factor clustering in families. The sustainability and scalability of this intervention will be assessed through economic and qualitative lenses to estimate value and acceptability. Scalability will be informed by cost-effectiveness and acceptability of the integrated cardiovascular risk reduction approach.



The study flow chart: Families with an index case of premature coronary heart disease (CHD) will be identified from an existing young CHD register. After obtaining written informed consent, families will be randomized to intervention and usual care group. Cardiovascular risk will be compared between the two study arms after 24 months of context specific and structured intervention delivered by trained front-line health workers. CVD=Cardiovascular Disease

Dr. Nikhil Patkar

Intermediate Fellow

MBBS Institution: Grant Medical College, Mumbai, India

MD Institution: Armed Forces Medical College, Pune, India

Post-MD Institution:
- Asian Institute of Oncology, Mumbai, India
- Tata Memorial Centre, Mumbai, India
- Christian Medical College, Vellore, India
- Hematologics Inc, Seattle, USA

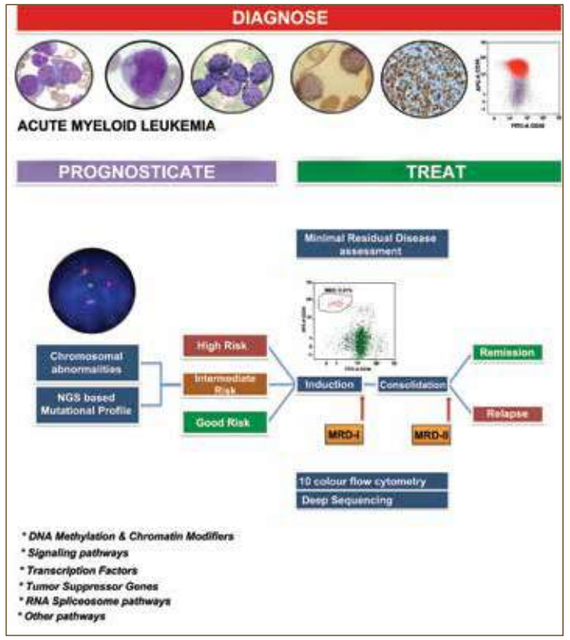
Host Institution: Tata Memorial Centre, Mumbai, India

Acute Myeloid Leukemia and the dynamics of relapse

Acute Myeloid Leukemia (AML) is a type of blood cancer. Even though patients get the same treatment, some get cured whereas others relapse. The reason is that AML is a biologically heterogeneous cancer. Some patients of AML have chromosomal abnormalities in their leukemic cells where as others have mutations in genes or in some cases there is a combination of both. These genetic changes harbored by the leukemic cells are critical in influencing response to treatment and disease outcome. Here, we will study AML genome at the chromosomal and DNA sequence level so that we can identify patients who are most likely to respond to chemotherapy and distinguish them from patients who likely to relapse. For this purpose, we will utilize a combination of technologies such as karyo typing & fluorescence in-situ hybridization to study structural abnormalities in chromosomes and next generation sequencing to study mutations in genes.

Detection of leukemic cells left behind, after a course of treatment is called minimal residual disease (MRD). These leukemic cells will eventually repopulate the bone marrow and cause relapse. The presence of MRD suggests that relapse is imminent and offers a window for early treatment intervention. For AML, MRD is usually assessed by detecting abnormal expression of antigens on the leukemic cells. However, this technology suffers from low sensitivity and can usually detect only one leukemic cell in a background of 1000 normal cells. In some patients, after treatment, leukemic cells can change their abnormal antigenic profile and try to mimic normal cells. Further more, some patients just do not express antigens abnormally. These problems result in false negatives, at least, in a subset of patients. To overcome these hurdles, we will develop deep sequencing strategies to detect MRD and compare these results with immunophenotyping based MRD.

Through this research we hope that a contribution to personalized medicine can be made which will be used for management of patients with AML in the future.



Dr. Yogeshwar Kalkonde

Intermediate Fellow

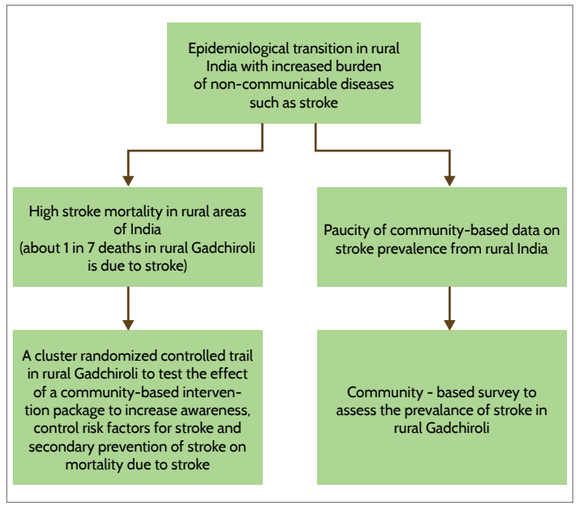
MD Institution: Government Medical College, Nagpur, India

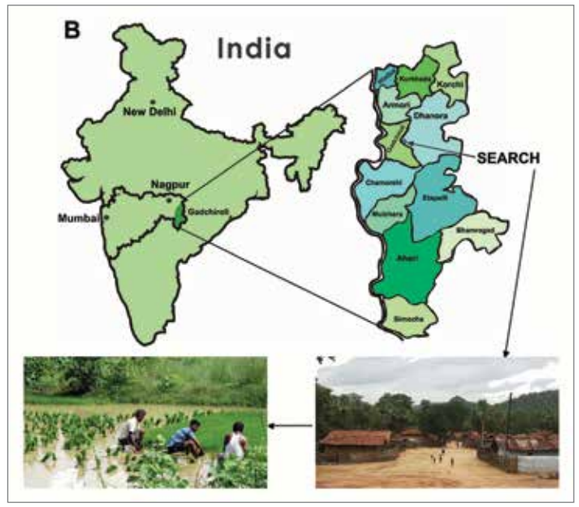
Post-MD Institution:
- Sanjay Gandhi Post-Graduate Institute of Medical Sciences, Lucknow, India
- National Institute of Immunology, New Delhi, India
- University of Texas Health Science Centre at San Antonio, Texas, USA
- Baylor College of Medicine, Houston, Texas, USA

Host Institution: Society for Education, Action and Research in Community Helath (SEARCH), Gadchiroli, Maharashtra, India

A community-based programme for reducing the burden of stroke in rural Gadchiroli, Maharashtra, India

Stroke is an underappreciated but emerging health problem in rural India and perpetuates poverty. Population level data on stroke burden in rural India are scarce and well tested interventions to reduce the burden of stroke are lacking. The goals of this study are to address these gaps by - **a)** measuring stroke burden in a rural community using cross-sectional surveys, and **b)** developing and testing a community-based intervention package to reduce stroke burden by conducting a cluster randomized controlled trial. The intervention package will include increasing awareness about stroke, screening and treating selected risk factors for stroke and secondary prophylaxis of stroke. The primary outcome will be reduction in stroke mortality rate in population ≥ 40 years of age while the major secondary outcomes will include reduction in the prevalence of stroke and reduction in all-cause mortality in population ≥ 40 years of age. If the intervention is effective, it can provide important operational data for the non-communicable diseases programme of the Government of India.





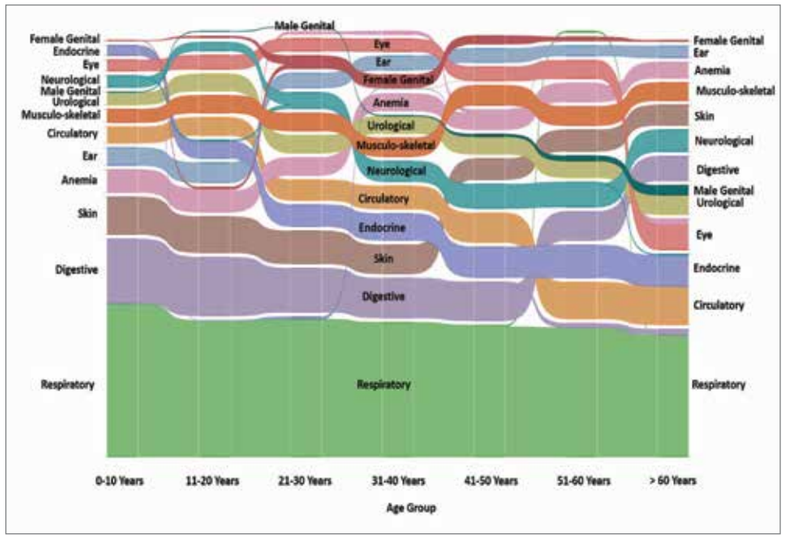
The figure A shows the need for the study and the components of the study while figure B shows the geographical location and the landscape of the study area.

Dr. Anurag Agrawal
Senior Fellow

MBBS Institution:	All India Institute of Medical Sciences, New Delhi, India
Diplomate American--Board:	Baylor College of Medicine, Texas, USA
PhD Institution:	VP Chest Institute, Delhi University, New Delhi, India
Post-PhD Institution:	Institute of Genomics & Integrative Biology, Delhi, India
Host Institution:	Institute of Genomics & Integrative Biology, Delhi, India

Low Lung-Function in apparently healthy Indians: physiological variation or sub-clinical disease?

Healthy adult Indians have the lowest lung-function, on spirometry, amongst all major nationalities. Low-lung-function has been associated with lung pathology and systemic metabolic abnormalities like insulin resistance or diabetes. Since low-lung-function can result from undetected small airway disease, here we propose to determine whether the low-lung-function of apparently healthy adult Indians is a pathological state and if so, what are the causes? Impulse Oscillometry (IOS) as well as novel algorithms developed in my lab will be used to enable detection of subclinical small-airway obstruction. We hypothesize that "quiet" inflammatory small-airway pathology contributes to the observed low-lung-function among Indians. Bayesian network analysis of detailed environmental and health data from a large cohort across India is expected to reveal the key factors and would be important in formulating public health policy.



A network of organ-wise symptoms and diseases, organized by decades of age, for about 100,000 patients across India. The alluvial-graph format shows changing connections and strengths (width) of the modules.

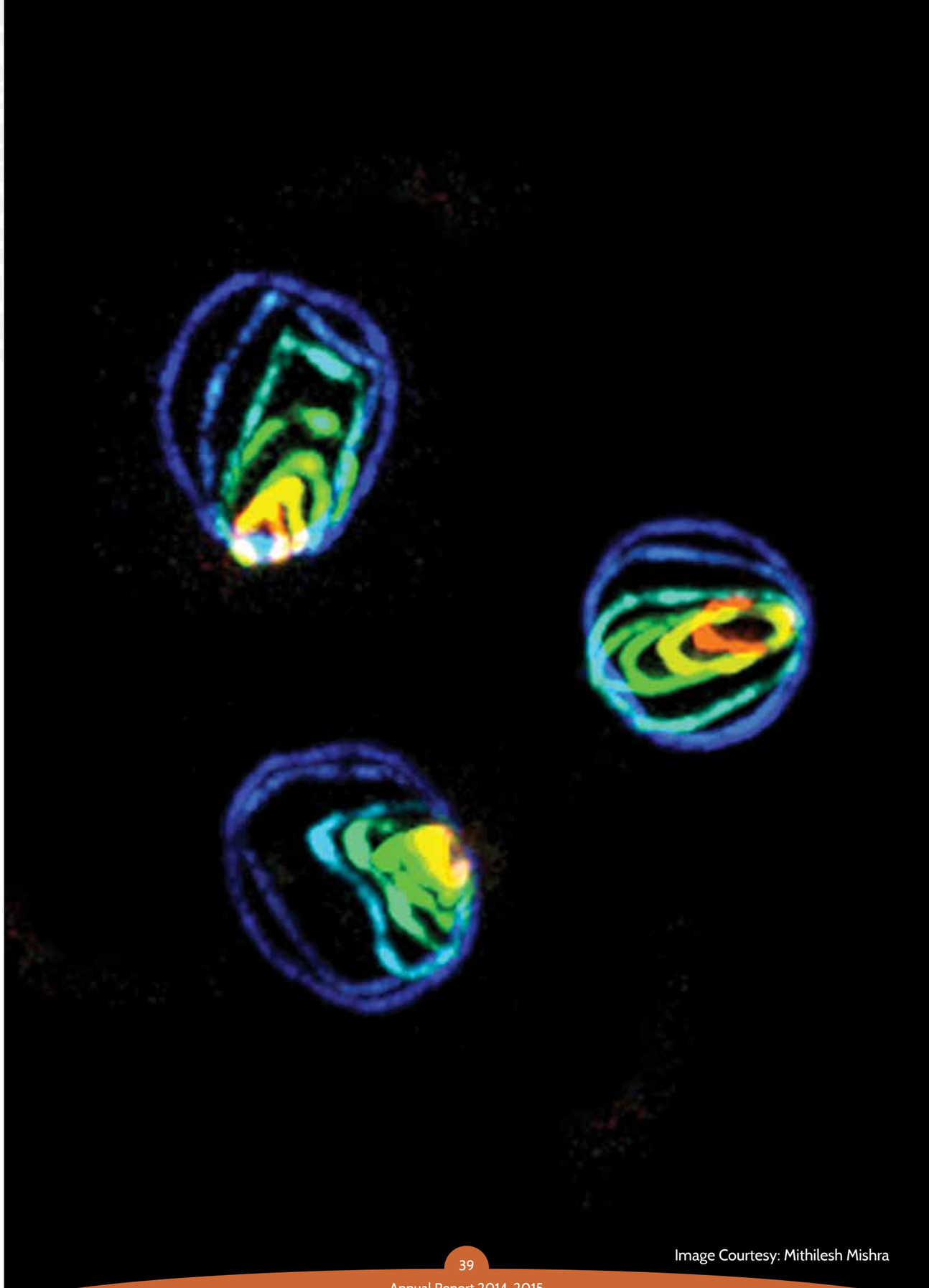


Image Courtesy: Mithilesh Mishra

MARGDARSHI FELLOW

Dr. Anura V Kurpad

MD Institution: St John's Medical College, Bangalore

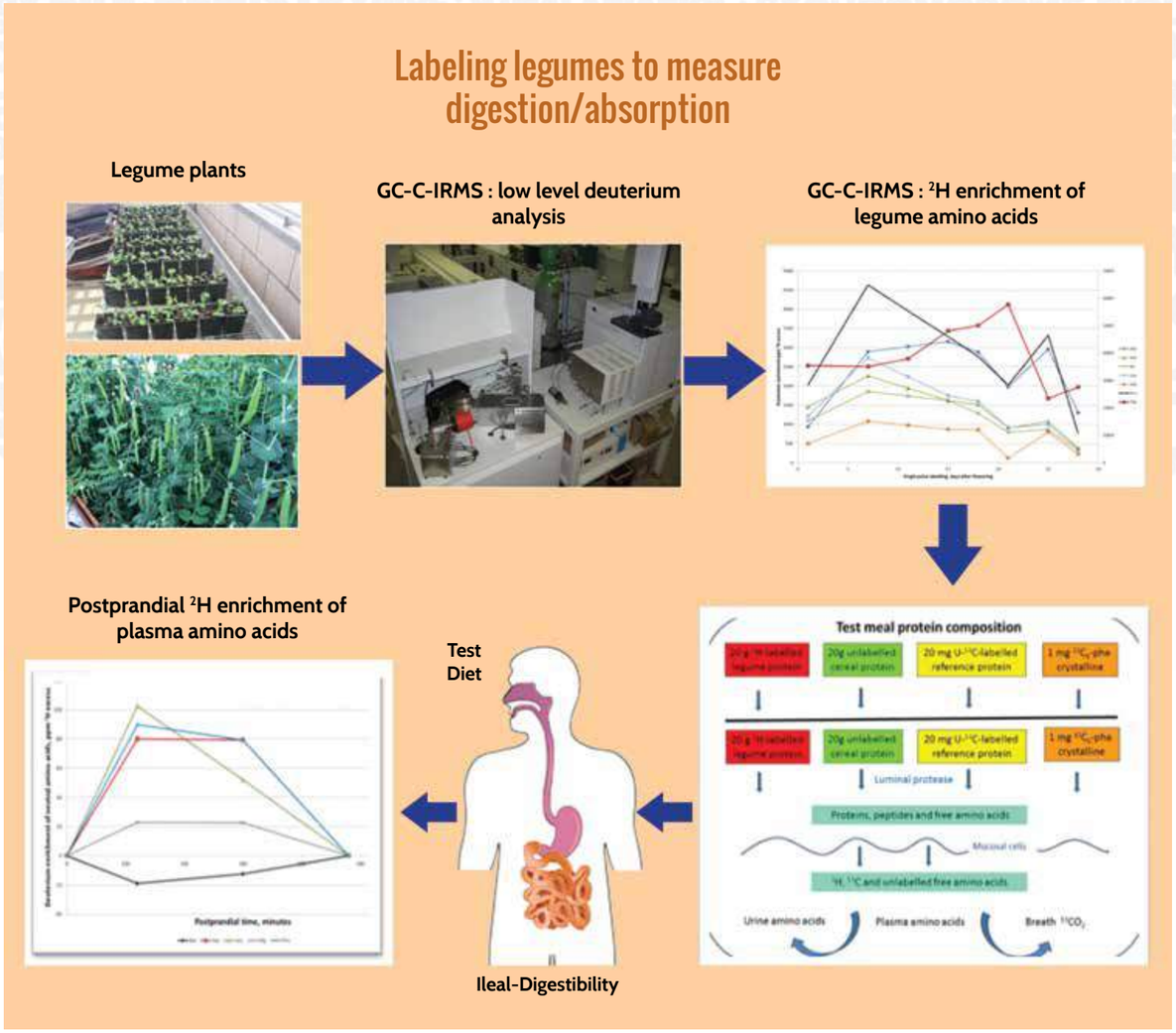
Post MD/MS Institution:
- Rowett Research Institute, Aberdeen, Scotland
- Dunn Clinical Nutrition Centre, Cambridge, UK

Primary Host Institution: St John's Medical College, Bangalore, India

Secondary Host Institution: University of Agricultural Sciences, Bangalore, India

An integrated approach to public health nutrition

The bio availability of nutrients from plant sources is dependent on intestinal absorptive capacity, which is linked to the environment, sanitation/hygiene and the intestinal microbiome: in turn, this will affect the success of nutritional interventions. In this program, new methods of estimating the bioavailability of nutrients in humans through intrinsic stable isotope labelling of plants will be developed, along with novel and sensitive human physiological studies of their efficacy through dynamic proteomics and other methods.



Journey so far.....

In my undergraduate days at St John's Medical College, I was intrigued by Burkitt's work in Africa, which described the benefits of dietary fiber and the ills of a 'westernized diet'. That was a remote concern in India at the time, but even so, when Dr Prakash Shetty, who was then in the Department of Physiology, invited me to work with him on dietary fiber and colonic physiology, I jumped at the opportunity. He was an inspiration to work with. It was a hungry lab, meaning not very well funded, but that led to a culture of improvisation and alternate thought, which was an excellent learning ground. My engagement with human metabolism grew outward in subsequent post-doctoral associations with Philip James and Marinos Elia in the UK, where I learnt to use stable isotope probes of metabolic substrates to investigate the role of the sympathetic nervous system in energy metabolism adaptations. As a young faculty member in St John's, I was fortunate to run into Vernon Young from MIT, who invited me to develop a stable isotopic method to investigate essential amino acid requirements.

This was fascinating work that eventually led to a change in the WHO/FAO policy relating to the protein requirements of man. It also showed me how basic human biological work could have profound implications on policy that was not only relevant to human health, but also to food production. That set me on a path to engage with public health and policy.

All this was fortuitous, since India was changing in rapid and unsettling ways in the meantime. It became evident that the Indian phenotype and environmental exposure were somewhat unique, and good basic physiological investigations into mechanistic biology were needed to underpin the epidemiological evidence available. Without that, policy making was under-informed and somewhat blind. From the food perspective, science had also largely ignored important research into traditional food groups like pulses, millets and green leafy vegetables, which are important sources of protein, minerals and vitamins; all attributes of a good quality diet. How they are digested and absorbed, particularly in India, with its own peculiar environmental concerns, is also a question.

It is a full circle now, from my beginnings with the 'westernized diet'. It is no longer a remote concern, and no longer about fiber alone. We still do not know how well food is digested and its nutrients absorbed, even if it were of good quality. After nutrients are absorbed, relatively non-invasive evaluations of their acute and chronic effects on physiological function and health are required. This is the area I plan to work in, and it is complex, not only because on one end, the confounding effects of environmental enteropathy on absorption need to be understood, and on the other end, there is the need to develop strategies that can be used to measure nutrient absorption from plant foods in vulnerable populations as well as to develop sensitive and dynamic evaluations of physiological efficacy.

BASIC RESEARCHERS

Dr. Laasya Samhita

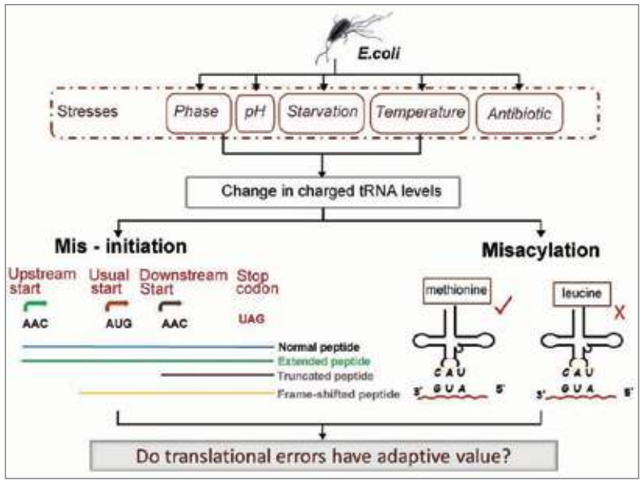
Early Career Fellow

PhD Institution: Indian Institute of Science, Bangalore, India

Host Institution: National Centre for Biological Sciences, Bangalore, India

Stress dependent evolution in bacteria through manipulation of tRNA levels

Bacteria adapt to stress in various ways. Recent work indicates that one such way is by the generation of novel translational products not encoded in conventional reading frames. I propose to test the hypothesis that tRNAs mediate a non genetic stress response by generating proteome diversity through **(i)** mis-initiation and **(ii)** misacylation. Bacterial cells show changes in the levels of charged tRNAs under stresses like amino acid starvation. I hypothesize based on previous results that mutant strains depleted of initiator tRNAs will show translation initiation at alternate sites along mRNAs and at non-AUG codons, potentially using amino acids other than methionine. Misacylation and misincorporation frequency will also be examined in wild type *E.coli* and mutant strains under different stress regimes. While in the short term, an altered proteome may help tide over a stress, prolonged maintenance of the stress could lead to the evolution of new traits via genetic changes that consistently produce the novel beneficial peptide(s). Alternatively, under weak or inconsistent stress, diverse phenotypes may arise but not be genetically fixed (~canalized). While canalization of a new phenotype may occur with rarely encountered and long term stresses, retaining the ability to explore many phenotypes (without canalization) could serve as an adaptation to survival in changing environments.



Investigating the potential adaptive value of tRNA mediated translation errors in the bacterium E. coli.

Dr. Reety Arora

Early Career Fellow

PhD Institution: University of Pittsburgh Cancer Institute, Pittsburgh, Pennsylvania, USA

Post-PhD Institution: Institute for Stem Cell Biology and Regenerative Medicine, Bangalore, India

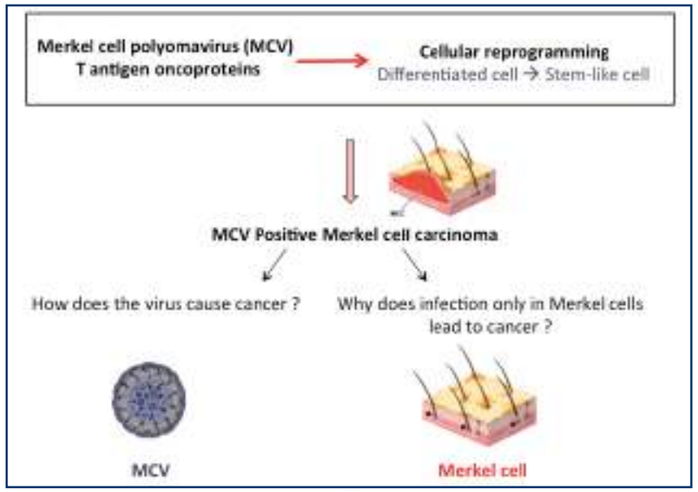
Host Institution: National Centre for Biological Sciences, Bangalore, India

Elucidating the link between stemness and carcinogenesis - through the lens of an oncogenic virus

There is increasing evidence unvieling shared mechanisms between carcinogenesis and stemness. Cancer-causing (oncogenic) viruses are being implicated in the modulation of pluripotency as well. Viral oncoproteins target classic tumor suppressors (eg. pRB), increase cell proliferation and are now being found to transcriptionally regulate pathways traditionally associated with lineage commitment. Cancers caused by viruses serve as excellent models for the studying various aspects of cancer. Merkel cell polyomavirus (MCV) positive Merkel cell carcinoma (MCC) is one such unique new paradigm for human cancer, whereby a virus' ability to modify/alter a cell can be used to understand the slow process of transformation leading to cancer. Using this MCV based model I propose to understand the complex relationship between stemness and cancer. I hypothesize that MCV oncoproteins reprogramme differentiated cells and that this is an important prerequisite of malignant transformation.

To test the hypothesis stated above, I want to investigate both the viral and the cellular angles to my model. Following are the key goals of the proposed research:

- To examine MCV large T antigen's (one of the viral oncoproteins) transcriptional regulation activity. (Viral perspective)
- To decipher why only Merkel cells develop this disease and investigate the cellular reprogramming capacity of MCV and its implications in cancer (Cellular perspective)



Dr. Neeraj Kumar

Early Career Fellow

PhD Institution: Indian Institute of Technology Gandhinagar, Gujarat, India

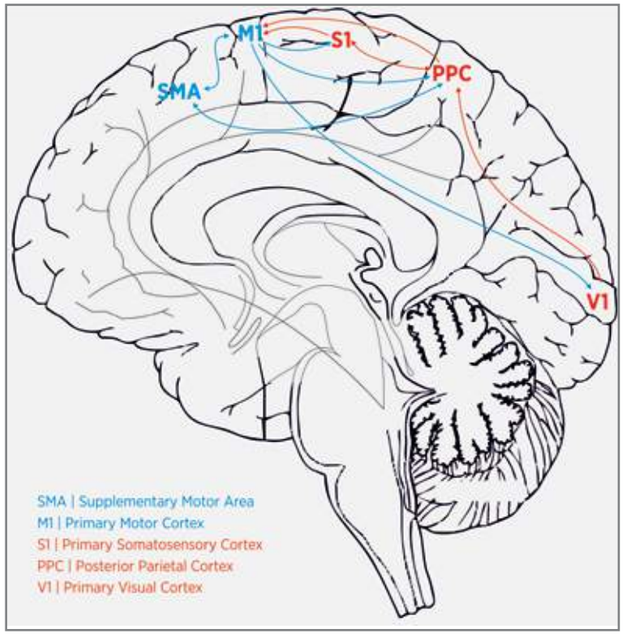
Post-PhD Institution: Indian Institute of Technology Gandhinagar, Gujarat, India

Host Institution: Indian Institute of Technology Gandhinagar, Gujarat, India

Exploring bi-directional interactions between perception and motor control

Goal directed actions depend crucially on the ability to perceive the world and act upon the perceived information. Perception and action have traditionally been thought to be mediated by distinct neural mechanisms (Goodale & Milner, 1992), and as such, have only been independently investigated. We question this long held view and explore the interplay between perceptual and movement control mechanisms, and identify potential neural substrates that might underlie their interaction. We examine these bidirectional interactions particularly in the context of learning, in a series of seven experiments. We first investigate whether visuomotor or force-field adaptation influence visual processing of moving stimuli when such adaptation is driven by errors or reward. Next, we examine how visuomotor adaptation influences perceptual decision-making, and whether the robustness of these decisions is modulated by changes in reinforcement during adaptation.

Third, we investigate modulation of motor learning by prior perceptual training, induced via a novel perceptual learning paradigm. Finally, we explore the role of primary somatosensory and motor cortices in these interactions by perturbing their activity using transcranial magnetic stimulation and examining its behavioral consequences. These studies have substantial implications for neural organization of perceptual and motor systems and may also contribute from a translational perspective.



Functional connectivity between motor and sensory areas of the brain. Blue colour represents the motor areas and flow of motor information. Red colour represents sensory areas and flow of perceptual information.

Dr. Md. Zahid Kamal

Early Career Fellow

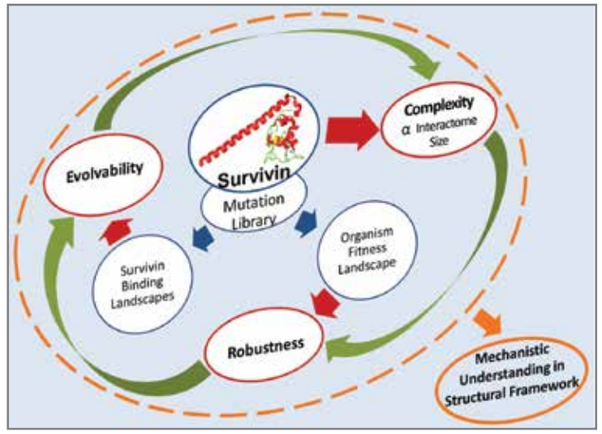
PhD Institution: Centre for Cellular and Molecular Biology, Hyderabad, India

Post-PhD Institution:
- Centre for Cellular and Molecular Biology, Hyderabad, India
- Biological Research Centre, Szeged, Hungary

Host Institution: National Centre for Cell Science, Pune, India

Decoding organism - related evolution of survivin, a hub protein

Natural selection spreads the beneficial genotypes but the processes that create and maintain genotypic diversity to select from, even in the absence of selection pressure, are also of paramount importance and in true sense decide the limits of biological evolution. Biological complexity, robustness and evolvability have long been debated for such contribution in evolution; however scarcity of experimental data eluded a clear understanding. I will experimentally uncover their interrelationship at the level of protein using "survivin", a hub protein. Using interactome size of survivin as a proxy of complexity, I will investigate its effect on **(i)** robustness against point mutations and **(ii)** the capacity to gain/lose interaction(s) (proxy for evolvability). As regards of **(i)**, fitness landscape of survivin, containing fitness information on all the possible point mutations, will be captured and robustness will be measured from neutral mutations. As regards of **(ii)** binding landscapes of survivin, containing information of the effect of mutations on binding to various interaction partners will be captured. Additionally, to develop mechanistic understanding of interrelationship between complexity, robustness and evolvability on a structural framework, crystal structures of few of the selected survivin mutants alone and in complex with binding partners will be acquired.



The scheme depicts the primary goals and approaches of the proposed work. The green arrows indicate the accepted relationship between complexity, robustness and evolvability of biological systems.

Dr. Madhu Khatri

Early Career Fellow

PhD Institution: University of Massachusetts, MA, USA

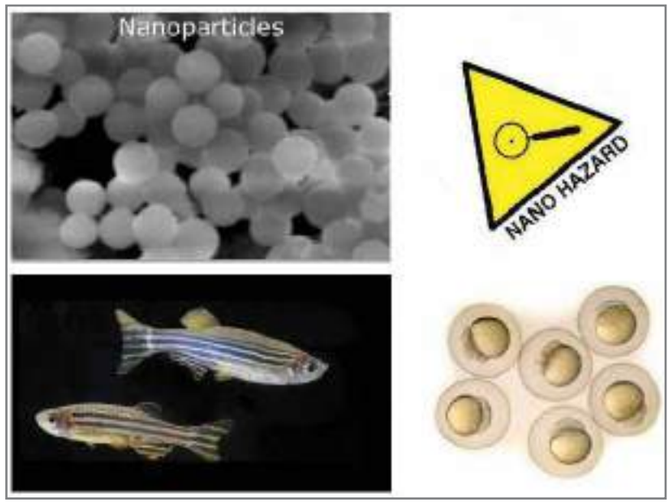
Post-PhD Institution:
- University of Massachusetts Lowell, MA, USA
- Institute of Nano Science and Technology, Mohali, Panjab, India

Host Institution: Panjab University, Chandigarh, India

Nanomaterial hazard identification: High throughput toxicity assessment using Zebrafish model

Rapid growth of nanotechnology in the past decade has produced hundreds of new engineered nanomaterials (ENM), which are steadily leaving the laboratory and entering the market, bringing with them the real possibility of exposure to global populations and ecosystems in general. The large variety of ENM, coupled with their novel physicochemical and biological properties, have posed an urgent need to develop timely, high throughput, cost efficient, and predictive toxicity screening/evaluation approaches of ENM. The animal studies using rodents are expensive and time consuming therefore zebra fish embryo model due to its unique features may provide a better alternate for *in vivo* studies. This model has the potential to fit in between the traditional cell culture and mammalian models, providing validation of *in vitro* toxicity and prioritization of *in vivo* animal experiments.

In this project, we intend to use zebra fish embryo model for *in vivo* high throughput toxicity screening of assorted ENMs from different classes and validate its utility compared to various *in vitro* systems. At present most of the toxicity research conducted on nano-based products pertains to short duration only, with miniscule prediction of long-term toxicity. Hence, the proposed study will attempt to answer some of the questions related to chronic toxicity.



Nanomaterial hazard identification using zebra fish.

Dr. Lakshmi Revathi Perumalsamy

Early Career Fellow

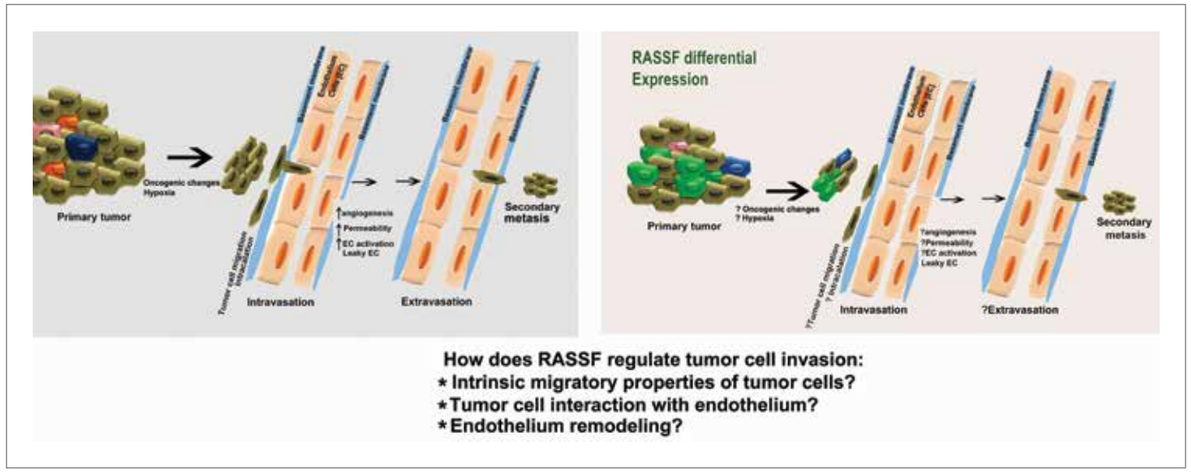
PhD Institution: National Centre for Biological Sciences, Bangalore, India

Post-PhD Institution: Indian Institute of Technology Madras, Chennai, India

Host Institution: Indian Institute of Technology Madras, Chennai, India

Role of Ras effector - Ras Association (RalGDS/AF-6) Domain Family Member in tumor invasion and migration

Cancer is a disease of heterogeneous cell populations, with acquisition of genetic/epigenetic alterations in developmental pathways contributing to the initiation and progress of the disease. Several of these pathways are known, but the contribution of cellular context defined by other signaling molecules is not clear. Tumor microenvironment interaction with tumor is identified as critical contributor to the pathology of disease. However, the cellular and molecular players involved are only beginning to be understood. Oncogenic activation of Ras family of proteins, which regulate normal development, is frequently (~30-60%) detected in several types of cancer. Ras association (RalGDS/AF-6) domain family (RASSF) proteins are non-enzymatic effectors of Ras with both tumor suppressive and/or oncogenic functions. Differential expression of RASSF7 as well as few mutations in its open reading frame is observed in certain cancer tissues. Using this paradigm of RASSF7 expression in tumor, I will first probe the contribution of such effectors to tumor cell migration and invasion across the endothelium. Secondly, set up a tumor cell-niche model system to study the signaling pathways which govern these interactions. Subsequently, I will dissect key interacting pathways which can be extended to *in vivo* tumor invasion and metastasis in a mouse model and patient samples.



Role of RASSF in tumor cell interaction with endothelium during tumor cell migration and invasion.

Dr. Abhik Saha

Intermediate Fellow

PhD Institution: Bose Institute, Kolkata, India

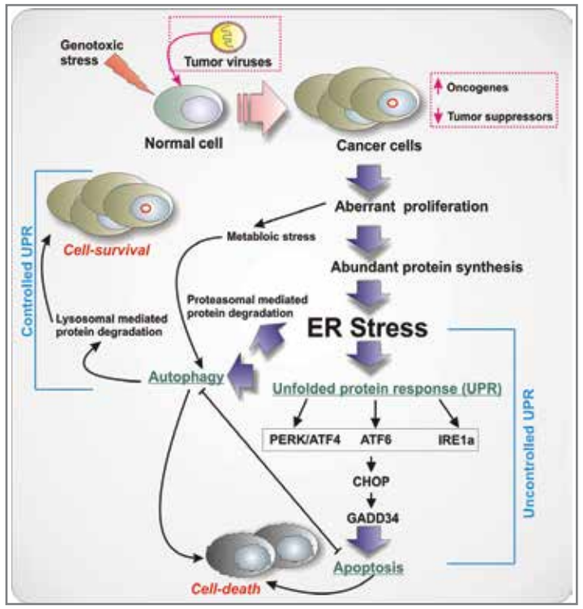
Post-PhD Institution: Perelman School of Medicine at the University of Pennsylvania, Philadelphia, USA

Host Institution: Presidency University, Kolkata, India

Understanding the molecular crosstalk between unfolded protein response and EBV pathogenesis in developing B-cell Lymphomas

Epstein-Barr virus (EBV) is associated with several B-cell lymphomas development. *In vitro*, EBV can readily transform quiescent B-cells into continuously proliferating lymphoblastoid cell-lines (LCLs), which express only a subset of latent-genes. EBNA3C, one of the essential latent-genes expressed in transformed B-cells, deregulates many important cellular pathways like cell-cycle checkpoints, apoptosis and ubiquitin-proteasome degradation pathway, which results in aberrant cell-proliferation. Cancer-cells often suffer ER-mediated unfolded-protein-response (UPR)-stress due to uncontrolled cell-proliferation and high metabolic-demand and initiate autophagy for scavenging the damaged organelle and protein-aggregates. Tumor-viruses, including EBV were shown to modulate UPR-autophagy network as a survival-strategy.

However, the mechanisms that connect regulators of this network with EBV-induced B-cell transformation and consequently B-cell lymphomas development remain unclear. Here we propose that EBNA3C given its capacity to integrate diverse signaling-networks may also target UPR-autophagy pathway for B-cell transformation and subsequent lymphoma development. The study aims to identify key-players of deregulated UPR-autophagy cascade in response to EBV-infection and EBNA3C-expression and to delineate the functional significance of EBV-mediated deactivation of tumor-suppressors activities particularly in DNA-damage-response pathway to regulate UPR-autophagy mechanism. The prominent interaction of EBNA3C with the protein-degradation pathway led us to hypothesize that EBNA3C may also be involved in regulating autophagy-lysosomal mediated degradation of protein-aggregates.



Targeting unfolded protein response (UPR)-autophagy network offers a promising therapeutic option for many human cancers.

Dr. Amit Tuli

Intermediate Fellow

PhD Institution: University of Nebraska Medical Centre, Nebraska, USA

Post-PhD Institution: Brigham and Women's Hospital/ Harvard Medical School, Boston, USA

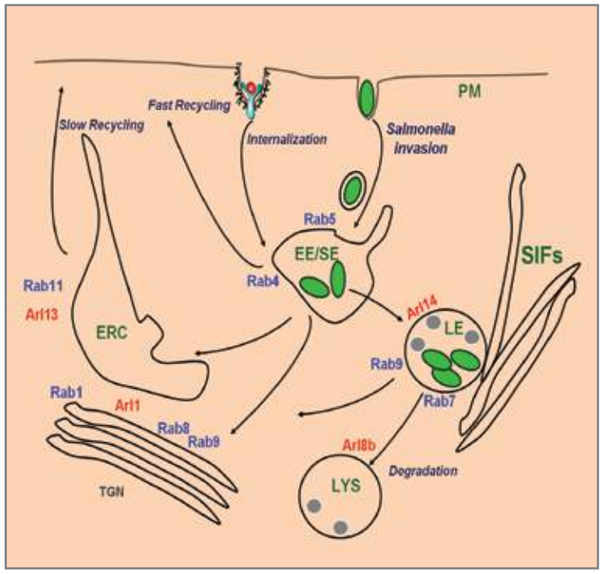
Host Institution: Institute of Microbial Technology, Chandigarh, India

Building a network of Arf-like GTPases and their effectors in phagosome maturation

Intracellular pathogens have evolved several mechanisms to manipulate the host cellular pathways for their survival. *Salmonella* is one such successful pathogen that invades primarily epithelial cells and macrophages and builds its replicative niche within these cells. Most of the *Salmonella* effectors that it secretes in the host cytosol and their intracellular targets are not characterized yet. Recent studies have identified Arf-like (Arl) GTPases as important regulators of vesicular trafficking whose function is not explored during *Salmonella* pathogenesis. Here, we aim to understand the role of this important family of endocytic regulators in *Salmonella* infection.

These studies will be relevant in further characterizing *Salmonella* phagosomes and identifying novel targets for controlling *Salmonella* infection. We will also address the role of lysosomal localized Arl8b that was recently shown to regulate formation of *Salmonella*-induced filaments (SIFs). As part of this proposal, we want to understand the mechanism by which Arl8b and its effectors regulate SIF formation. Furthermore, we aim to explore whether the crosstalk of Arls with Rabs is important during progression of *Salmonella* infection.

We expect that results from these studies will identify unknown targets of *Salmonella* effectors, and will provide a better understanding of how *Salmonella* survives inside the host cells.



This schematic depicts the intracellular localization and associated vesicle transport pathway(s) of several Rab and Arl GTPases. Intracellular pathogens such as Salmonella modulate the function of the GTPases and their effectors to form a replicative compartment inside the host cell. SIFs: Salmonella-induced filaments; EE/SE: early endosome/sorting endosome; ERC: endocytic recycling compartment; LE: late endosome; LYS: lysosome and TGN: trans-golgi network.

Dr. Arati Ramesh

Intermediate Fellow

PhD Institution: Texas A&M University, College Station, USA

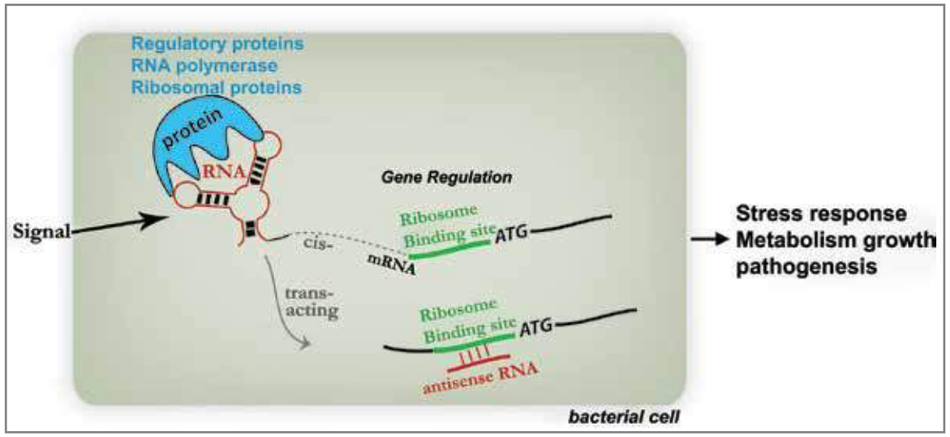
Post-PhD Institution: University of Texas Southwestern Medical Centre, Dallas, USA

Host Institution: National Centre for Biological Sciences, Bangalore, India

Structural mechanisms of RNA - mediated gene regulation in bacteria

Bacteria are adept at responding to environmental stresses and cues by precisely regulating different genes. Regulatory roles were traditionally attributed to proteins, however, it is now well established that RNAs plays a major role in genetic control. Discovery and deeper mechanistic insight into regulatory RNAs are both at very early stages. In pathogenic bacteria especially, the roles of regulatory RNAs are largely unknown. Understanding RNA-based regulation is central to understanding bacterial biology. My post-doctoral research has contributed towards understanding mechanisms of regulatory RNAs called riboswitches. Riboswitches directly sense metabolites to regulate related genes, often controlling growth, metabolism and stress-responses.

I have also uncovered the mechanism of a widespread protein regulator called ANTAR and its target RNA, that together control key metabolic genes in some bacteria. In this proposal, I aim to understand i) how ANTAR and similar regulatory RNA-protein complexes function at the mechanistic and structural level, ii) how RNA-regulators control genetic responses to multiple, integrated signals and iii) mechanisms by which RNA-based regulatory complexes function in pathogenic bacteria. The overreaching goal of this proposal is to understand and ultimately target pathogenic bacteria. This will have substantial implications for human health.



RNAs respond to diverse cellular signals as well as to RNA-binding proteins to elicit control over genes in bacteria, ultimately affecting processes such as growth and metabolism, stress response and the ability to cause disease.

Dr. Jeet Kalia

Intermediate Fellow

PhD Institution: University of Wisconsin Madison, USA

Post-PhD Institution: National Institutes of Health, Bethesda, USA

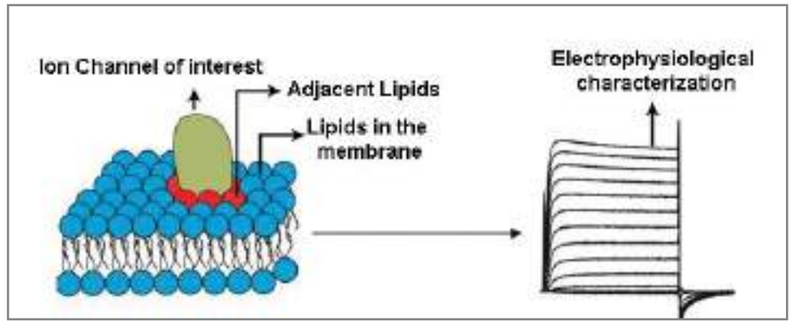
Host Institution: Indian Institute of Science Education and Research, Pune, India

Elucidating the role of lipids in ion channel function

Ion channels are membrane proteins that perform the vital task of acting as conduits for the passage of ions through otherwise impermeable hydrophobic cellular membranes. Upon application of specific stimuli, ion channels undergo a series of conformational changes leading to the opening or closing of their pores. This process, often referred to as "ion channel gating", has been the focus of extensive research utilizing electrophysiological techniques. Although extremely insightful, these studies have largely overlooked a fundamental aspect of ion channel function–the roles of surrounding membrane lipids in ion channel gating.

The critical importance of lipids in membrane protein function has recently been revealed by crystal structures of membrane proteins showing lipids specifically bound to well-defined lipid-binding sites, and also by functional studies demonstrating modulation of membrane protein activity upon lipid depletion. Furthermore, the recent discovery that several drugs modulate their target ion channels by binding to and modulating the protein–lipid interface, confirms the importance of these interactions. Clearly, elucidating how lipids interact with and influence ion channel gating is critical for understanding ion channel function and could also have a tremendous impact on drug development. Such studies are, however, severely hampered by the paucity of methods to manipulate lipids in cells. My laboratory is developing methods for manipulating the chemical properties of lipids in cells and is utilizing those methods to elucidate the roles of lipids in ion channel function by employing electrophysiological approaches.

Ion channel function is profoundly modulated by surrounding membrane lipids.



The ion channel of interest is shown in green and the adjacent lipids in red. Lipids in the membrane that are not adjacent to the ion channel are depicted in cyan. A family of current traces on the right depicts the electrophysiological characterization of the ion channel.

Dr. Sunil Laxman

Intermediate Fellow

PhD Institution: University of Washington, Seattle, USA

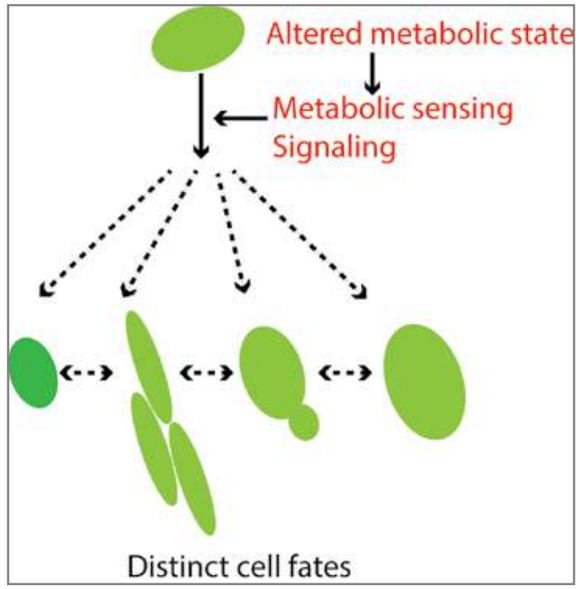
Post-PhD Institution: UT Southwestern Medical Centre, Dallas, USA

Host Institution: Institute for Stem Cell Biology and Regenerative Medicine, Bangalore, India

Nutrient sensing and regulation of cell fate

Cells show a remarkable plasticity of fates, transitioning through cell growth, proliferation, differentiation, autophagy, quiescence and cell death. It is increasingly clear that the underlying metabolic state of the cell can directly determine cell fates. These distinct fates are regulated by "metabolic sensors", which sense key metabolites. Most of our current understanding of nutrient sensing and metabolic regulation come from cell culture models where cells either grow in abundant nutrients, or acute starvation. However, in most biological contexts nutrients are limited, but not entirely absent. During nutrient limitation, cells might divide, differentiate, undergo autophagy, or die.

Our knowledge of how cell fates are determined under these conditions is poor. My lab is interested in understanding how cells sense nutrients (particularly amino acids), and regulate metabolism which in turn regulates distinct cell fates. To address this, we use a range of approaches combining biochemistry, genetics and cell biology with quantitative metabolomics and proteomics. Our current research focuses on two broad questions addressing how amino acids are sensed, and how amino acid metabolism is regulated. Part of our lab investigates how modifications on specific tRNAs can control metabolic homeostasis and cell fates. In other work, we seek to identify new components that regulate amino acid dependent cell growth and metabolism.



Understanding the metabolic basis of cell fate decisions

Dr. Athi N. Naganathan

Intermediate Fellow

PhD Institution: University of Maryland, College Park, USA

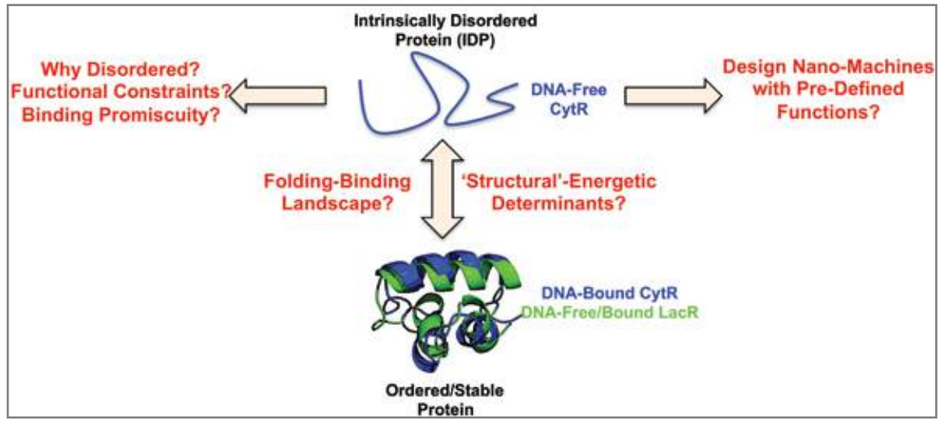
Post-PhD Institution:
- Barcelona Supercomputing Centre, Spain
- Centro de Investigaciones Biológicas (CIB-CSIC), Madrid, Spain

Host Institution: Indian Institute of Technology Madras, Chennai, India

Towards designing tunable nano-machines: taking advantage of protein disorder

How are evolutionarily selected functional features imprinted on the structure and how does Nature introduce multi-functionality into proteins through minimal changes in the primary sequence? Can a quantitative picture of the interplay between energetic frustration, folding speed, stability and functional constraints be detailed at the amino-acid level on homologous proteins? How can an understanding of these structural-energetic subtleties at both local and global level be interwoven to design protein-based nano-machines?

We plan to answer these questions by studying homologous proteins that display extremes of conformational behavior – one completely unstructured, promiscuous and exhibiting weak DNA-binding (CytR) and the other well-folded, displaying specific and strong DNA-binding (LacR) - through rational protein engineering and positive/negative design, extensive biophysical characterization and DNA-binding assays. We will be guided by a simple Ising-like statistical mechanical model that incorporates diverse physical terms in its energy function apart from the extracted folding-functional landscape of the different mutant proteins. Combining the model and experiments, we expect to develop a robust predictive approach that can aid in designing proteins that can bind specific DNA sequences, sense changes in ambient environment, and exhibit enhanced mutational and thermal fitness.



Deciphering the Sequence-'Structure'-Function Code and Exploiting this Knowledge to Design Nano-Machines.

Dr. Gulam Hussain Syed

Intermediate Fellow

PhD Institution: University of Hyderabad, Hyderabad, India

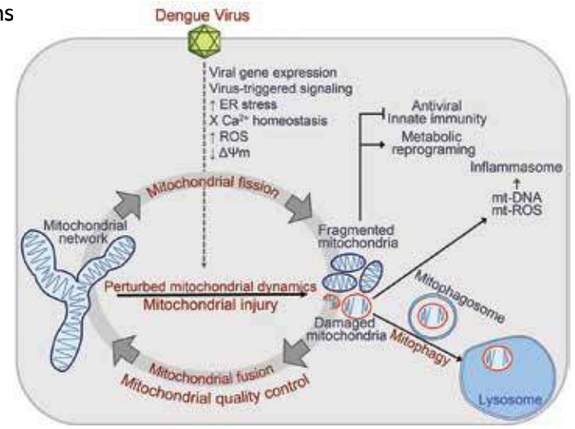
Post-PhD Institution: University of California, San Diego, La Jolla, USA

Host Institution: Institute of Life Sciences, Bhubaneshwar, India

Role of mitochondrial dynamics in Dengue virus life cycle and disease pathogenesis

With the lack of effective vaccine or therapy, Dengue virus (DENV) is emerging as a global health burden. There is an urgent need to unravel the molecular mechanisms underlying the pathophysiology of DENV disease to assist in development of effective therapeutic strategies. Mitochondrial dynamics is an integral cellular process with implications in cellular and mitochondrial homeostasis, metabolism, inflammation, and innate immunity. Viruses may exploit mitochondrial dynamics to facilitate viral infection, evade innate immunity, and to trigger disease pathogenesis. I hypothesize that mitochondrial dynamics plays a critical role in DENV infection and pathogenesis. To elucidate this hypothesis, I will explore the effect of DENV on cellular mitochondrial dynamics and characterize the underlying mechanisms

Further, I will determine if DENV exploits altered mitochondrial dynamics and mitophagy to benefit the infectious process. Subsequently I will characterize if DENV utilizes the altered mitochondrial dynamics and mitophagy to cripple cellular innate immune signaling. Antibody-dependent enhancement (ADE) of secondary DENV infection is implicated in the exponential increase in inflammatory signaling that lead to lethal dengue disease. I will explore if ADE signals for defect in mitochondrial quality control thereby causing an accumulation of damaged mitochondria that are major source of mtDNA and mtROS, which can trigger inflammasome.



Mitochondrial dynamics during Dengue infection

Infection-associated stress and viral gene expression promote mitochondrial injury. Subsequently mitochondria undergo fragmentation followed by mitophagy to eliminate damaged mitochondria. Damaged/fragmented mitochondria are impaired in innate immune signaling and promote accumulation of mt-ROS and mt-DNA that can trigger inflammasome.

Dr. Kalyaneswar Mandal

Intermediate Fellow

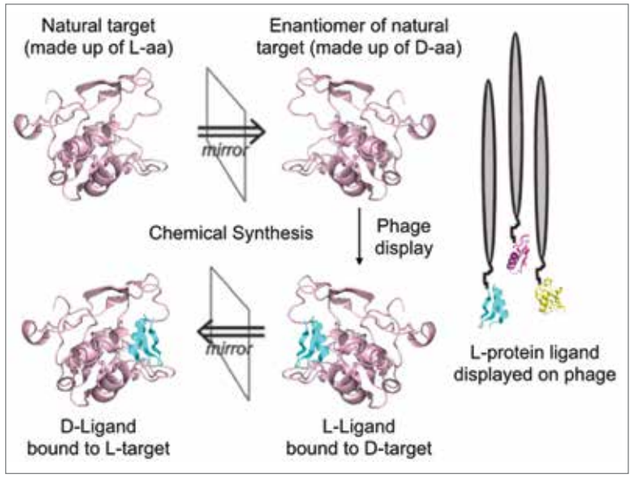
PhD Institution: Indian Institute of Technology Bombay, Mumbai, India

Post-PhD Institution: The University of Chicago, Chicago, USA

Host Institution: Indian Institute of Chemical Biology, Kolkata, India

Systematic development of novel therapeutics against Malaria

The goal of my research is to systematically develop novel high affinity D-protein based inhibitors of *Plasmodium falciparum* AMA1-RON2 protein-protein interaction using 'mirror image phage display'. D-proteins have advantageous properties: they are resistant to proteolytic degradation, amenable to chemical manufacture, and are known to be non-immunogenic. Therefore, a properly engineered D-protein inhibitor would be superior to a conventional natural peptide/protein (consisting of all L-amino acids and glycine) as a therapeutic. Inhibiting the interaction between AMA1 and RON2 proteins was chosen for the following reasons. Malaria transmission can be prevented by inhibiting the invasion of uninfected erythrocytes by merozoites. Studies suggest that formation of a moving junction between the merozoite and an erythrocyte that involves two key proteins, apical membrane antigen 1 (AMA1) and rhoptry neck protein 2 (RON2), is critical for merozoite invasion. The AMA1 at the merozoite surface binds to the extracellular domain of RON-2, located outside the membrane of erythrocyte, for effective junction formation. Interestingly, both the proteins involved in moving junction formation are parasite proteins. Therefore, turning off the interaction between AMA1 and RON2 by a potent, stable D-protein inhibitor would be an ideal strategy to prevent the junction formation, and thereby prevent invasion by merozoites.



Mirror image protein phage display: development of novel D-protein inhibitor of P. falciparum AMA1-RON2 interaction.

Dr. Minhaj Sirajuddin

Intermediate Fellow

PhD Institution: Max-Planck-Institute for Molecular Physiology, Dortmund, Germany

Post-PhD Institution: University of California, San Francisco, USA

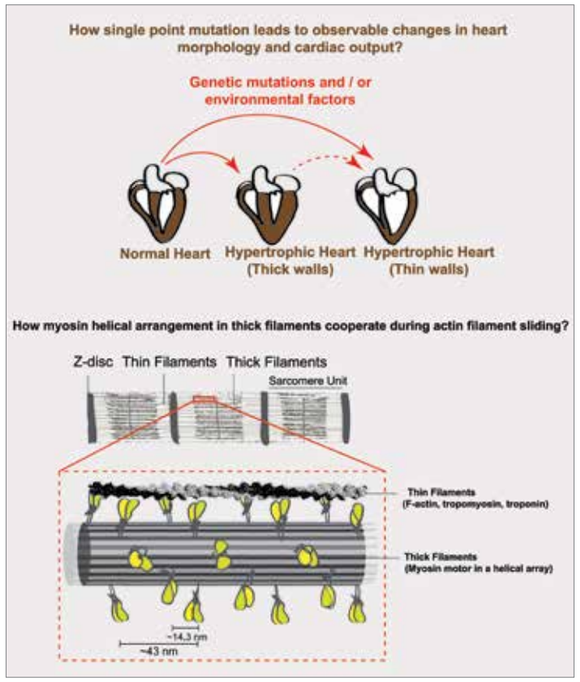
Host Institution: Institute for Stem Cell Biology and Regenerative Medicine, Bangalore, India

Structure and function studies of sarcomere proteins implicated in cardiomyopathies

Cardiomyopathy is a collective term used to describe diseases related to heart muscle, which often lead to heart failure. Cardiomyopathies can be broadly classified into hypertrophic (HCM), dilated (DCM), restrictive and arrhythmogenic right-ventricular cardiomyopathies. Among them, HCM and DCM accounts for the most common inherited form of cardiomyopathy. HCM is characterized by thickening of heart walls and decreased ventricular chamber volume. On the other hand, the DCM phenotypes include enlargement of ventricular chambers and thinning of heart walls. Both HCM and DCM results in decreased cardiac output, which can lead to sudden cardiac arrest and death. In addition to other acquired factors, so far more than 400 mutations in over a dozen genes have been implicated in cardiomyopathies.

Most of these genes encode important protein components of heart muscle cells, which generate contractile forces responsible for heartbeat. An outstanding question is how mutations in proteins lead to observable changes in heart morphology and physiology. Therefore, the main goal of this proposal is to understand the molecular basis of mutations that leads to HCM and DCM disease. The structural, biochemical and biophysical approaches proposed here will pave the way towards developing therapeutic intervention for cardiomyopathy diseases.

Illustration of gross morphological changes that accompany cardiomyopathy causing mutations in sarcomere proteins.



Sarcomere is the basic contractile unit responsible for muscle contraction. During muscle contraction the thin filaments slide over thick filaments to create a constricted sarcomere unit. Simplified illustration (blown-up) of elements involved in muscle contraction.

Dr. Sabyasachi Rakshit

Intermediate Fellow

PhD Institution: Indian Institute of Science, Bangalore, India

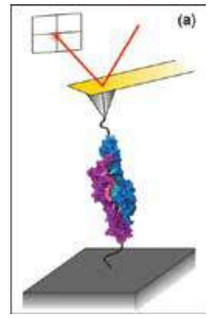
Post-PhD Institution: Iowa State University, Ames, IA, USA

Host Institution: Indian Institute of Science Education and Research, Mohali, India

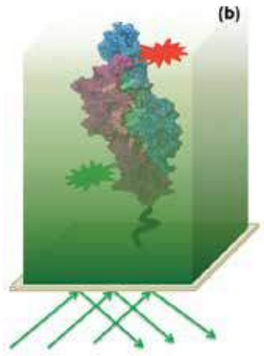
Deciphering the mechano-responsive behavior of cadherins in hearing

Hearing is one of the most complicated but well-developed sensing ability of mammals. In hearing, sound wave deflects the hair-cells in inner ear. The precise deflection of hair-cells leads to the opening of ion-channels and generates electrical signal that is carried by neurons to brain. Brain decodes the electrical signal as sound. As expected, these hair-cells deflect thousands of times in a second during a stimulation. More importantly, the hair-cells in accord with their load-bearing molecular springs restore their structural and functional integrity after each stimulation for retaining sensitivity to next transient stimuli. The correlation between molecular-springs and hearing is further reinforced with the fact that mutational modification on these springs directly associated with hearing impairment diseases like Usher-Syndrome. Molecular-springs that act together to adaptively convert the sound pressure into hearing are identified, however, little is known about the molecular elasticity of these load-bearing molecular springs and their precise and repetitive response to force.

The overarching goals of this proposal are therefore to decipher the force-regulated molecular elasticity of the springs, and resolve how mutations tune the mechano-responsive properties of such springs leading to deafness. We propose single molecule force spectroscopy based experiments using AFM, single molecule FRET along with *in-sillico* Molecular Dynamics and Steered Molecular Dynamics simulations to achieve the proposed goals.



(a) Single - molecule Force Spectroscopy to measure the interactions of cadherins in tip-links under tension



(b) Single-pair FRET to decipher the domains involved In tip-link formation.

Dr. Sandeepa Eswarappa

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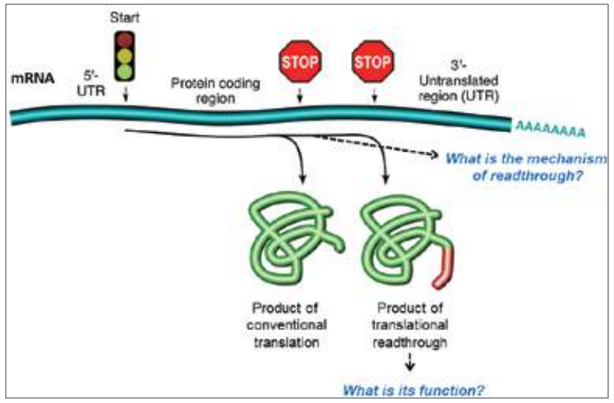
Role of translational readthrough in angiogenesis regulation

Contrary to the common notion, protein translation does not always end at the stop codon. This is true even in mammals. Translating ribosomes some time continue translation beyond the stop codon to generate proteins with C-terminal extension. This phenomenon is known as translational readthrough or stop codon readthrough. The importance of translational readthrough in less complex organisms such as viruses and yeast is well established; however, its role in vertebrate biology is beginning to emerge. My postdoctoral work demonstrated that mRNA of VEGF-A, a known pro-angiogenic factor, undergoes programmed translational readthrough in mammalian endothelial cells to generate an anti-angiogenic isoform, VEGF-Ax. We have identified few more mRNAs which undergo translational readthrough in endothelial cells. Investigating these novel readthrough events is the primary goal of our laboratory.

Specifically, we are asking the following questions:

- Why does protein translation in certain mRNAs go beyond the stop codon?
- What is its biological significance?

Because of my interest in vascular biology and my previous research experience, I plan to study the importance of translational readthrough in angiogenesis executed by endothelial cells.



"Genetic signal jump": *Typically stop codons (UGA, UAA and UAG) signal termination of protein translation. However, in some exceptional cases, ribosomes 'jump' this signal and generate longer proteins with unique properties. Our laboratory investigates these translational readthrough events in endothelial cells. Specifically, we study the molecular mechanism and the biological significance of these phenomena.*

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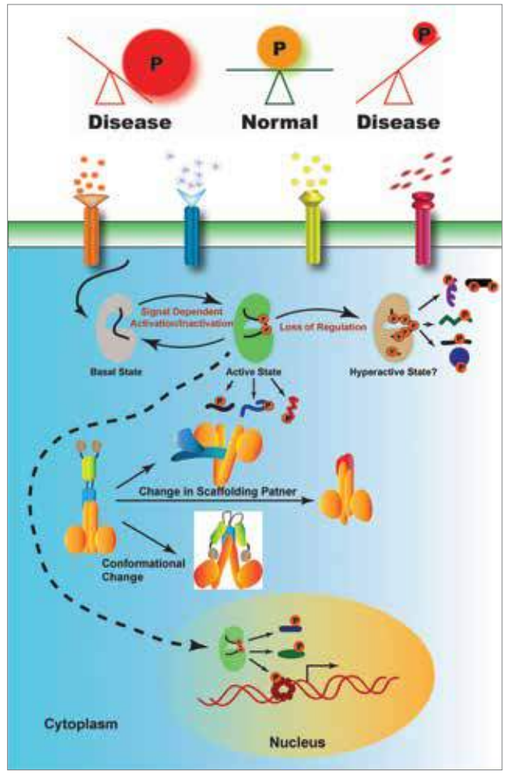
Understanding the biochemical and structural basis of signaling modularity of Kinases in their biological context

The human genome encodes more than 500 protein kinases, which provide the regulatory framework for most signaling pathways in eukaryotic cells. They create modified chemical entities by adding phosphate groups to amino acids that provide altered functionality to protein substrates. Stringent regulation of kinase-activities is critical to proper functioning of cellular processes making protein kinases important drug targets. Many of them show signaling modularity entailing both beneficial and harmful outcomes, depending upon the situation. Indiscriminate inhibition of these activities by active-site directed drugs often lead to deleterious side-effects. It is important to investigate the mechanistic details of their activation and spatio-temporal regulations to fully realize the scope of controlling them in a manner beneficial for the organism.

In my laboratory, a unique combination of biochemical, biophysical, genetic and structural biology approaches will be adopted to investigate regulatory mechanisms critical for kinase-signaling modularity in a context dependent manner. Signaling modularity is dictated by choice of substrates, cognate-binding partners, subcellular localization and post-translational modifications of the kinase itself. Systematic investigation of kinase-signaling complexes at different stages (pre- and post-stimulation) of action might enable us to modulate them more appropriately in a given patho-physiological condition without affecting their role in normal cell physiology.



Delicate balance between protein kinase and phosphatase activity is crucial, lack of which often causes havoc. A single kinase may show signaling modularity depending upon the nature of the signal.

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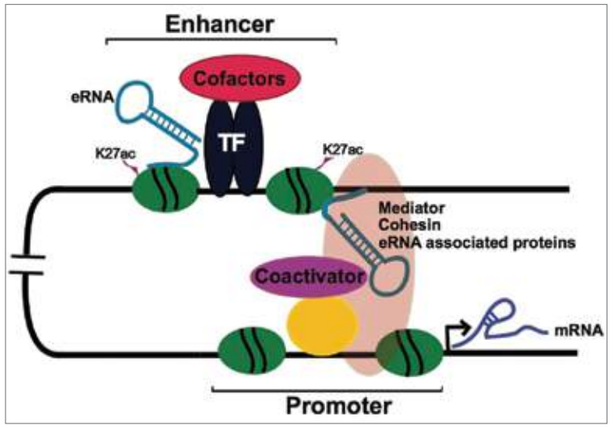
Understanding the Enhancer - Code used by IFNγ in the activation/repression of target genes during inflammation

Eukaryotic gene expression is tightly controlled in a spatio-temporal manner by distal regulatory elements known as enhancers. Enhancers being highly cell type-specific, deliver crucial transcriptional machinery to the target genes by virtue of looping. Although discovered 35 years ago, enhancer functions and their mechanisms of action still remains poorly understood. Yet another layer of enhancer-mediated transcriptional regulation has been uncovered by the recent discovery of ncRNA (eRNA) transcription from active enhancers, further widening the gap between the known and unknowns of enhancer-mediated gene regulation. eRNAs bear several common and unique features with lncRNAs and their expression levels are highly correlated with the activity of the functional enhancers both in developmental and signal-regulated transcription programs. Since, enhancer alterations have been linked with defects in development and disease outcomes. Therefore, understanding enhancer functions is crucial in developing therapeutic strategies that target enhancers and eRNAs.

Using locus-specific as well as genome-wide approaches, I strive to uncover the following aspects of this conundrum: **(i)** How is the specificity between an enhancer and the corresponding promoter defined? **(ii)** Role of enhancers in the three-dimensional chromatin architecture, its alterations during signaling cascades. **(iii)** Function of eRNAs-associated distinct protein cargos in the enhancer-mediated activation vs. repression events.



Schematic depicts the functional anatomy of an enhancer-promoter unit: Functional enhancers, recruit lineage and tissue-type specific transcription machinery, triggering eRNA transcription leading to target gene activation via looping.

Dr. Dhirendra Kumar Simanshu
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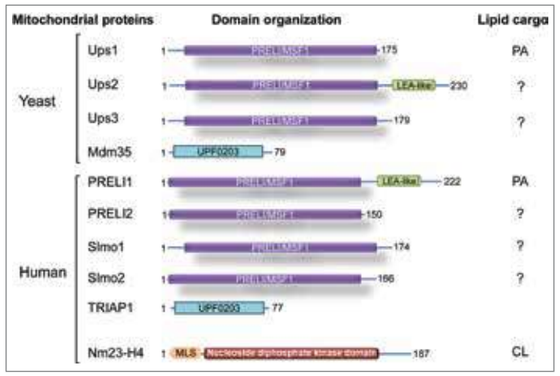
Structural and mechanistic studies on lipid-transfer proteins involved in non-vesicular lipid trafficking

Mitochondrial inner and outer membranes have specific phospholipid composition that is essential for mitochondrial functions such as oxidative phosphorylation for ATP production, import of mitochondrial proteins, mitochondrial morphogenesis, and regulation of apoptotic signaling pathways. Regulation of phospholipid homeostasis in mitochondrial membranes through their transport into and out of the mitochondrial membranes is essential for mitochondrial functions and for avoiding many diseases. The recent identification of lipid-transfer activity of mitochondrial inter-membrane space proteins Ups, PRELI and Nm23-H4 has provided key insights into lipid trafficking between mitochondrial membranes.

In my laboratory, I plan to carry out structural studies to elucidate molecular basis of recognition and transfer of specific lipid cargo by these newly-identified lipid-transfer proteins involved in non-vesicular lipid trafficking between the two mitochondrial membranes. Structure-based mutational and *in vivo* functional studies will be carried out to gain mechanistic insights into the transport process and its regulation of mitochondrial morphology and functions. The experimental plan combines a multipronged approach including crystallography and protein-lipid interaction studies supplemented with various biochemical, biophysical and cell biological techniques. Completion of proposed aims will not only provide structural and mechanistic insights into these lipid-transfer proteins, but also elucidate atomic details about potential targets for drug-design.



Domain organization and lipid cargo of mitochondrial lipid-transfer proteins selected for the proposed study. PRELI/MSF1: domain first discovered in human PRELI and the yeast MSF1 proteins, LEA-like: late embryogenesis abundant-like domain, UPF0203: uncharacterized protein family domain, MLS: Mitochondrial localization signal, PA: phosphatidic acid, CL: cardiolipin.

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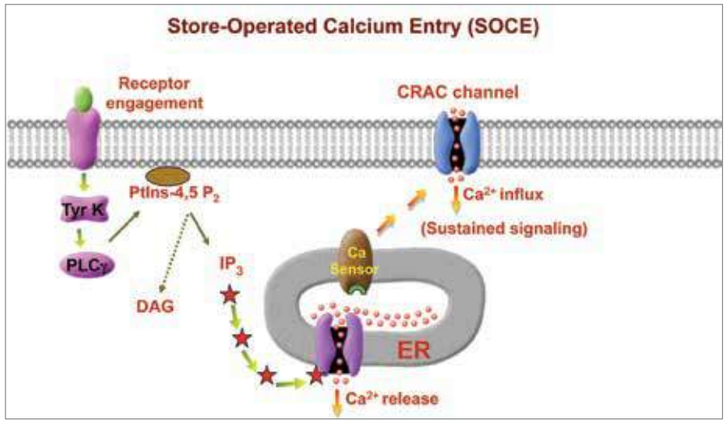
α-SNAP dependent structural and molecular dynamics in Store-Operated Calcium Entry

Calcium ions are important second messengers. In most cells, cross-linking of tyrosine kinase or G-protein coupled receptors initiates a signaling cascade that results in calcium release from the endoplasmic reticulum (ER) followed by influx across plasma membrane, known as store-operated calcium entry (SOCE). In lymphocytes SOCE is mediated by calcium release activated calcium (CRAC) channels. Previously, using a genome-wide RNAi screen, we identified the gene encoding the pore subunit of CRAC channels known as CRACM1 (or Orai1). More recently, my lab has identified a crucial and unexpected role of alpha-SNAP in SOCE. We have found that alpha-SNAP binds Orai1 and Stim1 and regulates the ratio of these proteins in the junctional ER. Using an interdisciplinary approach a major goal of this project is to understand how alpha-SNAP orchestrates this molecular re-arrangement in the ER-plasma membrane junctions to enable SOCE via CRAC channels. SOCE influences the activation of several transcription factors and integrates with a variety of signaling pathways. Point mutations in key components of CRAC channel complex have been reported to result in immune-deficiencies in human and mice. Using mouse models, we will identify novel physiological roles for SOCE and characterize signaling nodes where SOCE intersects with other signal networks.



Schematic depicts the functional anatomy of an enhancer-promoter unit: Functional enhancers, recruit lineage and tissue-type specific transcription machinery, triggering eRNA transcription leading to target gene activation via looping.

Dr. Poonkuzhali Balasubramanian
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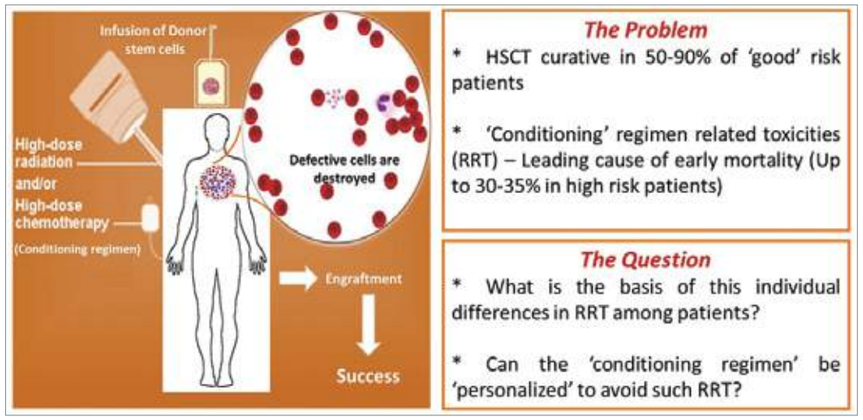
Host Institution: Christian Medical College, Vellore, India

Personalizing conditioning regimen in hematopoietic stem cell transplantation

Hematopoietic Stem Cell Transplantation (HSCT) is the only curative treatment for various hematological conditions. This procedure involves treating the patient with high dose chemo and or radiotherapy- called conditioning regimen in order to remove the defective cells and then infusion of donor stem cells, resulting in engraftment of donor stem cells in the patient and hence cure. However, HSCT is curative only in 50-90% of good risk patients. Conditioning regimen related toxicities (RRT) are the leading cause of early mortality upto 30-35% in high risk patients. In addition to age and other co-morbidities, the bioavailability of the drug if it is given orally, the transporters involved in drug influx or efflux, drug metabolism and ethnic variations in the genes encoding the enzymes and transporters are known to influence RRT. There is limited knowledge on these aspects for several drugs used in conditioning. The conditioning regimen act on the vascular endothelium and release circulating endothelial cells, resulting in serious early complications including toxicities and/or graft vs. host disease. The basis of the role of endothelial damage caused by different conditioning regimen in causing RRT among patients is not completely clear.

We propose to evaluate the dose - exposure - response relationship for the drugs used in conditioning as well as the genetic determinants responsible for this variation among individuals in order to personalize the conditioning regimen thereby avoiding RRT. We will also evaluate the damage to endothelial cells by different drugs used for conditioning in cell lines and animal models to identify targets that can reverse the damage.



Dr. Raghu Padinjat

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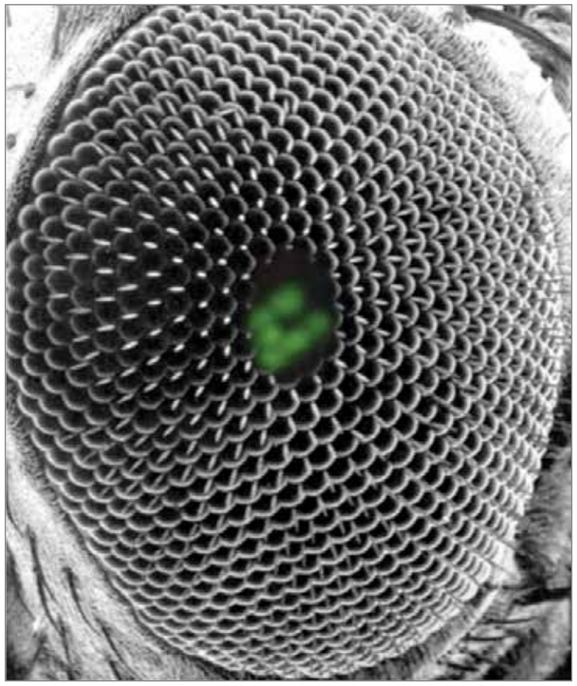
Co-ordination and control of the phosphoinositide cycle during cell signaling

My long-term scientific interest is to understand cellular communication mediated by lipid molecules generated by phosphatidylinositol metabolism. Phosphoinositide signals provide molecular control for key sub-cellular processes such as membrane remodelling, cytoskeletal function, transcription and translation. Through these processes, this signaling pathway orchestrates basic cellular behaviours such as cell division, shape changes, polarized movement and cell death and this plays a key role in a number of physiological processes including early embryogenesis, lymphocyte development and function as well as neuronal activity.

The overall goal of our work is to understand how the architecture of this signaling cascade is designed to deliver optimal physiological outputs.

Our principal model is the fruit fly *Drosophila*; the goal is to discover key principles of signal transduction that are likely to be conserved during evolution but are experimentally more tractable in *Drosophila*. It is hoped that in the medium term, our analysis in *Drosophila* will inform studies of equivalent signaling pathways in mammalian models with more immediate biomedical relevance.



Drosophila photoreceptors utilize G-protein coupled phosphatidylinositol 4,5 bisphosphate [PI(4,5)P_2] turnover to transduce the detection of light. The image depicts live imaging of plasma membrane PI(4,5)P_2 turnover from intact Drosophila eyes. We use a combination of molecular genetics, live-cell imaging and electrophysiology to study this signaling process.

Dr. Rupinder Kaur

Senior Fellow

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Post-PhD Institution:
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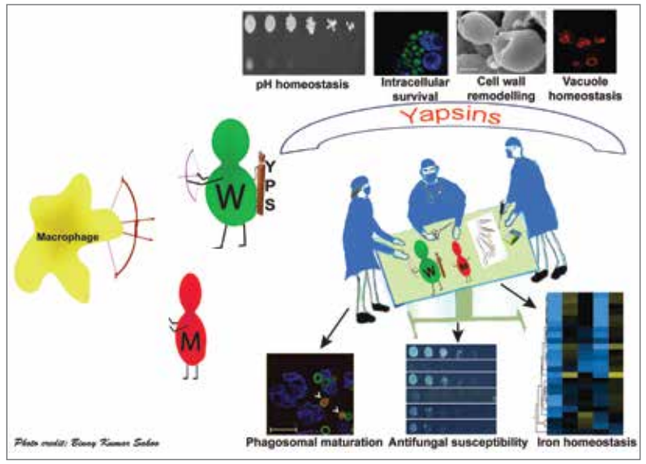
- Johns Hopkins School of Medicine, Baltimore, MD, USA

Host Institution: Centre for DNA Fingerprinting and Diagnostics, Hyderabad, India

Characterization of glycosylphosphatidylinositol-linked aspartyl proteases in *Candida glabrata* : role in pathogenicity

Candida species, benign residents of mucosal surfaces and the gut in healthy individuals, are the fourth most common blood stream pathogens. Among Candida species, prevalence of *Candida glabrata* is on the rise, and it accounts for up to 30% of Candida bloodstream infections. It is also a common etiologic agent of mucosal and urinary tract infections. Treatment of *C. glabrata* infections is particularly challenging as *C. glabrata* inherently is less susceptible to widely-used azole antifungals. Development of any new therapy requires an in-depth understanding of pathogen products that facilitate infection of host tissues. Our recent work has demonstrated a pivotal role for a family of eleven glycosylphosphatidylinositol-linked aspartyl proteases, also known *as yapsins*, in several cellular processes including pH and vacuole homeostasis, cell wall remodeling, intracellular survival and virulence in *C. glabrata*. Here, we propose to uncover the mechanisms that regulate the expression and the activity of *C. glabrata yapsins*. We will conduct a systematic analysis to identify yeast and mammalian substrates of yapsins, decipher their physiological functions, and examine environmental cue-dependent transcriptional regulation of yapsin-encoding genes in both clinical and culture model system contexts. Our work will aid fungal pathogenesis research and may identify new targets for therapeutic research.



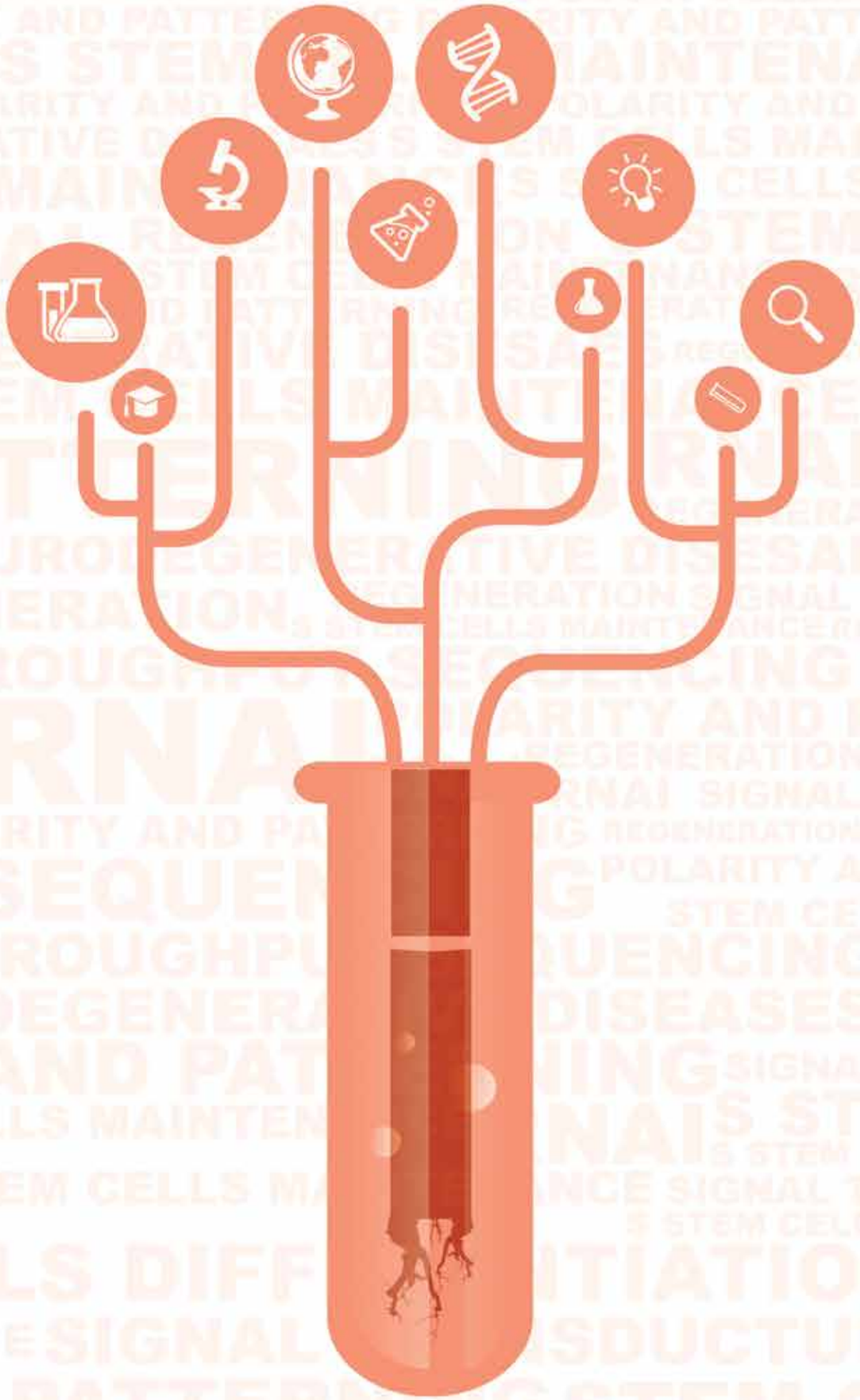
Schematic illustration summarizing our current research on physiology and pathogenesis of Candida glabrata. 'W', 'M' and 'YPS' refer to wild-type, mutant and yapsins, respectively.

INDIA ALLIANCE FELLOWS

Unlocking the secrets of biology with "Planaria" model

"Research on regenerative biology is one of the key frontiers of biomedical research. The flatworm Planaria with its unique capacity for whole body regeneration from small fragments, presence of widely distributed pluripotent somatic stem cells, and availability of molecular tools to manipulate gene expression has emerged as a powerful animal model to study regenerative biology."

- Dr Dasaradhi Palakodeti
Intermediate Fellow
inStem, Bangalore



INTERESTING RESEARCH FINDINGS

YEAST MODEL

Dr. Nishanth Koodali Thazath
Intermediate Fellow
Indian Institute of Science Education and Research, Thiruvananthapuram

Distributing crossovers among chromosomes: How to do it equitably?

A fundamental problem for meiotic cells is to ensure chromosomes of varying physical sizes receive at least one crossover each, despite considerable cellular variation in crossover frequencies per meiosis. We use high through-put genomic approaches to understand (Figure 1A) the molecular basis for variation in crossover frequencies and mechanisms that govern crossover distribution to ensure one crossover per homolog pair (crossover assurance).

The obligate crossover is not protected from variations in crossover frequency

Using hypomorph mutants of *msh4*, a key crossover control gene, we showed that experimentally induced variations in crossover frequency can cause loss of crossover assurance without compromising homolog segregation (Figure 1A). These observations suggest meiotic cells do not maintain the obligate crossover, when crossover rates fluctuate stochastically or through a mutation. Such non-exchange events occur frequently on smaller chromosomes, even in wild-type cells. The non-exchange chromosomes are efficiently segregated by mechanism's that are sensitive to the number of non-exchange chromosomes and their physical sizes.

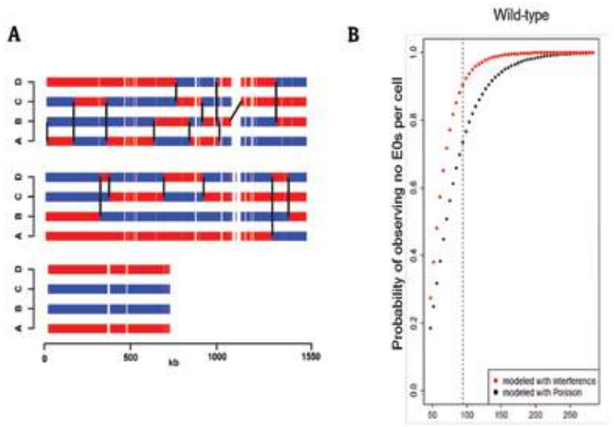
References:

1. Krishnaprasad GN .....**Nishant KT.** Variation in crossover frequencies perturb crossover assurance without affecting meiotic chromosome segregation in Saccharomyces cerevisiae. **Genetics. 2015;199:399-412.**

2. Rakshambikai R, Srinivasan N and **Nishant KT.** Structural insights into Saccharomyces cerevisiae Msh4-Msh5 complex function using homology modeling. **PLoS One. 2013;8:e78753.**

Crossover interference facilitates crossover assurance

In the absence of interference, *S. cerevisiae* would require up to ~200 crossovers per meiosis for observing no non-exchange chromosomes (Figure 1B). We are determining the mechanism of crossover formation through the MSH4-MSH5/MLH1-MLH3 complex and the molecular basis for interference, which regulates spatial crossover patterning.



A) Representative meiotic crossover map for wild type (11 crossovers) and msh4 hypomorph (6 crossovers) for S. cerevisiae chromosome IV. *A non-exchange chromosome X observed in the msh4 hypomorph is also shown. Segregation profile of SNPs within the four spores comprising the tetrad are shown in blue and red colors respectively.*

B) Probability of observing no EOs (fraction of chromosomes with zero crossover) for a cell, given an average number of total crossovers per cell. *Crossover distribution is modelled in the presence (red dots) and absence of interference (black dots) using the experimentally determined average crossover counts per chromosome. Adapted from Krishnaprasad et al., Genetics, 2015.*

HYDRA AND DROSOPHILA MODEL

Dr. Girish Ratnaparkhi
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Indian Institute of Science Education and Research, Pune

Universal mechanisms in animal development

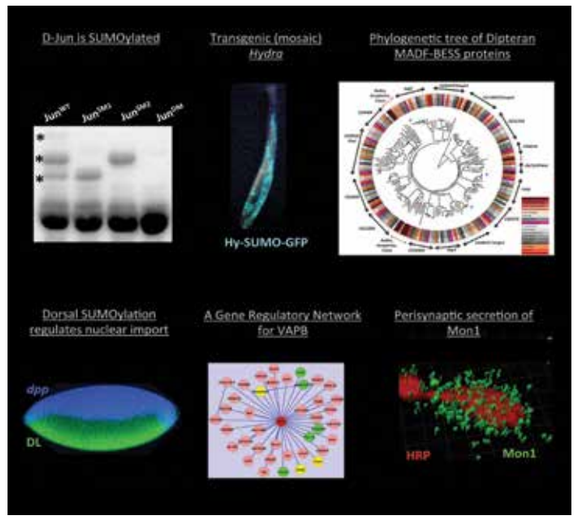
Animals as different as humans, worms and flies use remarkably similar molecular mechanisms to control their development[1]. We utilize *Drosophila melanogaster* and *Hydra magnipapillata* as model organisms to study common molecular principles underlying animal development and disease.

SUMO is a post-translational modifier that conjugates to substrate proteins and modifies their properties and activity. Proteins modified with SUMO can be discovered using MS based proteomics. We have generated animal transgenics with tagged SUMO in both *Hydra*[2] and *Drosophila*, to identify SUMOylated species and to study roles for SUMO in stress, immunity and regeneration.

Using *Drosophila* cells in culture we have identified a list of proteins that change their SUMOylation status in response to immune stress[3]. Novel SUMO targets have been identified and validated. SUMOylated proteins are found in immune signaling pathways and in large protein complexes such as the multi acetyl tRNA synthetase, proteasome and splicing complexes.

In collaboration with Dr. Anuradha Ratnaparkhi, we study human disease models for motor neuron degeneration. We show that TOR signaling, a key metabolic pathway, is upregulated in ALS8[4]. Mon1, a regulator of Rab7- which is involved in CMT neuropathy, was found to be secreted from neurons and regulate glutamate receptor levels[5].

We also find that the sixteen-member MADF-BESS family of transcription factors sub-functionalize, over 40 million years of evolution, post gene duplication and expansion[6]. The sixteen members have distinct expression patterns, and seemingly independent roles in regulating animal development[6].



References:

1. **GS Ratnaparkhi** & AJ Courey. Cascades, gradients and gene-networks in dorsoventral patterning in Principles of Developmental Genetics. Editor Sally Moody. **Elsevier Publishing. 2014.**

2. U Khan..... **GS Ratnaparkhi.** The SUMO Cycle in Hydra. Genesis: **Journal of Genetics & Development. 2013;51:619-29.**

3. M Handu....**GS Ratnaparkhi.** SUMO enriched proteome for the *Drosophila* innate immune response. **G3:Genes, Genomes & Genetics. 2015. In press.**

4. D Senthilkumar.....**GS Ratnaparkhi.** A genetic screen identifies Tor as an interactor of VAPB in a *Drosophila* model of Amyotrophic Lateral Sclerosis. **Biol. Open. 2014; 3:1127-38.**

5. A Basargekar..... **GS Ratnaparkhi**, A Ratnaparkhi. A pre-synaptic regulatory system acts trans-synaptically via Mon1 to regulate glutamate receptor levels in *Drosophila*. **Genetics. 2015. In Press.**

6. VS Shukla.....**GS Ratnaparkhi.** Gene duplication, lineage-specific expansion, and sub-functionalization in the MADF-BESS family pattern's the *Drosophila* wing hinge. **Genetics. 2014;196: 481-96.**

Dr. Lolitika Mandal
Intermediate Fellow
Indian Institute of Science Education and Research, Mohali

A newer perspective to *Drosophila* hematopoiesis

We are engaged in unraveling molecular signals required for specification and maintenance of hematopoietic niche, HSCs and blood progenitors using *Drosophila* as a model system.

Identification of active hematopoietic sites in adult fly that resembles vertebrate bone marrow

Site for Active hematopoiesis was believed to be present only in fly embryo and larvae. We however could demonstrate that active sites of blood cell formation do exist in adult fly. These hemocyte clusters present in the abdominal region of the fly and are in close association with the heart. In addition to blood cell development, these active haematopoietic sites/hubs are capable of responding to bacterial challenges. Our work has also revealed that these active hubs harbour bi-potent and biased progenitors, and differentiated haemocytes, embedded in a functional network of Laminin A and Pericardin, that is similar to vertebrate bone marrow.

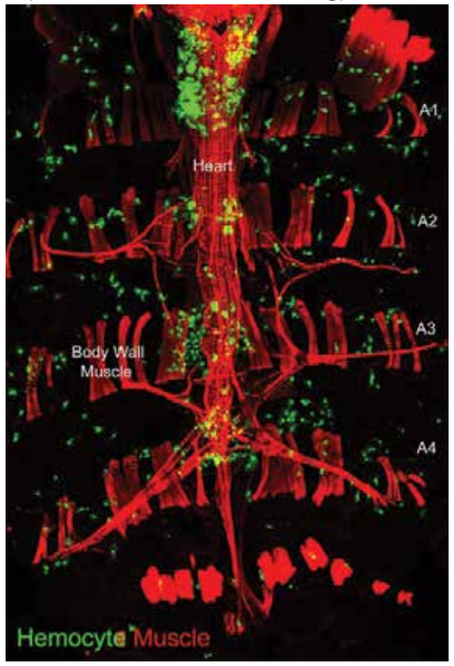
Given the fact that the vertebrate bone marrow is not easily accessible, we believe that our finding will establish *Drosophila* adult haematopoiesis as a simpler, yet genetically testable, model to answer questions related to blood stem cells, hemocyte migration, immunity, wound healing, and senescence.

Reference:

Ghosh S, Singh A, Mandal S and **Mandal L.** Active Hematopoietic Hubs in Drosophila Adults generate hemocytes and contribute to immune response. **Developmental Cell.** 2015;26:33:4:478-88.

Identification of the hematopoietic stem cells in the larval hematopoetic organ of *Drosophila*

Although there was no evidence of Hematopoietic stem cells (HSCs) in *Drosophila*, the larval hematopoietic organ-lymph gland with its hemocyte progenitors, differentiating hemocytes and a niche has been an established invertebrate model of progenitor biology. Using molecular markers and lineage tracing analysis, we have now identified the elusive HSCs in the first instar larval lymph gland. Our study demonstrates that the multipotent progenitors arise from the asymmetric division of these founder cells. We have also identified Dpp (Decapentapelagic) signaling as the maintenance cue for these newly identified HSCs. With the identification of the HSCs in *Drosophila* lymph gland, this invertebrate model can now be exploited to answer questions related to HSC biology. (*Man. submitted*).



Hematopoietic Hub in Adult Fruit fly ***Hemocyte***

Dr. Mahendra Sonawane
Senior Fellow
Tata Institute of Fundamental Research, Mumbai

Building an epithelial barrier: how to control cell size and shape?

During morphogenesis, tissues are built from the cells that acquire particular fates. The cellular features such as size, shape and polarity play a crucial role in morphogenesis. We investigate how these features are acquired and maintained in developing zebrafish epidermis.

In our recent publications, we have uncovered mechanisms that regulate cell size and cell shape during epidermal morphogenesis.

Plasma membrane homeostasis in cell size regulation and epidermal homeostasis

Using mutations in *myosin Vb*, a gene that encodes for an actin based molecular motor, we have shown that the plasma membrane homeostasis is important for the maintenance of cell size and tissue homeostasis in the developing epidermis. Recently, we have uncovered that any genetic condition or reagent, that affects plasma membrane homeostasis and cell-size, has an effect on cell-proliferation. We have been able to show that the increased endocytosis, which leads to decrease in cell size, results in increased proliferation. On the other hand, decrease in endocytosis leads to increase in cell size and decrease in cell-proliferation.

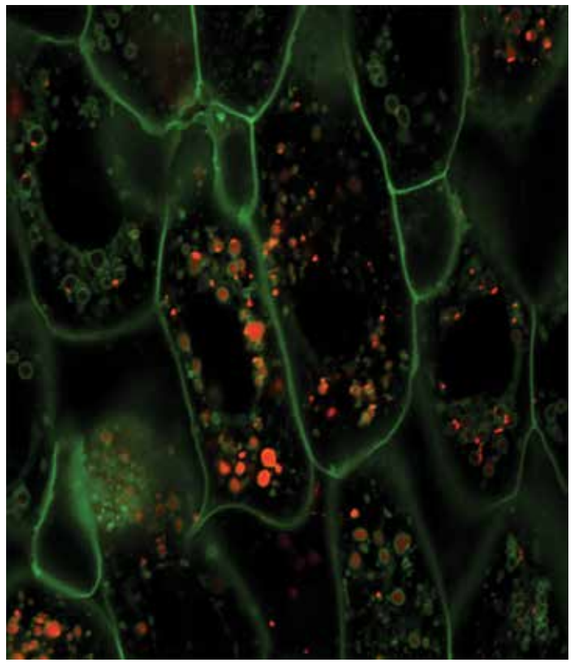
Wnt signaling in patterning of the median fin-fold epithelium

In this study, we have shown that the Wnt signaling regulates synthesis of laminins, the extra cellular matrix components, to establish an epithelial pattern in the median fin-fold, which is an evolutionarily ancient unpaired appendage formed of the epidermis. We further show that this mechanism is conserved in pectoral fins that are evolutionarily recent appendages homologous to tetrapod limbs. We are now investigating whether the crosstalk between Wnt and BMP signaling is important in patterning the fin fold epithelium.

References:

1) Nagendran M...**Sonawane M.** Canonical Wnt signaling regulates epithelial patterning by modulating levels of laminins in zebrafish appendages. **Development.** 2015;142(2):320-330.

2) Sonal.....**Sonawane M.** Myosin Vb mediated plasma membrane homeostasis regulates peridermal cell size and maintains tissue homeostasis in the zebrafish epidermis. **PLoS Genet.** 2014;10(9):e1004614.



Dextran uptake by epidermal cells in the goosepimples/myosin Vb mutant.

MOUSE MODEL

Dr. Chittur Srikanth
Intermediate Fellow

Regional Centre of Biotechnology, Gurgaon

Understanding the mechanisms of infectious and idiopathic inflammation of the gut

We aim to understand the molecular mechanisms that shape infection, inflammation and auto-immune disorders of the gut.

Salmonella-host SUMO wrestling: a novel mechanism involving miRNAs in intracellular pathogen survival

Pathogens have evolved sophisticated strategies to subvert host defence mechanisms to cause successful infection. Several reports suggest post-translational modification (PTM) pathways of the host are desirable targets that enable the pathogen to achieve instantaneous control over host function[1-3]. Our recent report, demonstrates modulation by intestinal pathogen *Salmonella enterica* serovar Typhimurium (ST) of host SUMOylation, a PTM pathway central to all fundamental processes of a cell[4]. Both in cell culture and in mouse model, ST infection led to a dynamic SUMOylome alteration. The observed phenomenon also coexisted with a decrease in crucial SUMO pathway enzymes, Ubc9 and Pias1, at protein and RNA levels. The Intracellular survival of ST was subject to host cell SUMO status as revealed by lower bacteria in SUMO upregulated cells. The depletion of PIAS1 and Ubc9 depended on small non-coding RNA MiR30C and Mir30e which was upregulated during ST infection. The presence of the miRNAs were necessary and sufficient for **(a)** depletion of the SUMO pathway enzymes and **(b)** successful infection by ST. Thus, we demonstrate a novel mechanism of pathogen mediated perturbation of host SUMOylation, an integral mechanism underlying infection and intracellular survival[4].

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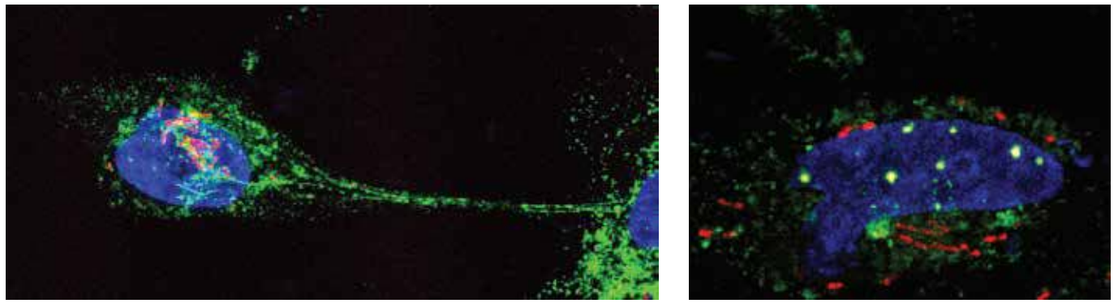

Likes and dislikes of Salmonella

(A) ST (stained red) modulates host SUMO machinery to form Salmonella induced filaments or Sifs (stained green) that is needed for its intracellular stability and positioning close to nucleus (stained blue – DAPI).

(b) In cells with high SUMOylome (stained yellow) as shown in (B) ST is unable to induce Sif formation and its survival is compromised.

PRIMATE MODEL

Dr. Arun Sripati
Intermediate Fellow

Indian Institute of Science, Bangalore

If we can make computers play chess, why can't we make them see?

Our visual abilities remain unsurpassed because our brain uses a sophisticated code to represent objects. Understanding this code can lead to improved computer vision algorithms and also help us understand complex disorders of vision in humans.

My research over the last five years has uncovered many important properties of the code used by the brain for object recognition. We have shown that this object code develops dynamically in the neural response to encode emergent properties such as view invariance (Murty & Arun 2015) and coding of relative size (Vighneshvel & Arun, 2015). It can explain many aspects of both shape (Sripati & Olson, 2010) and texture perception (Zhivago & Arun, 2014). This code can also explain complex phenomena such as rapid visual categorization (Mohan & Arun, 2012) and real-life visual search (Vighneshvel & Arun, 2013). This final object representation also operates according to simple linear rules as we have shown in monkey IT neurons (Sripati and Olson, 2010b) and in human visual search (Arun, 2012; Vighneshvel & Arun, 2013; Pramod & Arun, 2014; Pramod & Arun, 2015). Taken together, our findings place important constraints on computational models of object recognition.

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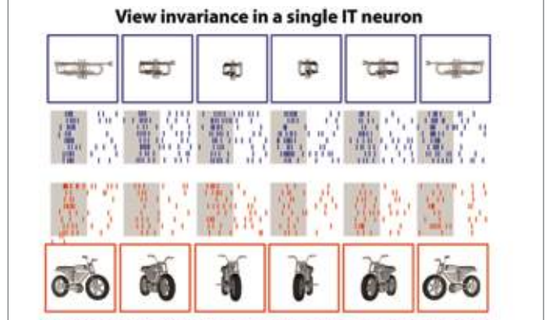
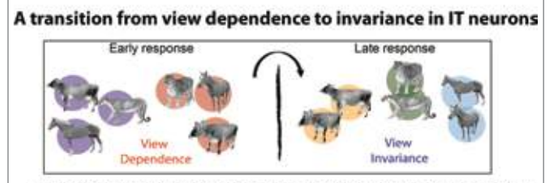


Responses of a single IT neuron to a trumpet and a motorbike at multiple views. Each row is a trial, and ticks represent times of spikes evoked in the neuron (Murty & Arun, 2015).



During the early part of the response, IT neurons distinguish strongly between views of an object, and only later respond similarly to many views of the same object (Murty & Arun, 2015).

CEL CULTURE MODEL

Dr. Subbareddy Maddika

Intermediate Fellow

Centre for DNA Fingerprinting and Diagnostics, Hyderabad

Dissecting cellular phosphatase biology using proteomics

Phosphatases are a group of ubiquitously expressing enzymes, which control nearly every cellular process. We aim to systematically identify and functionally characterize the network of interacting proteins of all the available phosphatases in regulation of cellular processes.

By using tandem affinity purification approach followed by LC-MS/MS analysis we identified the associated protein complexes of 144 phosphatases and developed a highly complex network of phosphatase interactome built on 6597 high confident interactions. We validated several of these novel interactions in cells and some of the functionally significant interactions identified in this work so far are shown in the given image.

We have identified the protein phosphatase-1 nuclear targeting subunit PNUTS (PPP1R10) as a new PTEN-associated protein that acts as a potential oncogene by negatively regulating PTEN tumor suppressor function[1]

On the other hand, we found that a mitotic kinase TOPK inactivates PTEN by phosphorylating S380 residue specifically, which leads to activation of Akt that is required for proper mitotic progression[2]

In addition, we identified WDR48-USP12 as a deubiquitinating complex, which is required for maintaining the stability of PHLPP1, a tumor suppressor phosphatase in cells. Importantly, we found a WDR48 somatic mutation (L580F) that is defective in stabilizing PHLPP1 in colorectal cancers, supporting WDR48 role in PHLPP1 mediated tumor suppression[3]

Also, we recently identified phosphatase PPM1G as a functional switch that controls the balance between monomeric WWP2 (an E3 ligase) and a WWP2/WWP1 heterodimeric state in the cell, which is critical for controlling p73 mediated cellular apoptosis[4]

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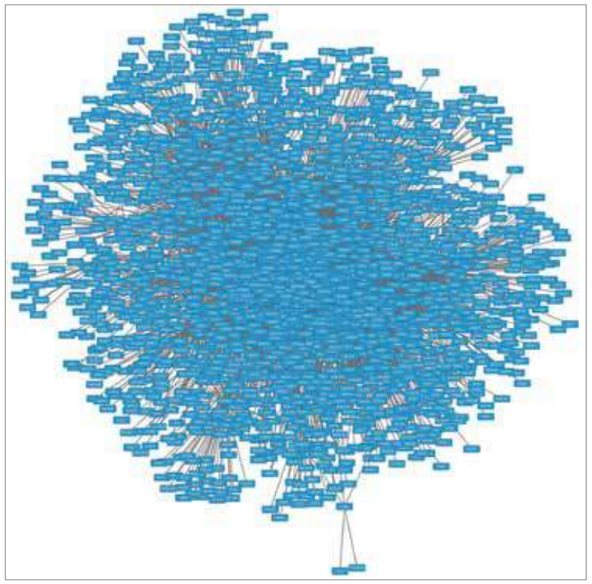

Network of phosphatase interactome

WORK WITH CANCER PATIENTS

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Distinct profile of *EGFR* and *KRAS* alterations and their clinical outcome in Indian Lung Cancer patients

We published the first report from India detailing an intermediate frequency (compared to Caucasians and East Asians) of 23% *EGFR* mutations in a study involving 907 Indian NSCLC patients [1, 2]. In another study at our Centre we showed 74% response rate to oral tyrosine kinase inhibitor (TKI) among Indian NSCLC patients harboring activating mutation of *EGFR* emphasizing its importance as predictive marker for response to oral TKI [3]. More recently, we performed directed sequencing of KRAS in 86 NSCLC patients to an overall mutation rate of 18.6% *KRAS* mutations among Indian NSCLC patients. This study describes that patients harboring KRAS mutations are unlikely to respond to TKI, unless it co-occurs with EGFR alterations[4].

The HPV Detector: A novel NGS-based tool to determine the presence of HPV and their sites of integration in Human Cancer Genome

We present a novel freely distributable computational tool "HPVDetector" (through a weblink download--with more than 30 current users world wide-- http://www.actrec.gov.in/pi-webpages/AmitDutt/HPVdetector/HPVDetector.html.) to detect all known HPV types along with their sites of integration in the host genome using next generation sequencing data set, along with a widely compatible annotated reference of 143 HPV genome as a resource[5]. This user-friendly tool has been designed for researchers who have limited computational expertise using graphical user interface (GUI) that requires minimal third party tools. Using HPVDetector, one can analyze paired end whole exome, whole genome or whole transcriptome dataset.

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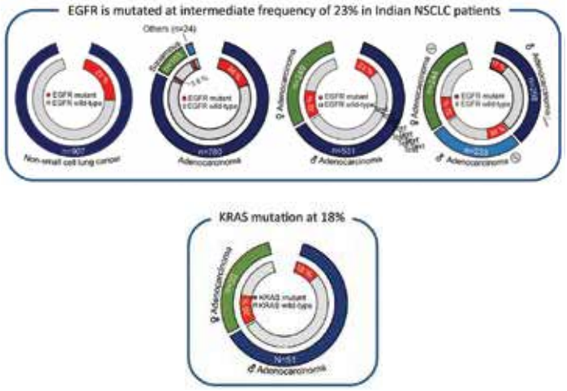

EGFR (exon 18-21) and KRAS mutation status among NSCLC patients India. EGFR and KRAS mutation status across all NSCLC samples is shown. Red segment in the inner circle indicate patients harboring mutation, the segment in grey indicates patients with wild type status. The segment in blue and green (outer circle) represents lung cancer patients with tumors histology other than adeno or squamous carcinoma.

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Bangalore

Membrane fusion regulators during organelle maturation

Melanosomes are a class of lysosome-related organelles (LROs),originate from endocytic system, which co-exist with conventional lysosomes. These organelles were produced by specialized cells called melanocytes and they play a key role in skin color and photoprotection against ionizing radiation. Melanosome biogenesis requires efficient delivery of melanin-synthesizing enzymes from recycling endosomes to pre-melanosomes.

This process is defective in Hermansky-Pudlak syndrome patients, due to the mutations in certain subunits of cytosolic protein machinery called biogenesis of LROs complex (BLOC) -1, -2 and -3. However, the function of these complexes in LRO biogenesis is only partially known. Moreover, the SNARE proteins underlie in mediating these membrane fusion events is unknown.

BLOC - 2 targets recycling endosomes to maturing melanosomes

Our studies using mouse melanocytes show that melanosome cargo containing recycling tubular structures make fewer and more transient contact with melanosomes in melanocytes deficient for BLOC-2 compared to wild type cells. Furthermore, mutations in any of the three subunits of BLOC-2 mistarget the recycling endosomes to multiple organelles and a subset to hypopigmented melanosomes.

These results support a model in which BLOC-2 acts as a tether in directing the recycling endosomes to maturing melanosomes.

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Melanosomal cargoes BLOC'd off from alternate routes. J. Cell Biol. biosights: June 8, 2015

STX13 - VAMP7 together control the cargo delivery to pre-melanosomes

Our shRNA mediated SNARE-depletion studies in wild type melanocytes show that STX13, a recycling endosomal Qa-SNARE, regulates the cargo delivery to maturing melanosomes. In addition, mutations in the N-terminal regulatory Habc domain of STX13 increased the SNARE activity, and redistributed it to melanosomes, suggesting a role for Habc domain in recycling the SNARE to endosomes. Importantly, we also found that the VAMP7, an R-SNARE localized to melanosomes, control the trafficking of STX13 and its dependent transport steps.These findings support a model in which STX13-VAMP7 together regulate the cargo delivery to melanosome during its biogenesis.

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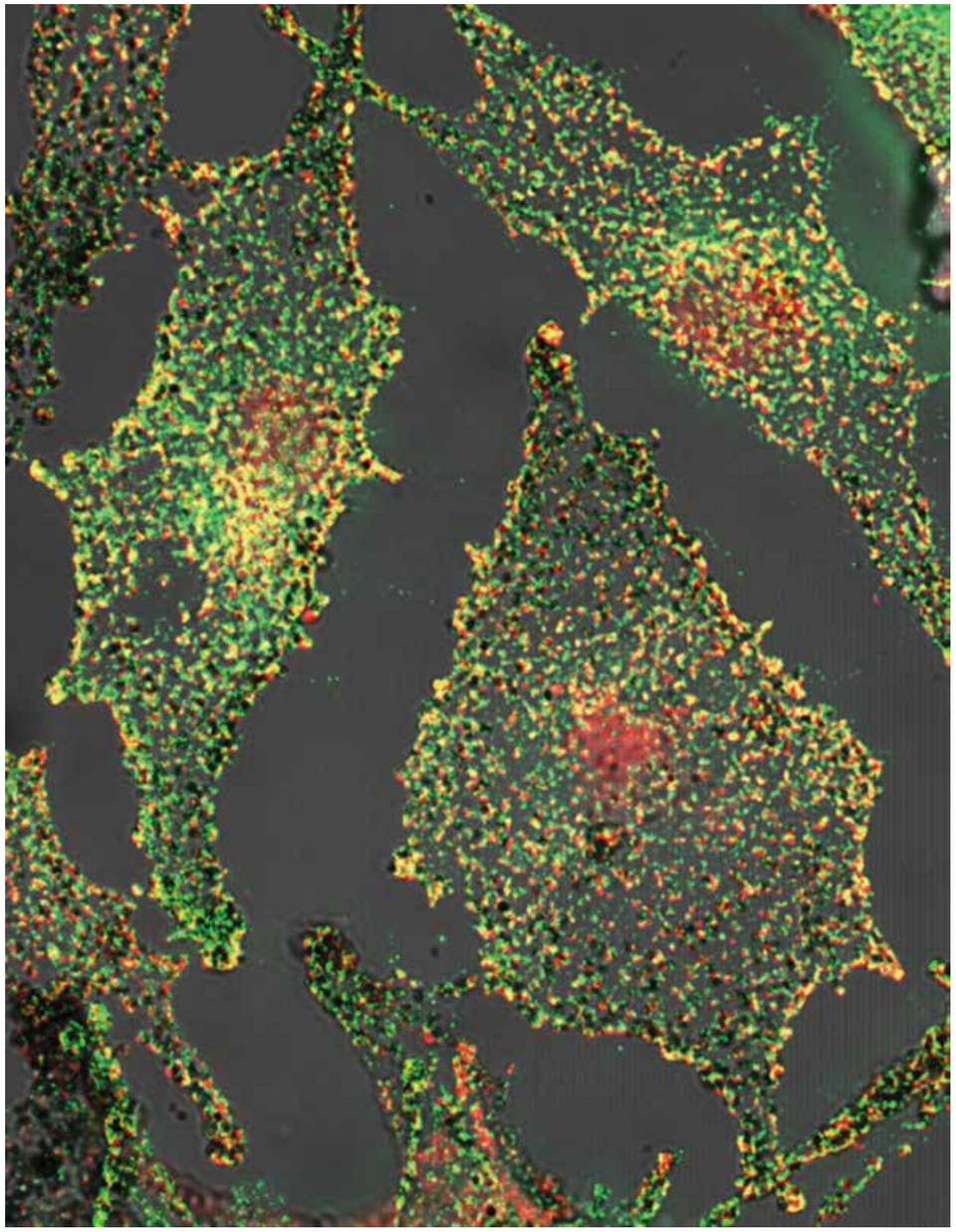
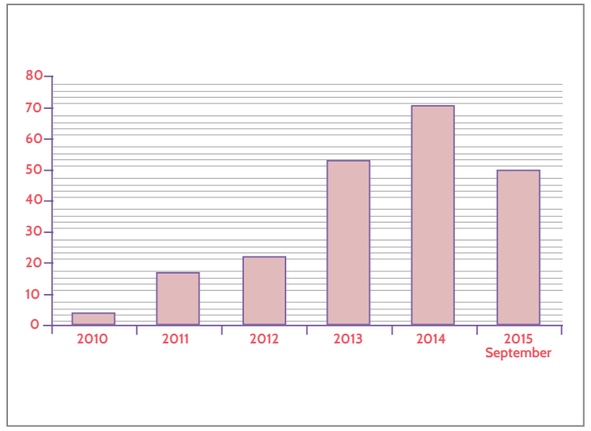
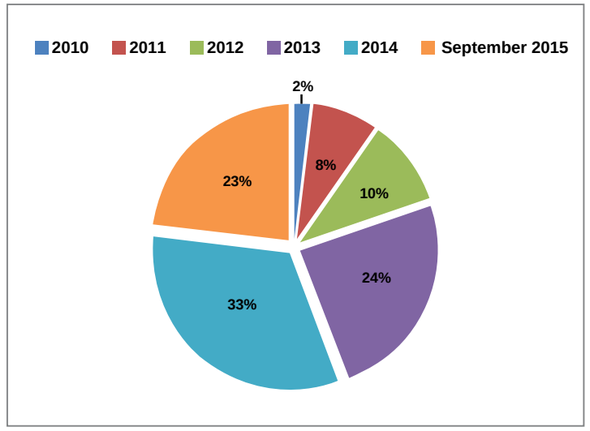


Merged bright field and immunofluorescence microscopy image of wild type mouse melanocytes expressing Habc domain deleted STX13, a recycling endosomal Qa-SNARE mislocalized to melanosomes. Green, Myc-STX13 (D129); red, a melanosomal resident protein TYRP1 and black granules, melanosomes captured by bright field microscopy.

J. Cell Sci., Vol. 128, Issue 17, "Cover page"

Trend of publications between 2010 -2015





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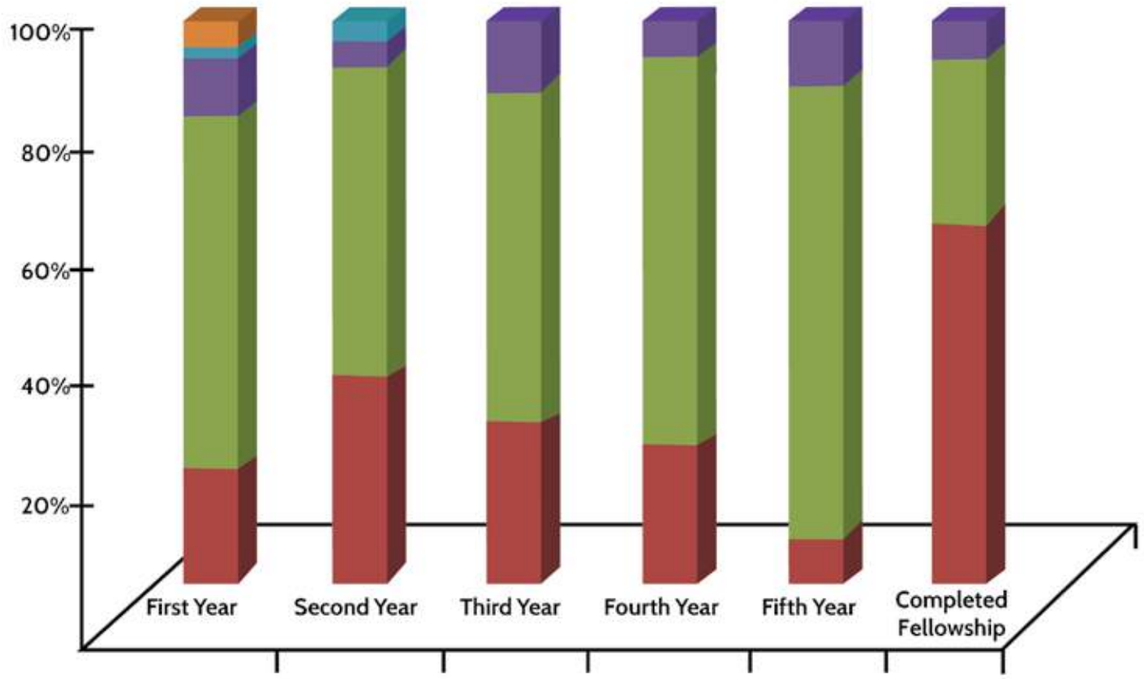
Distribution of Fellows at different stages of the Fellowship cycle



LIST OF INDIA ALLIANCE FELLOWS

recommended for an award upto September 2015

Margdarshi Fellows

Name	Host Institution	Area of Interest
	2014	
Anura V Kurpad	St. John's Medical College and Hospital, Bangalore	Public Health/Nutrition
	2012	
Vaskar Saha	TMC, Kolkata	Molecular Medicine

Senior Fellows

Name	Host Institution	Area of Interest
Rupinder Kaur	CDFD, Hyderabad	Mycology/Genetics/ Cell Biology
Poonkuzhali Balasubramanian	CMC, Vellore	Pharmacology/Genetics/ Clinical Research

Intermediate Fellows

Name	Host Institution	Area of Interest
Sabyasachi Rakshit	IISER Mohali, Mohali	Biophysics
Gulam Syed	ILS, Bhubaneswar	Virology/Molecular Biology
Sandeepa Eswarappa	IISc, Bangalore	Angiogenesis/Molecular Biology
Smarajit Polley	Bose Institute, Kolkata	Structural Biology/ Biochemistry
Kalyaneswar Mandal	IICB, Kolkata	Parasitology/Drug Development
Athi Narayanan Naganathan	IIT Madras, Chennai	Bioengineering/ Computational-Modelling

Early Career Fellows

Name	Host Institution	Area of Interest
Laasya Samhita	NCBS, Bangalore	Molecular Biology/Evolution
Reety Arora	NCBS, Bangalore	Molecular Biology/Virology /Cell Biology
Neeraj Kumar	IIT, Gandhinagar	Neuroscience (Perception)
Md. Zahid Kamal	NCCS, Pune	Structural Biology/ Biochemistry
Madhu Khatri	UIET- Panjab Univ, Chandigarh	Toxicology/Nanotechnology
Lakshmi Revathy Perumalsamy	IIT, Madras	Molecular Biology/ Cell Biology
	2014	

Clinical and Public Heath Researchers

Senior Fellow

Name	Host Institution	Area of Interest
Anurag Agrawal	IGIB, Delhi	Epidemiology/Physiology

Intermediate Fellows

Name	Host Institution	Area of Interest
Jeemon Panniyammakal	PHFI, New Delhi	Epidemiology/Public Health
Yogeshwar Kalkonde	SEARCH, Gadchiroli	Epidemiology/Health Service Research/Neurology
Giridhara R Babu	PHFI, IIPH-Hyderabad, Bangalore campus	Epidemiology
Nikhil Patkar	TMC, Mumbai	Clinical Research/ Molecular Haematology

Early Career Fellows

Name	Host Institution	Area of Interest
Tavpritesh Sethi	AIIMS, New Delhi	Bioinformatics/Mathematical Modelling/Sepsis
Suceena Alexander	CMC, Vellore	Nephrology/Immunology
Shweta Khandelwal	PHFI, New Delhi	Nutrition/Neurodevelopment
Srinivas Marmamula	LVPEI, Hyderabad	Opthalmology/Health service research/Epidemiology

Research Training Fellows

Name	Host Institution	Area of Interest
Bharath Holla	NIMHANS, Bangalore	Neurosciences (Cognition/ Neuroimaging)
Muralidhara Nagarjuna	Mazumdar Shaw Center for Translational Research, Bangalore	Tissue Engineeering/ Stem Cells
Sivaranjani Gali	M S Ramaiah University of Applied Sciences, Bangalore	Prosthodontics/ Material Science
Maria Frances Bukelo	St. John's Medical College Hospital, Bangalore	Hirschsprung's disease/ Genomics
Sanjay Chilbule	CMC, Vellore	Osteosarcoma/Stem Cells
Rasmi Ranjan Sahoo (Declined)	ILS, Bhubaneswar	Systemic Lupus Erythematosus/Genomics

Basic Researchers

Senior Fellows

Name	Host Institution	Area of Interest
Narendra Dixit	IISc, Bangalore	Bioinformatics
Raghu Padinjat	NCBS, Bangalore	Signaling/Membrane Transport

Intermediate Fellows

Name	Host Institution	Area of Interest
Amartya Sanyal (Declined)	CCMB, Hyderabad	Bioinformatics
Arun Shukla	IIT, Kanpur	Structural Biology
Debabrata Biswas	IICB, Kolkata	Molecular Biology
Guruprasad Medigeshi	THSTI, Gurgaon	Virology
Mithilesh Mishra	TIFR, Mumbai	Cell Biology
Nixon Abraham	IISER, Pune	Neuroscience
Paras Anand (Declined)	CCMB, Hyderabad	Immunology
R Mahalakshmi	IISER, Bhopal	Biophysics
Rajat Varma	TIFR, Hyderabad	Immunology
Samsiddhi Bhattacharjee	NIBMG, Kalyani	Biostatistics
Sunil Chauhan (Declined)	LVPEI, Hyderabad	Mesenchymal Stem Cells/ regenerative biology
Monika Vig	TIFR, Hyderabad	Cell Biology/Structural Biology
Sunil Laxman	inStem, Bangalore	Metabolism/Biochemistry/ Molecular Biology
Minhaj Sirajuddin	inStem, Bangalore	Structural Biology/ Biochemistry/Biophysics
Dimple Notani	NCBS, Bangalore	Molecular Biology
Abhik Saha	Presidency University, Kolkata	Virology/Molecular Biology
Jeet Kalia	IISER Pune, Pune	Membrane Protein Biochemistry/Electrophysiology/ Chemistry
Amit Tuli	IMTECH, Chandigarh	Microbiology/Cell Biology
Arati Ramesh	NCBS, Bangalore	Structural Biology/ Biochemistry/Molecular Biology
Dhirendra Simanshu	NCBS, Bangalore	Structural Biology

Early Career Fellows

Name	Host Institution	Area of Interest
Aneesh Tazhe Veetil (Terminated)	NCBS, Bangalore	Bioengineering
Anjali Bajpai	IIT, Kanpur	Molecular Biology
Jafar Hasan	IISc, Bangalore	Bioengineering
Pushpa Kumari	RCB, Gurgaon	Biochemistry

Sneha Shah	TIFR, Mumbai	Neuroscience
Subhasri Ghosh	inStem, Bangalore	Stem Cell Biology
Sukdeb Pal (Declined)	inStem, Bangalore	Biophysics
Thomas van Zanten (Declined)	NCBS, Bangalore	Biophysics
Ujjwal Neogi (Declined)	St John's Medical College and Hospital, Bangalore	Bioinformatics/Virology
Yogesh Dahiya	IISER, Mohali	Neuroscience

2013

Clinical and Public Heath Researchers

Senior Fellow

Name	Host Institution	Area of Interest
Anita Shet	St John's Medical College and Hospital, Bangalore	Pediatrics/Public Health/ Virology

Intermediate Fellows

Name	Host Institution	Area of Interest
Pallab Kumar Maulik	George Insitute for Global Health India, Hyderabad	Public Health
Sucharita Sambashivaiah	St Johns Medical College and Hospital, Bangalore	Endocrinology/ Physiology/ Public Health

Early Career Fellows

Name	Host Institution	Area of Interest
Bhanu Duggal	Grant Medical College & Sir JJ Group of of Hospitals, Mumbai	Molecular Biology
Urvakhsh Mehta	NIMHANS, Bangalore	Neuroimaging/Neuroscience

Basic Researchers

Senior Fellow

Name	Host Institution	Area of Interest
Arvind Kumar (Declined)	ICTS, Bangalore	Computational Biology

Intermediate Fellows

Name	Host Institution	Area of Interest
Amitabha Majumdar	NBRC, Manesar/ NCCS, Pune	Neuroscience/Cell Biology
Anindya Ghosh Roy	NBRC, Manesar	Neurogenetics/Cell Biology
Benu Brata Das	IACS, Kolkata	Molecular Biology
Bidisha Sinha	IISER, Kolkata	Biophysics
Dipayan Rudra (Declined)	CCMB, Hyderabad	Immunology
Janesh Kumar	NCCS, Pune	Structural Biology
Kunal Rai (Declined)	ACTREC, Mumbai	Oncology/Molecular Biology
Pradyumna Singh (Declined)	IISc, Bangalore	Bio-engineering
Rahul Roy	IISc, Bangalore	Bio-engineering
Sachin Deshmukh	IISc, Bangalore	Neuroscience (cognition)
Sam Mathew	RCB, Gurgaon	Developmental Biology
Sandeep Singh	NIBMG, Kalyani	Stem Cell Biology
Shantanu Jadhav (Declined)	NCBS, Bangalore	Neuroscience
Sreelaja Nair	TIFR, Mumbai	Cellular Development Biology
Supriya Ray	University of Allahabad, Allahabad	Neuroscience
Varsha Singh	IISc, Bangalore	Neuroscience

Early Career Fellows

Name	Host Institution	Area of Interest
Debarati Mukherjee (Terminated)	NCBS, Bangalore	Neuroscience
Mallika Chatterjee	TIFR, Mumbai	Neuroscience
Megha	NCBS, Bangalore	Cell Biology
Padmavathy Bakthavathsalam	IMTECH, Chandigarh	Bio-engineering
Rajiv Sarkar	CMC, Vellore	Public Health
Shital Sarah Ahaley	IISER, Pune	Molecular Biology

2012

Senior Fellows

Name	Host Institution	Area of Interest
Mallur Srivatsan Madhusudhan	IISER, Pune	Computational Biology
Arun Shet	St. John's Medical College and Hospital, Bangalore	Public Health

Intermediate Fellows

Name	Host Institution	Area of Interest
Amit Awasthi	THSTI, Gurgaon	Immunology
Bushra Ateeq	IIT, Kanpur	Oncology/Molecular Biology
Deepa Subramanyam	NCCS, Pune	Stem Cells

Farah Ishtiaq	IISc, Bangalore	Epidemiology/Parasite Biology (Molecular Biology)
Kavita Babu	IISER, Mohali	Neurobiology
Mahak Sharma	IISER, Mohali	Cell Biology
Nitin Patel (Terminated)	PGIMER, Chandigarh	Molecular Biology
Purusharth Rajyaguru	IISc, Bangalore	Molecular Biology
Rajesh Ramachandran	IISER, Mohali	Retinal Stem Cells
Rakesh Singh Laishram	RGCB, Thiruvananthapuram	Molecular Biology / Biochemistry
Saibal Chatterjee	IISc, Bangalore	Molecular Biology
Suhita Nadkarni	IISER, Pune	Alzheimer's Pathogenesis/ Computational Biology
Venu Gopala Reddy Bommireddy Venkata (Terminated)	ACTREC, Mumbai	Neurobiology

Early Career Fellows

Name	Host Institution	Area of Interest
Abhijit Majumder	inStem, Bangalore/ IIT, Bombay	Stem Cells
Anil Kumar Pasupulati (Declined)	Osmania University, Hyderabad	Diabetic Nephropathy / Biochemistry
Ashwin Kelkar	IISER, Pune	Chromosome Biology
Daniel Weatherill	NCBS, Bangalore	Neurobiology
Geeta Godbole	TIFR, Mumbai	Neurobiology
Murali Krishna	CSI Holdsworth Memorial Hospital, Mysore	Psychiatry/Epidemiology
Praveen Balabaskaran Nina (Declined)	NII, New Delhi	Malaria biology/ Molecular biology
Priyanka Rai	TIFR, Mumbai	Lipid Metabolism/ Biochemistry
Sujoy Mukherjee (Declined)	IICB, Kolkata	NMR, Biophysics

2011

Senior Fellows

Name	Host Institution	Area of Interest
Nagaraj Balasubramanian	IISER, Pune	Cell Biology/Cancer Biology
Ramanuj Das Gupta (Withdrawn)	NCBS, Bangalore	Developmental Genetics/ Cancer Biology
Roop Mallik	TIFR, Mumbai	Biophysics
Venkatasubramanian Ganesan	NIMHANS, Bangalore	Neuroscience (Neurobiology and Neuroimaging)
Vikram Mathews	CMC, Vellore	Cell biology/Leukemia

Intermediate Fellows

Name	Host Institution	Area of Interest
Ajit Bikram Datta	Bose Institute, Kolkata	Structural Biology
Alena Srinivasan	ICGEB, New Delhi	Immunology
Amit Dutt	ACTREC, Mumbai	Cancer Genomics
Antony Merlin Jose (Declined)	inStem, Bangalore	Molecular Biology/ Epigenetics
Chittur Srikanth	RCB, Gurgaon	Microbial Immunology
Collins Assisi	IISER, Pune	Computational Neurobiology
Matloob Husain (Withdrawn)	ICGEB, New Delhi	Virology (Virus-Cell Interactions)
Nishant Koodali Thazath	IISER, Thiruvananthapuram	Yeast Genetics
Rupjyoti Talukdar	AIG, Hyderabad	Cell Biology/Pancreatitis
Sharba Bandyopadhyay	NBRC, Manesar/IIT, Kharagpur	Neuroscience
Sheetal Gandotra	IGIB, New Delhi	Respiratory Disease Biology
Shravanti Rampalli-Deshpande	inStem, Bangalore	Epigenetics/Stem Cell biology
Subba Reddy Maddika	CDFD, Hyderabad	Cell Signaling/Proteomics

Early Career Fellows

Name	Host Institution	Area of Interest
Bhavana Muralidharan	TIFR, Mumbai	Developmental Neurobiology
Biswa Sengupta (Terminated)	IISc, Bangalore	Computational Biology
Joe Varghese	CMC, Vellore	Biochemistry
Leelavati Narlikar	NCL, Pune	Epigenetics
Sathya Srinivasachari	inStem, Bangalore	Structural Biology

2010

Senior Fellows

Name	Host Institution	Area of Interest
Annapoorni Rangarajan	IISc, Bangalore	Stem Cells and Cancer Biology
Mahendra Sonawane	TIFR, Mumbai	Epidermal Biology/Signaling
Sanjeev Galande (Declined)	IISER, Pune	Epigenetics
Shantanu Chowdhury	IGIB, New Delhi	Molecular Biology/ Cancer Biology
Subba Rao Gangisetty	IISc, Bangalore	Cell Biology/Molecular Biology
Suman Kumar Dhar (withdrawn)	JNU, New Delhi	Molecular Biology/Malaria

Intermediate Fellows

Name	Host Institution	Area of Interest
Dasaradhi Palakodeti	inStem, Bangalore	Stem Cells
Kundan Sengupta	IISER, Pune	Molecular Biology/Cancer
Lolitika Mandal	IISER, Mohali	Stem Cell Biology/Signaling
Madhusudhan Venkadesan (Terminated)	NCBS, Bangalore	Biomechanics/Neuroscience /Mathematics
Mukund Thattai	NCBS, Bangalore	Computational Cell Biology
Partho Sarothi Ray	IISER, Kolkata	Molecular Biology /'ribointeractomics'
Ravi Manjithaya	JNCASR, Bangalore	Molecular Biology/ Drug discovery
Rohit Joshi	CDFD, Hyderabad	Neuroscience/Molecular Biology
Shivprasad Vitthal Patil	IISER, Pune	Biophysics
Soumen Basak	NII, New Delhi	Immunology
Sunish Kumar Radhakrishnan	IISER, Thiruvananthapuram	Cell Biology/Cell Cycle Regulation
Supratim Ray	IISc, Bangalore	Neurophysiology
Thomas J Pucadyil	IISER, Pune	Protein Biology/Cell Biology
Vidya Chandran (Terminated)	IISc, Bangalore	Structural Biology

Senior Fellows

Name	Host Institution	Area of Interest
Rashna Bhandari	CDFD, Hyderabad	Cell Signaling
Dominik Schwudke (Terminated)	NCBS, Bangalore	Computational Biology (Lipidomics)
Gobardhan Das (Terminated)	ICGEB, New Delhi	Immunology

Intermediate Fellows

Name	Host Institution	Area of Interest
Amit Singh	ICGEB, New Delhi / IISc, Bangalore	Biochemistry/Molecular Biology
Arun Sripati	IISc, Bangalore	Neuroscience (Neuroimaging)
Shivraj Shivramakrishnan (Declined)	inStem, Bangalore	Molecular Biology

Early Career Fellow

Name	Host Institution	Area of Interest
Amit Sharma (Declined)	IGIB, New Delhi	Cell Signaling

List of Fellows - Completed Tenure of the Fellowship

2009

Intermediate Fellows

Name	Host Institution	Area of Interest
Kausik Chakraborty	IGIB, New Delhi	Functional Genomics
Kayarat Saikrishnan	IISER, Pune	Structural Biology
Vatsala Thirumalai	NCBS, Bangalore	Developmental Neurobiology

Early Career Fellows

Name	Host Institution	Area of Interest
Albert Chiang	NCBS, Bangalore	Neuroscience
Aseem Mishra	ICGEB, New Delhi	Peptide Chemistry/ Diabetology
Chandra Shekar Prabhakar	inStem, Bangalore / CCMB, Hyderabad	Stem Cells/Molecular biology
Gayatri Muthukrishnan	NCBS, Bangalore	Cell Biology/Molecular Biology

2010

Senior Fellow

Name	Host Institution	Area of Interest
Yamuna Krishnan	NCBS, Bangalore	Biophysics

Intermediate Fellow

Name	Host Institution	Area of Interest
Girish Ratnaparkhi	IISER, Pune	Immunology

Early Career Fellows

Name	Host Institution	Area of Interest
Gagan Deep Jhingan	NII, New Delhi	Signal Transduction
Harsha Gowda	IoB, Bangalore	Bioinformatics/Molecular Biology
Neha Vyas	inStem, Bangalore	Stem Cells

SCIENCE COMMUNICATION WORKSHOPS

Unlocking the secrets of biology with *"C. elegans"* model

"Research in C. elegans has allowed for a better understanding of scientific processes like programmed cell death (implications in Cancer research) and RNA interference (applications in turning down gene expression in disease conditions). This worm has also contributed immensely to our understanding of basic processes like Aging, Obesity and Nervous system functioning among other processes."

- Dr Kavita Babu
Intermediate Fellow
IISER Mohali

SCIENCE COMMUNICATION WORKSHOPS: INNOVATIVE WAYS TO EMPOWER THE COMMUNICATORS IN YOUNG RESEARCHERS

In an earnest attempt to address the dire need for effective science communication training programs in India, and in alignment with its mandate to strengthen the biomedical research framework in the country, the India Alliance has been conducting Science Communication workshops for young researchers (senior PhD students and junior postdoctoral researchers in the basic, clinical, and public health research streams). The India Alliance organises these workshops using two different models:

- **A pan-India SciComm**

and

- **SciComm101**

The unifying theme of the two models is the interactive style in which the training modules are rendered and the informality that generally prevails during these workshops.

Pan-India SciComm, Hyderabad

This is a two-day workshop conducted biannually in Hyderabad, the participants of which are selected through a pan-India competition

Workshop number	Workshop dates	Applications received	Applications in the CPH category	Participants trained	Participants in the CPH category
10th IA SciComm	28-29 Nov 2014	82 applications from 46 institutions	26%	35 Participants from 33 institutions	17%
11th IA SciComm	20-21 Mar 2015	60 applications from 36 institutions	23%	31 Participants from 26 institutions	26%
12th IA SciComm	14-15 Sep 2015	121 applications from 70 institutions	25%	35 Participants from 28 institutions	20%

Mentors who played an integral role in supporting various modules of the workshops

Dr Anurag Agrawal,
IA Senior Fellow, IGIB, New Delhi

Dr Anand Bachhawat,
IISER Mohali

Dr Anant Bhan,
Yenepoya University, Mangalore

Dr Rashna Bhandari,
IA Senior Fellow, CDFD, Hyderabad

Prof. Amitabha Chattopadhyay,
CCMB, Hyderabad

Dr Shantanu Chowdhury,
IA Senior Fellow, IGIB, New Delhi

Dr Venkatasubramanian Ganesan,
IA Senior Fellow, NIMHANS, Bangalore

Dr Shahid Jameel
CEO, India Alliance

Dr Rohit Joshi,
IA Intermediate Fellow, CDFD, Hyderabad

Dr Lolitika Mandal,
IA Intermediate Fellow, IISER Mohali

Dr Vikram Mathews,
IA Senior Fellow, CMC, Vellore

Dr Mahak Sharma,
IA Intermediate Fellow, IISER Mohali

Prof. Arun Shet,
IA Senior Fellow, St. John's Research Institute, Bangalore

Prof. Sandhya Visweswariah,
IISc, Bangalore

Dr Amitabha Chattopadhyay

Dr Ganesan, IA Senior Fellow

Dr Shantanu Chowdhury, IA Senior Fellow

Dr Vikram Mathews, IA Senior Fellow

Pan-India workshop at Hyderabad

Feedback from participants

Dr Jyotsna, Reader

D A Pandu Memorial - RV Dental College and Hospital, Bangalore

The workshop provided hands-on training in preparing a research proposal, and insights into the selection/rejection criteria adopted by grant agencies. The selection process for participation in the workshop ensures that highly motivated individuals participate.

Mr Anand K Das, PhD student

Tata Institute of Fundamental Research, Mumbai

One aspect of the workshop which wins over everything else is the one-on-one feedback on proposals by the experts. This is a valuable and pertinent training for young researchers. The ambiance of the venue, the freedom to interact and the theme of the workshop make it one of the most sought after science communication training programs in India.

Ms Anushree Bose, PhD student

National Institute of Mental Health and Neurosciences, Bangalore

Spending the entire day with patients or petri dishes does little to prepare one for facing mixed audience, even if it comprises of scholars. In this regard, the entire communication skills module was simply brilliant. A lot of questions that I never postulated, but should have, got answered.

SciComm101

SciComm101 is a one-day variant of the workshop held, upon request, at institutions willing to host the mentors (members of the India Alliance staff) and mentees (motivated young researchers from the host institution and neighbouring research institutes, hospitals, and universities). Since the inception of the SciComm101 in April 2014, fourteen such one-day workshops have been organized in 11 institutions across the country, training over 700 young researchers.

The success of these workshops has been greatly facilitated by the enthusiastic help from local coordinators at the host institutions; here, a few coordinators share their perspectives on SciComm101 and suggestions for improvement:

A Scicomm 101 workshop was conducted for clinicians at The All India Institute of Medical Sciences, Bhopal

Scicomm 101 at University of Kashmir

Scicomm at Aligarh Muslim University

Coordinators' Perspectives

Dr Bhavna Dhingra Bhan
Assistant Professor - Pediatrics
All India Institute of Medical Sciences, Bhopal

Communication in science is an area which is not addressed formally in the medical school curricula. Only recently, the importance of addressing this need has received due attention. Young researchers in their early and mid - careers need some guidance, mentoring and handholding during their initial years to develop these skills of communication. Such workshops are the need of the hour for the science community to be able to produce good quality research and for it to be communicated and disseminated to the general public and the policy makers to identify the focus areas that need prioritization.

The workshop saw an overwhelming response for registrations and participants from ten institutes across the country attended the workshops. More than 50 registrations were received not only from various institutes in Bhopal, but also from Delhi, Cochin and Kolkata and 45 participants attended the workshop. A wide spectrum of participants ranging from undergraduate MBBS students to young faculty members and postdoc fellows participated enthusiastically in the workshop. The workshop was well received by the participants and almost all appreciated the interactive nature of the workshop.

Hands-on exercises on manuscript writing with different writing styles and the case studies in ethics were praiseworthy; the session on effective Power Point presentations was the highlight of the workshop. The session on Grant writing was found useful by almost all participants. The efforts taken by the faculty members to answer the queries of the participants were exceptional. The information provided about the various fellowship options was much appreciated. Some of the participants suggested that a brief session on biostatistics could be included. Overall, a very fruitful and enriching experience for one and all.

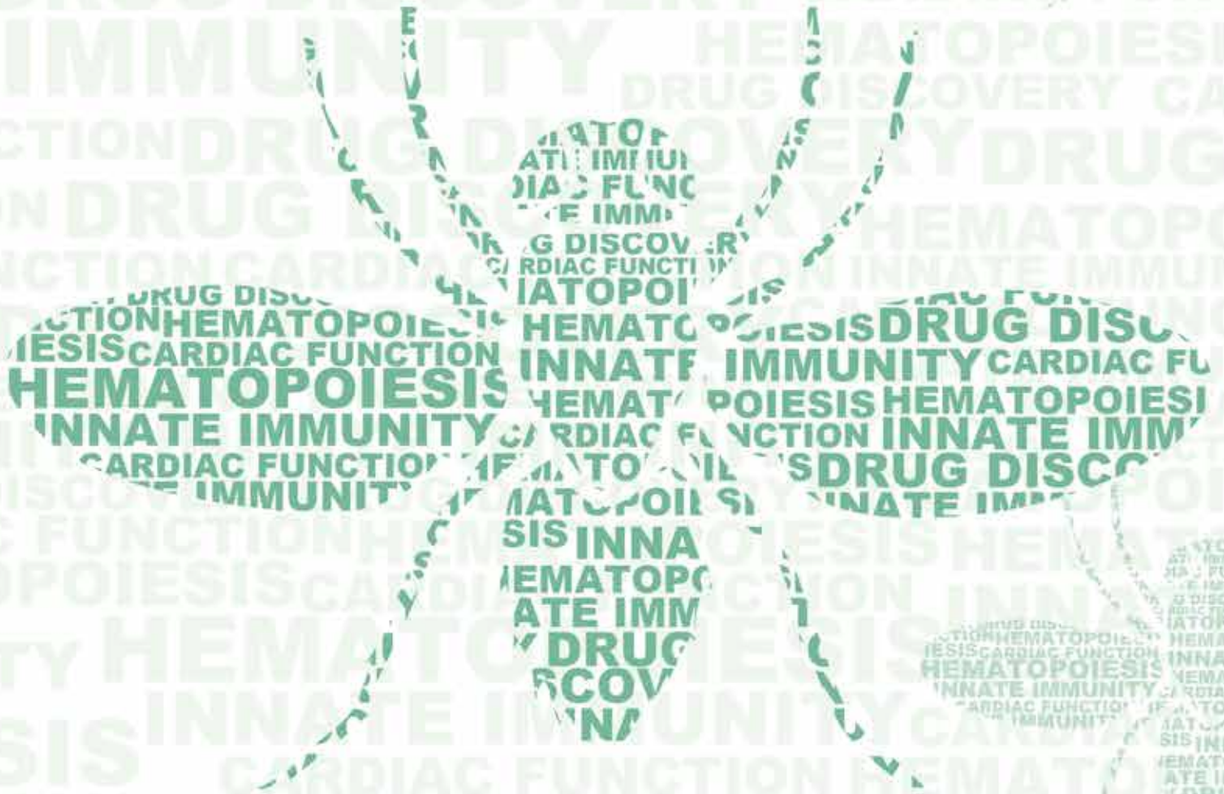
Dr S Nagini
Professor & Head
Department of Biochemistry & Biotechnology
Annamalai University, Chidambaram

Seventy five students from 9 universities across South India participated in the workshop. The team from the India Alliance made meticulous arrangements and had an excellent roadmap for the workshop that was executed with clockwork precision. The modules included some case studies that stimulated intense discussion among the participants. The workshop covered all aspects of scientific communication and also catered to participants from diverse backgrounds within the Life Sciences. The lectures were very interactive and lively. The participants were given exercises to hone their writing skills and also ponder on ethical issues. The feedback from the participants was excellent. Many of the participants requested that the workshop be conducted in their institution. Some participants felt that the workshop should be held for 2-3 days, while others opined that it will be useful to include first year Ph.D. students to enthuse them at the beginning of their career. All the participants expressed their deep appreciation for the India Alliance Team for their zeal and commitment in imparting communication skills to aspiring researchers.

Professor S Ganesh
Biological Sciences & Bioengineering
Indian Institute of Technology, Kanpur

The SciComm workshop being conducted by the India Alliance is a commendable job in training as well as introducing students to fellowships and grants. Thanks for the wonderful initiative. I understand that the workshop allowed students to gain first-hand wisdom from an active scientist who is publicising science at many forums. The program covered the basics of written and oral communication with some interactive exercises and case studies, which helped cover the ethics of doing and writing science. Also, the interaction with India Alliance fellows provided a perspective on how to tailor grant applications in accordance with the research methodology one wishes to pursue. The India Alliance could host a science writing competition for PhD students, providing incentives to students to communicate their research to general public; thus popularizing science and creating awareness. A little more emphasis on the publication process describing how an editor/reviewer analyses a manuscript could be beneficial; for this a few interviews from select editors could be included. A few exercises explaining how to do a peer review of a paper might also introduce students to the other side of the publishing process.

Participants benefit from a unique platform to discuss various aspects of Science Communication and Career development



OUTREACH

Unlocking the secrets of biology with *"Drosophila"* model

"Research in Drosophila provides us with Nature's blueprint to understand development both in normal as well as in aberrant conditions. Understanding normal development in this simple organism helps us to unravel the complexities in disease conditions. Moreover, it is a powerful model organism for studies that have translational impact for genetic diseases."

- Dr Lolitika Mandal
Intermediate Fellow
IISER Mohali

The India Alliance Fellows' meeting, New Delhi, 5-6 November, 2014

The 5th Annual Fellows meeting was held at The Grand, Vasant Kunj, New Delhi on 5th and 6th November, 2015. It was attended by 68 Fellows of the India Alliance. There were 54 poster presentations and 14 talks. The meeting was inaugurated by the CEO - Dr. Shahid Jameel.

Professor Jeremy Farrar, Director of the Wellcome Trust also attended the Fellows Meeting. The Delhi Office was inaugurated remotely by Professor Jeremy Farrar and Dr. K. VijayRaghavan, by unveiling a plaque. The Delhi Office located in Jasola, New Delhi is a branch office of the India Alliance which started functioning in 2014.

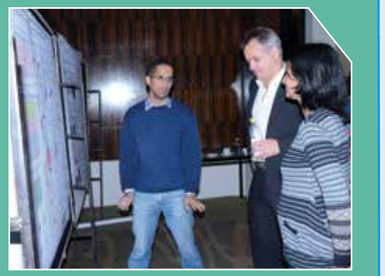
Dr Simon Kay, Head of International Operations, Wellcome Trust gave a talk about the Public Engagement awards instituted by The Wellcome Trust.

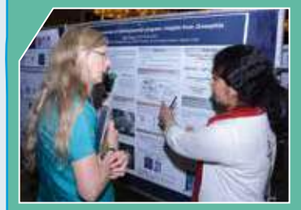
The first day concluded with the Plenary Lecture delivered by Professor Rafi Ahmed, who spoke extensively on the importance of funding basic science.

A special session was conducted by Professor Noel J Buckley about the role of mentoring in scientific research which was followed by an interactive session where Professor Buckley and other Committee members answered questions from India Alliance Fellows on finding the right mentor.

This was the first India Alliance Fellows Meeting where a review process was put in place so that Fellows could receive detailed feedback about the progress of their research from Committee Members.

The meeting concluded with Professor Farrar and Dr. K. VijayRaghavan examining the posters the Fellows were presenting about their research.





Professor Doreen Cantrell's farewell

On February 25, 2015 Professor Doreen Cantrell, previous Chair of the Early Career Fellowship (ECF) Selection Committee was given a farewell. This was attended by members of the ECF selection committee and India Alliance staff. Early Career Fellows based in Bangalore were also invited. Professor Cantrell played a critical guiding role in the early years of India Alliance along with Professor Mike Turner. Professor Fiona Watt from King's College London will take on the responsibility as Chairperson of the ECF committee.

National Outreach

Sponsored Events

Symposium on Clinical and Public Health Research methods (22-25 September, 2014)

This Symposium was organized by Dr Pallab Maulik who is an Intermediate Fellow. The four days workshop objective was to provide a practical understanding of clinical and public health research methods to early and mid-career scientists. Representatives of the India Alliance gave a short talk on funding opportunities for public health researchers and also answered questions about the kind of research funded by the organization.

Joint IUBMB-RCB Advanced School on Diabetes and Metabolic Syndrome (24-29 November, 2014)

This was organized by the International Union of Biochemistry and Molecular Biology and the Regional Centre for Biotechnology at the Heritage Village Resort, Manesar, Haryana. The School focused on the disorders associated with Diabetes and Metabolic Syndrome in terms of mortality and socio-economic burden. The School aimed to provide the participants with an exposure to contemporary research in this area, therapeutic strategies, as well as an awareness about programmes on this theme.

International Conference on Biomaterials, Bioengineering & Biodiagnostics (Biomaterials-2014) (24-27 November, 2014)

The Indian Institute of Technology, Delhi, ENEA and CNR Italy jointly organized a conference under the auspices of the Asian Polymer Association (APA). The conference was meant to bring together material scientists, biologists, pharmacologists and medical practitioners at various stages of their career to facilitate an information exchange on the role of polymeric biomaterials in healthcare. India Alliance representatives gave a short talk on funding opportunities and also had a booth set up to answer queries and questions from the participants.

International conference on "Genome Architecture and Cell Fate Regulation" (1-4 December, 2014)

About 200 delegates participated in this conference which intended to bring about more interactions between early stage career scientists and established scientists; and between Indian and international scientists about understanding nuclear processes at a molecular level, and to uncover "the grammar" of how cell-type specific nuclear form and function emerge during development and differentiation. The conference was organized at the School of Life Sciences, University of Hyderabad.

Guha Research Conference (GRC)- 2014 (6 - 10 December, 2014)

The Guha Research Conference was organized in Chandela, Khajuraho by the National Centre for Cell Sciences, Pune. The Conference was designed to provide four days for Indian biologists to exchange ideas and participate in academic discussions, in an informal setting. The Guha Research Conference is a professional society set up by Indian scholars to develop the field of Biochemistry.

SERB School in Neuroscience, 8th Edition (8-21 December, 2014)

The SERB School was a Department of Science and Technology initiative for providing training to graduate students, postdocs and early career faculty, in the field of Neurosciences. It was organized at the Indian Institute of Science and Technology, Pune. The School involved lectures, research seminars, tutorials, in addition to hands on training on experimental and computational approaches to circuit neuroscience.

2nd Chromosome Stability Conference (14 - 18 December, 2014)

The second Chromosome Stability conference was organized at the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore. It was meant to be a platform to facilitate interaction between the motivated and fast growing Indian community interested in areas related to chromosome stability. About 120 scientists took part in this conference with 50 of them presenting posters.

EMBO Workshop on 'Upstream and Downstream of Hox Genes' (14-17 December, 2014)

This was a European Molecular Biology Organization (EMBO) workshop organized at the Centre for Cellular and Molecular Biology (CCMB), Hyderabad. Current status and future directions in the field of developmental biology, with a special emphasis on the Hox genes, were discussed. It was designed to increase awareness among Indian researchers, teachers and students about the importance of Hox gene biology.

83rd Annual Meeting of Society of Biological Chemists (India) and pre-conference workshops (December 17 - 21, 2014)

The Annual meeting of the Society of Biological Chemistry (founded in 1930; headquartered In the Indian Institute of Science, Bangalore) was held at the KIIT University, Bhubaneshwar. It was organized jointly by the KIIT University, Institute of Life Sciences (ILS) and the National Institute of Science Education and Research (NISER). In addition to the presentation of posters and lectures from international researchers, there were also two pre-conference workshops.

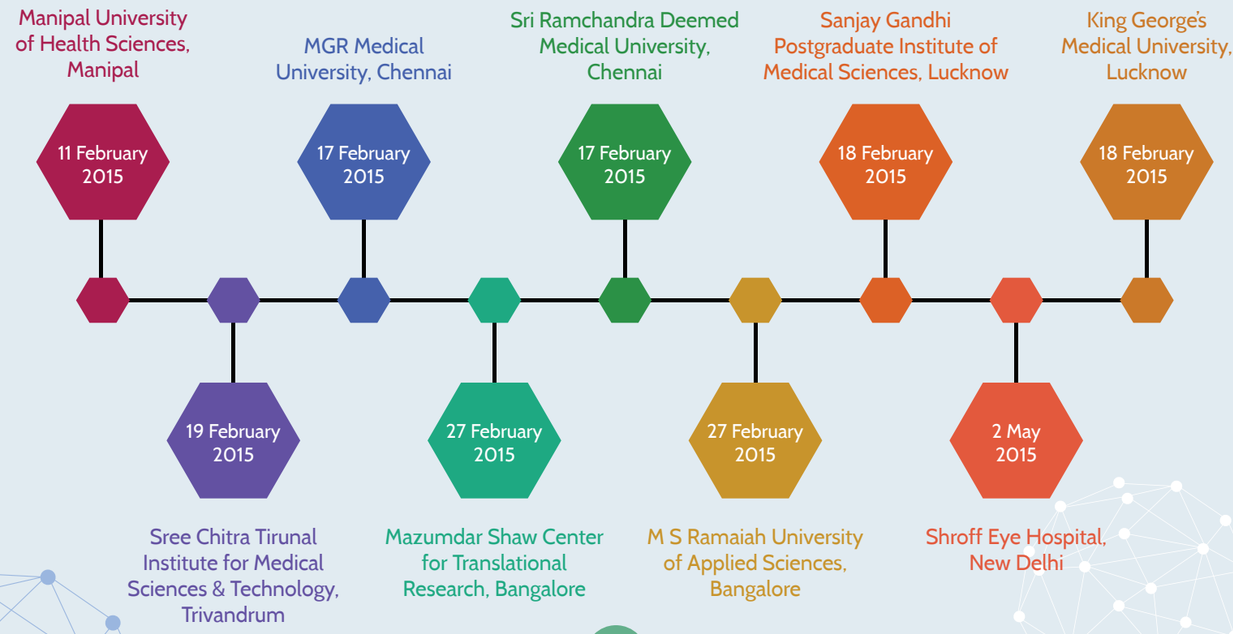
International Seminar on – "Our Genes & Genomes – Past, Present & Future" (4 February, 2015)

This seminar was organized by the H.N.B. Uttarakhand Medical Education University in Dehradun, Uttarakhand at the Doon University. There were talks by several international experts on the current status of research in the field of genetics and genomics. It was aimed to benefit the young researchers in the state of Uttarakhand.

Seventh Young Investigators Meeting, Srinagar (27 March - 1 April, 2015)

The 7th Young Investigators Meeting was held at Gulmarg, Srinagar, India. This meeting brought together postdoctoral fellows, young investigators, and early career researchers, reputed Indian and international scientists, administrators of institutions, funding agency representatives, and science policy makers for five days of discussions and interactions. The India Alliance was represented by the CEO, Dr Shahid Jameel who gave a talk on funding opportunities at the India Alliance.

Institutional visits by the India Alliance to promote the India Alliance Fellowships



International Outreach

Life Science opportunities in India: A special session at The EMBO Meeting 2015 (7 September, 2015)

India Alliance along with India Bioscience participated in The EMBO meeting 2015 from 5-8 September, 2015. The Wellcome Trust/DBT India Alliance had also sponsored travel awards for 6 young scientists from India to attend the EMBO meeting. India Alliance and India bioscience had a booth on all days of the conference. There were questions asked about opportunities in India, how to apply and also to get an overall picture of science in India. In addition to Dr Jameel and Professor Noel Buckley representatives from EMBO and DBT were also present. From DBT there was Suman Govil and Meenaskhi Munshi. Participants were also able to interact with invited speakers at the booth. Around 30 people attended the special session on India. The speakers included Drs Shahid Jameel, LS Shashidhara, S Ramaswamy, Suman Govil, Meenakshi Munshi and Anne- Marie Glynn.

Young Investigators Meeting (YIM), UK (9 September, 2015)

This event was organized at the Deakin Centre, Cambridge, UK. Nearly 130 people registered for the event. There was a full day of talks from representatives of Indian Science, Funding agencies and corporate entities who had labs in India. The session ended with a talk by Dr VijayRaghavan given by video conferencing. After the talks 20-25 graduate students and post-docs presented their work in a poster session. The delegates were highly enthusiastic and there was a great deal of interaction at the event. In addition to talks given by funding agencies, there were also different agencies seated at various tables. Participants were encouraged to approach them for further discussions. The Department of Biotechnology, the Wellcome Trust/DBT India Alliance, EMBO and Euraxess Links UK were some of the funding agencies represented at this event.

National Institutes of Health Research Festival (September 17-18, 2015)

India Alliance in collaboration with India Bioscience had a stall at the NIH Career Fair and Exhibition. Thousands of researchers working on various NIH campuses visited the booth. Researchers of both Indian origin and otherwise requested information about life sciences research in India and were particularly interested in the activities of India Alliance. There was a lively discourse about the opportunities and challenges of doing science in India.

PUBLIC ENGAGEMENT

Unlocking the secrets of biology with "Zebrafish" model

"Feasibility of performing genome-wide mutagenesis screens and the ease of applying transgenesis, reverse genetic and genome editing technologies have made zebrafish a powerful model organism to understand cellular and molecular basis of several biological processes that might be medically relevant. It's a wonderful model to replicate human diseases and perform chemical screens to identify novel compounds having therapeutic values."

- Dr Mahendra Sonawane
Senior Fellow
TIFR, Mumbai

IA's efforts towards creating new ways of scientific interaction in India

Public Engagement Competition

To enable its Fellows to effectively and creatively engage with the society, the India Alliance announced its first rolling 'Public Engagement competition' in May 2014. The India Alliance granted the first Public Engagement award in February 2015 to its Intermediate Fellow, Dr Mukund Thattai (NCBS, Bangalore), for his project titled 'Bodystorm hits Bangalore'.

Bodystorm hits Bangalore: A dance-science interaction at the National Centre for Biological Sciences

By Aparna U. Banerjee, Anjali Vaidya & **Mukund Thattai**

Science is caricutured as a dry and soulless enterprise. The reality is of course far from it. Those of us who "do" science everyday know how much our work depends on imagination, creativity, and accidental collisions of thought. Enter "Bodystorming". Bodystorming means brainstorming with the physical world. Creative work may be stifled if we do all our thinking at a desk; we think best when mind and body are integrated. In the past few years, bodystorming has been adapted to bridge the "two culture" divide between science and art by the Black Label Movement, a Minnesota-based dance company under the direction of Carl Flink (University of Minnesota), working together with biomedical engineer David Odde (University of Minnesota).

Dr Mukund Thattai, Intermediate Fellow

Odde, Flink and eight BLM dancers (or "movers," as they are called) spent eight event-filled days in Bangalore from 25 April to 2 May, 2015, working with Indian biologists and dancers to initiate new collaborations between science and art. The interaction was the brain-child of Darius Köster, a researcher at the National Centre for Biological Sciences (NCBS), who first encountered bodystorming at the Marine Biological Laboratory at Woods Hole, Massachusetts in 2014. A dancer himself, Darius wondered about the possibility of bringing the energy of bodystorming back to India. The timing was perfect: in May, 2014, the Wellcome Trust / DBT India Alliance had just announced its first Public Engagement Competition. Mukund Thattai, an India Alliance Fellow who had previously organised similar art/science engagements at NCBS, saw a convergence of goals: bodystorming was a unique exercise in creativity, but also a unique way to engage the public, and to spread awareness about the excitement of science. The Bodystorming Public Engagement proposal was successful, and in April 2015 the BLM team arrived in Bangalore.

BLM movers taught bodystorming techniques to 25 Indian dancers. This initial training was followed by a residency at NCBS, where biologists and dancers worked together to model systems ranging from the dynamics of virus propagation in bacterial populations to glycosylation, honey bee behaviour and speciation in frogs. Scientists searched for insights about their systems through the physicality of dance, often participating in their own models. Dancers, in turn, spent afternoons improvising on scientific structures to create art. Both products of the workshop came together on 2nd May at the National Gallery of Modern Art (NGMA), Bangalore, as dancers showcased the human simulations and art pieces created during the training session.

This publicly-attended event presented science in an unusual and very human light. The audience engaged enthusiastically with the performers, and went away with new insight into the scientific process.

Dancers performing at National Gallery of Modern Art, Bangalore

Bodystorming hits Bangalore

Biologists - Dancers interaction

Photo credits Bill Cameron Photography.

DNA@70 Public Lecture Series

India Alliance celebrated 70 years of the discovery of DNA as a hereditary molecule through a series of public lectures in various cities in 2014-15.

Speaker	Talk title	Date & Venue
 **Prof W Ian Lipkin** John Snow Professor of Epidemiology and Professor of Neurology and Pathology at Columbia University	Bad bugs on the big screen: science fiction and fact in Hollywood	16 June 2014, India International Centre, New Delhi
	Small Game Hunting, disease control in the genome era	19 June 2014, Bangalore Science Forum Auditorium, Bangalore
 **Prof Nadrian Seeman Margaret and Herman Sokol** Professor of Chemistry, Department of Chemistry, New York University, USA	DNA: Not Merely the Secret of Life	22 December 2014 International Centre, New Delhi 29 December 2014 CSIR-IICT Auditorium, Hyderabad 31 December 2014, Bose Institute, Kolkata 2 January 2015, Science Faculty Auditorium, Visva-Bharati University, Shantiniketan
 **Dr Karen Nelson** President, J. Craig Venter Institute (JCVI), USA	The Zoo in You	11 March 2015, NCCS, Pune 12 March, 2015, ICGEB, New Delhi
 **Prof Shankar Balasubramanian** The Herchel Smith Professor of Medicinal Chemistry, Department of Chemistry, University of Cambridge, UK	Decoding Human Genome on a population scale	17 June 2015, NII, New Delhi 18 June 2015, IISc, Bangalore

Speaker's outlook

Professor Nadrian C. Seeman

Department of Chemistry,
New York University, USA

I spent the period of December 19, 2014 to Jan 05, 2015 in India, lecturing, as part of the DNA@70 celebration, sponsored by the Wellcome Trust/DBT India Alliance. I had planned to give three lectures, one in New Delhi, one in Hyderabad, and one in Kolkata under the auspices of the DNA@70 public lecture series. My host in Kolkata, Gautam Basu of the Bose Institute, is an extremely energetic person; in addition to my scheduled lecture at the Bose Institute, he convinced me to give another lecture in Kolkata, to students of college age in the Jagadish Bose National Science Talent Search, and then a further lecture at Shantiniketan. The other lectures were on my specialty, structural DNA nanotechnology.

All the lectures were well-attended and the audiences were engaged and attentive. The lecture in New Delhi was at the India International Centre, a public forum, whereas the others were to audiences in academic settings. I was impressed and surprised that the most active questioning came at the New Delhi lecture, which was attended by people who were largely not professionals working in scientific research. The depth of those questions was no less than those in the academic settings. I had useful scientific interactions with audience members and hosts in both Hyderabad and in Kolkata. I also enjoyed learning about Jagadish Bose in detail; although I was aware of his existence, I had little idea of his accomplishments. My lecture in Shantiniketan was certainly the only time that my lecture has been opened and closed by music.

In summary, I found my visit to India during the DNA@70 celebration to be an experience that was highly enriching for me. I learned much of Indian culture and of Indian science. My specialty is new; I only conceived of it in the fall of 1980. I hope that I was able to impart some of its beauty and utility to my audiences. Of course, the best way to extend knowledge of its potential is for there to be a practitioner of the field in India. Yamuna Krishnan was the first Indian scientist to be involved in the field experimentally, and Prabal Maiti (both working in Bengaluru) is a theoretician who works in the area. Yamuna has moved to the University of Chicago, but my former student, Banani Chakraborty has recently started a group in Bengaluru. I hope that my visit has catalyzed interest in the other sites I visited in India. I certainly thank the Indian Alliance for giving me the opportunity to make this visit.

Dr Karen Nelson

President,
J. Craig Venter Institute (JCVI), USA

My lecture focused on the human microbiome, emerging infectious diseases and implications of both for human health. Globally, we have seen tremendous developments in new next generation technologies that are allowing us to interrogate any environment of choice including the human body at a scale that was not possible before. Studies of the human microbiome highlight a high degree of microbial diversity within and across individuals. Studying healthy and diseased human populations, their microbiomes and metabolites present significant new opportunities for defining novel diagnostics and therapeutic approaches for diseases.

India as a nation is well posed to have its own human microbiome program focused on studying the microbiomes of the population. My presentation allowed for a wonderful exchange with young and seasoned scientists and has resulted in several collaborations and ongoing discussions with several of those who were in attendance. Meetings like this allow for an exchange of thoughts and ideas in a lively vibrant setting and I was honored to be part of the DNA@70 series.

Voices for Cancer Panel Discussion

'Voices for Cancer' panel discussion was held at Miranda House, Delhi University, on February 17, 2015, with the aim to inform and encourage students to play an active role in cancer prevention - to discuss how we can bridge the gap between the public and their access to key health information on cancer, how effective communication and public engagement can remove the stigma attached to it The event was organised in collaboration with RTI International, Public Health Foundation of India and Miranda House.

The diverse panel comprised of Mr Dinesh Sharma (Science author and columnist), Dr Kanchan Kaur (Breast Cancer specialist, Medanta), Mrs Ritu Bhalla (Indian Cancer Society), young and inspirational cancer survivors, Chandan Kumar and Ritu Bhalla who work at Cankids and an a mother of a brave cancer survivor, Mrs Priti Sayeed. This was the first time the India Alliance partnered with an undergraduate institution in the country to organize a health awareness event with active participation coming from young students.

Co-ordinator's feedback

Dr Bilasini Naorem
Previous Convenor,
NSS Miranda House,
co-ordinator of the panel discussion

We feel immense pride to have organised "Voices for Cancer Event" at Miranda House on 17 February 2015 in association with the Wellcome Trust/DBT India Alliance, RTI International and PHFI. It was a pleasure and an inspiration to see the varied panelists together on one platform. The event was very informative and enriching. Because of the encouragement and support received from the India Alliance, our students took keen interest in organising this event by preparing Cancer related information boards which were put up in the college and one of our undergraduates, Ms Supriya, was chosen to moderate the panel discussion. It was a great experience for everyone involved and we look forward to more such events and collaborations.

This write-up is personal view of Dr Bilasini Naorem, Previous Convenor, NSS Miranda House

Student's Views

MS Supriya Pranay
3rd year undergradutae,
Miranda House

This event not only helped young students to understand why prevention is better than cure, but holding a 'public' discussion on a disease condition that is generally considered a taboo topic, is a great attempt at changing the mindset of the people at large. I, as the moderator and as a young woman standing on the dais and hearing cancer survivors, their loved ones and cancer specialists share their experiences and knowledge, was inspired like many others in the audience and have decided to make my health a priority and also share the knowledge I gained at this discussion with others.

I really appreciate and thank the organisation for putting up such a productive and insightful discussion. I hope that I will find a way to keep myself connected and involved in this good cause.

A public lecture at NCCS, Pune

Unlocking the secrets of biology with "Mice" model

"Some of the path breaking discoveries of human disease biology would not have been possible without the mice model. Owing to their ease of use and genetic tractability, they virtually mimic any human disease or condition. These along with cost effectiveness and humanized versions make them ideally suited for basic and applied biomedical research."

- Dr Chittur Srikanth
Intermediate Fellow
RCB, Faridabad

PEOPLE

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Group photograph captured at the Fellows' Meeting 2014 held in New Delhi: Dr. K. VijayRaghavan, Secretary, Department of Biotechnology, Members of the India Alliance Selection Committees, India Aliance Fellows and India Alliance Staff were present at the event.

Unlocking the secrets of biology with "Primates" model

"Monkeys are extremely intelligent animals with brains that are similar to humans. This makes them an ideal choice for studying the neural basis of higher cognitive function. Primate studies, together with non-invasive techniques such as fMRI and TMS studies in humans, have the potential to elucidate higher cognitive function at multiple scales."

- Dr Arun Sripati
Intermediate Fellow
IISc, Bangalore

AUDITED STATEMENT OF ACCOUNTS

Independent Auditors' Report

To
The Trustees,
The Wellcome Trust/DBT India Alliance
New Delhi

We have audited the attached Balance Sheet of The Wellcome Trust/DBT India Alliance, registered as public Charitable Trust in India which comprise the Balance Sheet as at 31st March 2015, and the Statement of Income & Expenditure Account for the year ended on that date, and Cash flow Statement Account for the year ended on that date annexed hereto. These financial statements are the responsibility of the Alliance's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with the generally accepted auditing standards in India. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether financial statements are free of material misstatement. An audit includes examining on a test basis, the evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and the significant estimates made by management, as well as evaluating the overall financial statements. We believe that our audit provides a reasonable basis for our opinion.

We report that

1. We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purposes of our audit;
2. In our opinion, proper books of account as required by law have been kept by the Trust, so far as appears from our examination of those books;
3. The Balance Sheet and the statement of income & Expenditure Account dealt with by this report are in agreement with the books of account;
4. In our opinion and to the best of our information and according to the explanations given to us, the said accounts given a true and fair view:

   (i) In the case of the Balance Sheet, of the state of affairs of the Trust as at 31st March, 2015;

   (ii) In the case of the Statement of Income & Expenditure Account, of the excess of Income over Expenditure for the year ended on that date; and

   (iii) In case of the Cash Flow Statement, of the cash flows for the year ended on that date.

For SARATH & ASSOCIATES
Firm Regn. No. 005120S
Chartered Accountants

Sd/-

S.Srinivas
Partner
Membership No. 202471

Place: Hyderabad
Date: 30.09.2015

Balance Sheet

as on 31st March 2015

Particulars	Sch	31.03.2015		31.03.2014	
		Amount (Rs.)	Amount (Rs.)	Amount (Rs.)	Amount (Rs.)
Sources of funds:					
Reserve Funds	1		15,173,475		437,122
Current Liabilities & Provisions					
Current Liabilities	2	73,954,026		34,028,871	
Provisions	3	2,797,147		1,266,164	
Unspent Grant Amounts	4	51,701,144		80,351,689	
			128,452,317		115,646,724
Deferrals					
Deferred Grant Liability	5	-		1,549,244,928	
Deferred Grant Income	6	-		1,630,784,136	
Retention Money payable	7	76,745,581		98,038,497	
			76,745,581		3,278,067,561
			220,371,373		**3,394,151,407**
Application of funds:					
Fixed Assets	8				
Gross Block		21,045,694		17,813,695	
Less : Accumulated Depreciation		17,653,941		15,400,224	
Net Block			3,391,753		2,413,471
Current Assets,					
Cash & Bank Balances	9	209,025,832		208,025,847	
Other Current Assets	10	7,953,788		3,683,025	
			216,979,620		211,708,872
Deferrals					
Deferred Grant Receivable	11	-		1,630,784,136	
Deferred Grant Expense	12	-		1,549,244,928	
			-		3,180,029,064
			220,371,373		**3,394,151,407**

Accounting Policies 17

Notes to Accounts 18

Schedules referred above forms integral part of accounts.

As per our report attached

For Sarath & Associates

Chartered Accountants

Firm Registration No.005120S

Sd/-

S.Srinivas
Partner
Membership No. 202471

The Wellcome Trust / DBT India Alliance

Dr Shahid Jameel **CEO**

B.Nataraj **FM**

Place: Hyderabad
Date: 30-09-2015

Income & Expenditure Account

for the year ended 31st March 2015

(All amts in Rs.)

Particulars	Sch	31.03.2015	31.03.2014
Incomes:			
Grants Income	13	663,325,848	522,552,362
Other Income - Interest		12,608,080	13,176,216
		675,933,928	**535,728,578**
Expenses:			
Scientfic Costs	14	630,159,556	496,424,745
Employee Cost	15	20,167,972	13,858,450
Admin Costs	16	8,563,858	7,158,335
Depreciation	8	2,306,189	2,827,260
		-	
		661,197,575	**520,268,790**
Surplus / (Deficit) transferred to Balance Sheet		**14,736,353**	**15,459,788**

Accounting Policies 17

Notes to Accounts 18

As per our report attached

For Sarath & Associates

Chartered Accountants

Firm Registration No.005120S

The Wellcome Trust / DBT India Alliance

Sd/-

S.Srinivas
Partner
Membership No. 202471

Dr Shahid Jameel **CEO**

B.Nataraj **FM**

Place: Hyderabad
Date: 30-09-2015

Cash Flow Statement

for the year ended 31st March 2015

(All amts in Rs.)

SL	Particulars	Amount (Rs.)	Amount (Rs.)	Amount (Rs.)
A	**Cash Flow from operating Activites**			
	Surplus/ (Deficit) before Tax	14,736,353		
	Add : Depreciation and other write-offs	2,359,032	17,095,385	
	Changes in Working Capital			
	Less: Increase in other current assets	(4,270,763)		
	Add: Unpaid Retention Money	(21,292,916)		
	Add: Increase in Current Liabilities	12,805,593		
			(12,758,086)	
	Net Cash flow from operating activities			4,337,299
B	**Cash flow from Investing activities**			
	Purchase of fixed assets			(3,337,314)
C	**Cash flow from Financing activities**			
	Increase in Fund balance during the year			
	Net increase in Cash & Cash equivalents			999,985
	Cash and Cash Equivalent at beginning of period			208,025,847
	Cash and Cash Equivalent at the end of the period			**209,025,832**

As per our report attached

For Sarath & Associates

Chartered Accountants

Firm Registration No.005120S

S.Srinivas
Partner
Membership No. 202471

Place: Hyderabad
Date: 30-09-2015

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel **B.Nataraj**
CEO **FM**

Receipts and Payments Account

for the year ended 31st March 2015

(All amts in Rs.)

Receipts	Amount	Amount	Payments	Amount	Amount
Balance b/d			Scientfic Costs		
Cash in hand	15,622		Grants Awarded		566,358,089
Cash - Foreign Currency	32,162		Meeting Costs		
Petty Cash	4,959		Selection Committiee		15,050,665
Bank - Savings	147,497,104		Strategy & Advisory Council		815,759
Bank - Fixed Deposit	60,476,000				
		208,025,847	Scientific Meeting		14,226,772
Grants from Wellcome Trust-UK		324,658,861	Others		
Dept. of Bio-technology		300,000,000	Publicizing IA Activities		1,700,276
Interest from Bank		11,799,302	Website Development and Maintenance		3,755,625
			State-of-the-Art-Reports		614,800
			E-Journal Subscriptions		1,841,608
			Employee Cost		
			Salaries		17,728,676
			Staff welfare		148,860
			Relocation Cost		206,217
			Medical Insurance		280,374
			Leave Encashment		209,510
			Leave Travel Concession		220,631
			Admin Costs		
			Meeting Costs		
			Finance & Audit Committee		25,526
			Trustee		63,304
			Other Admin Costs		8,611,772
			Deposits		
			Rent Deposit	-	270,000
			Purchase of Fixed Assets		3,329,714
			Balance c/d		
			Cash in hand	35,207	
			Cash - Foreign Currency	94,889	
			Petty Cash	2,803	
			Bank - Savings	196,011,933	
			Bank - Fixed Deposit	12,881,000	
					209,025,832
		844,484,010			**844,484,010**

As per our report attached

For Sarath & Associates

Chartered Accountants

Firm Registration No.005120S

S.Srinivas
Partner
Membership No. 202471

Place: Hyderabad
Date: 30-09-2015

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel **B.Nataraj**
CEO **FM**

Schedules

FY 2014-2015

Schedule 1 : Reserve Fund

(All amts in Rs.)

Particulars	31.03.2015	31.03.2014
Income & Expenditure - b/f	437,122	75,077,334
Add/(Less) : Surplus/(Deficit) for the year	14,736,353	15,459,788
Less: Amount received from DBT during earlier years now regrouped (Refer Note No. 17)	-	(90,100,000)
	15,173,475	**437,122**

Schedule 2 : Current Liabilities

Particulars	31.03.2015	31.03.2014
Creditors for Expenses	1,667,814	1,979,878
ICICI Master Card	36,799	-
Payable to Institutes - Unspent amount	72,249,413	32,048,993
	73,954,026	**34,028,871**

Schedule 3 : Provisions

Particulars	31.03.2015	31.03.2014
TDS Payable	370,875	83,524
Professional tax payable	-	3,550
Provison for expenses	502,036	372,722
Provident Fund Payable	122,893	251,749
Salary Payable	619,067	-
Provison for Gratuity	716,000	554,619
Provison for Leave Encashment	466,276	-
	2,797,147	**1,266,164**

Schedule 4 : Unspent Grant Amounts

Particulars	31.03.2015	31.03.2014
The Wellcome Trust	39,379,975	41,375,817
Department of Biotechnology	12,321,169	38,975,872
	51,701,144	**80,351,689**

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel **B.Nataraj**
CEO **FM**

Contd..

Schedules

FY 2014-2015

Schedule 6 : Deferred Grant Income

Particulars	31.03.2015	31.03.2014
Deferred Grant Income (Refer Schedule 17.5 and Note No.3 of Notes to Accounts)	-	1,630,784,136
	-	**1,630,784,136**

Schedule 7 : Deferral - Retention Money payable

Particulars	31.03.2015	31.03.2014
Retention Money falling due in :		
FY 2014-15	-	13,275,945
FY 2015-16	28,501,518	35,409,341
FY 2016-17	29,560,201	28,723,834
FY 2017-18	18,683,862	20,629,377
	76,745,581	**98,038,497**

Schedule 9 : Cash & Bank Balances

Particulars	31.03.2015	31.03.2014
Cash in Hand	132,899	52,743
Cash at Bank		
- in Savings A/c	196,011,933	147,497,104
- in Deposit A/cs	12,881,000	60,476,000
	209,025,832	208,025,847

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel **B.Nataraj**
CEO **FM**

Contd..

Schedules

FY 2014-2015

Schedule 10 : Other Current Assets

(All amts in Rs.)

Particulars	31.03.2015	31.03.2014
Interest Receivable	180,832	228,840
Prepaid Expenses	2,366,610	665,105
Deposits	677,600	410,600
Advances for expenses	2,783,331	1,289,851
TDS Receivable	1,945,415	1,088,629
	7,953,788	**3,683,025**

Schedule 11 : Deferred Grant Receivable

Particulars	31.03.2015	31.03.2014
Deferred Grant Receivable		
Wellcome Trust - UK	-	815,392,068
Department of Biotechnology	-	815,392,068
(Refer Schedule 17.5 and Note No.3 of Notes to Accounts)	-	**1,630,784,136**

Schedule 13 : Grants Income

Particulars	31.03.2015	31.03.2014
Foreign Grants - Wellcome Trust UK	331,662,924	261,276,181
Govt.of India Grants - DBT	331,662,924	261,276,181
	663,325,848	**522,552,362**

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel **B.Nataraj**
CEO **FM**

Contd..

Schedules

FY 2014-2015

Schedule 14 : Scientific Costs

(All amts in Rs.)

Particulars	31.03.2015	31.03.2014
Grants Awarded	593,614,269	460,910,264
Grants committees Meeting Costs		
Selection Committee	15,050,665	14,978,482
Strategy & Advisory Council	815,759	709,330
Grant Related Direct Costs	20,678,863	19,826,669
	630,159,556	**496,424,745**

Schedule 15 : Employee Costs

Particulars	31.03.2015	31.03.2014
Salaries	18,803,349	12,525,334
Staff Welfare	148,860	139,924
Relocation Cost	206,217	260,414
Medical Insurance	137,244	292,386
Recruitment Expenses	32,679	32,880
Gratuity Expenses	161,381	554,619
Leave Encashment	678,242	52,893
	20,167,972	**13,858,450**

Schedule 16 : Admin Costs

Particulars	31.03.2015	31.03.2014
Meeting Costs		
Finance & Audit Committee	25,526	7,609
Trustee	68,973	58,741
Other Admin Costs	8,281,740	6,904,366
Statutory Audit Fees	187,619	187,619
	8,563,858	7,158,335

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel **B.Nataraj**
CEO **FM**

Contd..

Schedule 5

Deferred Grant Liability, FY 2014-2015

(All amts in Rs.)

Particulars	31.03.2015						31.03.2014				
	Research Training	Early Career	Intermediate	Senior	Margdarshi	Total	Early Career	Intermediate	Senior	Margdarshi	Total
Institutions											
AIG / AHF							-	11,444,294	-	-	11,444,194
AIIMS, New Delhi							-	-	-	-	-
Bose, Kolkata							-	8,629,149	-	-	8,629,149
CDFD, Hyderabad							-	22,565,373	3,554,572	-	26,119,945
ICGEB, Delhi							-	30,421,673	-	-	30,421,673
IGIB, Delhi							-	13,788,470	12,649,568	-	26,438,038
IICB, Kolkata							-	-	-	-	-
inStem, Bangalore							49,227,369	19,994,680	-	-	69,222,049
LVPEI, Hyderabad							-	-	-	-	-
NCBS, Bangalore							45,208,360	11,103,303	8,740,407	-	65,052,070
NCCS, Pune							-	58,040,392	-	-	58,040,392
NII, Delhi							-	8,410,896	-	-	8,410,896
IISC, Bangalore							18,244,370	164,797,389	19,144,427	-	202,186,186
IISER, Bhopal							-	-	-	-	-
PGIMER, Chandigarh							-	21,730,636	-	-	21,730,636
PHFI, Bangalore							-	-	-	-	-
TIFR, Mumbai							42,581,108	31,493,000	30,838,806	-	104,912,914
UIET, Chandigarh							-	-	-	-	-
ACTREC, Mumbai							-	80,405,538	-	-	80,405,538
IISER, Chandigarh							12,309,110	43,400,035	-	-	55,709,145
IISER, Kolkata							-	31,080,298	-	-	31,080,298
IISER (Thiruvananta-puram)							-	20,943,365	-	-	20,943,365
IIT, Kanpur							-	-	-	-	-
IISER, Pune							14,989,381	39,275,840	40,070,257	-	94,335,478
IIT, Bombay							-	-	-	-	-
IIT, Gandhinagar							-	-	-	-	-
IMT, Chandigarh							11,554,574	-	-	-	11,554,574

Note: Refer to Schedule 17.5 and Note number 3 & 5 for change in presentaion of deferred liability.

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel
CEO

B.Nataraj
FM

Contd..

Schedule 5

Deferred Grant Liability, FY 2014-2015

(All amts in Rs.)

Particulars	31.03.2015						31.03.2014				
	Research Training	Early Career	Intermediate	Senior	Margdarshi	Total	Early Career	Intermediate	Senior	Margdarshi	Total
Institutions											
NCL, Pune							3,381,070	-	-	-	3,381,070
JNCASR, Bangalore							-	11,212,515	-	-	11,212,515
CMC, Vellore							19,638,739	-	22,743,743	-	42,382,482
ILS, Bhubaneswar							-	-	-	-	-
MSCTR, Bangalore							-	-	-	-	-
MSRUAS, Bangalore							-	-	-	-	-
CSIHMH, Bangalore							9,366,580	-	-	-	9,366,580
IOB, Bangalore							1,578,582	-	-	-	1,578,582
RCB, Haryana							14,493,160	50,565,011	-	-	65,058,171
RGCB, Thiruvananthapuram							-	18,396,958	-	-	18,396,958
SEARCH, Gadchiroli							-	-	-	-	-
THSTI, Gurgaon							-	9,709,331	-	-	9,709,331
NBRC, Haryana							-	62,287,326	-	-	62,287,326
NIMHANS, Bangalore							11,570,157	-	10,573,640	-	22,143,797
PHFI, Delhi							-	-	-	-	-
PU, Kolkata							-	-	-	-	-
SJMCH, Bangalore							15,197,820	34,839,662	82,482,285	-	132,519,767
TMC, Kolkata							-	-	-	90,049,999	90,049,999
GMCJJGH, Mumbai							10,343,355	-	-	-	10,343,355
IIT, Kanpur							13,874,300	27,105,339	-	-	40,979,639
IIT, Kharagpur							-	-	-	-	-
IMT, Chandigarh							-	-	-	-	-
IIT, Madras							-	-	-	-	-
GIGHI, Hyderabad							-	32,712,649	-	-	32,712,649
IACS, Kolkata							-	23,222,587	-	-	23,222,587
NIBMG, Kalyani							-	30,188,400	-	-	30,188,400
UoA, Allahabad							-	17,075,080	-	-	17,075,080
		-	-	-	-		**293,558,035**	**934,839,189**	**230,797,705**	**90,049,999**	**1,549,244,928**

Note: Refer to Schedule 17.5 and Note number 3 & 5 for change in presentaion of deferred liability.

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel
CEO

B.Nataraj
FM

Schedule 12

Deferred Grant Expense

(All amts in Rs.)

Particulars	31.03.2015						31.03.2014				
	Research Training	Early Career	Intermediate	Senior	Margdarshi	Total	Early Career	Intermediate	Senior	Margdarshi	Total
Institutions						-	293,558,035	934,839,189	230,797,705	90,049,999	1,549,244,928
	-	-	-	-	-	-	**293,558,035**	**934,839,189**	**230,797,705**	**90,049,999**	**1,549,244,928**

Note: Refer to Schedule 17.5 and Note number 3 & 5 for change in presentation of deferred liability.

Schedule 8

Fixed Asset and Depreciation Statement

(All amts in Rs.)

Assets	Rate	Gross Block				Depreciation				Net Block	
		01.04.2014	Additions	Deductions	31.03.2015	31.03.2014	For the Year	Depn added back	Total	31.03.2015	31.03.3014
Block A :											
Office Equipment	15	298,604	209,629	-	508,233	154,554	53,052	-	207,606	300,627	144,050
Mobiles	15	282,712	-	105,315	177,397	130,248	14,944	52,472	92,720	84,677	152,464
Block B :											
Computer	60	4,327,996	370,997	-	4,698,993	3,920,501	437,882	-	4,358,383	340,610	407,495
Software	60	12,850,513	1,081,208	-	13,931,721	11,184,765	1,628,392	-	12,813,157	1,118,564	1,665,748
Block C :											
Furniture & Fixtures	10	53,870	1,675,480	-	1,729,350	10,156	171,919	-	182,075	1,547,275	43,714
		17,813,695	**3,337,314**	**105,315**	**21,045,694**	**15,400,224**	**2,306,189**	**52,472**	**17,653,941**	**3,391,753**	**2,413,471**
Previous Year Figures		16,563,786	1,501,693	251,784	17,813,695	12,731,668	2,827,260	158,704	15,400,224	2,413,471	3,832,118

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel **B.Nataraj**
CEO **FM**

Schedule 17

Significant Accounting Policies

1. **Accounting Period:**
   Financials are reported from 01st April of a year to 31st March of the following year.

2. **Reporting currency:**
   The reporting currency of the Alliance is **Indian Rupee**.

3. **Basis of preparation:**
   The financial statements are prepared under the historical cost convention, in accordance with the generally accepted accounting principles in India.

4. **Method of Accounting:**
   Accounts are maintained on accrual basis.

5. **Change in Accounting Policy:**
   Grants Awarded - Recognition:
   Till the year ended 31st March, 2014, selection of an awardee by the Grants Selection Committee which creates a grant commitment was recognized as a Deferred Grant Liability. A corresponding Deferred Grant Expense was also recognized as an Asset. The Deferred Grant Expense and Liability not falling due during the current year was carried as "Deferrals" in the balance sheet, both as a Liability and as well as an Asset for the equal amount. Similarly, Deferred Grant Income which indicates commitment made by Settlors was being shown under Liabilities, with corresponding figure as Deferred Grant Receivable was shown on the Assets side in the Balance Sheet.

   During the year under review, the whole presentation was reviewed duly considering the application of Indian GAAP and relevant Accounting Standards 12 'Accounting for Govt. Grants as well as Accounting Standard 29 'Provisions, Contingent Liabilities and Contingent Assets' issued by the Institute of Chartered Accountants of India and other guidelines on accounting for grants and accordingly now, the accounting policy on disclosure of Deferred Liability including Deferred Income, Deferred Expense and Deferred Receivable are being appropriately disclosed in notes to the financial statements as off balance sheet items and not as financial commitments. The commitments of the stakeholders to provide funds in the subsequent years towards the awards made by the India Alliance are assured but no legal right to receive the said funds arise on the commitment of the same. The change in policy does not have any impact on the Income & Expenditure statement of the India Alliance.

   Grant Expense is recognized in Income and Expenditure Account from the start date of the grant over the period of the grant as per terms of payment. Corresponding Grant Liability is released to awardee.

6. **Grants Income Recognition – Income approach:**
   Income approach is adopted in recognizing grants matching with associated costs subject to:
   - Compliance of conditions and meeting the envisaged obligations;
   - Reliable measurement of the grant committed; and
   - Probability of economic benefits flowing

7. **Provisions:**
   Provisions are recognized on the basis of present legal or constructive obligation as on the date of balance sheet as a result of past events, requiring outflow of resources to settle the obligation and the same can be reliably estimated.

8. **Fixed Assets :**
   Tangible Fixed Assets:
   Fixed assets are stated at cost less accumulated depreciation and impairment loss, if any.
   The cost of an asset comprises of its purchase price and directly attributable costs of bringing the asset to working condition for its intended use.

   Intangible Fixed Assets:
   Intangible Assets are stated at cost of acquisition less accumulated amortization and impairment loss, if any.

   Non-Cash Contributions:
   Non-cash Contributions received including assets and services are recognized at their fairmarket value, at the time the service or asset is received.

   Capital Work-in-progress:
   All direct costs, indirect costs and incidental costs attributable for construction or development of fixed assets are classified as Capital Work-in-Progress till the construction or development of asset is complete in all respects and the asset is ready for its intended use.

9. **Depreciation on Fixed Assets:**
   Depreciation on Tangible Fixed Assets and Intangible Fixed Assets:
   Depreciation is charged on Fixed Assets as per **Written down value method** as per the rates and method prescribed under the Income Tax Act 1961 (Refer to Schedule 7)

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel **B.Nataraj**
CEO **FM**

10. **Receivables and Loans and Advances:**
Receivables and Loans and Advances are stated at their realizable value.

11. **Effects of changes in Foreign Exchange Rates:**
Foreign currency transactions are recorded on initial recognition in the reporting currency using the exchange rates on the date of the transaction. Year-end balances of current assets and liabilities of foreign exchange transactions are adjusted to exchange rates prevailing on the reporting date. Exchange differences on settlement / conversion are adjusted to Income and Expenditure account.

12. **Use of Estimates:**
The preparation of financial statements requires estimates and assumptions to be made that affect the reported amount of assets and liabilities on the date of the financial statements and the reported amount of revenues and expenses during the reporting period. Difference between the actual results and estimates are recognized in the period in which the results are known / materialized.

13. **Employee Benefit Expenses:**
Provident Fund:
The Contribution to Provident Fund, in the nature of defined contribution schemes, administered and managed by the Government of India, is charged off to the Income and Expenditure Account as and when incurred. There will not be any further obligations to the Trust beyond payment of committed monthly contributions under this Scheme.
Gratuity:
In accordance with applicable Indian laws, the Trust provides for gratuity, a defined benefit retirement plan (Gratuity Plan) covering eligible categories of employees. The Gratuity Plan provides a lump sum payment to vested employees, at retirement or termination of employment, an amount based on the respective employee's last drawn salary and the years of employment with the Trust.

14. **Contingencies & Events occurring after Balance Sheet date :**
Contingencies that can be reasonably ascertained are provided for, if in the opinion of the Trust, there is a probability of their future outcome being materially affecting the Trust.

Schedule 18

Notes to Accounts

1. The Trust is an Alliance formed by Wellcome Trust, UK and Department of Biotechnology, Government of India with the principal objectives of public charitable purposes of scientific research and education, including receiving, holding and disbursing funds for the promotion and funding of scientific research and education in India by way of grants. The Trust is registered as a public charitable trust in India.

2. **Grants:**

During the current year, 40 Researchers were selected, for awarding grants for research in the field of Science and Biotechnology. There are no cases of Grants declined after the reporting date but prior to approval of financials. Grants awarded to researchers are routed through the host Institution to which the researcher belongs.

Summary of Grants awarded/ committed

₹ In Lakhs

Grant Category	Current Year		Previous Year	
	Grants committed	No. of Awardees	Grants Commited	No. of Awardees
Research Training	171.00	05	--	--
Early Career	1,598.11	10	1,504.75	11
Intermediate	7,171.80	21	5,058.14	15
Senior	1050.67	03	464.88	01
Margdarshi	999.46	01	--	--
Total	**10,991.04**	**40**	**7027.77**	**27**

Details of Grants committed during the year

S,No	Name of the Institution		Name of the Researcher	Grant Commitment Rs. in Lakhs	Term
1	MF	SJMCH, Banglore	Prof Anura V Kurpad	999.46	60 Months
			Total	**999.46**	
1	SF	IISc, Banglore	Dr Narendra M Dixit	182.83	60 Months
2	SF	NCBS, Bangalore	Dr Raghu Padinjat	449.62	60 Months
3	SF	IGIB, Delhi	Dr Anurag Agarwal ('C)	418.22	60 Months
			Total	**1,050.67**	
1	IF	IISER, Bhopal	Dr R Mahalakshmi	353.56	60 Months
2	IF	IISER, Pune	Dr Nixon Abraham	304.65	60 Months
3	IF	NIBMG,Kalyani	Dr Samsiddhi Bhattacharjee	176.93	60 Months
4	IF	TIFR, Mumbai	Dr Mithilesh Mishra	323.72	60 Months
5	IF	IIT, Kanpur	Dr Arun Shukla	353.66	60 Months
6	IF	IICB, Kolkata	Dr Debabrata Biswas	298.09	60 Months
7	IF	THSTI, Gurgaon	Dr Guruprasad Medigeshi	363.19	60 Months
8	IF	NCBS, Bangalore	Dr Rajat Varma	360.00	60 Months
9	IF	IISER, Pune	Dr Monika Vig	360.00	60 Months
10	IF	inStem, Bangalore	Dr Sunil Laxman	351.16	60 Months
11	IF	inStem, Bangalore	Dr Minhajuddin Sirajuddin	291.88	60 Months
12	IF	NCBS, Bangalore	Dr Dimple Notani	369.18	60 Months
13	IF	PU, Kolkata	Dr Abhik Saha	359.82	60 Months
14	IF	IISER, Pune	Dr Jeet Kalia	356.54	60 Months
15	IF	IMTECH, Chandigarh	Dr Amit Tuli	364.50	60 Months
16	IF	NCBS, Bangalore	Dr Arati Ramesh	341.70	60 Months
17	IF	NCBS, Bangalore	Dr Dhirendra Simanshu	364.21	60 Months
18	IF	PHFI, New Delhi	Dr Jeemon Panniyammakal (C)	353.40	60 Months
19	IF	SEARCH, Gadchiroli	Dr Yogeshwar Kalkonde (C)	372.19	60 Months
20	IF	PHFI, Bangalore	Dr Giridhara R Babu (C)	386.56	60 Months
21	IF	ACTREC, Mumbai	Dr Nikhil Patkar (C)	366.86	60 Months
			Total	**7,171.80**	
1	EC	AIIMS, New Delhi	Dr Tavpritesh Sethi (C)	190.61	60 Months
2	EC	CMC, Vellore	Dr Suceena Alexander (C)	185.13	60 Months
3	EC	PHFI, New Delhi	Dr Shweta Khandelwal (C)	171.51	60 Months
4	EC	LVPEI, Hyderabad	Dr Srinivas Marmamula (C)	91.96	60 Months
5	EC	NCBS, Bangalore	Dr Laasya Samhita	164.10	60 Months
6	EC	NCBS, Bangalore	Dr Reety Arora	167.77	60 Months
7	EC	IIT, Gandhi Nagar	Dr Neeraj Kumar	139.56	60 Months
8	EC	NCCS, Pune	Dr Md Zahid Kamal	169.07	60 Months
9	EC	UIET, Chandigarh	Dr Madhu Khatri	146.35	60 Months
10	EC	IIT, Madras	Dr Lakshmi Revathy Perumalsamy	172.05	60 Months
			Total	**1,598.11**	
1	RT	NIMHANS, Bangalore	Dr Bharath Holla	34.03	24 Months
2	RT	MSTR, Bangalore	Dr Muralidhara Nagarjuna	33.96	24 Months
3	RT	MSRUAS, Bangalore	Dr Sivaranjani Gali	34.00	24 Months
4	RT	SJMCH, Bangalore	Dr Maria Frances Bukelo	34.02	24 Months
5	RT	CMC, Vellore	Dr Sanjay Chilbule	34.99	24 Months
			Total	**171.00**	

Grants commited	**10,991.04**
Add : Related Costs	381.82
Grand Total	**11,372.86**
Add : Admin Expenses @ 5%	598.57
Grants Entitlement	**11,971.43**

*Note: 'C' for Clinical Fellows

3. Wellcome Trust, UK and Department of Biotechnology, Government of India have made a total commitment of £ 80 million each up to FY 2024-25 for utilizing the funds for scientific research and education in India.

3.1 Grants Income for the year is recognized as follows:

₹ In Lakhs

S. No	Particulars	Current Year	Previous Year
1.	Grants of earlier years falling due during the year	4583.59	3,838.04
2.	Grants of current year falling due during the year	336.18	763.01
3.	Direct expenses relating to selection of awardees	381.82	363.19
4.	Total of (1) to (3) above	6,301.59	4,964.24
Add:	Admin Expenses @5%	331.66	261.28
	Grants Income for the year	**6,633.25**	**5,225.52**

In accordance with the Indian GAAP income from grants is recognized on a matching principle. As per AS-12 issued by the ICAI, Government Grants related to revenue is recognized on a systematic basis over the periods necessary to match them with the related costs which they are intended to compensate. Since releases of further grants in subsequent years are contingent to the claims for payments made by the Fellows, no Income is deemed to be recognized in the current year. In keeping with the above guideline, and also by the application of prudence principle as per Indian GAAP wherein Incomes are not anticipated; they are recognized only when realized. Deferred Income based on the contingent payments in subsequent years are not reflected in the financial statement. The change in the method of reporting in the Financial Statement does not have any impact on the Income and Expenditure Account of the entity.

The projected amount of grants funds required which are contingent to the awards commitment having materialized is as under:

3.2 Projection of Funds required in subsequent years with respect to Grants Awarded during the year

₹ In Lakhs

S. No	Particulars	Current Year	Previous Year
1.	Grants committed during the year	10,991.04	7,027.77
2.	Direct expenses relating to selection of awardees	381.82	363.19
3.	Total of (1) and (2) above	11,372.86	7,390.96
4.	Admin Expenses @5%	598.57	389.00
	Admin Expenses on Opening Balance Adjustment	-	34.74
	Total of (3) and (4) above	11,971.43	7,814.70
Less:	Grants income recognised during the year	6,633.25	5,225.52
Projected Fund Requirement		**5,338.18**	**2,589.18**

3.3 Projection of Funds required against the Awards made till date

₹ In Lakhs

Particulars		Current Year	Previous Year
Opening balance		16,307.84	13,861.25
Add:	Projected fund Requirement	5,338.18	2,589.18
Less:	Grants declined during the year	808.28	142.59
Estimated future requirement of funds as on 31st march, 2015		**20,837.74**	**16,307.84**

4. Reserve Fund:

₹ In Lakhs

Financial Year	Fund Balance at the Beginning of the Reporting Period	Funds recognized During the Reporting Period	Funds Applied During the Reporting Period	Earlier DBT Amount Regrouped	Fund Balance on the Reporting Date
2014-15	4.37	6,759.34	6,611.98	-	151.73
2013-14	750.77	5,357.29	5,202.69	901.00	4.37
2012-13	764.04	4,384.20	4,397.47	-	750.77
2011-12	731.98	4,360.59	4,328.53	-	764.04
2010-11	849.15	2,728.60	2,845.77	-	731.98
2009-10	898.07	985.23	1034.15	-	849.15

5. Grant Liabilities arising after 31st March, 2015:

₹ In Lakhs

Grant Category	Opening Deferred Liability	Grant Declined During the Year	Grants Revision/ Permanent Reduction	Grants awarded During the Year	Deferred Grant Transferred to Expenditure	Closing Deferred Liability
Research Training	-	-	-	171.00	1.46	169.54
Early Career	2,935.58	468.85	135.81	1,598.11	809.08	3,391.57
Intermediate	9,348.39	534.84	94.94	7,171.80	3,859.89	12,220.40
Senior	2,307.98	-	5.07	1,050.67	1,016.34	2,347.38
Margdarshi	900.50	-	-	999.46	233.00	1,666.96
Total	**15,492.45**	**1,003.69**	**235.82**	**10,991.04**	**5,919.77**	**19,795.85**

6. Status of Current Grant Liabilities:

₹ In Lakhs

Grant Category	Opening Grants unpaid	Supplementry Funds/ Public Engagement Award	Grants falling due During the Year	Retention amount During the Year	Grants released During the Year	Amount Credited to WT & DBT	Unpaid Grants Closing Balance
Research Training	-	-	1.46	-	1.46	-	-
Early Career	83.99	1.88	809.08	(28.45)	793.18	36.90	93.32
Intermediate	135.86	10.00	3,859.89	(138.34)	3,656.39	62.30	425.40
Senior	100.64	-	1,016.34	(2.80)	965.07	-	154.71
Margdarshi	-	-	233.00	-	233.00	-	-
Total	**320.49**	**11.88**	**5,919.77**	**(169.59)**	**5,649.10**	**99.20**	**673.43**

7. Total amount of Funds received till current year

₹ In Lakhs

	Amount upto 31st March 2014	Received during the Year	Amount upto 31st March 2015
Department of Biotechnology	9,052	3,000	12,052
Wellcome Trust	9,076	3,247	12,323
Total	**18,128**	**6,247**	**24,375**

8. Provision for Income Tax - Current and Deferred Tax:

Provisions for current income tax and deferred tax are considered as **NIL** as the Alliance is registered u/s 12AA & 10(23C)(iv) of the Income Tax Act, 1961 and accordingly, the income of the Alliance is not liable to Income Tax as per the provisions of the said Act.

9. Provision for Auditor's remuneration :

i) Statutory Audit Fees to M/s Sarath & Associates ₹ 1,87,619

ii) Internal Audit Fees to M/s Somanchi & Co. ₹ 4,31,462

10. The Current Assets, Loans and Advances are stated at estimated realizable values in the ordinary course of activities of the Trust.

11. Related parties Disclosures:

During the year, no trust funds were utilized for the benefits of the settlors or the trustees other than reimbursement of expenses incurred by them.

12. Voluntary Pre-closure of Grant

During the year, there were three cases of Pre-mature termination. The amount of Grant spent till the pre-closure amounted to Rs.501.59 Lakhs.

13. No Cost Extension:

The term of four fellowships has been extended as a No Cost Extension and the amounts projected to be released to the extent of unspent in their accounts, as under.

Grant Holder Name	Institution Name	Grant Closing Date	Period of Extension	No Cost Extension Amount
Dr Rashna Bhandari	CDFD, Hyderabad	31.10.2014	1 Year	132.57
Dr Kausik Chakraborty	IGIB, Delhi	31.12.2014	3 Months	9.15
Dr Neha Vyas	inStem, Bangalore	31.05.2014	1 Year	20.22
Dr Harsha Gowda	IOB, Bangalore	30.09.2014	6 Months	14.22

14. Sundry Creditors do not include any dues to Small Scale Undertakings.

15. Gratuity provision had been made during the year based on Actuary Valuation Report, given in accordance with the Accounting Standard – 15 "Employee Benefits" issued by the Institute of Chartered Accountants of India.

16. During the year under review, the Trust has provided for Leave Encashment amounting to Rs.4.66 Lakhs on accrual basis.

17. During the immediately preceding year under review, there was regrouping of accounts showing funds received from Department of Bio Technology to the extent of Rs.901 Lakhs from the Reserve Fund to Receivables Account to reflect actual position of funds between Wellcome Trust and Dept of Bio Technology.

18. Previous year's figures have been regrouped / reclassified wherever necessary to conform to the classification of the year.

19. Contingent Liabilities:

There were no contingent liabilities as of the reporting date. There were no contingent liabilities at end of the previous year also.

20. Schedules 1 to 18 and Significant Accounting policies form integral part of the accounts and have been duly authenticated.

Abbreviations Used:

CDFD	Centre For DNA Fingerprinting & Diagnostics
DBT	Department of Biotechnology
IOB	Institute of Bioinformatics
ICGEB	International Centre for Genetic Engineering & Biotechnology
IGIB	Institute of Genomics and Integrative Biology
inStem	Institute for Stem Cell Biology And Regenerative Medicine
NCBS	National Centre for Biological Sciences
NII	National Institute of Immunology
IISC	Indian Institute of Science
IISER	Indian Institute of Science Education & Research
TIFR	Tata Institute of Fundamental Research
NCL	National Chemical Laboratory
JNCASR	Jawaharlal Nehru Centre for Advanced Scientific Research
CMC	Christian Medical College
AIG/AHF	Asian Institute of Gastroenterology/ Asian Health Care Foundation
TMC	Tata Memorial Centre
RCB	Regional Centre for Biotechnology
NBRC	National Brain Research Centre
NIMHANS	National Institute of Mental Health and Neurosciences
NCCS	National Centre for Cell Science
THSTI	Translational Health Science and Technology Institute

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel
CEO

B.Nataraj
FM

Contd..

Abbreviations Used:

RGCB	Rajiv Gandhi Centre for Biotechnology
PGIMER	Postgraduate Institute of Medical Education & Research
IIT	Indian Institute of Technology
ACTREC	Advanced Centre for Treatment, Research and Education in Cancer
CSIHM	C.S.I. Holdsworth Memorial Hospital
IMTECH	Institute of Microbial Technology
GIGHI	George Institute for Global Health of India
GMCJJGH	Grant Medical College/Sir JJ Group of Hospitals
IACS	Indian Association for Cultivation of Science
NIBMG	National Institute of Biomedical Genomics
UOA	University of Allahabad
SJMCH	Saint John's Medical College and Hospital
IICB	Indian Institute of Chemical Biology
PU	Presidency University
PHFI	Public Health Foundation Of India
SEARCH	Society for Education, Action and Research in Community Health
AIIMS	All India Institute of Medical Sciences
LVPEI	L V Prasad Eye Institute
UIET	University Institute of Engineering and Technology
MSTR	Mazumdar Shaw Center for Translational Research
MSRUAS	MS Ramaiah University of Applied Sciences

The Wellcome Trust / DBT India Alliance

Sd/-

Dr Shahid Jameel
CEO

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