News & Views

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INDIA ALLIANCE

EDITORIAL

Welcome to the March 2017 issue of the Wellcome Trust/DBT India Alliance Newsletter. In this issue we bring to you updates on new research stories penned by our Fellows, funding opportunities, event updates and interesting interviews. This newsletter also features new India Alliance Fellows and the research they are pursuing.

At the outset, we would like to congratulate our Fellow, Dr **Amit Awasthi**, (Translational Health Science and Technology Institute, Faridabad) who was awarded G P Talwar mid-career Scientist Award 2016 by the Indian Immunology Society. Also, IA Fellow at IIT Kanpur, Dr **Arun Shukla** joins the editorial board of Wiley's Journal of Cellular Biochemistry and was recently invited as a guest editor for Elsevier's latest volume in the Methods in Enzymology series "Proteomics in Biology- Part A and B".

We are presently not accepting applications for **any of our Fellowship schemes**. Submitted applications are currently under review.

In the Research Highlights section, IA Fellow, Dr **Rupjyoti Talukdar** (Asian Institute of Gastroenterology, Hyderabad) takes us through his recently published work elucidating the underlying molecular mechanisms in acute and chronic Pancreatitis pathogenesis and provides a curious connection between pancreatitis, diabetes and gut microbiome. Intermediate Fellow at Indian Institute of Science, Bangalore, Dr **Purusharth Rajyaguru**, writes about his latest research which elucidates the effect of RNA-binding protein modification on gene regulation in a baker's yeast model. Ecologist and IA Intermediate Fellow, Dr **Abi T Vanak** (Ashoka Trust for Research in Ecology and the Environment, Bangalore) makes a case for rabies control in India in an insightful piece set in the backdrop of his current research work. This newsletter also includes interviews of our Intermediate Fellow Dr **Sreelaja Nair**, Tata Institute of Fundamental Research, Mumbai and India Alliance Fellowship Committee member, Prof **Mohan Balasubramanian**, Warwick Medical School, UK.

For those of you who missed our last issue, we would like to highlight once again that the India Alliance "Event Support" has been replaced by our new funding scheme for interdisciplinary meetings-the "**India I EMBO Symposia**", a joint collaboration between the India Alliance and European Molecular Biology Organization (EMBO) which aims to co-fund up to three meetings in a year in India that intend to address discovery and innovation through an interdisciplinary approach, with the speakers and participants discussing important global challenges in the context of the life sciences. Applications submitted for the first round are currently under review. The next call for applications will be made next month. More information on this funding opportunity is included in this issue and is also available on the India I EMBO Symposia website.

The India Alliance continues to organise various Science Communication training activities. The India Alliance will be hosting a unique workshop "**Visualising Science**" in partnership with Nature India and National Institute of Immunology, which aims to introduce scientists to visual tools and methods that make science communication more effective and interesting. The issue includes short reports on our recently concluded 19th **SciComm101** workshop in Manipal University and 15th biannual **two –day SciComm Workshop** in Hyderabad.

On the Public Engagement front, we are excited to support the next public event around **Mental Health "It's Ok to Talk"** organised by the PRIDE team at the Public Health Foundation of India, which coincides with WHO's World Health Day next month**.** More details on these events are included in this issue. This issue also includes highlights from a report prepared by the Wellcome Trust International Engagement based on a survey that gathered views of Public and Community engagement with research in India and Africa.

As always, we would like to extend our heartfelt gratitude to those who have contributed to this newsletter. Special thanks to our Intermediate Fellow, Dr **Abi Vanak** for the cover image, where he is seen with an Indian Fox , tagged with a high-resolution GPS transmitter to track their movements, which helps Abi and his team to determine their possible interactions with dogs and transmission of infections such as rabies.

As always, it's a pleasure to receive your valuable comments and suggestions for the newsletter so please do keep them coming.

Best wishes,
Sarah Iqbal, PhD
Public Engagement Officer
Wellcome Trust/DBT India Alliance

CONTENT

Image credit: Wellcome Images

Efficient information encoding in hippocampal neurons

Dr Rishikesh Narayanan
Senior Fellow 2016

Indian Institute of Science, Bangalore

WEBSITE

Neurons are thought to hold a central piece in the puzzle on how we learn and store memories. The amazing complexity of these cell-types — complete with their complex structure and the perpetually reorganizing innumerable types of protein molecules that define their function — however, has impeded progress towards a clear understanding of how they adapt to and store new information. In our current work, we ask if this complexity is the solution (rather than being the problem), which bestows upon neurons the ability to efficiently encode information through several disparate routes, while also not losing the semblance of their functional identity.

Technology for Tuberculosis:
Mobile phone-based directly observed treatment for supporting adherence to anti-tubercular treatment in India

Dr Rashmi Rodrigues
Intermediate Fellow 2015
(Clinical and Public Health Research Fellowship)

St. John's National Academy of Health Sciences, Bangalore

WEBSITE

Widespread prevalence, prolonged treatment and emergence of drug resistant strains resulting from suboptimal adherence to treatment, make tuberculosis a disease of public health importance both globally and in India.

The current Indian guidelines for tuberculosis recommend an alternate day, directly observed treatment (DOT) regimen that will soon transition into a daily treatment regimen. Given this scenario, the logistics of daily treatment along with factors such as, forgetfulness, stigma, loss of wages and medication side effects, pose barriers to treatment adherence and completion.

The ubiquity of mobile technology presents a unique opportunity to support tuberculosis treatment. However, evidence indicates the need for family, peer or counseling support along with such mobile phone interventions.

This study proposes an alternative to in-person DOT with mobile phone based video DOT along with counseling support. For this, patients will send in a video of themselves taking medications via their mobile phone and receive monthly adherence counseling (video DOT). The effectiveness of video DOT will be studied in a Randomized Controlled Trial (RCT) in treatment naïve tuberculosis patients. Consenting patients will be divided into two groups of 190 patients each, with an equal chance of being allocated to either group. One group will receive the video DOT intervention, while the other, the prevailing standard of care. Treatment completion and adherence along with the multidimensional impact of tuberculosis on the individual, i.e., costs of care, nutritive status, quality of life and emergence of multidrug resistance, will be studied over time. Perceptions regarding the intervention, studied through in-depth interviews in a subset of participants and analysed with a qualitative approach will assess if the intervention is patient centric and user friendly.

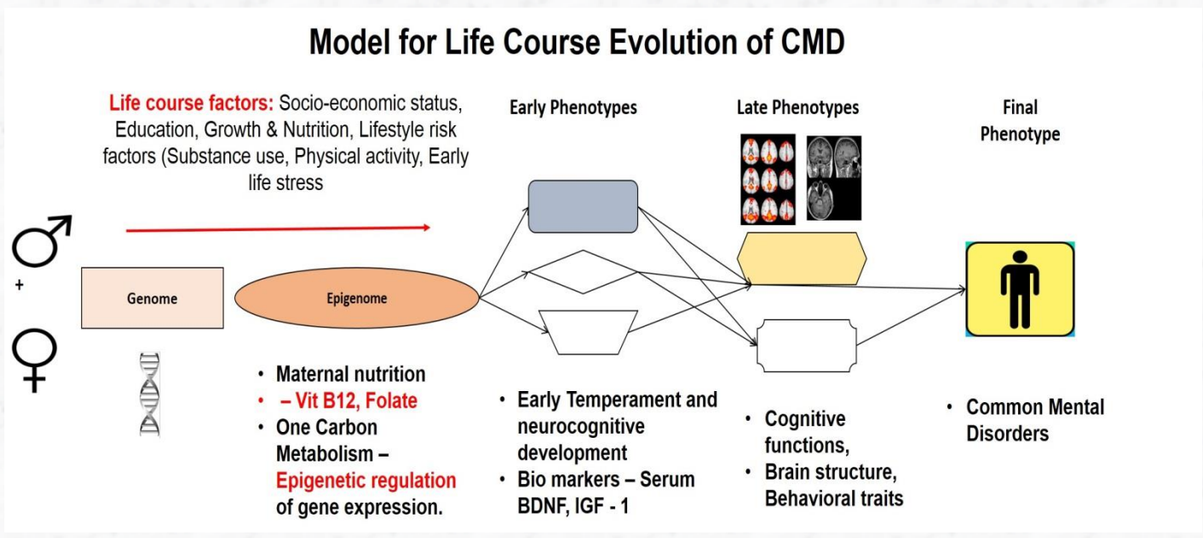
Investigating the impact of mother's nutrition on the mental health of young adults of a prospective birth cohort

Dr Rishikesh V. Behere
Intermediate Fellow 2016
(Clinical and Public Health Research Fellowship)

KEM Hospital Research Center, Pune

WEBSITE

Mother's nutrition during pregnancy can affect brain development of fetus. Vitamin B12 deficiency is common in Indian women, however they routinely receive only iron-folic acid supplements during pregnancy. At KEM hospital, Pune, group of 700 children are being regularly assessed since their birth in 1994 and their mothers Vitamin B12- folic acid levels were measured during pregnancy. In this study we will examine whether mother's nutrition during pregnancy has long-term effects on risk for mental disorders in offspring as well as brain size and its functions. This may provide scientific evidence for advocating micronutrient supplementation including iron-folic acid and vitamin B12 to all mothers during pregnancy.



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Super-resolution imaging to study cell structure changes in aging

Dr Sarit S. Agasti
Intermediate Fellow 2016

Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore

WEBSITE

The cytoskeleton is an important cellular component, participating in various fundamental cellular functions. It acts as scaffold to maintain cell shape and internal organization. In addition, cytoskeleton plays crucial role in organelle transport, cell division, cell-cell communication, cell signaling, and ultimately defining cell fate. Due to their essential roles in various cellular processes, the cytoskeleton has been linked to the process of aging and progression of age-related diseases. However, majority of the current studies were performed to elucidate the role of a single or a very small group of cytoskeleton components during aging process. It should be noted that along with three major cytoskeleton building blocks, microtubule, actin filaments and intermediate filaments, there are a large number of auxiliary proteins that control their dynamics, assembly/disassembly, homotypical/heterotypical organization, and ability to cross-link with various organelles. Therefore, despite these progresses, a fundamental gap remains between our understanding of individual cytoskeleton component and the network level view of how different cytoskeleton components function collectively to maintain normal function and are altered during aging. My goal is to utilize an innovative DNA-based super-resolution imaging technique with high multiplexing power (>100X) for in situ cytoskeleton network mapping to elucidate the molecular and structural basis of cytoskeleton alteration during aging.

An investigation of the impact of chromosome organisation on global gene expression and evolution of bacteria

Dr Aswin Sai Narain Seshasayee
Intermediate Fellow 2016

National Centre for Biological Sciences, Bangalore

WEBSITE

Microbes rapidly adapt to their environment, be it the unique challenges posed by life in the human body, or in facing up to the plethora of toxins and nutrient shifts that they encounter everywhere. Over short timescales, they do so by changing the set of proteins and other molecules they produce, i.e. by changing gene expression states; and over longer timescales by making changes to their genetic material. At times, the two converge. We ask how large and reversible changes to the genetic material can result in gene expression alterations. Is the ability to do so hardwired in the genome?

Structure, functions and recognition of long non-coding (lnc) RNA

Dr Regalla Kumaraswamy
Intermediate Fellow 2016

Center for Cellular and Molecular Biology, Hyderabad

WEBSITE

All protein-coding genes in humans originate from about 2% of the genome and the remaining portion of the genome remains untranscribed or transcribed as non-coding RNAs. All available therapies and disease diagnostics today are based on this 2% of the coding-genome. Until recently, non-coding genome was believed to be 'junk' DNA. However, recent studies have highlighted the importance of non-coding RNAs in various pathophysiological conditions. MicroRNAs (≈21nt-long) and long non-coding RNAs (lncRNAs; ⩽200nt-long) are the two major classes of non-coding RNAs that regulate gene-expression. We and others have shown that microRNAs play a very important role in cardiovascular diseases. However information about the role of lncRNAs in this context is relatively scarce. General research focus in my lab at CCMB is to understand how lncRNAs regulate fate of the different major cellular subsets of the heart (cardiomyocytes, fibroblasts and endothelial cells).

Identifying predictive and prognostic biomarkers in Acute Lymphoblastic Leukemia (ALL)

Dr Arunabha Chakrabarti
Early Career Fellow 2016

Tata Translational Cancer Research Centre (TTCRC), Tata Medical Center, Kolkata

WEBSITE

Alteration(s) in *IKZF1* (a B-cell developmental gene, functions as transcription factor), alone or in combination with other gene mutations, induce downstream signaling pathways that promotes leukemic cell survival on chemotherapy and risk of relapse in ALL. Combination of sensitive genomic and proteomic analyses along with functional studies can identify molecular biomarker(s) and pathways that can be used to further risk-stratify ALL patients and identify alternate targets for therapy.

The overall aim of the project is to identify predictive and prognostic biomarker of ALL for better risk stratification and alternative cost-effective therapeutic approach.

ALL therapy is risk-stratified using a complex algorithm. As a result of high-cost of treatment, outcomes in India and other developing countries have stagnated over the last 3 decades.

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The national ICiCLe protocol, a TTCRC initiative, has created a modern-yet-simplified clinical management process for childhood ALL. This brings with it the opportunity to ask questions about the treatment response as-well-as develop new cost-effective tools for risk stratification and also investigate alternative therapeutic options in terms of repurposing drugs. This proteogenomic study both in cell lines as-well-as in patients with known IKZF1 status will have impact on alternative treatment strategy for ALL patients in India.

Investigating circadian behavior in *Drosophila*

Dr Nisha N Kannan
Early Career Fellow 2016

Indian Institute of Science Education and Research (IISER)
Thiruvananthapuram, Kerala

WEBSITE

Evidence from genetic and molecular approaches contributed significantly to our understanding on the molecular basis of circadian timing system. Molecular oscillation of circadian clock is based on clock genes such as period and timeless that drive the rhythmic expression of transcripts and product proteins. Regulation at various levels including transcriptional, post-transcriptional and post-translational mechanisms is important for the accurate functioning of the circadian clock. Emerging evidence indicates an important role for post-transcriptional regulation including from splicing, polyadenylation to non-coding functions by microRNAs. Among the post-transcriptional regulation, mRNA stability plays an important role in rhythmic expression and cycling of transcripts. Although microRNAs recently emerged as significant players in accurate timing of the circadian timing system, broad impact of microRNAs in circadian rhythm remains to be elucidated. To this end, my studies are focused towards elucidating micro RNA mediated post-transcriptional regulation of circadian rhythms.

Modulation of physiological and oncogenic Ras protein signaling *via* plasma membrane clustering

Dr Anchal Chandra
Early Career Fellow 2016

National Center for Biological Sciences, Bangalore

WEBSITE

Activated KRas signaling is among the most common molecular drivers in human cancers, but therapeutic targeting of KRas remains a challenge. Emerging evidence suggests that the dynamics of KRas proteins in cellular membranes, in particular, their homo- and heterotypic interactions in nanoscale protein clusters in these membranes, drives KRas-mediated signaling. The central aim here is to elucidate the mechanisms that underlie KRas protein clustering in the plasma membrane, and its role in physiological and oncogenic signaling.

The second objective is to investigate the role of cortical actin embedded beneath the cytoplasmic side of the plasma membrane in regulating the nanocluster architecture of Ras proteins. I hypothesize that the protein and lipid sorting by cortical cytoskeletal filaments create restrictive environment for the plasma membrane associated KRas protein diffusion and hence imparting a definite nanocluster architecture. This nanoscale organization of Ras proteins is essential for its signaling activity. This mechanistic control via cortical actin serves an internal feedback control mechanism to maintain high fidelity signaling at the plasma membrane especially in case of oncogenic KRas, which is uncoupled to receptor-initiated signals.

FROM INTERMEDIATE TO SENIOR FELLOWSHIP

India Alliance Intermediate Fellows Dr Thomas Pucadyil, (2011) Dr Subba Reddy Maddika (2011) and Dr Amit Singh (2009) recently received our Senior Fellowship (Basic Biomedical Research Fellowship scheme). Here, Dr Thomas Pucadyil and Dr Subba Reddy Maddika, talk about their experience on the IA Fellowship so far and their plans to build on their research in round two of theFellowship.

Dr Thomas Pucadyil
Senior Fellow 2016
Indian Institute of Science Education and Research (IISER), Pune
WEBSITE

Internalization of membrane receptors from the cell surface is vital to cellular physiology since it regulates nutrient uptake and display of adhesion molecules, ion-channels and antigen-presenting receptors. Internalized receptors are sent to the lysosome for degradation or recycled back to the cell surface for additional rounds of endocytosis. The latter process is known as endocytic recycling and is managed by the endocytic-recycling compartment (ERC). Remarkably however, the mechanism by which vesicles are released from the ERC remains unclear. Every vesicle generated inside the cell is an outcome of a regulated process of membrane fission wherein a protein coat polymerizes around and severs a tubular membrane intermediate. Despite an appreciation of the ubiquitous nature of membrane fission reactions, identifying proteins that manage this process has been a tremendous challenge in contemporary cell biology. Our current research, generously funded by the Wellcome Trust/DBT India Alliance in the form of a Senior Fellowship, aims to address this question by taking a reconstitution approach to understand how proteins remodel and vesiculate membranes at the ERC.

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INDIA ALLIANCE FELLOWSHIP : Round 2

People who made it all possible. The supported membrane tubes (SMrT) assay system constitutes Srishti Dar's (left) and Sukrut Kamerkar's (right) thesis work. SMrT templates constitute our core-assay system with which to understand the process of membrane fission.

I have invested close to 10 years researching membrane fission both as a Postdoctoral Fellow at the Scripps Research Institute and now as an Associate Professor at IISER Pune. During this period, my lab has been instrumental in designing novel model membrane assay systems with which to interrogate the process of membrane fission. The generous funding support the lab has received from the Wellcome Trust/DBT India Alliance in the form of an Intermediate Fellowship has yielded a novel high throughput assay platform that can be utilized in understanding membrane fission from a systems biology perspective. The assay lends itself easily to assaying membrane fission activity in cell lysates and designing small molecule inhibitor screens for such activity. The success of this assay is realized in numerous requests for collaborations we have received since the paper describing our results was published. I am very grateful for the generous financial support already provided by the India Alliance and to fostering a platform where strong collaboration are forged; not just those based on science but also ones that organically manifest between compatible personalities.

Dr Subba Reddy Maddika
Senior Fellow 2016

Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad

WEBSITE

Phosphatases are a group of ubiquitously expressing enzymes, which are responsible for the removal of a phosphate group of various proteins in a cell. Phosphatases play a crucial role in nearly every cellular process, including metabolism, gene transcription and translation, cell-cycle progression, protein stability, signal transduction, and apoptosis. While several kinases (their counterpart enzymes) have been found to be intricately involved in human malignancies, studies on the role of phosphatases are very limited.

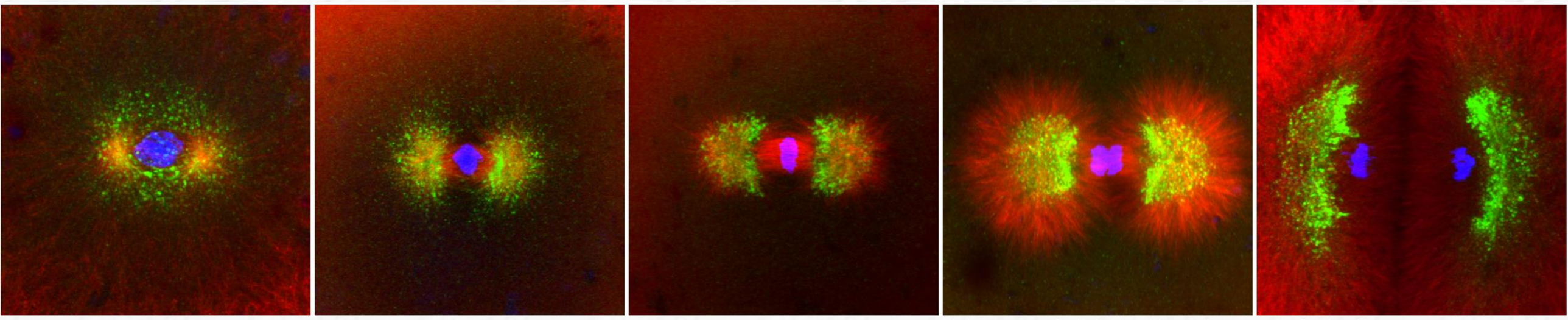
I started my independent scientific career at CDFD with the goal to establish a program on cellular phosphatases. We envisioned identifying and characterizing novel cellular functions and pathways controlled by phosphatases along with their role in human cancers. We initiated the program to address two important questions

Can we identify novel cellular functions for phosphatases based on their interactors?
Can we fill in any missing mechanistic links for the role of phosphatases that were already established?

The Intermediate Fellowship awarded by the Wellcome Trust/DBT India Alliance at that stage of establishing my independent lab has been very critical in helping me address these questions. During my tenure as an intermediate Fellow, we proposed to utilize a proteomics based approach to establish the functional network of phosphatases in human cells. With the generous funding support from India Alliance, we established a detailed interaction network of 143 human phosphatases, which contains about 85% novel interactions. Using this approach, we readily established the concept of identifying novel functions for cellular phosphatases based on interacting partners. For example, we demonstrated that tumor suppressor phosphatase, PTEN, functions in endosome maturation *via* interacting with Rab7, a critical GTPase in this process.

The IA Fellowship has provided me the freedom and flexibility to address all important research questions in establishing my independent program at CDFD. Importantly, the generous support from Wellcome Trust/DBT India Alliance made it possible for young scientist like me to try new and risky directions. The highly competitive Fellowship program coupled with generous funding support, timely review mechanism, and extremely interactive Annual Fellows Meeting, undoubtedly makes it the best funding program in the country today. The timely release of funds, prompt response from the IA office including the Grant Adviser and Finance Manager was fantastic and definitely helped us in carrying our experiments in an unfettered manner. The Fellowship has truly helped us in asking bigger and bolder questions. I can strongly state that our work would not have reached the stage it is at right now without the support of the IA Intermediate Fellowship.

Having taken the early steps with intermediate fellowship, we now proposed to identify novel cellular functions for different phosphatases and characterize their importance in various cellular pathways based on our phosphatase interactome. As we are at the critical juncture of taking forward our program on phosphatases, it is highly important to have an unfettered support. Thus, the Senior Fellowship awarded to me by the Wellcome Trust/DBT India Alliance will now make it possible for me to expand into new directions, provide high quality training for graduate students and importantly assist in addressing the basic questions in phosphatase biology.



Various stages of cell division, Mitosis (Image credit: Sreelaja Nair)

INDIA ALLIANCE FELLOW IN SPOTLIGHT

Dr Sreelaja Nair

Intermediate Fellow, Tata Institute of Fundamental Research, Mumbai

Please tell us what you are working on and what impact do you hope it will have.

Each species has a defined amount of DNA, which is known as the chromosome number. For humans this number is 46 represented by 23 pairs, one set of which comes from the father and one set from the mother. Several congenital diseases have abnormal chromosome numbers such as Down`s syndrome. A drastic change in chromosomal numbers is also a cause of spontaneous abortions and is a hallmark of cancer cells. In disease conditions such as myocardial infarction, the heart cells at the site of the blockage change their chromosome numbers. All of these are ploidy syndromes and we use zebrafish to study the importance of fidelity in chromosome number for development of an embryo.

Zebrafish are native to India and are found extensively across rivers in the country. We find that when we change the chromosome numbers in zebrafish embryos, the embryo attempts to alter a machinery inside cells known as the mitotic spindle that allow the chromosomes to separate equally when a cell divides. What was unexpected is that embryos alter mitotic spindle parameters even at the one cell stage, very soon after fertilization. In some sense, altered chromosome numbers sets the stage completely wrong for normal development. We are trying to understand exactly how it goes wrong and why. We are also trying to model altered ploidy conditions seen in disease states such as myocardial infarcts in the zebrafish heart. Hopefully, the information will be helpful in understanding why cells allow ploidy changes to happen and once it happens why it is bad for normal development.

What motivated you to become a scientist?

On a practical level, we are part of the biological world around us and we must understand the biology of ourselves as a species and that of species around us to justify placing ourselves at the top of the evolutionary pyramid.

If I have to articulate it on a more personal level, I think I was drawn in by the idea of solitude. I don't mean solitude in terms of isolation and remoteness, which is bad for scientific and intellectual growth. I mean solitude as in private-ness. Ultimately a scientific endeavour is a long conversation in your mind and I find it quite apt that all scientists get a degree in philosophy.

Is there a research area other than yours that interests you deeply?

I love the phenomenon of a one-cell becoming a complete organism. I can watch movies of development over and over again and still watch it one more time with equal fascination. At first glance the transformation into an embryo or larvae seems magical. But this magic is governed by strict rules of evolution, which executes a precise molecular and cellular program at an equally precise time and space in the embryo. Discovering some of these rules is and will continue to be my fascination as long as I live. Zebrafish is an incidental choice as my current muse and in this organism understanding fundamental mechanisms of cell division currently occupies most of my awake time. However, recently we have accidentally gotten involved in attempting to understand the role of a transcription factor in development of the habenula. The habenula are thought to be the reward-punishment centers in the brain. This is something I have never worked on in my career, but I am excited about understanding how a vertebrate embryo sets this center up during development. So besides ploidy, I have been trying to devour everything I can get my hands on regarding the habenula!

What must we do to encourage a stronger Postdoc culture in India?

We will only be able to seed a postdoc culture in India when we are able to provide jobs for our in-house trained postdocs. They must be able to view the option of continuing in or coming back to India for a postdoc as a productive addition to their career trajectory, not as a compromise due to personal or other circumstances. At the same time a stint in the research environment of a foreign country is a necessary part of ones growth as a member of the global research community. India Alliance's Early Career Fellowship provides for this opportunity, which is a step in the right direction. We need to erase the general impression that postdocs trained outside India are better than the ones trained-in-house. Currently, this impression has elements of truth in it and there are of course certain exceptions.

In India the academic structure in a lab is very top and bottom heavy. At the top you have the principal investigator (PI) and at the bottom, the students. Postdocs would be a fantastic pool of skilled intellectually driven individuals to occupy the middle tier as research associates. We have no provisions for it in the current academic structure. As of now, unless a postdoc gets a job as a PI or joins a company, academia has very few positions that offer job security to the large masses of postdocs that are currently getting trained in India.

How has Wellcome Trust/DBT India Alliance funding helped you and your research?

The Intermediate Fellowship from Wellcome Trust/DBT India Alliance is absolutely great to have. The financial independence from institute funding during the very early stages of my career is liberating, a little shot in the arm, like a confidence booster! It truly allowed me to exercise some freedom in the kinds of people I was able to recruit for my lab and other expenses such as travel and some experiments that would otherwise not have gotten done.

The peer-review feedback on my research proposal was very useful when I was starting out. Through the annual meetings and other forum where fellows run into each other, there is a sense of belonging to a lively young research community in India, which is very crucial for a growing science economy.

What keeps you going everyday?

I still get as excited as my students when they see a result for the first time and try to interpret it in context of what they are studying. The sharpness of that feeling never dulls. The only difference between my student`s reaction to a result and my reaction is that I am equally intrigued by negative results, while they get disappointed when they encounter one. Despite all the stressors associated with being a scientist in the current world, my world of science is still an exciting conversation in my mind that is ongoing.

Find out more about Sreelaja's research here

INDIA ALLIANCE FELLOW'S

RESEARCH HIGHLIGHTS

Image credit: Dr Rupjyoti Talukdar

New insights into the underlying molecular mechanisms in acute and chronic Pancreatitis

Dr Rupjyoti Talukdar, Intermediate Fellow 2011
Asian Institute of Gastroenterology (AIG), Hyderabad

In India, Pancreatitis, which refers to inflammation of the pancreas, may primarily be acute and chronic, while autoimmune (a form of chronic pancreatitis) constitutes a very small proportion. Globally, the most common risk factors ascribed to acute pancreatitis are alcohol, smoking and gallstones. Acute pancreatitis is characterised by inflammation of the pancreas that could be associated with pancreatic injury (necrosis), systemic inflammatory response and multiorgan failure resulting in death. A substantial proportion of patients with pancreatic necrosis can develop infection of necrotic pancreas, especially from the second week of disease onwards. Fortunately, up to 75% patients with acute pancreatitis develop mild disease that resolves without the need for much intervention. However, there are no specific curative modalities for the remaining 25% who develop moderate to severe disease; and treatment is restricted predominantly to organ support and treatment of complications. The absence of specific treatment stems from a relative lack of understanding of the early pathogenesis of the disease in humans.

Challenging the role of proteases in pancreatic injury and inflammation

Several elaborate mechanistic studies had been conducted previously in experimental models based on which treatment modalities such as the use of protease inhibitors (gabaxate, nafamostat) have been shown to be beneficial in experimental models, but results in clinical trials were heterogeneous. This led to an important question- is protease activation really required for acute pancreatitis? The concept of pancreatic intra-acinar activation of trypsinogen to trypsin had been held as the central dogma in the pathogenesis of acute pancreatitis. We challenged this century old question couple of years back, and conducted experiments where we induced acute pancreatitis in wild-type and trypsin knock-out mice. We observed that there was pancreatic injury even in the absence of trypsin, and there was parallel activation of the inflammatory cytokine, NF-*k*B **(***Gastroenterology*, 2011**)**. These data clearly implied that the protease, trypsin, though important, is not mandatory for development of pancreatic injury and inflammation.

In order to delve further into the role of trypsin in the pathogenesis, we conducted experiments in Prof Ashok Saluja's lab, University of Minnesota, USA, where we could demonstrate a novel paradigm of pancreatic acinar cell apoptosis or necrosis. Our data clearly showed that it is the concentration of the hydrolytic enzyme, cathepsin B in the cytosol of the acinar cells that determines whether the acinar cell will undergo apoptosis or necrosis. An important early event that has been consistently shown to occur in acute pancreatitis is co-localization of lysosome and zymogen containing organelles, which now has been proven to be impaired autophagy. In our studies, we observed that the role of trypsin is to make the membranes of autophagic vacuole permeable, through which cathepsin B leaks out into the cytosol and lead to acinar cell apoptosis or necrosis (*Gastroenterology* 2016). However, these events occur very early (in a matter of minutes) in the pathogenesis of acute pancreatitis. In the clinical context, by the time a patient visits the hospital with severe abdominal pain, these events have already passed; and what the patient manifests is the result of the early events, i.e. a systemic inflammatory response. Therefore, in order to treat human pancreatic inflammation one needs to study human pancreatitis. This notion led our group to embark into experimental pancreatitis using human pancreatic tissue with bile acid and alcohol. Our studies revealed that autophagy occur in human biliary acute pancreatitis and the acinar cell is the earliest source of cytokine release. These cytokines then activate the peripheral blood mononuclear cells (PBMCs) that flow through the pancreatic circulation. The cytokines liberated by the activated PBMCs lead to a systemic inflammatory response syndrome and also cause a second wave of injury to the pancreatic acinar cells. We believe it is the second wave of cytokines (from the PMBCs) that determine the severity of the disease in patients **(manuscript submitted and under revision).**

Identifying inflammatory biomarkers to predict infection of necrotic tissue in patients with acute pancreatitis

As patients with acute pancreatitis go into the second week, a proportion with necrosis develops infection in the necrotic tissue. The question here is why only a proportion of patients with necrosis develop infection? In sepsis literature there is an entity called **C**ompensatory **A**nti-**I**nflammatory **R**esponse **S**yndrome (CARS), in which there is down regulation of important cell surface receptor, HLA-DR, involved in immune response, and up regulation of the anti-inflammatory cytokine IL-10, among other mediators. Earlier, studies had indicated that HLA-DR down regulation could be associated with infected pancreatic necrosis in humans. We tested this in patients with acute pancreatitis admitted within 72 hours of disease onset, where we divided patients with and without infected pancreatic necrosis and looked for IL-10 and HLA-DR expression during the first and second week of illness. We observed that irrespective of eventual development of infected pancreatic necrosis, the HLA-DR is down regulated in nearly 90% of patients during the first week. However, HLA-DR down regulation persisted till second week only in those patients who developed infected necrosis. The relative risk (95% CI) for developing infected necrosis in the patients who continued to have HLA DR down-regulation into the second week of the disease was 2.8 (0.9-8.8). Along with this, IL-10 increased during second week only in the patients who developed infected necrosis **(manuscript in preparation)**. These data show that dynamic changes in these markers could be potential biomarkers that could predict development of infected necrosis. This needs further validation though. Currently we are evaluating in an experimental setting and also in patients with acute pancreatitis who present early in the disease if gut microbial dysbiosis could increase the susceptibility to infections and severity of the disease.

Diabetes in chronic pancreatitis is associated with infiltration of pancreatic islets with immune response regulating cells

Recurrent acute pancreatitis, especially those related to alcohol intake and those that are idiopathic (most of these are associated with genetic polymorphisms), progress to chronic pancreatitis. It was earlier shown that 50% of alcohol-related recurrent acute pancreatitis develops features of chronic pancreatitis in two years. We had recently shown that

recurrent acute pancreatitis in the presence of Claudin2 rs7057398 CC genotype was associated with seven fold higher risk of progressing to chronic pancreatitis **(***Journal of Gastroenterology and Hepatology*, 2015**)**. The pathological hallmark of chronic pancreatitis is pancreatic fibrosis, while clinically it is characterized by recurrent intractable pain, malnutrition resulting from Pancreatic Exocrine Insufficiency (PEI), and Type 3c diabetes that is distinct from Type 1 and 2 diabetes. In India, chronic pancreatitis and the related manifestations, including diabetes, mostly occur early in life, and we have recently shown that diabetes in chronic pancreatitis is associated with infiltration of immune response regulating cells (Th1 and Th17) into the pancreatic islets that is associated with secretion of the cytokine, interferon-γ **(***Pancreas* 2016**)**.

Alteration of gut microbiota in chronic pancreatitis

Since there is fat maldigestion due to PEI in chronic pancreatitis, it is likely that there will be an alteration in the gut microbiota. We tested for this by metagenomic 16S rDNA V3-V4 region sequencing and observed that there was a significant reduction in the relative abundance of the species *Fecalibacterium prausnitzii* in patients with chronic pancreatitis who had diabetes compared to those who did not. This bacterium is known to maintain the gut barrier integrity, implying that its reduction could result in disrupted gut barrier. We also observed an increase in LPS synthetic pathways among the intestinal bacteria and a parallel increase in plasma endotoxin. This correlated positively with blood glucose and negatively with relative abundance of *Fecalibacterium prasunitzii*. Taken together, these findings led to the hypothesis that pancreatic exocrine insufficiency and fat malabsorption results in gut microbial imbalance (dysbiosis) in chronic pancreatitis, which results in gut barrier alteration and translocation of endotoxin into the circulation. The circulating endotoxin could then contribute to islet dysfunction, along with other possible mechanisms. It is known from earlier experimental studies that endotoxins could result in islet injury *via* TLR4. We also observed correlation of the relative abundance with several bacteria genera with nutritional parameters **(***Scientific Reports*, 2017**)**. The current attempt in the lab has been to elucidate the mechanistic insights of the above findings that would provide better understanding of the connection between pancreatitis and gut microbiome.

Elucidating the effect of RNA-binding protein modification on gene regulation in a baker's yeast model

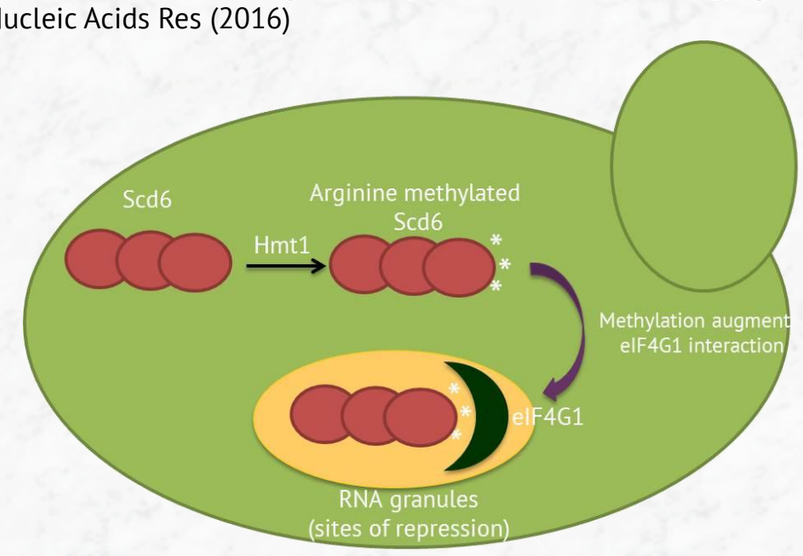
Dr Purusharth Rajyaguru, Intermediate Fellow 2012
Indian Institute of Science, Bangalore

Synthesis of proteins is key for maintaining optimal status of a cell. The step involved in conversion of RNA to protein (translation) is highly regulated to control protein output in response to physiological status of cell. Our work identifies role of a posttranslational modification of RNA-binding protein in regulating translation. Posttranslational modifications are chemical changes occurring on specific protein sequences. We have focused on arginine methylation, which is merely an addition of methyl group to arginine amino acid, of an RNA-binding protein Scd6 that acts as a negative effector of translation (translation repressor). Scd6 has a three amino acid motif (Arginine-Glycine-Glyicine ; RGG) which has been shown to be involved in arginine methylation in other proteins containing this motif. We have used baker's yeast, *Saccharomyces cerevisiae*, as our model organism owing to a) the extreme ease of working with it and b) conservation of fundamental biological processes with humans.

We observed that Scd6 gets arginine methylated and Hmt1 (the predominant methyltransferases in yeast) is required for its methylation. Characterization of the arginine methylation defective (AMD) mutant of Scd6 indicated that this modification is important for its repression activity. Specifically, the Scd6 AMD mutant fails to induce formation of RNA granules (markers of translation repression process). Upon probing the molecular mechanism, we have learnt that methylated Scd6 is able to interact with **E**ukaryotic **T**ranslation **I**nitiation **F**actor **4** **G**amma **1** (eIF4G1) better than unmethylated Scd6. It has been observed earlier that Scd6 represses translation by targeting eIF4G1. Whether methylation directly improves binding of Scd6 to eIF4G1 remains to be explored.

This work helps us understand the contribution of arginine methylation to the fundamental process of messenger RNA fate determination. Since proteins with sequence and functional similarity (ortholog) to Scd6 are present in all higher organisms (including humans), we think that the finding reported by us might well be conserved in higher organisms. Further experiments will be required to test this idea. We are currently exploring if arginine methylation affects other translation repressors in a similar manner. Our long-term goal is to understand the mechanistic basis of mRNA movements in and out of translation.

Arginine methylation promotes translation repression activity of eIF4G-binding protein, Scd6. Gopalakrishna Poornima Shanaya Shah Venkadasubramanian Vignesh Roy Parker **Purusharth I. Rajyaguru**. Nucleic Acids Res (2016)



Arginine methylation of Scd6 by Hmt1 augments its repression activity by promoting its interaction with eIF4G1.

Why does rabies still plague India in the 21st century?

By Dr Abi Tamim Vanak

Intermediate Fellow
Ashoka Trust for Research in Ecology and the Environment, Bangalore

Image credits : Abi Tamim Vanak

In a rapidly changing world, responsive and scientifically sound surveillance systems are needed in order to better understand, and possibly predict outbreaks and spread of zoonotic infectious diseases. Unfortunately in India, most efforts towards strengthening response to zoonoses have mainly focused on improving technical and laboratory capacity. Surveillance and the collection of field data have either been neglected or at best patchily implemented.

Making a case for rabies control in India

The case of rabies in India is a classic example of such neglect. Despite India having more cases of human rabies deaths (20,000) than any other country in the world, we suffer from a massive knowledge deficit. Even today, the primary citation for rabies incidences in India comes from one study carried out in 2003. One of the key reasons for this grim reality is the lack of a comprehensive policy for rabies control that is based on rigorous scientific study of disease dynamics in India.

The present strategy for the control of rabies in India is based largely on the World Health Organisation's guidelines, which prescribe annually vaccinating 70% of the dog population to reduce the prevalence of rabies in the dog population. Mass vaccination is supposed to be accompanied by vector population reduction in the form of Animal Birth Control (ABC) programs . However, these strategies have rarely been systematically implemented in India, and their efficacy or practicability rarely tested under Indian conditions.

Unlike other countries in Africa and Asia, India has a panmictic free-ranging dog population that occurs at high densities. There is also a high turnover rate in the dog population due to high reproduction and low adult survival. A typical street dog is estimated to live no more than 3 years. Furthermore, even though a high proportion of free-roaming dogs are quasi-owned, i.e. they may be associated with a reference person and occasionally fed, they are not restrained or provided with health and fertility control interventions. However, frequent vaccination campaigns are necessary to eradicate canine rabies, since a single rabies vaccine injection does not result in long lasting neutralizing antibodies. If vaccination coverage is not sustained, rabies can rapidly re-establish number.

Not surprisingly, this target 70% vaccination coverage has rarely been achieved by any program in India (with one or two notable exceptions). Despite this, many cities attribute a reduction in the incidence of human rabies cases to the success of dog mass vaccination programs.

It is more likely that better education levels in urban centres, as well as increased accessibility to Post-exposure Prophylaxis (PEP), explain the decrease of symptomatic rabies in humans in some areas. Given that rabies is not a reportable disease, and because symptoms can vary, rabies in dogs can persist in urban India despite claims to the contrary. Circumstances in rural areas are much poorer. There are very few targeted campaigns for education or vaccination in villages and almost no sero-epidemiological evaluation of vaccination efficacy, even though the majority of rabies cases are reported from villages.

A conservative estimate puts the human death toll from rabies in India at ~20,000/annum, the economic cost of PEP following dog bites at ~INR 200 crores/annum with loss of 38 million man-hours for post-exposure treatment. The cost of rabies prevention measures in towns and cities is not known, but is likely to run in the hundreds of crores/annum. Thus, both human as well as economic cost of rabies is not insignificant. Given that rabies is a wholly preventable disease, these statistics provide an example of a failure of the scientific as well as policy environment around rabies control.

In these unique circumstances, it is important to understand the dynamics of rabies in these super-abundant free-ranging dog populations, so that a site-specific rabies control protocol may be devised. It is also important to understand that rabies is unlikely to ever be eradicated in an Indian context, because of attitudes of people to free-ranging dogs, unwarranted beliefs about vaccinating dogs, dependence on traditional health systems as well as possible alternative hosts in wildlife populations.

Despite the recognition that dogs are the primary vectors of rabies in India, there have been few studies to understand the population ecology of dogs and how this may impact rabies spread or its control. India has the highest proportion of un-owned, free-ranging dogs in the world. Because of poor health care of these dogs, population turnover rates are usually very high. Furthermore, free-ranging dogs belong to different categories (e.g. village dogs, farm dogs, herding dogs, feral dogs), with markedly different ecology and behavior. In such circumstances, maintaining herd immunity using a blanket strategy of mass vaccination campaigns impracticable. Our current project funded by the Wellcome Trust/DBT India Alliance aims to use a "One Health" approach by integrating the fields of animal ecology, epidemiology and movement ecology to understanding rabies dynamics in India across the human-domestic dog-wildlife spectrum.

Counting dogs

We use a combination of basic and high-tech ecological techniques to determine population size, demography, movement patterns and foraging ecology of free-ranging dogs. This starts with population

Image credits : Abi Tamim Vanak

surveys using a technique called mark-resight, where in a city or rural area is divided into grids, and systematically surveyed for dogs. Each dog is photographed and its location recorded using a GPS and a smartphone app. Each survey is repeated three times to obtain a "capture" history for each dog. This enables the use of sophisticated Capture-recapture models of population estimation to determine population size and density in a given area. We also record the presence of possible food sources, so that a resource explicit map of dog density can be created.

For a subset of study areas, we capture and fit uniquely numbered collars on a cohort of dogs to enable identification during resampling surveys every 3 months. This allows us to determine survival and population turnover rates in dogs across an urban rural gradient.

Assessing vaccination as a means to reduce the burden of rabies

Mass vaccination of dogs is prescribed as the best option of rabies elimination, with the assumption that vaccinating 70% of the dog population confers population-wide immunity against rabies. However, this assumption has not been epidemiologically tested in India. Given the high turnover rates in free-ranging dog populations in the developing world, and the possible presence of non-responders and immunologically challenged individuals, it is likely that this assumption is violated. For example, in a study conducted in Chandigarh (Singh *et al.* 2011), the authors found that only 16% of owned-dogs had protective antibody titers for rabies, whereas only 1% of free-ranging dogs tested had the necessary antibody titers.

This shows that, not only are continuous and sustained mass vaccination campaigns required, but also surveillance and testing for population level protective antibody titers is required. Furthermore, dog populations are not homogeneous and consist of several categories (e.g. farm dogs, village dogs) with markedly different behavior and ecology. Accessibility of dogs for vaccination will also vary between these categories and regions, and so too the efforts necessary to achieve target vaccination coverage. For example, the logistics of vaccinating a high density dog population in an urban environment, consisting mostly of unrestricted and semi-restricted neighborhood dogs, would differ from that of vaccinating a low density, rural dog population, consisting of unrestricted family and village dogs. Because of these challenges, there is an unknown proportion of dogs that is always without vaccination coverage, and in areas with a high dog population, this is enough to maintain enzootic status. To test for the efficacy of vaccination as means to reduce rabies incidence, we are conducting a systematic longitudinal epidemiological survey across our study sites. We obtain a blood sample for every dog that is captured, and will test them for levels of neutralizing rabies antibodies at both the individual and population levels. In some cases, we also come across dogs that show rabies-like clinical symptoms. We test these dogs using a rapid field antigen kit (lateral flow device), to determine if they are actively shedding the rabies virus. For dogs that have died, we also obtain brain tissue samples for laboratory confirmation of rabies.

Rabies dynamics in a multi-host system

The vast majority of India's free-ranging dogs live in rural areas, where they interact with wild carnivores. A potential exists for spill-over of rabies from the abundant reservoir host (dogs) to wolves (*Canis lupus pallipes*), jackals (*C. aureus)* and foxes (*Vulpes spp.)* as these species occur in close vicinity of human dominated areas throughout India. Even though it has been established that dogs are main reservoir for rabies in India, the dynamics of rabies transmission within and between these host populations continues to remain enigmatic. This is mainly due to a lack of disease ecology research on wild and domestic host species in India. To better understand the potential for spread of rabies from dogs to wildlife and back, we are using a movement ecology approach to determine interaction rates. We capture and fit with GPS telemetry devices, dogs, jackals and Indian foxes in the same area. These GPS collars provide a high temporal resolution of data, allowing us to determine the movements of each of these species, the overlap in their home-ranges, and the potential for direct or indirect contact.

The final step of this project will be to bring together all these empirical data to parameterise agent-based models to understand the dynamics of rabies in these multi-host systems. We expect that various components of the model will allow us to determine pathways for rabies spill-over/spill-back, link populations, and effectiveness of control measures. Ultimately, we may be able to use these model simulations to test possible alternate strategies to control rabies such as identifying areas of high rabies endemicity, and probable pathways of transmission, and target vaccination and population control measures.

Ultimately, controlling this dreaded disease may well depend on changing our behavior and attitudes to the presence of free-ranging dogs. Dogs are companion animals, and their welfare is best served under human care. If we are to eliminate canine rabies in India, humans need to take full responsibility for dogs by strengthening the laws that govern pet ownership, limit the population of free-ranging dogs and ensure that dogs have adequate healthcare. This will result in win-win solutions for humans and for dogs.

Dr Abi Tamim Vanak is an Associate Professor at ATREE, Bangalore and Wellcome Trust/DBT India Alliance Intermediate Fellow. He is an ecologist with broad interests in animal movement ecology, disease ecology, savanna ecosystems and wildlife in human-dominated systems.

In conversation with

Prof Mohan Balasubramanian

Warwick Medical School
University of Warwick, Coventry, UK

Prof Mohan Balasubramanian is the Pro-Dean, Biomedical Research at Warwick Medical School, Coventry, UK. His areas of research include cell cycle control, cytokinesis, mitosis, morphogenesis, cell physiology, yeast genetics. He is currently a member of the Wellcome Trust/DBT India Alliance Senior and Intermediate Fellowship selection committee. In this interview he shares his scientific beginnings and current research interests.

What motivated you to become a scientist?

I was born in a very conventional household, with the usual expectations from my parents- study and get a job. There was no pressure from my family as such to choose a particular career, however, it was clear that one had to do well in whatever they chose to pursue. My motivation for science came late, when I was doing undergraduation in chemistry. I went to MSU Baroda to do my Masters in Microbiology and Biotechnology where I had the good fortune to meet a fantastic and passionate teacher Prof Bharat Chattoo, who was also an outstanding scientist. Just being around him made us high and excited for science. Even though we were Masters students he made us think like PhD students and Postdocs. There weren't a lot of research facilities for us in the late 80s in Baroda but he helped us develop the intellectual process of doing science – coming up with a hypothesis, testing it, designing experiments and so on. Prof Chattoo was singularly responsible for my choosing science.

and if you were not a scientist, you would be..

It is hard to say. I did have a lot of interest in cricket. In fact, I got admission in MSU Baroda because of that, but I never wanted to make my career in that field. Music is a secret passion too, but I cannot say if I would have become a performing artist either. It really could have been anything, but what I know for certain is that whatever career I would have chosen I would have committed to it completely.

Could you briefly take us through your scientific journey and about your interest in biology.

I wasn't interested in Biology to start with; it was mostly Chemistry. However, meeting Prof Bharat Chattoo changed that for me and I slowly moved from chemistry to molecular biology, then genetics and cell biology, a path he showed us. During my Masters in Baroda, Prof Chattoo used to get hard copies of *Cell*, *Nature* and *Science* magazines a week after they would get published, which helped us keep abreast with current scientific knowledge.

From Baroda I went to a small town in Canada, Saskatchewan to do my PhD with a leading plant biologist, Dr Sean Hemmingsen. The turning point in my PhD came when my supervisor went to Oxford to visit Paul Nurse who had cloned and characterized important cell cycle proteins in budding yeast. Interestingly, these breakthrough research findings were published during Sean's sabbatical there. Sean brought back these cell cycle mutant protein collection that Paul had isolated, to our lab. I read up more on the cell cycle literature and got hooked to the field of cell cycle regulation, which was not well-studied at that time. I found the topic of cytokinesis very interesting, as it combines cell cycle control with a beautiful mechanical problem of cell division. I continued my this research on cytokinesis in yeast when I moved to Prof Kathy Gould's lab in Vanderbilt University, Nashville for my postdoc. I have been intrigued by the mechanical question of how the cell division apparatus assembles and contracts and how much force is needed to divide the cell. This led me to make a departure from genetics and imaging and I teamed up with a group in Japan and biochemically purify and characterise the cell division apparatus and employed single molecule motility assays to enhance our understanding of this complex machinery at a molecular level. The research problem I chose almost 30 years ago is still throwing up more and more interesting questions, which keeps us going in the lab.

What according to you are the challenges in your field of research and how do you see the field evolve in the next ten years?

The descriptive work in this field is over. The challenge now is to get quantitative understanding of various cytokinesis phenomena. We are looking at a cellular machine which is very complex, perhaps even more than the ribosome. CryoEM is revolutionary technique and I am sure it will have major impact on the field. Cytokinesis is a huge structural biology problem to crack, big problem in quantitative cell biology and in soft matter physics. We have to bring these together to improve our understanding of this complex cell division apparatus.

Any other field that has caught your interest and attention?

I have become very interested in synthetic biology approaches to assembling designer proteins and to reconstruct signaling pathways involved in cell division. The logic for doing this is very simple; if we can reconstitute a functional cell pathway, it would mean our understanding of it is correct. So we are trying to understand key steps in developmental biology, which is not our field, but I am very interested in employing our technology to reconstruct complex signaling networks to understand how early development occurs.

Any advice for young researchers and students?

The one advice of my PhD mentor that has stayed with me is that, communication is as important as the experiment. It is important to be able to effectively communicate both verbally and in writing what you are trying to do. In addition to this, my other advice to biomedical scientists today would be to appreciate that every biological problem has a physical and chemical basis and therefore not restrict themselves to only descriptive work. It is important to reach out to other disciplines to broaden your research horizon. I highly recommend that researchers take teaching very seriously along with the research work. If you teach regularly you will see tangible difference in the way you envision and do your science.

Find out more about Mohan's research here

EVENT SUPPORT

India | EMBO *Symposia*

About India I EMBO Symposia

The Wellcome Trust/DBT India Alliance and European Molecular Biology Organization (EMBO) will jointly fund up to three meetings per year in India. The meetings should address discovery and innovation through an interdisciplinary approach, with the speakers and participants discussing important global challenges in the context of the life sciences.

The meetings should be small, with 10 – 15 highly acclaimed international speakers and 50 – 75 participants, allowing early to mid career scientists to interact with leading international experts during a period of three days.

Proceedings from the meeting should be drafted as a position paper to advise the India Alliance regarding this area of research. The paper should in particular outline if and how research covered by the meeting could be beneficial to India. India Alliance may consider increasing funding for research in that area following expert advice and review.

Benefits

- The maximum funding available for an India | EMBO Symposia is 60,000 euros.
- EMBO also supports the organizers and meeting in the following ways:
- EMBO creates a dedicated meeting webpage, including registration and abstract submission forms.
- EMBO provides a poster and advertising in selected print and social media channels.
- Organizers can apply for funds for an EMBO Young Investigator lecture, EMBO Science Policy lecture and EMBO Women in Science lecture.

Eligibility

- India | EMBO Symposia must take place in India, but scientists from anywhere in the world are eligible to apply, independent of their nationality.
- India | EMBO Symposia must cover frontier, pioneering and interdisciplinary areas of life sciences that are underserved in India, and include speakers with interdisciplinary expertise. Furthermore, the application should include a list of (mostly) confirmed speakers.
- For detailed information on the eligibility criteria, including the format of the meeting, please consult the application guidelines (pdf).

Application process

- Applications for India | EMBO Symposia will be accepted twice in 2017 and must be submitted through the online system. Organizers should apply at least 6-12 months before the proposed date of the meeting. The deadline for second round is 15 July 2017, 14:00 CEST which is will be tentatively launched on 15 April 2017.
- Applicants will be asked to complete an online and an offline application form.
- All incoming applications are screened to ensure eligibility requirements are met.
- The decision on which proposals receive funding is jointly made by the EMBO Course Committee and the India Alliance Meetings Committee in May and October.
- All applicants are informed of the outcome of their application by email shortly after the committee meetings.

Required documentation

Applicants will be asked to provide:
- A list of organizers
- Proposed title and topic of the meeting
- Reasons for holding a meeting on the proposed topic
- Information on any competing or similar meetings held in the current, proposed or following year
- Proposed date and location
- List of proposed speakers/instructors
- Draft programme
- Participant selection criteria and number of participants
- Proposal for the position paper
- Information on the practical component of the meeting (if applicable)
- Draft budget

Selection process

The selection process involves the following steps:
- All incoming applications are screened to ensure eligibility requirements are met.
- The decision on which proposals receive funding is jointly made by the EMBO Course Committee and the India Alliance Meetings Committee in May and October.
- All applicants are informed of the outcome of their application by email shortly after the committee meetings.

For detailed information on the application process, key dates, format of the meeting and required documentation, please consult the application guidelines or visit India | EMBO Symposia website.

For any enquiries, please write to workshops@wellcomedbt.org

Note: Second round will be launched tentatively on 15 April 2017.
Applications submitted in the first round announced on 15 December 2016, are currently under review.

INDIA ALLIANCE WORKSHOPS

SCIENCE COMMUNICATION

Snapshots from the 15th two-day SciComm Workshop in Hyderabad

19th SciComm101 workshop

13 February 2017, Manipal University

On 13 February 2017, India Alliance's SciComm101 team reached the vibrant campus of Manipal University. This **19th SciComm101** Workshop was attended by around 100 participants, mostly senior PhD students, clinical and public health researchers and junior postdocs from different departments and campuses in Manipal University. The Workshop attempted to highlight the ethical considerations in biomedical research, importance of good presentation skills for a successful academic career and useful tips on manuscript and grant writing through a combination of lectures and case study discussions.

Read a short coverage of this Workshop in The Hindu.

To request one at your institution, send your request to workshops@wellcomedbt.org

15th Two-day SciComm workshop

2-3 March 2017, Hyderabad

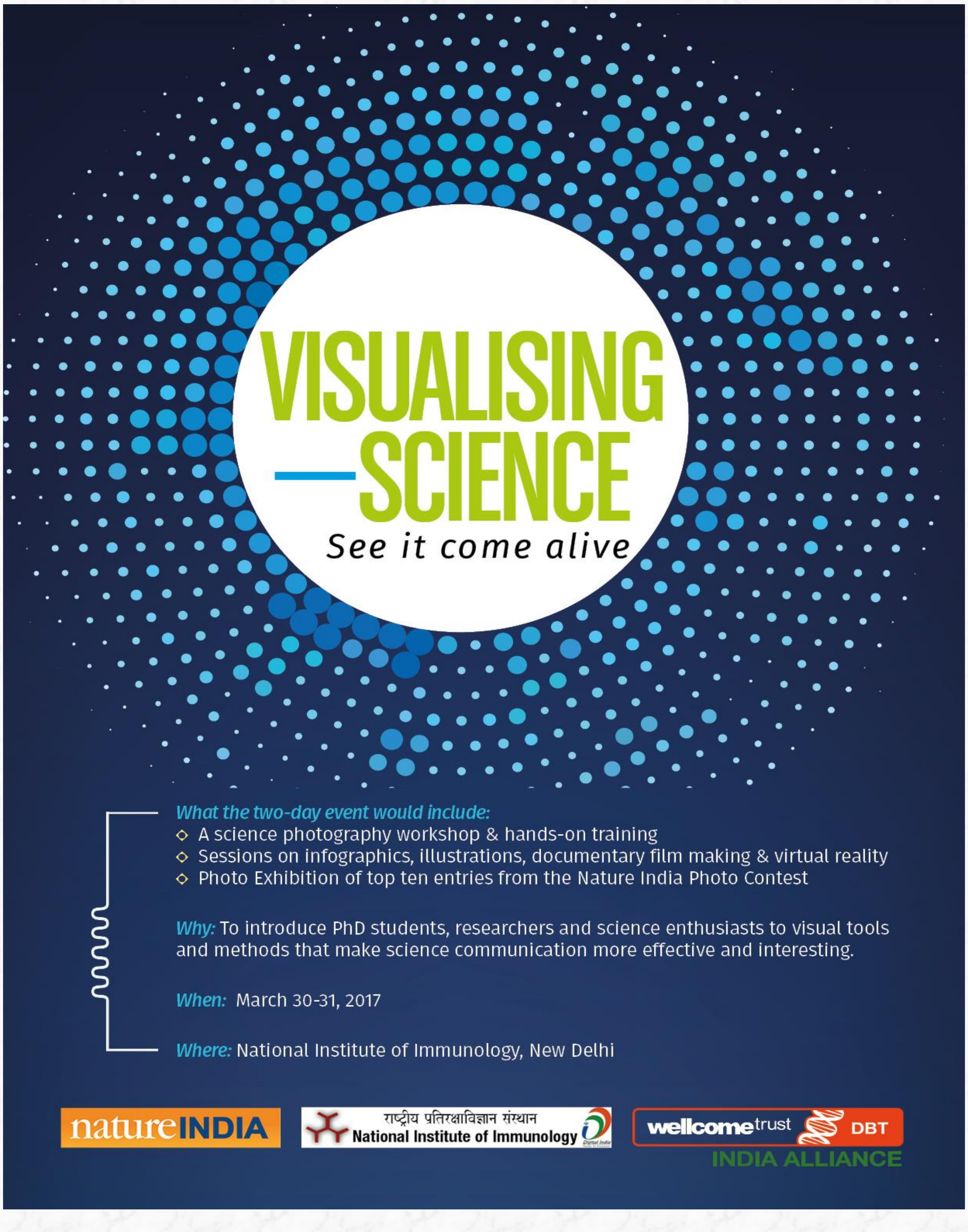
We recently concluded our **15th two-day Science Communication (SciComm) Workshop** in Hyderabad, which was attended by 32 participants mostly comprising of PhDs, Postdocs, young faculty and clinicians from 26 different institutions across India. Over the two days, participants received training on research ethics, manuscript and grants writing and presentation skills. In addition to these, there were engaging discussions on career choices in academia and the importance of mentorship towards building a successful career. Our eminent panel of mentors included, Dr Sandhya Koushika (TIFR Mumbai), Dr Sunil Laxman (InStem, Bangalore; IA Intermediate Fellow), Prof Amitabha Chattopadhyay (CCMB, Hyderabad), Dr Mahesh Kate (CMC Ludhiana; IA Intermediate Fellow), Dr Rupinder Kaur (CDFD, Hyderabad; IA Senior Fellow) and Ms Sumathy Haridas (HR consultant, Bangalore). The two days entailed enthusiastic interaction between the participants, mentors and India Alliance staff about the workshop modules, career choices and their current research. The eagerness to learn and active questioning at the workshop by the participants reinforced the importance of Science Communication in nurturing and training the future researchers of India.

The next two-day Science Communication workshop will be held tentatively in September 2017. Announcement for the same will be made on our website shortly.

For more details on our Science Communication workshops, visit our website

INDIA ALLIANCE WORKSHOPS

SCIENCE COMMUNICATION



The Wellcome Trust/DBT India Alliance in partnership with Nature India and National Institute of Immunology, New Delhi is to announce "Visualising Science", a first-of-its-kind Workshop in India, which aims to introduce scientists to visual tools and methods that make science communication more effective and interesting.

What the two-day event would include:
* A **science photography workshop & hands-on training**
* Sessions on **infographics, illustrations, documentary film making & virtual reality**
* **Photo Exhibition** of top ten entries from the Nature India Photo Contest

Where: **National Institute of Immunology, New Delhi**
When: **30 & 31 March 2017**

REGISTRATION FOR THIS EVENT IS NOW CLOSED

For inquiries, write to public.engagement@wellcomedbt.org

LET'S COME TOGETHER & FIGHT THE STIGMA AROUND MENTAL HEALTH!

On Saturday, 8th April 2017
Exhibition Ilam onwards
Conversations from 3:00 **to** 6:00pm
At PHD Chamber of Commerce and Industry, New Delhi

08.04.2017

LAUNCHING A YOUNG PEOPLE'S MENTAL HEALTH CAMPAIGN WITH **WWW.ITSOKTOTALK.IN** AND **A MULTI-MEDIA EXHIBITION (IN COLLABORATION WITH INSTAGRAM)**

CONVERSATIONS WITH

Vikram Patel
global mental health expert

Jo Agarwal & Ramakant Vempati
co-founders of Wysa,
(a happiness chat-bot app)

Resh Val
artist and mental health activist

Jhilmil Brekenridge
poet and author

Dhruv Visvanath
musician

Natasha Noel
yogini, dancer and writer

HOSTED BY

Pramada Menon
queer feminist activist

SUPPORTED BY

PUBLIC HEALTH FOUNDATION OF INDIA
PRIDE
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Sangath
LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

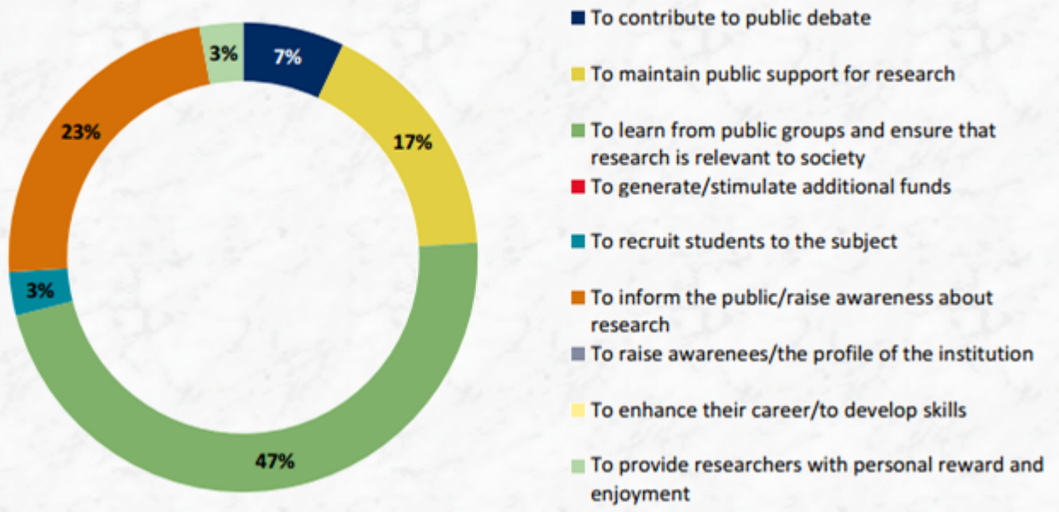
It's Ok To Talk is a campaign by The PRIDE Project, Public Health Foundation of India (PHFI), London School of Hygiene and Tropical Medicine and Sangath and is supported by the Wellcome Trust, UK **www.phfi.org**

PUBLIC ENGAGEMENT

"Public or community engagement most simply can be defined as a symbiotic relationship and exchanges between the public and research/scientific community. Public engagement must result in a meaningful impact on both the groups and should not be restricted to dissemination of research knowledge or its uptake." Survey respondent

The Wellcome Trust International Engagement gathered views on Public and Community Engagement with research in India and Africa. The report prepared by them includes perceptions, challenges and training needs for public engagement as shared by researchers and public engagement specialists. "**The survey results highlighted 5 key areas that could help improve support for public engagement in their region: increased availability of funding, dedicated staff, senior management support, training and organisational structures**". Read their **full** report here.

"What do you think is the *main* benefit, if any, of researchers engaging with the public?"

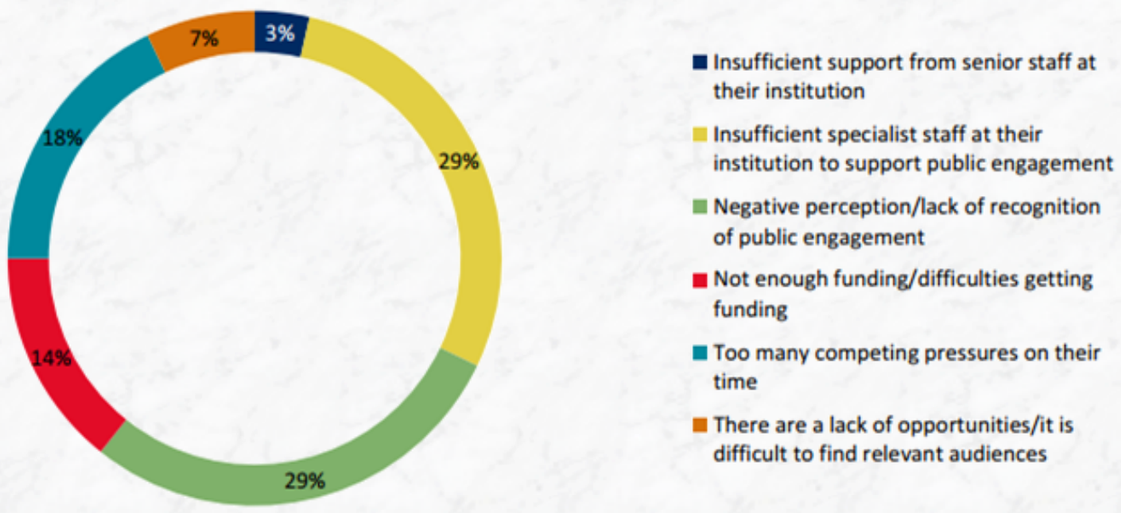


"The majority of respondents thought that learning from public groups and ensuring that research was relevant to the public was the main benefit of engagement."

Interest and commitment to public engagement

"The survey indicated a keen interest and commitment to public engagement, with 83% saying that they would like to spend more time engaging with the public. However only 19% of respondents felt very well equipped to engage with the public about their research. 34% of respondents had not received or been offered public engagement training in the past 5 years. "

"What would you say is the main challenge associated with researchers engaging with the public or local communities?"



"After competing pressures on their time, insufficient specialist staff at their institution, a negative perception and lack of recognition of public engagement, almost half (47%) of international respondents highlighted not enough funding or difficulties getting funding as a main barrier to public engagement."

Other announcements

Postdoctoral fellow in a research project funded by a Wellcome Trust/DBT India Alliance Intermediate Fellowship Grant

Title: Molecular mechanism of Cell-cell adhesion by non-classical cadherins
This project aims to decipher the molecular mechanism of non-classical cadherins in cell-cell junction. Recently, non-classical Cadherin, cadherin-23 has been found at the cell-cell junction of Breast-cancer cells mediating both homotypic and heterotypic cell-adhesion with Fibroblasts. We are interested to understand the molecular and structural details of these molecules at the cell-cell junction.
We are an interdisciplinary research group who use single molecule techniques to understand biology quantitatively. To know more about our research interests, please visit our web-page.
Positions: One
Duration: One year and extendable up to 3 years upon evaluation
Emoluments: As per IISER Mohali
Essential Qualifications:
The applicants should hold a PhD or MD/PhD, and have a strong training in molecular biology and cell biology. Expertise in fluorescence based and AFM based imaging techniques and bioinformatics are desired. It is also essential that the candidates have strong first author publication history. Interested applicants should email their CV and a 1-page cover letter (describing their past accomplishments, research interests and career goals) along with names and contact information of three references to: srakshit@iisermohali.ac.in.

Submission Deadline for Full Application: 30th April, 2017
Interview (walk-in or skype): 15th May-17th May, 2017
Exact date, time and venue will be intimated to the shortlisted candidates by email.
Joining Date: 1st June, 2017

Contact person:
Sabyasachi Rakshit, PhD
Assistant Professor
Wellcome Trust/ DBT Intermediate Fellow
Centre for Protein Science, Design and Engineering
Department of Chemical Sciences
Indian Institute of Science Education and Research Mohali, Sector 81, SAS Nagar, Manauli, Punjab 140306
India
Web: https://sites.google.com/site/rakshitslab/home

This scheme is aimed at encouraging young, talented, enthusiastic and result-oriented scholars to take up industry-relevant research. Under this scheme, the full-time PhD scholars get double the money that they would otherwise get for doing research. Maximum government fellowship in India at any academic or research institute is approximately Rs 36,400 per month, including House Rent Allowance (HRA) for SRF category. Under the Prime Minister's Fellowship Scheme for Doctoral Research, the scholars get double the JRF/SRF as scholarship (as per applicable slabs). While one-half of this scholarship comes from the government, the second half comes from a partner company which also works closely with the candidate on the research project. The first batch commenced in 2013. The scheme has been made open-ended since September 2014, allowing aspirants to apply anytime within 14 months from their PhD registration. Visit the website to find out more about this funding opportunity.

Please send your feedback, suggestions and contributions to
public.engagement@wellcomedbt.org

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