EDITORIAL

We are pleased to bring to you the penultimate issue of the India Alliance Newsletter for 2017, which includes latest research stories from our Fellows, funding opportunities, event reports, workshop announcements and more.

To begin with, a few special mentions. Intermediate Fellow at TMC- ACTREC, Mumbai, Dr. Amit Dutt has been awarded the Shanti Swarup Bhatnagar Award in Medical Sciences 2017. Heartiest congratulations to him! Dr. Arunag Agrawal, Senior Fellow at CSIR- IGB, New Delhi, joins an 18-member task force comprising of entrepreneurs, scientists, and government bureaucrats, set up by the Government of India to explore and identify social problems and make recommendations on how Artificial Intelligence can be leveraged to solve them. Intermediate Fellow at St. John’s National Academy of Health Sciences, Bangalore, Dr. Rashmi Rodrigues is converting her new-found enthusiasm for running into an activity to support a cause by participating in the Delhi Half Marathon to raise funds for Doctors without Borders Médecins Sans Frontières (MSF). Help her support MSF, an organization that strives to take healthcare to the underserved in difficult circumstances.

In an effort to encourage IA Fellows to forge not just national but also international research collaborations, India Alliance has been in a dialogue with Developing Excellence in Leadership, Training and Science (DELTAS) Africa program to enable such scientific alliances. This issue includes a short report on the recently held DELTAS Africa Annual Grantees Meeting in Accra, Ghana from 3-5 July, organised by the Alliance for Accelerating Excellence in Science in Africa (AESA) which was attended by nine IA Fellows from various research streams.

On the Fellowship front, we are presently not accepting preliminary applications for any of our Fellowship schemes. However, applications already submitted to various schemes are currently under review. The next call for applications for Senior and Intermediate Fellowships in Biomedical research and Clinical and Public Health Fellowships will be announced in January 2018. Check our website for regular updates.

Research Highlights section in this issue includes an assortment of recently published research stories from our Fellows’ labs. Dr. R Mahalakshmi and her team at IISER Bhopal have devised new energy scales to study folding and assembly energetics of cell membrane proteins. These novel contributions will significantly improve our understanding of how these proteins regulate various biological processes across the membrane such as nutrient and drug uptake, diffusion of toxic material, cell signalling and so on.

Dr. Dasaradhi Palakodeti and colleagues from InStem, Bangalore, add to our current knowledge of how vision and neural processing has evolved and provide clues into eye and brain regeneration in their recent paper published in Science Advances.

Dr. Amit Dutt and his group at TMC-ACTREC, Mumbai, continue to uncover molecular complexities underlying the emperor of all maladies, cancer. In two recently published reports, they present first genetic signature for tobacco/nut chewing Human Papillomavirus (HPV)-negative early tongue cancer and provide prognostic biomarker for cancer metastasis. Their second study uncovers the genetic signature for tobacco/nut chewing Human Papillomavirus (HPV) -negative early tongue cancer and provide prognostic biomarker for cancer metastasis. Their second study uncovers the genetic signature for tobacco/nut chewing Human Papillomavirus (HPV).

Finally, Senior Fellow Dr. Shantanu Chowdhury at CSIR-IGIB, New Delhi and his team have discovered the mechanism by which cancer cells become resistant to drugs such as doxorubicin and have used a small molecule-drug combination to reverse this drug resistance.

Some of these research stories were also covered in the popular media, links of which are included in the section.

We are pleased to announce that India Alliance funded-research will now be freely available through Europe PubMed Central (PMC). India Alliance has joined 27 other members of the Europe PMC funder family to provide IA Fellows with a dedicated mechanism to fulfil its open access policy and support its Fellows in achieving greater visibility for their work.

India Alliance constantly strives to reach out to the scientific community not just in India but also abroad to inform potential applicants about the Fellowship programme, identify needs of young researchers and build partnerships to advance biomedical research in the country. In this issue, read about the recently organised outreach events in the US which were spearheaded by India Alliance CEO, Dr. Shahid Jameel.

Applications submitted for the first Developing Indian Physician Scientists workshop in Delhi are currently under review. We are presently accepting applications for the DIPS workshop in Hyderabad from 2-5 March 2018. These workshops have been developed with the aim to ignite scientific curiosity in young doctors, while promoting an understanding of the frontiers of medicine and related sciences. Find out more about this workshop and how to apply for the workshop in Hyderabad in this issue.

Next call for applications for the India EMBO Symposium will be announced later this year on our website. Applications submitted in the last round are currently under review.

The India Alliance organised and supported various Science Communication training and public engagement activities in the past two months. One-day SciComm101 workshop was held at IIT Gandhinagar (18 August) and two-day Workshop was organised for the first time in Delhi at Indian National Science Academy (INSA) on 7-8 September. Both these workshops were attended by PhD scholars, Post-doc researchers, young faculty and clinicians from around the country.

Last date to submit applications for the Art + Science programme 2017-18 is 30 September. This programme is designed to advance projects that explore artistic applications of emerging thoughts and technologies with the help of partners from the scientific industry and academia. More information on this inside this issue. Also read reports on Intermediate Fellow, Dr. Pinky Kain’s (RCB, Faridabad) public engagement outing in Delhi and recently held talk by renowned artist and mathematician Dr. Jean-Marc Castera at NCCS Pune.

Don’t forget to check out more announcements at the end of this issue for job opportunities.

As always, a big thank you to all those who have contributed to this newsletter.

Special thanks to our Intermediate Fellow at RCB Faridabad, Dr. Sam Mathew for giving an engaging interview for this newsletter and for the cover image, which shows a cross section through a fetal mouse hind limb where muscle fibers are fluorescently labeled in green, basement membrane in red and nuclei in blue.

Please write to us if you have suggestions for how we can make these newsletters a more informative and enjoyable read for you.

Sarah Iqbal, PhD
Public Engagement Officer
Wellcome Trust/DBT India Alliance
September 2017.
India Alliance Fellowships

India Alliance Fellows’ Research Highlights: Recently published research of Dr. R Mahalakshmi (IISER Bhopal), Dr. Dasaradhi Palakodeti (InStem, Bangalore), Dr Amit Dutt (TMC-ACTREC Mumbai), Dr. Farah Ishtiaq (IISc Bangalore), Dr. Shantanu Chowdhury (CSIR-IGIB, New Delhi)

India Alliance Fellow in Spotlight
Interview with Dr Sam Mathew, RCB Faridabad

REPORT: 2nd Annual DELTAS Meeting, Accra, Ghana

REPORT: India Alliance USA Outreach 2017

Event Support
India I EMBO Symposia

Workshops
Call for applications: Developing Indian Physician Scientists (DIPS) Workshops, Hyderabad
Science Communication workshops

Public Engagement with Science
Report: Our Taste and We – Dr Pinky Kain
Report: Art and Science talk at NCCS Pune
Art+Science 2017 programme at Khoj

Other announcements
Positions available for a Postdoctoral Fellow and Project Assistant at IISc Bangalore
Senior and Intermediate Fellowships in Biomedical Research

Next call for applications: Early 2018

Senior and Intermediate Fellowships are available across the full spectrum of biomedical research from fundamental molecular and cellular studies through clinical and public health research.* Interdisciplinary projects are also welcome.

Eligibility:
• No age or nationality restrictions. The applicant need not be resident in India while applying but should be willing to relocate to and work in India.
• A salaried position or commitment towards a salaried position at the Host Institution is not required.
• Applicant can have a PhD in any discipline of science.
• This competition is open for basic science/veterinary researchers between 4 -15 years of post-PhD research experience.
• Applicants are advised to choose the most appropriate scheme suitable for them based on their qualification, research experience, career trajectory and track record. Please refer to the guidance notes, provisions and mandate of the scheme for deciding on the scheme you wish to compete for. The Office reserves the right to advise on the suitability of the scheme accordingly.

Eligibility guidance notes:

Senior Fellowship: For researchers who have demonstrated their potential to lead an independent research program and want to expand it further to undertake pioneering research. Suitable for applicants with 7-15 years of post-PhD research experience.

Intermediate Fellowship: For postdoctoral researchers who have been successful in building a track record of pursuing a cutting edge research and wish to establish their own independent research program in India. Suitable for applicants with 4-7 years of post-PhD research experience.

Provisions: The 5 year Fellowship support provides
• competitive personal salary support
• generous and flexible funds for research
• funds to develop international collaborations

Requirements: The following are essential for the application.
• A research proposal that is based on a hypothesis and seeks to answer an original biomedical research question
• A not-for-profit Host Institution in India that will administer the Fellowship for the full duration of the award
• A sponsor at the Host Institution, who can guarantee space and resources for the duration of the award

Application process:
After the call for application has been made, you can complete the online application form available on the India Alliance online application System (IASys)

Please visit our website for further information on the remit, provisions and application process. Write to us at info@welcomibt.org

"We encourage Clinicians and Public Health researchers to apply in the separate Clinical and Public Health competition (see below)"

Clinical and Public Health Research Fellowships

Next call for applications: Early 2018

Eligibility

Eligibility limit covers the entire range of Clinical and Public Health Research Fellowship schemes

• No age or Nationality restrictions.
• The candidates need not be resident in India while applying but should be willing to establish an independent research career in India.
• Clinicians and Public health researchers do not require a PhD to apply.
• This competition is open for clinicians and public health researchers with up to 15 years of post-MD/MS/MPh/PhD or equivalent clinical / public health research experience.
• Applicants are advised to choose the most appropriate scheme suitable for them based on their qualification, research experience, career trajectory and track record. Please refer to the guidance notes, provisions and mandate of the scheme for assessing your eligibility on the website. The Office reserves the right to advice on the suitability of the scheme accordingly.

Eligibility guidance notes:

Early Career Fellowship: For those applicants who have shown promise to pursue research and wish to further their efforts to build a research career under the supervision of a Fellowship supervisor. Suitable for applicants in the final year PhD/MD/MS/MPh or have up to 4 years of relevant experience

Intermediate Fellowship: For those applicants who have been successful in building a track record of pursuing a cutting edge research and wish to establish their own independent clinical/public health research program in India. Suitable for applicants with 4-7 years of relevant experience.

Senior Fellowship: For those applicants who have demonstrated their potential to lead an independent research program and want to expand it further to undertake pioneering research. Suitable for applicants with 7-15 years of relevant experience.

Provisions: The 5 year Fellowship support provides
• interested clinicians the opportunity to pursue their research goals in combination with their clinical duties.
• competitive personal support
• generous research support with flexibility to accommodate requirements of clinical and public health research.
• Flexibility to request additional support staff
• Support training cost and research sabbatical
• Funds for International training and travel

Application process:

Application forms are available on the India Alliance online application System (IASys)

Please visit our website for further information on the remit, provisions and application process. Write to us at info@welcomibt.org
New energy scales to study folding and assembly energetics of cell membrane proteins

Dr. R Mahalakshmi, **Intermediate Fellow**
Indian Institute of Science Education and Research (IISER) Bhopal

Outer membrane of a cell is made up of ordered assembly of lipid molecules that possess a hydrophilic (water-loving) head group and a hydrophobic (water-repelling) diacyl tail. Proteins in these cell membrane are one of the most important biomolecules as they act as gatekeepers of the cell and regulate various cellular processes. To be able to perform its function, the three-dimensional structure of these membrane proteins is stabilized by energetic contributions of each amino acid that make up these macromolecules. These contributions also decide the extent of intra-protein and protein-lipid interactions which ultimately regulates key biological processes on the cell membrane such as transport of nutrients, drugs etc. through ion-channels, elimination of toxic waste from cells and other signaling processes. Deducing these energetic contributions that stabilize membrane proteins is a fundamental problem of immense biological importance as these thermodynamic parameters decide membrane protein folding, protein stability, turnover, and regulation in all biological systems. Amino acids of these membrane proteins that lie along the membrane interface of the cell membrane are also crucial for membrane protein folding, and serve as anchors to the membrane protein's post-folding.

In our study using the native transmembrane protein PagP (an 8-stranded β-barrel), we have experimentally measured the per-residue transfer free energy for all the 20 amino acids present at the membrane interface. We present novel interface free energy scales for the lipid- and protein-facing membrane interfaces, which would act as the missing link in our understanding of folding and assembly energetics of membrane proteins. Our results demonstrate how a balance exists between concerted folding and hydrophobic collapse of the membrane protein at the interface of the membrane. These careful assessment of residues most suited for the environment of the membrane interface will now allow for the successful de novo design and development of membrane proteins as nanopore channels, membrane penetrating and antimicrobial peptides, and nanodevices for biotechnological applications.


Banner image: RCSB Protein Data Bank Crystal Structure of Outer Membrane Enzyme PagP

Light matters! Flatworms reveal new insights into light sensing, eye evolution and neural regeneration

Dr. Dasaradhi Palakodeti, **Intermediate Fellow**
Institute for Stem Cell Biology and Regenerative Medicine (InStem), Bangalore

The coordinated interplay between the brain and the eye has fascinated biologists for a long time. After all, that is the basis of 'vision' as we know it. But what has been a bone of contention between the creationists and the evolutionary biologists, is the origin of this network. As famously stated by Theodosius Dobzhansky, "Nothing in biology makes sense except in the light of evolution". To our knowledge, planarians are among the earliest organisms that have developed a 'brain' and 'eye' in the evolutionary tree. They are flatworms that have a rich neural architecture with a cerebral eye, a bi-lobed brain (dorsal ganglion) and a peripheral nervous system that includes a ventral nerve cord. Added to that is a unique capacity for extensive regeneration (including the brain and the eyes!) upon amputation, that makes them an excellent model to study the function of the eye and the brain.
So, we decided to understand the eye-brain conundrum in the planarian, *Schmidtea mediterranea*. Using *Schmidtea mediterranea* as a model system, we now have clearer insights about how light is sensed in nature. We have also been able to link these novel aspects of light sensing to regeneration and functional recovery. Contrary to prior expectations, we observed that planarians could decipher minute differences in the input light, despite possessing a very simple eye architecture. Using detailed light sensing studies and fluorescence imaging, we show that the color-blind worms could ‘discriminate’ between light stimuli of different wavelengths (‘colors’) with maximum efficiency. They cannot truly ‘perceive’ different wavelengths but use a trick. They convert light wavelength differences into a light ‘intensity’ changes, allowing them to ‘sense’ small wavelength differences. In simpler terms, they turn spectral information (colors) into very refined, shades of gray. Our work thus demonstrates that the planarian cerebral eye and nervous system has the ability to accomplish fairly sophisticated ‘comparative processing,’ that enables them to sense these small differences and switch their behavior accordingly, which we think is truly remarkable. This is an exciting finding and has implications for eye-brain evolution.

We are interested in understanding the neural network between the eye and the brain that allows the organism to exhibit such complex behavior. Interestingly, this is where regeneration comes in handy! If we cut away the heads of the worms, they should not be able to sense light. But these are planarians after all, so over time they will regenerate their eyes and their brain!

This is where this story gets another twist. These worms also seem to sense light without eyes. If we shine even tiny amounts of long UV light, headless worms start moving like intact worms, and show an escape response! This reflex-like response is quite different from the eye-brain sensing. Also, during regeneration, if we time it just right, we find worms that can sense light (they are not blind) but cannot compare small differences! Then as their eyes and brain connections strengthen, they build the right neural connections and their abilities gradually recover!! In essence, we can separate this ‘comparative processing,’ which is quite unique!

So we have two amazing but very different light sensing networks in one organism; allowing us to do really unique experiments. We were even able to challenge the worms with choices and ask which neural network would be stronger, the reflex-like whole body network or the brain based network?

In this paper we show that in intact worms, the eye-brain response can override the whole body response. This was quite striking and is reminiscent of hierarchies in neural networks in more complex animals and mammals. However, studying this extra-ocular (eye-independent) light sensing during eye-brain regeneration show that these hierarchies are very dynamic. During regeneration, there are time-points where the whole-body response is actually stronger, not yet under control of the newly forming eye and brain. Then in a clear, sharp switch, the eye-brain network reclaims its dominance! We believe that this switching depends on how the regenerating neural networks re-wire and connect to each other.

We are currently looking at molecular players that are critical for regulating eye and brain regeneration. Our new findings allow us to ask how is a simple light sensing eye and brain network able to ‘compute’ and compare small differences? This will help regeneration biology (eye and brain) as well as help our understanding of how vision and neural processing evolved. The exciting thing is: we now have a method to visualize this connectivity and competition between the two very different neural networks – all in the same animal.

This opens a new area of research where we can address the molecular and structural mechanisms underlying neural regeneration and function.

In summary, for these worms, light matters! They have evolved the ability to process light in multiple different yet sophisticated ways using seemingly simple sensing apparatus, as they must have adapted to their complex natural habitats.

This was a collaborative work between our group and Dr. Akash Gulyani’s at Institute for Stem Cell Biology and Regenerative Medicine, Bangalore.

**Hierarchies in light sensing and dynamic interactions between ocular and extraocular sensory networks in a flatworm.** Nishan Shettigar, Asawari Joshi, Rimple Dalmeida, Rohini GopalKrishna, Anirudh Chakravarthy, Siddharth Patnaik, Manoj Mathew, Dasaradhi Palakodeti* and Akash Gulyani*. Science Advances. July 2017

**Media coverage:** Chop Off This Worm’s Head and It Can Still Detect Light, *New York Times*

*inStem Researchers Shed Light On Planarian’s Epidermis Role In Its Regeneration, The Hawk*

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**Genetic signature for tobacco/nut chewing HPV-negative early tongue cancer & prognostic biomarker for metastasis**

**Dr. Amit Dutt, Intermediate Fellow**
Tata Memorial Centre Advanced Centre for Treatment, Research and Education in Cancer (TMC-ACTREC), Mumbai

In a recent report published in *Oral Oncology*, an official journal of the European Association of Oral Medicine, International Association of Oral Pathologists, we describe that distinct genomic alterations underlie tobacco/nut chewing, Human Papillomavirus (HPV)-negative early stage tongue tumors and identify a gene, *Matrix Metalloproteinase (MMP10)*, as a potential prognostic biomarker to identify those likely to develop cancer metastases (spread of cancer from one organ to another).

Tongue squamous cell carcinoma (TSCC) is the most predominant form of oral cancer in developed countries and with varying incidence in developing countries wherein diverse etiological factors such as HPV infection and chewing betel-quid forms distinct underlying genetic alterations that have remained uncharacterized to date.
These factors lend variability across populations, particularly in the Indian subcontinent wherein chewing betel-quid comprising of betel leaf (Piper betel), areca nut (Areca catechu) and slaked lime (predominantly calcium hydroxide) is a part of the tradition. While tobacco usage show a 5- to 25-fold increased risk of cancer, HPV infection defines clinical and molecularly distinct subgroups of head and neck squamous cell carcinoma (HNSCC) patients. Furthermore nodal metastases status, wherein tumor cells reach regional lymph nodes near the primary tumor, also play a decisive role for choice of treatment in about 27-40% of TSCC patients at an early stage. There's an unmet need for prognostic biomarkers to stratify the patients who could be spared unnecessary surgery, lessening morbidity and cost of treatment. While several large-scale genome-sequencing efforts of advanced stage primary oral tumors have been described, systematic efforts to catalogue somatic gene alterations in tobacco/nut chewing associated early stage HPV-negative tongue tumors has been lacking.

In our study, we present the first and most comprehensive glance at genomic alterations and mutational signature across 57 early stage cases derived from HPV-negative early stage tongue cancer patients habitual of chewing betel nuts, areca nuts, lime or tobacco by using whole exome and whole transcriptome sequencing followed by validation using orthogonal methods. We present several lines of distinct features underlie this study attributing to unique etiological, subsite, and specific population, which have been previously described for HNSCC. The mutational profile of large fraction of patients display high frequency (53%) of C:G > A:T transversion in exome sequencing data—a hallmark of tobacco usage—reflecting tobacco as the most predominant etiological agent. Most significantly, we identify gene-sets involved in overexpression of MMP10 in 48% early stage TSCC tumors (n=50) as a potential candidate prognostic biomarker in early stage tongue cancer patients to predict nodal metastases.


Media coverage: Mumbai researchers' biomarker will tell if early-stage tongue cancer will spread. The Hindu.

**Novel mode of action of naturally occurring hormone, Progesterone, in suppressing breast cancer**

A randomized clinical study carried out at the Tata Memorial Center in 2011 revealed that mimicking “luteal phase of menstrual cycle” by artificially elevating the levels of progesterone in patients at the time of primary breast cancer surgery was found to be beneficial in terms of survival among those breast cancer patients whose tumor had spread to the nearby lymphatic nodes (1). This landmark finding that has changed clinical practice though was counter intuitive, based on the understanding of progesterone biology, as the effect of progesterone was observed even among patients whose tumor cells did not express the receptor for progesterone on their surface. This clinical observation raised an important biological question - how do breast cells that do not produce progesterone receptor and those that do, respond to external progesterone treatment in a uniform manner?

In a set of two parallel research publications from our laboratory, we provide some interesting leads to help us understand the biological complexity underlying this disease. We show that breast cancer cells treated with naturally occurring progesterone induces deactivation of protein kinases (specifically EGFR, AKT and ERK1/2) and delay in the invasion and migration ability of these breast cancer cells in a cell culture setting (in vitro). Interestingly, this phenomenon was observed independent of the availability of progesterone receptors on the cells (2).

Our analysis also leads to a surprising discovery of a novel feedback mechanism that regulates the presence of progesterone receptor in the breast cancer cells following progesterone treatment. We show that progesterone treatment of breast cancer cells lead to an increase in a novel miRNA miR-129-2 that effectively brings down the levels of progesterone receptor, as an early response (3). miRNAs are small RNA molecules in the cell responsible for regulating expression of various genes. We further demonstrate that blocking the function of miR-129-2, restores the availability of progesterone receptor in these breast cancer cells.

Consistent with this finding, TCGA (The Cancer Genome Atlas) analysis of 359 primary breast cancer tumors revealed an increased expression of miR-129-2 in progesterone receptor-negative patients compared to progesterone receptor-positive ones.

Taken together, we present the first leads to model a successful randomized clinical study in vitro to systematically elucidate the role of protein kinases that potentially underlie the clinical outcome of pre-operative progesterone intervention in breast cancer. Furthermore, our study suggests that inhibition of miR-129-2 restores progesterone receptor in breast cancer cells, and hence could potentially be helpful for patients with inadequate progesterone receptor expression levels under adjuvant or neo-adjuvant settings along with hormonal therapy in breast cancer.

**References**


Media coverage: TMC team overcomes resistance to hormonal therapy for breast cancer. The Hindu.
Novel assay to detect damage caused to the iris by ocular antibiotics

Dr. Subba Rao Gangi Setty, Senior Fellow
Indian Institute of Science (IISc), Bangalore

In our recently reported study in Experimental Eye Research, we show that application of antibiotics such as fluoroquinolones (FQs) to the eye can cause toxicity in the iris melanocytes resulting in the release of melanin pigments into the aqueous humour. Additionally, we also developed an assay to measure these pigments which would hopefully improve our understanding of how these antibiotics cause toxicity.

Antibiotics such as FQs are commonly used to treat eye infections but have also been shown to be toxic. However, their effect on iris melanocyte (melanin-producing cells) pigmentation and phototoxicity has not been studied extensively in humans. Iris pigments contribute to the colour of the iris and are produced by melanin-synthesising enzyme called tyrosinase (TYR) present in melanocytes. Ocular antibiotics exposure results in iris melanocyte damage following accumulation of dispersed pigments, consisting of melanin deposits and melanocyte debris, in the aqueous humor of eye. These pigments can be visualized using slit-lamp biomicroscopy, but cannot be measured. Additionally, dispersed pigments have also been observed in eye diseases such as bilateral acute iris transillumination (BAIT) and bilateral acute depigmentation of iris (BADI), although the role of these class of antibiotics in developing these conditions is not fully understood. In our published study, we proposed that dispersed pigments are possibly enriched with melanin-synthesizing enzyme tyrosinase and thus measuring the enzyme or its activity will directly correlate to the extent of melanocyte damage. We have developed a tyrosinase activity assay, which measures the amount of dispersed pigments in the aqueous humor of eye. Further, in collaboration with Narayana Nethralaya, Bangalore, we examined the iris depigmentation and TYR activity in the aqueous humor samples of 82 healthy eyes undergoing cataract surgery following topical application of FQs.

Our experimental results suggest that antibiotics such as Ciprofloxacin and Moxifloxacin cause significant melanocyte toxicity. Additionally, Moxifloxacin inhibited the tyrosinase activity at subclinical dose. Intriguingly, none of these patients developed any clinically significant ocular side effects characteristic of BAIT or BADI. Nevertheless, investigation of aqueous humor revealed that iris melanocytes produce “soluble tyrosinase” rather than cell membrane-bound tyrosinase which are found in all types of melanocytes. This unique soluble active tyrosinase forms a potential therapeutic target in cosmetic and skin lightning biology.


First molecular study in tropical Himalayan birds shows no correlation between seasonal variations and malarial parasite prevalence

Dr. Farah Ishtiaq, Intermediate Fellow
Indian Institute of Science (IISc), Bangalore

Avian malaria is very widely distributed disease and have been reported from virtually every part of the world except Antarctica. It is primarily caused by blood parasites that belong to Plasmodium species; however, Haemoproteus parasites do infect blood cells as well. Infections from both parasite group are sometimes collectively referred as avian malaria. Being vector-transmitted parasites, both Plasmodium and Haemoproteus species need specific insect vectors for their transmission between birds, which are usually mosquitoes for Plasmodium and biting midges for Haemoproteus transmission.

Our team has shown for the first time that avian Plasmodium and Haemoproteus parasites remain in the blood throughout the year without undergoing dormant phase in a tropical system where parasites survive in the tissues of the avian hosts. These findings are in stark contrast to temperate regions where temperature regulates the presence of vectors and transmission of parasites with a bimodal pattern of spring and autumn peaks with absence of infection in winter.

Avian malaria was found in 38% of the birds examined

For a year in tropical Himalayan foothills in Dehradun, our team conducted seasonal bird sampling using mist-nets to record morphometric (wing length, weight), collect blood samples and subsequently released the birds on the site. In addition, mosquitoes sampling was conducted around the same habitat.

Among 413 bird blood samples representing 49 species from 19 families that were screened for infection with Plasmodium spp. or Haemoproteus spp., 153 birds (37.68%) in 24 species (49%) were infected. Of these 37 were infected with Plasmodium, 95 Haemoproteus and 21 were co-infections.
Combating drug resistance in cancer cells

Dr. Shantanu Chowdhury, Senior Fellow
CSIR-Institute of Genomics and Integrative Biology (IGIB), New Delhi

Like resistance to antibiotics, some cancers are, or become, resistant to anticancer drugs. This baffles clinicians and cancer researchers alike. More so because questions about why, how and when anticancer drug resistance sets in has remained difficult to understand - and counter.

Therefore, it was quite exciting when initial results showed we could re-sensitise drug resistant cancer cells. And, when we understood how this happens through the mechanisms that we were focused on, the plot became more exciting.

But, first let me talk about combating drug resistance in aggressive metastatic cancer cells.

Anticancer drugs like doxorubicin work by inducing damage to DNA, which triggers the damage response machinery of cells. Once damage response gets activated cells are forced to stop replicating and eventually perish. In essence, doxorubicin therefore uses mechanisms that are in place to ensure that damaged cells are not allowed to grow unhindered.

Many of the damage response signals get channelled through an important protein commonly called p21, which on sensing DNA damage is produced in larger amounts. Increased p21 levels in turn lock the gears of the engineering that helps cells to cycle through different stages of growth. In drug resistant cancer cells somehow, we noticed, the levels of p21 do not increase adequately when triggered by doxorubicin - and, therefore, doxorubicin treatment cannot produce the desired effect by killing or maiming cells from growing further.

Now, how did our findings impact the engineering of the gear box? Based on insights from mechanistic work described below we used designer small molecules that were able to increase p21 levels following DNA damage. This was particularly effective in aggressive resistant breast cancer cells that are otherwise unable to induce required amounts of p21 when treated with doxorubicin.

Our results show that when made-to-order small molecules are given along with doxorubicin - first, p21 levels jump up, and in turn the gear locks set in ensuring marked reduction in growth of cancer cells. Though further studies remain, what appears to be exciting is that the drug resistant cancer cells are once again susceptible to doxorubicin treatment.
The most fundamental point we learnt was that making of the p21 RNA (which produces p21 protein) is controlled by a well-known but seemingly unconnected protein called TRF2, short for telomere-repeat binding factor 2. As the name suggests, for years scientists have studied TRF2 to understand how it protects the end of human chromosomes called telomeres - much like small clips at the end of shoelaces that keep the ends from fraying. So controlling p21 was as if TRF2 had a new job away from home.

However, there was a twist. We started noticing that TRF2 associates with a typical structure formed by DNA - somewhat like a knot - called G-quadruplex within the promoter (a stretch of DNA responsible for managing RNA production) of p21. Though this seemed completely out of the blue first - on second thoughts started making sense as similar G-quadruplex structures are believed to form at TRF2’s home ground telomeres. Apart from the basic understanding, TRF2 binding to the p21 promoter G-quadruplex made us think of the problem in a completely different fashion.

Let me go back one step. TRF2 controls p21. Suppressed levels of p21 weaken effect of doxorubicin in cancer cells. Therefore, loosening the control of TRF2 over p21 could be key to regain p21 levels. This was what we therefore put our heads to. The most important clue came from the knowledge that TRF2 required a G-quadruplex structure in the p21 promoter - a structural architecture, in principle, is targetable using small molecules as commonly exploited by pharmacologists for drug molecules. Small molecules tailored to bind the G-quadruplex structure solved the puzzle! In presence of small molecules known to bind G-quadruplex structures TRF2 is unable to control p21 levels tightly in cancer cells. So, when given with doxorubicin these molecules produce increased amounts of p21 and this leads to higher doxorubicin sensitivity, in cells which were otherwise unresponsive to doxorubicin.


Media coverage: IIGB researchers reverse cancer drug resistance. The Hindu

India Alliance joins Europe PubMed Central to make its funded research accessible to all

We’re delighted to announce that the Wellcome Trust/DBT India Alliance joins Europe PMC as a new funder. This brings the Europe PMC funder family to 28 members.

Dr Shahid Jameel, the Chief Executive Officer of the Wellcome Trust/DBT India Alliance, says: “The India Alliance believes that maximizing the dissemination of new ideas and knowledge by providing free online access is the most effective way of ensuring that the research it funds can be accessed, read and built upon. It therefore considers unrestricted access to the results of research to be fundamental to its charitable mission and a public benefit to be encouraged wherever possible.”

By joining Europe PMC, India Alliance is enhancing their commitment to open access, by providing their researchers with a dedicated mechanism to fulfil their open access policy and supporting them in achieving greater visibility for their work. This also makes India Alliance first funders from India (and Asia) to become members of this consortium.

Researchers funded by the Wellcome Trust/DBT India Alliance will join thousands of others who make their published research articles freely available through Europe PMC as soon as possible, and in any event within six months of publication. In addition to supporting compliance with India Alliance’s open access policies, Europe PMC has a range of innovative features to support researchers manage their publications such as ORCID article claiming tool, which in turn supports the creation of open author profiles.
Dr. Sam Mathew
Intermediate Fellow
Regional Centre for Biotechnology, Faridabad

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

Our research is focused on understanding the process of cellular differentiation, whereby cells assume specific fates to perform particular functions, specifically focusing on the skeletal muscle. The skeletal muscle is one of the largest tissues in our body, composed primarily of long, tubular, multi-nucleate, contractile cells called myofibers, which are critical for movement, posture maintenance, support and body temperature maintenance. These myofibers arise from stem cells during the course of embryonic development, and in adult life following muscle injury or disease. We are trying to identify the precise molecular mechanisms underlying differentiation of stem cells to myofibers, and the role of a family of proteins called myosins in this process. Multiple myosins are present in the muscle, each with distinct contractile properties, expressed at different time points during animal life. For example, one myosin called myosin heavy chain-embryonic is expressed during developmental stages and its functions are unknown, although mutations in this protein can lead to congenital muscle diseases. We have generated a mouse model to study the function of this myosin, and find that it is crucial for proper skeletal muscle differentiation during development and its absence can lead to severe muscle defects. Our results should provide novel insights into how cellular differentiation takes place, which will have broad implications on animal development, adult regeneration, tissue homeostasis and diseases such as cancer. In addition, our studies should unravel the precise role of myosins in skeletal muscle function. These studies will also provide more information on how mutations in these proteins cause human muscle diseases so that we can develop better treatment strategies for these diseases.

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

There are scientists who focus on developing and refining scientific tools and technical resources, which in many cases become popular and are used by numerous researchers. For instance, the advances made in generating genetic mutations in model organisms, like mice, fruit flies, worms etc., has undergone enormous changes over the last 30 years, with CRISPR being one of the most recent additions. This type of research requires a slightly different mindset and creativity, and is an area that fascinates me.

In addition, a phenomenon that has deeply interested me is collinearity, exhibited by the Hox family of genes across evolution. Hox genes are arranged in clusters and regulate the development of the entire animal body, from head to toe (anterior-posterior axis) in the case of humans. Genetic experiments carried out in model organisms have elegantly demonstrated the role of specific Hox genes in determining where specific body parts need to form. The genomic location of a Hox gene within its cluster is directly linked to where it is expressed in the anterior-posterior axis, which is termed collinearity, and recent work has begun to unravel the mechanistic basis of this.

What motivated you to become a scientist?

On some level, I am an accidental scientist. I have been interested in the life sciences right from a very young age. May be because I had some excellent science teachers during my school and college days. I have contemplated other career options early on, and endured a frustrating period after completing my masters degree, where I wanted to try out research but could not get any opportunities to do so. After a fairly long wait, I got a break and managed to join a lab as a project assistant. I enjoyed the work and soon it was pretty clear to me that research was my calling. The independence in designing and carrying out research on questions that arouse your curiosity is a primary motivating factor for me to be in science. In addition, as a scientist, one is constantly learning, whether it is the latest scientific advances in your fields of interest, or new skills such as mentoring, which keeps one interested and inspired.

How has the India Alliance funding helped you and your research?

The process of securing funding from the Wellcome Trust/DBT India Alliance helped me carefully chart out specific experiments that I am interested in addressing over a period of 5-8 years. The fellowship proposal and its progress has been evaluated at multiple steps by grant advisers, reviewers, interview panels, expert scientists and mentors, and each of these have led to inputs that have been useful to the research we carry out. The flexibility of funding is the best part of the Fellowship, which has helped me utilize the funds optimally. In my case, perhaps the most important component of the India Alliance funding has been the possibility to travel abroad to carry out experiments. Most of my animal related experiments could not be initiated at my host institute, since the animal facility was not yet ready and the ability to travel to a collaborating lab to carry out those experiments has been critical for me to achieve progress with my research. This is especially important since very few other grants or fellowships to my knowledge provide this option, which could improve the quality of work carried out.

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Based on your scientific journey so far, do you have any advice for those completing their PhD or pursuing a Postdoc?

When one looks for a postdoc position, several aspects are generally taken into account. In many cases, rightly, the focus when looking for a potential postdoc lab is on identifying a scientist who is doing really well and publishing excellent papers. In addition, my suggestion would be to also evaluate the scientist on the basis of the mentorship you will gain. In order to set up your independent research program, numerous skills ranging from identifying and recruiting man power, to developing effective grant writing and communication skills are necessary. Therefore, identifying a scientist who is willing to mentor on all of these is important for career growth and eventually to be independent. I have been extremely lucky to have worked with some outstanding scientists who are also exceptional mentors.

As a postdoctoral researcher, it is important to decide quickly on the career path that one wants to follow. Mentors can help postdocs assess their strengths and weaknesses and provide inputs on possible career trajectories based on this. If an academic research career is the goal, in addition to carrying out high quality research and having scientific questions that excite you, acquiring as many skills, including but not restricted to reviewing papers, mentoring students, writing grants, perfecting presentation skills, setting up collaborations and so on need to be the priority. In my opinion, the key is to remain motivated, well-prepared, and patient.

What keeps you going everyday?

As a graduate student or postdoc, the science itself was the major driving force for me. It is a lot of fun to ask scientific questions related to your research, design and carry out experiments to address those and come up with interpretations of the results, which in turn leads to new hypotheses and experiments. As an independent investigator over the past few years, I have realized that in addition to actively pursuing the research questions of interest, teaching, interacting with, and mentoring students and postdocs is also fulfilling. Since I enjoy all of this, it is easy to stay motivated and keep myself going.

Find out more about Dr. Sam Mathew’s research here.
The numerous commonalities between India and Africa – in terms of disease burden, demographics, paucity of resources for large-scale public health initiatives, and the aspiration to attain self-sufficiency – have contributed to the enormous scope and need for partnership in research and capacity-building. In an attempt to foster cross-learning and collaboration, the India Alliance has been in a continued dialogue with the Alliance for Accelerating Excellence in Science in Africa (AESA), a Wellcome-Trust funded agency founded in 2015. The India Alliance was happy to host, at the last couple of its Annual Fellows’ Meetings, a few members of the AESA staff and Fellows of DELTAS Africa (Developing Excellence in Leadership, Training and Science), the first programme of AESA. The primary objective of DELTAS is to support cutting-edge scientific research aimed at addressing African health and research priorities through training, collaborative supervision, mentorship, and public engagement. More information on the programme can be found [here](#).

Its 2nd Annual Meeting, the theme of which was ‘Showcasing the best so far’, was held in Accra, Ghana, in early July. (Read about India Alliance’s participation at the DELTAS 1st Annual Meeting in the September 2016 issue of our newsletter.) The meeting saw participation from 54 universities, institutes and research centers in 21 African countries. Progress made by the 11 DELTAS Africa programmes was reviewed in order to course-correct and thereby enable enhanced performance over the coming years.

At this 3-day meeting, the India Alliance was represented by 9 Fellows belonging to different research streams and career stages. These Fellows (as they have shared below) enjoyed presenting posters highlighting their India Alliance-funded projects and interacting with Principal Investigators, pre-doctoral and postdoctoral researchers, public engagement officers, science communication managers, and grants managers from across Africa. It was fascinating to see all these African stakeholders interfacing enthusiastically, genuine appreciation for each other’s strengths and determination to co-operate towards achieving common goals were quite palpable throughout the meeting. The programme presentations, science communication workshops, research management discussions, public engagement sessions, and social events enabled these interactions.

On behalf of the India Alliance, I presented an overview of India Alliance’s activities, our Fellows’ achievements, and the India Alliance’s overall impact on the Indian research ecosystem. Besides providing a glimpse of existing and upcoming Indo-African partnerships, I laid emphasis on the importance of mutual awareness and respect as well as cross-cultural and interdisciplinary learning for researchers and science facilitators on both sides.

- Dr Madhankumar Anandhakrishnan, Grants Adviser, India Alliance

## Learning from the differences between the Indian and Africa research programs

**Prof. Raghu Padinjat, Senior Fellow**
National Centre for Biological Sciences (NCBS), Bangalore

The DELTAS meeting allowed us a first-hand experience of where science in general stands in Africa. It also offered a comparative perspective to where we are with the India Alliance.

A large section of the meeting was devoted to showcasing and reviewing the work of the DELTAS program. Several directors, principal investigators and post-doctoral Fellows supported by the DELTAS program presented their work. I found the structure of the DELTAS program to be fundamentally different from that of the India Alliance. In contrast to the India Alliance that is structured around the science of individual scientists and their laboratories, DELTAS is organized around programs incorporating several groups of scientists sometimes across multiple locations. In addition, several elements of the DELTAS program are designed to build and deliver capacity is specific areas; an excellent example is the Sub-Saharan African Consortium for Advanced Biostatistical Training led by Professor Tobias Chirwa from the University of Witwatersrand. This effort specifically seeks to build capacity across Africa for biostatistics, something which is critical to building biomedical research capacity. Each of the programs of the DELTAS network also centres around a biomedical/scientific problem that is relevant to the needs of Africa; thus, several programs are anchored around scientific issues related to infectious diseases in both humans and animals. This scientific content was displayed via a poster session as well as short presentations; India Alliance Fellows participated in these activities.

Prof. Peter Agre, Nobel Prize winner in Physiology and Medicine spoke about his work leading to award winning discovery of the water channel, aquaporin. Using this setting he illustrated and emphasized the truly international nature of science in which colleagues from numerous countries contributed to his laboratory’s work in the area of water channel function and human health. Prof. Agre also spoke to the positive contributions of science in international diplomacy, helping to bring together peoples of divergent cultural and political leanings.
Finding common ground in OneHealth to tackle rabies

Dr. Abi Tamim Vanak, Intermediate Fellow
Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore

The DELTAS program is a Pan-African model where consortia of researchers lead thematic groups either within or across countries in Africa. Of special interest to me was the Afrique One-African Science Partnership for Intervention Research Excellence (ASPIRE) program focusing on research and capacity-building using the OneHealth paradigm. This program is also working to tackle the problem of rabies in sub-Saharan African countries, and I had an opportunity to discuss the similarities and differences in rabies control in India.

Africa and India share a similar burden of dog-mediated rabies. However, given the scale of the continent, and the lower human-densities, I believe the model of mass vaccination of dogs is more likely to succeed in many African countries than in India. I am hopeful that we can continue this dialogue during the next meeting of Afrique One-ASPIRE OneHealth researchers in Tanzania later this year. Having previously attended ecology meetings in Africa that are by far dominated by researchers from western countries, this meeting stood out as a shining example of research that is led by the global south. It showcased excellence in research that was of and by Africans, and is a model worth emulating for a Pan-Asian initiative!

Commonalities in cancer epidemiology and health systems

Dr. Bushra Ateeq, Intermediate Fellow
Indian Institute of Technology (IIT) Kanpur

The research work presented by Dr. Moses Galukande from Makerere University, Kampala, on triple Negative Breast Cancer was of great interest to me. Dr. Galukande works on the epidemiology and genomics of breast cancer in Uganda in collaboration with the Sanger Genome Centre and supported by the Wellcome Trust through Thrive – an East African initiative.

Similar to the Indian scenario, African women with breast cancer also have low survival rates. Therefore, an understanding of this disease in context-specific societal, health-systems and barriers to early detection, diagnosis and treatment are highly warranted. Overall increase in life expectancy, and decrease in the burden of communicable diseases, thus shifting the trend from communicable diseases towards non-communicable is quite identical to India. Of note, non-communicable diseases are the leading cause of death in Sub-Saharan Africa with cancer being the leading cause. Many of these cancers are usually preventable or treatable when detected at an early stage. Unfortunately, cancers diagnosed in Africa are associated with higher mortality than the rest of the world due to limited access to screening methods, pathology labs, trained personnel training, resources and infrastructure.
The five-year survival rate for breast cancer is less than 50% in Gambia, Uganda, and Algeria, compared to nearly 90% in the United States (American Cancer Society).

For me, this meeting further reinforced the fact that India and Africa share several commonalities in disease epidemiology, including communicable and non-communicable diseases and other health-specific challenges. Therefore, there is an urgent need to take appropriate measures in recognizing strength from both sides, gauging overlapping research areas, and in fostering joint initiatives to improve biomedical research. Africa and India will benefit significantly by investing in bilateral efforts to ensure accessible and affordable health care, improved diagnostics (point-of-care) which is critical in reducing delays in diagnosis and initiating appropriate treatment strategies. Strategically planned capacity building between two countries through training workshops, exchange programs and joint collaborative research on epidemiology, population-based studies and disease-specific pharmaceutical development will be beneficial.

Huge scope for collaborations on HIV-TB research

Dr. Amit Singh, Senior Fellow
Indian Institute of Science (IISc), Bangalore

DELTAS annual meeting was a unique opportunity to witness high quality, public health-related research programmes across Africa. In addition to scientific presentations, a major part of the meeting showcased the work behind setting up centres, employing staffs, generating additional funds and sharing preliminary findings. Program investigators raised the need for collaboration among African countries and other countries that share similar public health challenges. In this context, several basic and public health issues pertaining to mental health, malaria, HIV, and Tuberculosis were of interest to me and other Fellows from India Alliance.

In particular, I had several productive discussions with DELTAS Fellows working in the areas of infectious diseases such as HIV-TB. I learnt about African Science Partnership for Intervention Research Excellence (Afrique One-ASPIRE) ongoing project on assessing the anti-HIV potential of compounds derived plants normally consumed by chimpanzees in the Ivory Coast. Chimpanzees are naturally tolerant to many bacteria, fungal, and viral infections. Discussions are on-going to work together on understanding molecular mechanisms of HIV inhibitory potential of these compounds. I also got the opportunity to interact with a DELTAS Fellow at University of KwaZulu-Natal, South Africa who has access to several HIV cohorts, which are unique, important and can impact basic, clinical and translational research programmes on HIV and HIV-TB coinfection in India.

While I am in touch with both Fellows at personal level, I feel the need for more interactions between the DELTAS and India Alliance Fellows. This would be important in helping us understand each others expectations and share complementary expertise. Also, it might help if a student exchange program is set up between labs of India Alliance and DELTAS Fellows to foster intellectual exchanges and to accelerate research in key areas that are common between India and Africa. I had an opportunity to interact with several Master students who are interested in doing graduate research in India. India Alliance can help spread information among DELTAS Fellows regarding international graduate programs available in various Indian research institutions.
The projects presented at the meeting covered a broad area from zoonotic diseases to mental health and it was interesting to note that the structure of the program in DELTAS was slightly different to that of the India Alliance. In my discussions with project leaders from Zimbabwe and Ethiopia I learnt, however not to my total surprise, that many of the issues around mental health were common to Africa and India, and the themes of using task sharing, engaging primary health care services, building service delivery and research capacity in mental health were also the objectives of some of the African programs. In my discussions we agreed to identify opportunities that both of our teams could benefit from and develop projects in that direction.

From me, this was an initial meeting and other follow-up meetings would be needed before anything can be developed. As a first meeting it was helpful to meet key members working in the same area face-to-face and hopefully the next meetings even if virtual will help to build on these. I believe that collaborative relationships take some time to fructify and need a lot of nurturing which the Fellows should take responsibility for and utilize any existing structures within the two programs – India Alliance and DELTAS - to facilitate these interactions.

Finally, it was a real pleasure to hear Prof. Peter Agre talk about his experience and share how he grew from a ‘hippy’ background to becoming a Nobel laureate! His anecdotes, sense of humour and candor were really touching, and showed how perseverance and right attitude can help in the long run.

I would take many positives from this meeting (both academic as well as exposure to a different culture) and feel such engagements in future would be useful for Fellows. However, I would like to suggest that a structure and process be put in place which allows for direct collaborative projects between Africa and India.

Dr. Pallab Kumar Maulik, Intermediate Fellow  
The George Institute for Global Health, New Delhi

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Emerging infectious disease in the context of land-use change

Prof. Uma Ramakrishnan, Intermediate Fellow  
National Centre for Biological Science (NCBS), Bangalore

The DELTAS meeting was an incredible learning experience. For me, as someone interested in animals and human evolution, the continent of Africa has always held a deep fascination. Being able to meet Fellow scientists in the DELTAS meeting allowed me a birds-eye view of science happening here. I was particularly struck by the collaborative, theme-based nature of research programs in Africa. This was a nice contrast to the more individual-PI based models for doing science such as in India. I liked that many talks included a strong social dimension to formulating research. Many scientists thought about people who could not access healthcare or were unsure of accessing it.

I found the sessions on OneHealth and AIDS interesting. Abi Tamim and I spoke in detail with Constant, a postdoctoral Fellow working on chimpanzees, and invited him to visit our laboratories to discuss more detailed collaborations. Dr. Bonfoh of Afrique One-ASPIRE suggested possible ways ahead for collaborations. In particular, I would be interested in continuing to interact with scientists in Africa who work on emerging infectious disease in the context of land-use change, something happening at a dramatic scale in both India and Africa. There is a long way to go, since no such dialogue exists, but it would be very interesting to contract scenarios in India and some parts of Africa.

Another dimension of interaction could include student and postdoc training. For example, workshops on bioinformatics and/or several other tools would be good to hold together for Indian and African students. I would be happy to help contribute to such initiative.
Understanding mental health status of HIV survivors through the African lens

**Dr. Aparna Mukherjee, Early Career Fellow**
All India Institute of Medical Sciences (AIIMS), New Delhi

Meeting with people from diverse backgrounds at the DELTAS meeting made me realize how similar we are in our endeavor to take science forward and the challenges we face in the process. The keynote address by the Minister of Environment, Science, Technology and Innovation, Ghana, Prof. Frimpong-Boateng ‘My life Journey from Cardiovascular Miracles to Political Leadership’, was very inspiring – it was heartening to see educated, scientific-minded academician in position of policy-making.

I met various researchers working in my field of interest, tuberculosis, and had some interesting discussions regarding potential collaboration with researchers working on childhood tuberculosis in University of Ghana. It was particularly useful to gain insights into the importance of mental health in people living with HIV/AIDS and to discuss strategies to improve the same in children/adolescents with HIV. This is a problem which has been intriguing me for some time now specially because we are seeing increasingly more adolescent survivors of perinatal HIV infection. There was also a very stimulating discussion in the meeting regarding safeguarding women scientists against attrition in their career by providing targeted support.

The India Alliance Fellows had a separate meeting with Consort Strategy (UK) to discuss research management landscape in India. This was a fruitful discussion where we unanimously felt a need for specialization and support in research management in our Indian institutions.

Overall, it was a motivating and enriching experience to listen to and interact with peers from a different yet similar setting at the DELTAS meeting. There were many fruitful exchanges which will hopefully further our collaborative research.

Carrying the impression of best of science from Africa to India

**Dr. Giridhara R Babu, Intermediate Fellow**
Public Health Foundation of India, IIPH-H, Bangalore campus

Attending the DELTAS conference provided me with a unique opportunity to learn about African-led initiatives in the key areas of health research. The meeting provided opportunities for scientific dialogue and collaboration with many African collaborators.

I was moved by Prof Agnes Binagwaho’s talk on “For better service delivery, master the “How”.” Create more health with what we have” was one of the highlights and related to my research in the public health settings in poor resource landscapes. The knowledge gained through this meeting has primed me for exploring collaborations including grant seeking. The various talks on topics like Research Management and Models & Evaluation for Engagement were very handy in day-to-day research administration. I found the idea of the research management Fellowship programme for Professionalizing Research and Innovation Management in India (PRIMI) very welcoming and apt as most institutions do not have a formal research strategy and lack related policies and guidelines to inform research priorities. I was also excited to note that the F1000/Wellcome Open platform would be extended to the Fellows of India Alliance. Interacting with Nobel Laureate Prof Peter Agre was an amazing source of motivation that I shall carry with me for a longtime.

On a personal level, receiving the award for best poster to me was astounding. We were participating from India as special invitees and consideration of our posters and talks for the awards shows exemplary professionalism and focus of AESA/DELTAS Africa towards quality in science and their collaborative vision. I carry the impression of best of science pursued in the African continent and look forward to forge strong collaborations with African scientists.
Outreach events help the Wellcome Trust/DBT India Alliance reach out to potential applicants to inform them of our programmes and to understand the aspirations and needs of young researchers. These events also allow us to meet key leaders at major institutions, learn from them and to build partnerships for developing future science leaders for India.

India Alliance has so far awarded 280 fellowships. Over 50% of the applications are received from researchers based overseas, which are also reflected in those awarded the Fellowship. Of these, a majority of the applications and successful Fellows are from USA, who are typically Indians undergoing PhD and/or postdoctoral training at US institutions. Thus, annual outreach events in USA have become an important part of the working of India Alliance.

This year’s ‘West Coast Outreach’ focused on three large public universities in California. Events were held at the University of California campuses in San Francisco (UCSF, August 7), Los Angeles (UCLA, August 9) and San Diego (UCSD, August 11). The UCSF event also attracted attendees from UC Berkeley and Stanford University and the UCLA event also had people from the University of Southern California. Besides my talk on India Alliance Fellowships and programmes, each event also had a panel discussion of ‘Opportunities for Life Sciences in India’. The panelists included Dr. Tavpritesh Sethi (India Alliance Fellow, currently at Stanford University), Professor Ramesh Rao (at UCLA), and Professors Shankar Subramaniam and Suresh Subramani (at UCSD). About 40-50 PhD students and postdoctoral fellows of Indian origin attended each event.

The ‘Midwest Outreach’ was built around the Science Research and Opportunities in India (Sci-ROI) Annual Event – the Young Investigator Meeting, Chicago (YIM-C) held on September 8-10 at the University of Chicago (see). This meeting attracted over 100 PhD students and postdoctoral fellows of Indian origin, located in different parts of USA. It also brought together institutional heads and Indian funding agency representatives to inform the attendees on science opportunities in India. The Sci-ROI group also arranged satellite meetings at the University of Wisconsin at Madison (UW-M, September 11) and the University of Illinois at Urbana-Champaign (UIUC, September 12).

Taking advantage of the Sci-ROI meeting, India Alliance outreach events were also held at the Lerner Research Institute, Cleveland (September 5) and Purdue University (September 15). In Cleveland the attendees included people from the larger metropolitan area, including Case Western Reserve, Cleveland State University and Northeastern Ohio Medical University. Besides my talk on India Alliance fellowships and programmes, both of these events also had a panel discussion of ‘Opportunities for Life Sciences in India’. The panelists included Professor Tariq Haqqi (at Cleveland) and Professors Richard Kuhn and Suresh Garimella (at Purdue). About 40-50 PhD students and postdoctoral fellows of Indian origin attended each event.
An important part of the outreach events was my meeting with the leadership at UCSD, UW-M, UIUC and Purdue.

At UCSD I met with Chancellor Professor Pradeep Khosla, Professor Andrew Chisholm (on leave from UCSD at Wellcome) and members of the Tata Institute for Active Genetics and Society (TIAGS) core group, which included Professors Suresh Subramani, Karthik Muralidharan, Anita Raj, Ramesh Rao and Tariq Rana. Ashley Hernandez, Director of Foundation Relations, coordinated the visit. We discussed TIAGS and how India Alliance can help with policy and information exchange in its formative years. We also discussed various UCSD initiatives centered on career development, mentorship and academic leadership, which can be of value for India Alliance Fellows. These include the Advantage Program: Preparing Scholars for Professional Success; Associate Professor Leadership Development Program; Faculty Mentorship Program; Research Communications Program; and Qualcomm Institute, High-Speed Data Transfer.

The UW-M and UIUC visits dealt with bioengineering programmes, and were led by Professor Parmesh Ramanathan, Associate Dean at UW-M and Professor Rohit Bhargava, Founding Professor of Bioengineering at the Beckman Institute, UIUC. At UW-M, I also met with Dr. Imogen Hurley, Director, Office of Postdoctoral Studies and laerned about their training programmes towards non-academic science careers as well as mentorship and academic leadership initiatives at the university. Some of these resources will be valuable for India Alliance Fellows - Individual Development Plan resource- Center for the Improvement of Mentored Experiences in Research; Leadership course for postdocs; and The Fully Prepared to Lead program.

The visit to Purdue University also included meeting their leadership engaged with international programmes, especially the Purdue-India initiative. Professor Richard Kuhn, Director, and Dr. Thomas Sors, Assistant Director, Purdue Institute for Inflammation, Immunology and Infectious Diseases, hosted my visit. I also met with Professor Suresh Garimella, Vice President for Research and Partnerships. Considering the strength of Purdue University in structural biology and cryoelectron microscopy and India poised to invest heavily in these tools, this will be a very valuable training and research resource for Indian researchers. Computational biology could be another area as Purdue University is partnering Infosys Technologies as a finishing school for the latter’s US workforce.

Overall, this year’s USA outreach was very valuable in not just meeting potential applicants, but also key academic leaders at major universities. These interactions should help India Alliance attract higher quality applications, build our reviewer network, establish research and training partnership opportunities, and put together academic leadership and mentoring programmes.
About India | 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].

Please note:
After the meeting, the organizers must provide a position paper on the theme that includes a plan to catalyze research in that area in India. India Alliance may consider funding research in that area following expert advice and review.

Application process

• 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 will be jointly made by the EMBO Course Committee and the India Alliance Meetings Committee in May and October.
• All applicants will be informed of the outcome of their application by email shortly after the committee meetings in September.

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.

Next call for applications: December 2017

INDIA ALLIANCE EVENT SUPPORT
Rapid developments in biomedicine and information technology is ushering in a new age of medicine. Artificial intelligence, genome editing, tissue engineering, are just a few of the frontier fields that are changing the practice of medicine.

The Developing Indian Physician Scientists (DIPS) workshops aim to ignite scientific curiosity in young doctors, while promoting an understanding of the frontiers of medicine and related sciences. The workshops will provide training in quantitative methods and research methodology, and an opportunity to young clinicians to discuss the relevance of biomedical research and career options. Eminent physician-scientists will make up the workshop faculty.

Workshop will be restricted to 40 participants.

Eligibility: To apply for participation in the workshop, applicant must be

- an MBBS (final professional) and/or MD student training in an Indian medical institution.
- prepared to pay refundable advance of INR 2500 (MBBS) or INR 5000 (MD) which will be refunded after the workshop to those who have attended the complete workshop.
- prepared to make their own travel arrangements. Accommodation (double occupancy) and meals will be provided by the organisers at no charge.

Application deadline: January 2, 2018

Online application form for the Hyderabad workshop can be found here.

Please write to us at workshops@welcometdbt.org should you have any questions regarding these workshops or visit our website for more information.

We would appreciate if you could display the workshop flyer on your notice board and/or share this information with anyone who might be interested in participating at these workshops.

Organizers
Prof. Rakesh Aggarwal, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow
Dr. Anurag Agrawal, CSIR-Institute of Genomics and Integrative Biology, New Delhi

Supported and facilitated by Wellcome Trust/DBT India Alliance is an initiative funded equally by the Wellcome Trust, UK and Department of Biotechnology, India, aimed at promoting basic biomedical, clinical and public health research in India through funding and engagement.
The India Alliance organised its 16th two-day Science Communication workshop at the Indian National Science Academy (INSA), New Delhi on 7 and 8 September. The workshop was attended by 33 participants from across the country mostly comprising of PhDs, Postdocs, young faculty and clinicians from 23 different institutions.

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 opportunities in academia and useful pointers for building a successful career.

Our eminent panel of mentors included, Dr Anna George (NII, New Delhi), Dr Anurag Agrawal (CSIR-IGIB, New Delhi; IA Fellow), Dr Sam Mathew (RCB, Faridabad; IA Fellow), Sheetal Gandotra (CSIR-IGIB, New Delhi; IA Fellow), Dr Shweta Khandelwal (PHFI, New Delhi; IA 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 enthusiasm to learn and active questioning at the workshop by the participants emphasizes the need for Science Communication in nurturing and training the future researchers of India.

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

http://www.wellcomdbt.org/science-communication-workshop; workshops@wellcomdbt.org
Program Report

Our Taste and We

Dr. Pinky Kain
Intermediate Fellow
Regional Centre for Biotechnology, Faridabad

Eating processed, unhealthy and fat-rich food like burgers, pizza, French fries etc. is a rage among young children these days. Kids pester their parents to take them out to restaurants which coupled with other unhealthy lifestyle choices like watching TV whole day, playing video games and no outdoor activities is proving to be deleterious for the health of these young children. Not to forget, lately Indians have been topping the list when it comes to obesity, diabetes, cardiovascular diseases which have been worsened due to these unhealthy food choices and our sedentary lifestyles.

These worrying trends prompted me and my research team to organise a program titled “Our Taste and We” at a government school (Sarvodaya Vidyalaya, INA Colony) in New Delhi on 7 July 2017. This was also driven by our desire to share the research on taste system in fruit flies “Drosophila”, an experimental model we use in our lab to study the biology of taste, understanding of which can ultimately improve our food choices. Aim of the program was to sensitise young children about the importance of leading a healthy lifestyle by enabling them to appreciate the connection between our taste and eating behaviours. The event saw participation of around 160 students from class 9th and 10th, including their teachers.

The program started with a general discussion with the students on topics such as, what they like to eat more; how much water they drink every day; how many of them understand what diabetes is, etc. We also touched up on socio-cultural factors governing our feeding habits in India such as, girls not being fed properly; our mothers eating left overs and not eating regular healthy meals and so on. Many more issues were raised and deliberated upon to appreciate and understand that unknowingly we are indulging in unhealthy eating habits.

These conversations were followed by presentations on “what taste really is”, “why is it important for us” and “how we recognise different tastes”. We explained these concepts in the backdrop of our research studies in fruit flies and how this model can help us better understand human taste behaviour. Some other topics that were discussed “what happens if our taste is defective or we are unable to taste when undergoing medical treatment or recovering from an illness’. To make it more fun and help students grasp these concepts more easily, we showed images and live fruit flies under a stereo microscope. My team and I also explained and demonstrated how similar the taste responses of flies and humans are. For example, how flies are attracted to sweet taste and are averse to bitter tasting, just like humans. These activities also led us into a discussion on how understanding taste in fruit flies can help us apply this knowledge to other insects and reduce incidence of vector-borne diseases like dengue, malaria, chikungunya and Yellow fever. Additionally, we touched up on how we can save our crops by understanding feeding behaviour of insects. These sessions helped the students appreciate why we use the fruit fly model in our lab and how taste can influence what we eat.

In order to gauge whether students understood and retained the concepts shared with them, they were asked to complete a short questionnaire on general eating habits, healthy and unhealthy food, about nutrients, personal hygiene, exercises and diseases related to our unhealthy feeding behaviour. These instructive and deliberative sessions were followed by a more creative approach to further explore the relationship between taste and health - an art competition. Students were asked to draw the first thought that came to their mind about taste and health.

At the end of the program, each student received a colourful fruit-shaped bookmark with quotes on healthy food habits, as a way to remind them about good lifestyle choices that they must adopt. The enthusiasm and eagerness shown by the students to learn and participate in the program underscored the importance of engaging with young children on important health issues early on in their lives and it must be done in an interactive and creative manner. Active involvement and support from teachers in these programs is of prime importance to ensure efforts like these can be sustained and the message is carried forward.
INDIA ALLIANCE
PUBLIC ENGAGEMENT

Event report
Another Look at Traditional Geometric Art: Pattern morphogenesis, link with quasicrystals, contribution to a revival

Jean-Marc Castera, a gifted artist, mathematician and author and a renowned expert on Islamic Geometric Art, gave a fascinating talk at National Centre for Cell Science, Pune on ....

Subsequent to obtaining a degree in mathematics, Jean-Marc launched an experimental course exploring the connections between mathematics and arts, at Paris-8 University.

Jean-Marc Castera’s talk described non-periodic patterns in traditional geometric art, quasicrystals and architecture, and explored the connections between them. Jean-Marc began with a presentation on the western and Persian traditional styles of geometric patterns (octagonal family observed in Morocco and Andalusia; pentagonal family observed in Iran), which were exemplified by several eye-catching images. He further demonstrated with engaging animations, how these complex patterns can be seen to arise interestingly from very simple transformations acting on simple primitive shapes. Examining these patterns further with respect to the concepts of self-similarity, fractals and non-periodicity, his talk progressed towards discussing the relationship between such patterns and quasicrystals. Quasicrystals, whose discovery earned the Nobel Prize in Chemistry in 2011, are a unique category of ‘crystals’ in which atoms are ordered over long distances, but whose patterns do not occur in periodically repeating arrangements, unlike traditional crystals. Further, explaining the practical applications of his work, Jean-Marc then spoke about his research towards evolving new geometric patterns, and his experiences with using them in modern architecture.

He concluded his talk with a presentation on some of his architecture projects in the United Arab Emirates, such as the Abu Dhabi New Central Market and Masdar Institute of Technology, carried out in association with the renowned architect, Sir Norman Foster. In a nutshell, Castera’s talk beautifully demonstrated the interesting threads that can link diverse disciplines like the arts, mathematics, science and architecture.

CALL FOR APPLICATIONS
Art + Science programme 2017

Khoj International Artists Association invites proposals for its Art + Science programme. Instituted by Khoj and supported by Wellcome Trust/DBT India Alliance, Art + Science is designed to advance projects that explore artistic applications of emerging thoughts and technologies with the help of partners from the scientific industry and academia.

We seek project proposals that have the potential to allow the public to learn alongside artists, scientists and technologists doing thought-provoking work. Projects, including prototypes, documentation, and work-in-progress, will be presented to the public at an Open Studio at Khoj Studios in late March 2017. We are greatly interested in project proposals that include some aspect of public demonstration and engagement with the public.

The Art + Science grant program is open to individual artists and artist collectives.

The scientists for this edition work across and are interested in Biological Sciences, Genomics, Regenerative medicine, Internet and Science, Myth and Science, Health and Disease, Infections, Genetic Engineering, Neuroscience, Biotechnology, Perception and alternate or augmented reality and Human/machine, Mars, Terra-forming and Astronomy, interface, robotics; sensorial and extra-sensorial interfaces etc.

Particular areas of interest include the following:

The Internet
Science-Fiction
Health, Medicine and disease
Issues of perception and alternate, augmented or virtual reality.
Human/machine interface; robotics; sensory and extrasensory modes of perception.
Space, exploration and new frontiers.
The Politics of Science and Technology.
Science and Myth.

Applicants wanting to co-develop projects with Scientists/Academics may write to applications@khojworkshop.org and they will be connected to the scientists working in the relevant area. Alternately if applicants want to work on topics outside the stated, please write to us and we will try our best to connect you with suitable researchers/scientists/scholars.

Deadline to submit proposals 30 September 2017

Read more here: http://khojworkshop.org/opp_/call-for-proposals-art-science/

http://www.wellcomedbt.org/public-engagement; public.engagement@wellcomedbt.org
A Challenge for a Challenge: Running to provide healthcare in difficult circumstances

India Alliance Fellow, Dr. Rashmi Rodrigues St. John’s National Academy of Health Sciences, Bangalore, converts her new-found enthusiasm for running into an activity to support a cause by running for the Médecins Sans Frontières (MSF) on the 19th November 2017 at the Airtel half marathon in New Delhi.

Help her support MSF, an organization that strives to take healthcare to the underserved in difficult circumstances! Donate generously at http://icfn.in/ADHM/fundraiser/rashmirodrigues/

Positions available for a Postdoctoral Fellow and Project Assistant at IISc Bangalore

Understanding the movement of mRNAs in and out of translation Our research group started in September 2013 at Department of Biochemistry, IISc. As a group we are excited about understanding the movements of mRNA between different functional states in cytoplasm. Research in our laboratory has been funded by the highly competitive Intermediate Fellowship from The Wellcome Trust/DBT India Alliance.

An mRNA can be a) translated b) degraded or c) stored in a translationally silent state in cytoplasm. We are trying to understand the mechanistic basis of various mRNA fate decisions. Movement of mRNA between these functional states plays an important role in various cellular processes such as Development, Learning, Memory, Ageing and Regeneration. It also plays a crucial role in disease conditions such as Cancer, Neurodegenerative disorders, Duchenne Muscular Dystrophy etc. Specifically deregulated and uncontrolled translation is considered to be a contributing factor to tumorigenesis. We are interested in studying the regulation of proteins that reduce protein translation known as translation repressors in Saccharomyces cerevisiae. These factors act mostly at the translation initiation step.

We are specifically working on translation repressors that contain Arginine-Glycine-Glycine (RGG) motif. We started addressing the role of arginine methylation of RGG-motifs in regulation of repression activity. We have now observed that RGG-motif protein Scd6 gets arginine methylated in Hmt1-dependent manner. Using a combination of genetic, biochemical and imaging approaches we observe that arginine methylation promotes Scd6 repression activity by augmenting its interaction with translation initiation factor eIF4G. These results were published last year as first publication from our group in Nucleic Acids Research journal. In this research we have demonstrated for the first time that arginine methylation regulates fundamental cellular process of translation repression. It raises a very exciting possibility that arginine methylation could be a general modulator of global translation since RNA binding proteins constitute the largest group of arginine methylated proteins.

We are currently focusing on looking at the role of arginine methylation in regulating other translation repressors. We are also exploring other modes of regulation of translation repressors. Incoming postdoc/project assistant can work on these exciting aspects or come with a plan to address a question of his/her interest within the purview of lab.

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