

## Empowering Partnerships





**B**IRAC presents before its readers the 2nd issue of the Newsletter *Birac i3*. The first issue of the Newsletter was launched on the 2nd Foundation Day – 20th March, 2014. The Theme of this edition is “Empowering Partnerships”. BIRAC, in its effort to promote and nurture the Biotech Innovation Ecosystem lays major emphasis on partnerships. It is important to leverage the strengths of partners – both national and international, to be able to deliver quality results.

BIRAC’s collaborations with international and national agencies such as Bill & Melinda Gates Foundation, Wellcome Trust, University of Cambridge, CEFIPRA, CDSA, IKP Knowledge Park, and ABLE is testimony to our commitment of leveraging the partnerships for stimulating, fostering and enhancing the strategic research and innovation capabilities of the Indian biotech industry.

Forging collaborations in research and innovation can have multitudes of benefits. Most of the funding agencies encourage collaborative proposals where each of the collaborators possess some unique skills or technology or knowledge to complement the other. Partners can leverage the collaborations for expanded capacity demands of the projects. The Human Genome Project is an exemplary model of largest collaborations ever undertaken whereby thousands of researchers worked in tandem to unearth and decode the 3 billion bases of human genome. Partnerships can provide collaborators with the ability to share resources, an opportunity to understand and learn other disciplines and develop collegiality in individuals. Last but not the least, risk management is one of the important aspects addressed by rightly matched collaborations.

BIRAC marches on towards fulfillment of its mission to Empower and Enable the Biotech Innovation Ecosystem for Affordable Product Development. In its journey, BIRAC seeks continued support and cooperation of all the stakeholders. Together we pledge to deliver. ■

**Renu Swarup**

Managing Director, BIRAC

&

Adviser, Dept. of Biotechnology, Govt. of India

## PPP Models for Development of Biotech Sector in India



India is among the largest and fastest growing economies of the world. We are the fourth largest economy on the basis of Purchasing Power Parity (PPP) and one among the most attractive markets for business opportunities owing to our huge pool of talented and skilled manpower, abundant natural resources and strong economic foundation. According to The World Bank, Indian economy has witnessed 5% annual GDP growth in the past 5 years and is poised to grow at a rate of over 6% during 2014-15. The model of Public-Private Partnership (PPP) has played a major role in the growth of Indian economy and will continue to do so in coming times.

Biotechnology sector in India has moved in tandem with the growing economy and has witnessed growth and evolution since the inception of DBT under Ministry of Science and Technology in 1986. The establishment of BIRAC in 2012 has provided further impetus to the sector’s growth. The total industry size in FY12-13 was USD 4.3 billion and is estimated to increase to USD 11.6 billion by the end of FY16-17.

The Government is committed towards the development of biotech sector in India and the recent budget is a testimony to that. We have to understand that though the Government has the access to public funds and wants to put those funds to the best possible use, the limitations still exist at the execution level.

Here, PPP model has proved itself as an effective and trustworthy mechanism to execute the government’s plans and policies. The model is capable of alleviating the most urgent problems our country is facing, such as malnutrition, food security, energy deficit, healthcare and poor sanitation.

PPP programmes such as SBIRI and BIPP, both run by BIRAC, have proved to be highly successful in fostering and nurturing the growth of biotechnology in India. So far, both programmes taken together have made cumulative investments of ~ USD 223 million with support extended to around 274 projects, involving approximately 250 companies. Several successful innovations have been rolled out as a result of support from SBIRI and BIPP.

I would like to emphasize here that BIRAC, while adopting some of the best practices around the world, will be keen to leverage the PPPs as a platform to bring the biotech innovations from lab bench to the hands of the end users. *Empowering Partnerships* in every facet of biotechnology will be our priority to expedite the product discovery to translation pipeline. ■

**Prof. K. VijayRaghavan**

Chairman, BIRAC

&

Secretary, Dept. of Biotechnology, Govt. of India

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Editorial Convenor

**Ankur Gupta**

Manager, Business Development, BIRAC

Editorial Consultant

**Manoj Dabas**

Design, Production and Circulation

AFE Consultants Private Limited

Aravali House, 431/D-22, Chhatarpur Hills

New Delhi-110074, India





## BIRAC - 2nd Foundation Day

# Milestones behind, miles ahead

Anniversaries are important time pegs that also serve as occasions for any organisation to evaluate its progress towards achieving focal parts of its mandate. BIRAC, set up as Department of Biotechnology's interface agency, which serves as a single window for the emerging biotech industries – completed two years of its incorporation on 20<sup>th</sup> March, 2014. These two years have been full of action with BIRAC making all efforts to reach out to the large number of potential stakeholders, both national and international. As a result, BIRAC today engages with nearly 300 companies by way of extending financial and mentoring support. It already has as many as 10 agencies, both national and international, as partners for implementing various activities and in the process, it has involved nearly 700 national experts from academia, industry, public and private research laboratories and government/ministries departments as resource persons to facilitate evaluation of projects. During this short but eventful period BIRAC has also interacted extensively with a large number of international partners at the government level and also with like minded funding organizations to explore opportunities to build affordable biotech products.

BIRAC Foundation Day on 20<sup>th</sup> March 2014 brought together nearly 300 scientists from industry and academia, public and private sector, policy makers and national and international organizations. The theme for the Foundation Day celebrations was “**Promoting Partnerships–Innovation Research to Product Development**”. Various stakeholders of BIRAC leveraged the Foundation Day platform to discuss the priorities for making India globally competitive in the biotech arena.

The proceedings were kicked off by a Welcome address delivered by **Dr. Renu Swarup**, MD, BIRAC & Adviser, DBT, who recounted BIRAC's journey for promoting the bio-

innovation ecosystem over the past 2 years. This was followed by a Keynote Address by **Prof. K VijayRaghavan**, Chairman, BIRAC & Secretary, DBT, that focused on the importance of Partnerships in achieving the vision and goal of BIRAC for creating an Innovation Research Ecosystem for Affordable Product Development.

Theme Lecture was delivered by none other than **Dr. M.K. Bhan**, Founder Chairman, BIRAC & Former Secretary, DBT. In his address Dr. Bhan emphasized on the importance of forging national and international partnerships to address the challenges faced by Indian Biotechnology sector and to make the indigenous competencies globally competitive. **Dr. Sam Pitroda**, Chairman, National Innovation Council graced the occasion and also delivered the Foundation Day lecture on the topic “*Role of Government in fostering ecosystems for innovation*”. The insights of Dr. K. VijayRaghavan, Dr. M K Bhan and Dr. Sam Pitroda helped in setting the pace and momentum for the 2 day event that ensued.



The event was attended by a large number of international agencies that support scientific R&D. This included Bill & Melinda Gates Foundation, The Wellcome Trust, Tekes, USAID and Grand Challenges Canada. Embassies of several countries were represented at the event by their senior science counsellors.

The 2<sup>nd</sup> Foundation Day was also an occasion where two new partnerships were announced. These were:

- A joint Call on “Red Biotechnology” between BIRAC – CEFIPRA for Indo French Industry Academia Collaboration.
- A BIRAC – Wellcome Trust Joint Call on “Translational Medicine” with the focus on “Diagnostics for Infectious Diseases”.

In addition to above calls the Foundation Day celebration also saw the announcing of 5 award winners for the Grand Challenges India programme titled “Achieving Healthy Growth through Agriculture and Nutrition”. The programme is managed by



BIRAC under the aegis of trilateral partnership with DBT and Bill & Melinda Gates Foundation. The five awarded proposals focus on achieving development of innovative interventions that integrate agriculture practices with nutrition outcomes aimed at improved health benefits for woman and children for significant socio-economic impact (See Box 1).

Prof. K VijayRaghavan announced the winners of “Reinvent the Toilet Challenge – India” programme, which was also launched under the DBT-BIRAC-BMGF Grand Challenge initiative. The awards were given during the “Reinvent the Toilet Fair: India” on 22<sup>nd</sup> March 2014 (See Box 2).

BIRAC funded 9 BIG Innovators presented their Innovations at the event. These innovators were :

- Dr. Dhananjaya Dendukuri, Achira Labs Pvt. Ltd.
- Dr. Ashwini Nangia, Crystalin Research Pvt. Ltd.
- Dr. Rajyashri K. R., Navya Biologicals Pvt. Ltd.
- Dr. Tuhin Bhowmick, Pandorum Technologies Pvt. Ltd.





## Grand Challenges India Programme

## Achieving Healthy Growth through Agriculture and Nutrition

## AWARDEES

- **Digital Green** in collaboration with Voluntary Association for Rural Reconstruction and Appropriate Technology (VARRAT), London School of Hygiene and Tropical Medicine (LSHTM), The Strengthening Partnerships, Results and Innovations in Nutrition Globally (SPRING), Tata-Cornell Agriculture & Nutrition Initiative (TCI), Development Corner (DCOR): Digital technology enabled and community driven integrated agriculture and nutrition intervention to promote maternal and child nutrition in Odisha. This is an interventional development grant.
- **Annamalai University** in collaboration with The International Rice Research Institute, New Delhi: Designing on-farm participatory models of integrated farming system for enhancement of household diet diversity and livelihood of women small holder farmers. This is an interventional development grant.
- **E Kutir Rural Management Services Private Limited** in collaboration with Wholesome Wave, McGill Center for Convergence of Health and Economics: Veggie Lite – Conjunction of agriculture, nutrition and health for inclusive development of women. This is a seed grant.
- **Science for Society, Mumbai:** To ensure year wise nutritional food security for Indian women through community level implementation of Domestic Solar Conduction Dryer. This is a seed grant.
- **Amity University, NOIDA:** Novel approach to reduce zinc malnutrition in rural women and children through agronomic bio-fortification of food crops. This is a seed grant.

- Mr. Dinesh Bindiganavale, Pradin Technologies Pvt. Ltd.
- Mr. Dinesh Kumar, Design Innova
- Dr. Uttara Joshi, Optra Systems
- Dr. Nitin Kale, NanoSniff Technologies Pvt. Ltd.
- Dr. Vishwas Joshi, Seagull BioSolutions Pvt. Ltd.

The agenda for the Foundation Day was set in a way so as to focus the lectures, plenaries and panel discussions on issues that are critical for forging industry-academia partnerships and cross-border linkages to foster and nurture the bio-innovation

ecosystem in the country.

The plenary session “Setting the Scene: Successful Partnerships from Discovery to Product Development for Delivering Impact” focused on how partnerships are evolving for taking discovery to product development and delivering impact. The speakers were Prof. Mike Ferguson, University of Dundee, UK; Dr. Chris Wilson, Bill & Melinda Gates Foundation; Dr. Ted Bianco, Wellcome Trust and Shri Srivatsa Krishna, IAS,

## Reinvent the Toilet Challenge – RTTC India

## WINNERS

- **Eram Scientific Solutions Pvt. Ltd., Kerala**, in collaboration with **University of South Florida**: A field trial grant to test off-grid, self-sustained, modular, electronic toilet for houses and communities with solar energy for Indian weather, integrated with mixed waste processing unit. The project will couple a modern, public toilet with an advanced onsite, biological treatment system. It will be housed in a standalone unit that will be initially field tested in a suburban slum.
- **Amrita School of Biotechnology, Kerala**: A proof of concept grants to use viral agents to target and kill pathogens and odour-producing bacteria in faecal waste and also develop a way to integrate this into waste treatment systems. This is a proof of concept grant.
- **Pradin Technologies Pvt. Ltd., Bangalore**: The project will test the concept of using ultra-sound to reduce water use in a toilet. It will also test the ability to enhance the settling of faecal particles in a storage tank using ultra-sound. This is a proof of concept grant.
- **Indian Institute of Technology, Roorkee** in collaboration with **Fresh rooms Life Sciences**: The project will develop a single household container that will cultivate Black Soldier Fly larvae, using human faeces, which can be processed into valuable products. The project will also demonstrate the market potential for these products. This is a proof of concept grant.
- **Institute of Chemical Technology, Mumbai**: The project will evaluate the concept of using fine sand-like material and an air blower to create a water-free toilet interface that is free from odour and flies.
- **BITS PILANI K. K. Birla Goa Campus** in collaboration with **Ghent University** and **Sustainable Bio solutions LLP**: The project will demonstrate a novel septic tank design that integrates electrochemistry to reduce organic pollutants and improve the quality of effluent discharged. The system will be demonstrated at a single household and society/gated community. This is a proof of concept grant.



Secretary IT, BT & S&T Karnataka. Prof. K VijayRaghavan, Chairman, BIRAC & Secretary, DBT summarized the essential elements of the plenary talk and concluded that ‘doing is the only best way to learn’ and that we should be self-critical for our own betterment.

BIRAC plants green shoots of the future Indian bioeconomy by helping seed biotech start-ups especially through its Biotechnology Ignition Grant (BIG) as well as several SMEs through SBIRI & BIPP. The session “The BIG Achievers: Powering the Indian Bioeconomy” highlighted 9 BIRAC funded start-ups that are at the front end of bio-innovation. BIRAC’s initiative on BIRAC Regional Innovation Cluster was also highlighted during the session.

The session on “Navigating Extant and Emerging Components of Successful National & Global Partnership Models” focused on the key theme of Partnerships and discussed how successful partnerships navigate issues regarding technology licensing & sourcing, IP, infrastructure and cross border regulations.

The session “Industry – Academia Partnerships in the Indian Context” focused on highlighting industry-academia partnership evolution in India and on identifying areas where BIRAC could play an even more active role as a platform to



bring the two ecosystems to work synergistically.

The 2<sup>nd</sup> day of the event started with the Plenary Lecture “Accelerating India to a Global Bio-manufacturing Hub: Segways & Roadblocks” by Shri Arun Maira, Member, Planning Commission, Government of India. This was followed by discussions and deliberations on strategies for making India a global bio-manufacturing hub, with special emphasis on biopharma, bioindustrial and bioproducts. Financing options in the bio-manufacturing segment were also discussed. The day was concluded with lively discussion on steps that are needed for creation of a talent pool for the biotech sector as well as for retention of talent in that pool over the long run.

In addition to lectures and plenary sessions, several panel discussions on key issues facing biotech industry were set up to elicit views of the galaxy of specialists invited for the function.

The panel discussions led to spirited and intense discussions comprehensively reviewing the relevant issues in all their dimensions with enthusiastic participation of those in the audience as well.

The recommendations of various panels can be accessed at: [http://birac.nic.in/webcontent/Foundation\\_Day\\_2014\\_Report.pdf](http://birac.nic.in/webcontent/Foundation_Day_2014_Report.pdf) ■





## G. Padmanaban

# No shortcuts to excellence



One of the most respected scientists of India Dr. G Padmanaban is known for his originality of thought and intellectual candour. Dr. Padmanaban has played a key role in mentoring a number of initiatives and institutions in their formative stages. BIRAC is also a beneficiary of his intellectual guidance and mentorship. This has helped BIRAC to set itself as an important and serious player in the Indian biotech sector.

Dr. Padmanaban spoke to **birac23** about his take on re-energising the Indian S&T sector and the future that BIRAC should aim for in the times to come to make itself more effective in terms of serving its stakeholders.

India is not really known for its ability to seamlessly transfer/exchange talent between government and private domains. Why do you think this has come to be what it is?

**G. Padmanaban (GP):** Traditionally talent in the government system was vested with the Indian Administrative Service. While they are very bright people, they end up essentially as jack of all trades. In the present day concept, every field has become narrow with specializations and demands a fair amount of technical expertise. In more recent times, specialists have been inducted into the government system, but bureaucracy still holds the upper hand. Government has the experience, which is used to provide solutions but not necessarily based on expert knowledge. The private domain may have the expertise, but may not have the necessary knowledge at implementation. In S&T departments, technocrats are in position, but real implementation still rests with the administrative ministries.

It is difficult for me to compare our system with those of developed countries. I believe the UK evolved our version of bureaucracy to have control over the subjugate nation! Many of our R&D structures such as CSIR, ICMR, ICAR etc have evolved from similar structures in the UK, Australia etc. But, I believe that these autonomous entities, while receiving fund allocation from the concerned ministries are by and large independent. In our case the parent ministry would decide not only on the allocation but also on priorities, expenditure, approvals for the processes followed etc. The budget cut towards the end of every year can throw many programmes out of gear, which may not happen in developed countries.

In other countries, especially the developed west, academia and industry literally work in tandem which is evident in the amount of science they are able to convert into viable



products and services. What are the bottlenecks/mindset issues that hinder same level of academia and industry partnership in India?

**GP:** I think it starts with our traditional value system, where knowledge is considered sacred and commercial exploitation is considered as materialistic! Many academicians are still in this mould. R&D institutions by and large attach value to paper publication and do not consider applications as a major contribution. This is the yardstick used for assessing candidates for promotions, election to the Fellowship of academies, bestow Bhatnagar and other awards.

The fact of the matter is that it is much easier to publish papers than to take a potential application all the way to the end goal. As an example, I can tell from personal experience that in India we have to face several obstacles before we can even take a drug/vaccine to clinical trial with the added uncertainty that it may not succeed.

The processes of evaluation of candidates for promotion, election to Fellowship of academies and bestowing awards need to change with adequate emphasis on translational research. The criteria for assessing translation research are different and need to be carefully evolved. This can be done without compromising on the quality of publications in peer-reviewed journals.

Academicians can be successful entrepreneurs too. This has been demonstrated in several successful startups set up by academic professionals. What mechanisms according

to you are necessary that academicians feel encouraged to venture out as technopreneurs without severing their linkages with academic ecosystem while/after making the transition?

**GP:** Yes, at least a few institutions in India now permit an academician to start his/her own company. There are still mind set issues. There is this nagging suspicion whether the academic is committed to the institution or to his/her company. Is the teaching affected because of company commitments? Are the research students taken care of properly? Are the resources diverted to the company? In my opinion, ultimately it is for the academic to live up to institutional commitments. But, if the industry is based on his/her technical expertise and is not an unrelated venture, then the parent institution should be proud of the development and facilitate the growth of the company. Perhaps, the parent institution can derive some royalty for a successful outcome. At some point of time, the academic has to take the decision to move over completely, but an academic linkage should be facilitated. For example, he or she in the industry can be an Adjunct Professor (Hon.) at the academic institution, which can provide a forum for interaction and delivery of lectures.

BIRAC, which is partly your brainchild has now been around for some time. What according to you are BIRAC's strengths and what it needs to do build upon them?

**GP:** The real credit of conceiving BIRAC should go to Dr Bhan and its implementation to Dr Renu Swarup. BIRAC



is a unique venture, a section 25 company in a government system to promote Biotech industry. To me, it is a first of its kind. All along, DBT had supported academic institutions to carry out R&D in the broad area of life sciences, trying to create mechanisms for exploitation of at least some of the discoveries for applications. I must say this has not been a successful exercise, although this support has helped to build good quality life science research in the country. Industry in India is not in real contact with academia and potential applications remain within the precincts of research laboratories. This is unlike in the US, where academic research can be publicized and there are takers in the industry. For the first time, DBT has started supporting R&D in industry through the BIRAC machinery. The timing is also right in the sense that the contour of Biotech industry in India is changing. It is no more a family owned concern with old technologies imported from abroad. The industry has well qualified people with post-doctoral experience abroad etc. There are entrepreneurs, who were academics till recently. Interestingly, it is now the industry that is seeking collaboration with academia, since the knowledge available is valuable. It is also encouraging to note that young researchers with a Ph.D. would like to start a company to experiment on new ideas. I must say that they are all banking on BIRAC (BIG scheme for example), since no VC would come anywhere near.

BIRAC in a short span has supported over 300 projects with over 200 industries. It is an efficient machinery in terms of processes of evaluation and release of funds. We need expertise to assess and monitor projects covering a wide range, from drug development to transgenic crops to medical instrumentation to energy from biomass to biotoilets. We are still short of experts in the country in many areas. This is important, since companies indicate that they more often come to BIRAC for expert project guidance and monitoring rather than for money. This is free advice and it is a matter of pride for me that many of my colleagues have provided valuable guidance to companies. BIRAC has to get into supporting manufacturing. This is a big lacunae in the country, since most companies would be only looking for licensing their product rather than venturing into manufacturing. BIRAC should dispense with giving loans and tortuous recovery mechanism in cases of chronic defaulters. It can only be grants with some equity options. After all, for a government this investment is pittance and its role is catalytic to grow the industry, reach a turnover of 200 billion USD by 2020, eventually improving the quality

of life of the people. BIRAC should increase its capital base through international collaborations, industry participation and R&D funds from other ministries with overlapping interests.

**Protection of IPR is a major issue when it comes to academia industry collaboration? Is India up to speed with the rest of the world in terms of mechanisms/services that encourages academics to engage with the industrial managers?**

**GP:** IPR situation is improving slowly. Many academic institutions are now aware of the importance of IPR and may even have a cell to promote the same. IPR is always owned by the discoverer. If the discovery process has involved both the academia and the industry, the IPR belongs to both of them. In any case, the IPR can be licensed to the industry for exploitation. But, filing patents in India is still not an easy process. Many academic institutions do not have funds to file or maintain patents. The patent cell of BIRAC and other government agencies can help in this regard. Our patent offices are very slow. I filed a US patent in 2005 and the same was sanctioned in 2010. The Indian patent office had not even opened the file by that time! I do hope the assessors get adequate exposure to fast changing technologies. I also find that our patent lawyers, barring a few, are very mediocre. One has to see the patents drawn by a US lawyer for the same data to realize as to how well they can position the claims.

Then, you pay for by the hour! I think that more and more law graduates are getting into IPR field and this is welcome.

**What are the two-three-four most immediate steps that should be taken by central/state governments to promote crossover entrepreneurship from academia to help convert more ideas into useful products and services?**

**GP:** To my mind:

1. Establishing of incubators in academic institutions, where the academia can house the start up should be supported.
2. Apart from funding research projects, support should also be made available to the academics, on a competitive basis, to start a business to commercialise the research outcomes. Funds should also be made available to academics for filing and maintaining patents.
3. Institutional rules should permit academic turned entrepreneurs to maintain formal linkages with the parent institutions, even after they become full time entrepreneurs. ■

## BIRAC at BIOtech Japan 2014 Looking East

**B**IRAC participated in BIOtech Japan 2014 held at Tokyo from May 14-16. The Indian participation was kicked off on May 14<sup>th</sup> by way of a formal inauguration of the Indian pavilion by Prof. K. VijayRaghavan, Secretary, Department of Biotechnology, Govt. of India, in the presence of various distinguished dignitaries from India and Japan. On the occasion, Prof. VijayRaghavan also released a report titled *“BIOIT and Healthcare in India”* commissioned by DBT and prepared by Association of Biotechnology Led Enterprises (ABLE) in collaboration with NASSCOM. The inaugural ceremony was followed by a keynote address by Prof. K VijayRaghavan, on *“Developing R&D systems in India – The Challenges for Growing Bio-Economies”*.

BIRAC stall received a large number of visitors during the course of the three day event. Most visitors evinced a keen interest in the aims, objectives and functioning of BIRAC as well as its mechanisms for fostering collaborations with Universities and Incubation Centers. They also appreciated various initiatives of BIRAC especially those aimed at young entrepreneurs. As an exhibitor, BIRAC also presented a talk on *“Indian Govt’s Biotech Strategies for Early-Stage Support”*.

The Indian Ambassador to Japan HE Ms. Deepa Gopalan Wadhwa hosted a dinner for the visiting Indian delegation at the Indian Embassy on May 15<sup>th</sup>, 2014. Besides the members of the Indian delegation, CEOs and senior officials from several important Japanese firms also attended the dinner. The attendees included the Deputy Minister of Japan for Science & Technology. The Ambassador, Secretary DBT and the Deputy Minister addressed the gathering and expressed an earnest desire to strengthen collaboration between India and Japan. ■





## Promotion of Bioscience Industry in Punjab Engaging Stakeholders

The State of Punjab is endowed with a fairly good network of universities and institutions offering educational programmes in biotechnology & other life science disciplines. This offers an opportunity to create a robust ecosystem/culture for developing enterprises around innovations emerging out of these institutions. This is especially important in view of the fact that development of core biotechnology industry in Punjab is at relatively nascent stage. Even still, the existing pharma, agri/food processing & allied industry is exploring value-addition of their operations through biotechnological interventions.

In view of the present scenario, the Punjab State Council for Science and Technology (PSCST) collaborated with BIRAC to organize a Road Show-cum-Workshop for “Promotion of Bioscience Industry in Punjab” on 5-6<sup>th</sup> March 2014 at ISB Knowledge City, Mohali. This was in collaboration with Mohali Biotechnology Park and Indian School of Business.

The objective of the workshop was to sensitize the industry and researchers, academicians and students (doctorates/ masters) about funding opportunities available with BIRAC for supporting bio-entrepreneurship; effective grant writing



for securing funding under various schemes; insights into IP aspects in bio-sciences; and experience sharing by bio-science industry that has been supported by BIRAC under one of their programmes. The event was attended by about 92 participants comprising of researchers, scientists, and academicians, representatives of small, medium and large industry, start-ups and students (postgraduate & graduate students from life science disciplines) and domain experts drawn from various institutions working on promoting innovation in biosciences. ■

### Call for Proposals

#### Biotechnology Ignition Grant Scheme

The Biotechnology Ignition Grant (BIG) scheme is for potential entrepreneurs from Academia, start-ups or an Incubatee who have an exciting idea which may be in the nascent and planning stage and there is an unmet need for mentorship and initial funding. The aim of Biotechnology Ignition Grant is to support and nurture these high risk early starters to establish and validate proof of concept and to enable creation of spin-offs.

#### 5th Call for Proposals

Last Date of Submission : 16 August 2014

#### Biotechnology Industry Partnership Programme

Biotechnology Industry Partnership Programme (BIPP) is a Government Partnership Program with industry for support on a cost sharing basis targeted at development of novel and high risk futuristic technologies mainly for viability gap funding and enhancing existing R&D capacities of Start-ups and SMEs in key areas of national importance and public good. BIRAC invites, under the aegis of BIPP, proposals for following :

#### Special Call For Proposal on Human Papilloma Virus (HPV)

#### Regular Call For Proposals (31st Batch)

15th June - 31st July, 2014

Last Date of Submission : 31 July 2014

To know more about scope, terms & conditions, and/or to submit a proposal please log on to the BIRAC website: [www.birac.nic.in](http://www.birac.nic.in)

## Bridging the gaps

Identifying promising innovation ideas and nurturing them to a fruitful conclusion lies at the heart of BIRAC's mandate. Here we showcase a few of the many successes achieved by institutions across the country in collaboration with BIRAC.

### Mitra Biotech Pvt Ltd & Anthem Biosciences Pvt Ltd

## A new assault on cancer

The goal of the project was to synthesize and validate proof of concept of PAT-1102 as a novel HDAC inhibitor and to select cancer indications for PAT-1102 using Mitra's 'oncoprint®' technology.

PAT-1102 is a structurally novel, best-in-class HDACi and has showed potential anticancer activity against various solid and liquid cancers in cell lines, ex vivo and in vivo human tumor xenograft models. Among solid cancers, PAT-1102 has very high probability of getting into clinics especially for Gastro-Intestinal and Pancreatic cancer which gives its high commercial potential worldwide. PAT-1102 possesses drug like properties including good aqueous solubility, oral absorption, metabolic stability and favorable pharmacokinetic profile in rodents with superior efficacy than Vorinostat and comparable efficacy with Pracinostat. It is expected to go to clinical trials after performing GLP Toxicity/safety studies, CMC documentation and IND submission.

The work between Anthem and Mitra Biotech

was shared as per the competencies available. Anthem Biosciences is involved in biological/pharmacological evaluation of PAT-1102 for HDAC activity and selectivity in addition to Non-GMP Synthesis, DMPK and early toxicity studies where as Mitra Biotech studied the following:

- Explant evaluation of PAT-1102 in 4 different solid and 2 liquid cancers
- Generation of Human tumor xenografts for Ca-Pancreas, Ca-GI & AML
- Maximal tolerated Dose studies for a single agent as well as in combination with selected SOC's to identify the toxicity and tolerance levels in mice
- Identification of Pharmacokinetic and Pharmacodynamic parameters
- In vivo efficacy studies in selected indications

BIRAC played a very valuable role in funding and providing scientific support to the current project. Apart from that it also helped to build relationships and partnership between two industries which were working completely in different research areas. It also provided us an opportunity to bring our technology and innovative ideas to the lime light. ■



**Padhma  
Radhakrishnan**  
Mitra Biotech Pvt Ltd



**Prasad  
Shivarudraiah**  
Anthem Biosciences Pvt Ltd

### C-CAMP-NCBS-IIT Madras

## Challenging AIDS

HIV is one of the most serious infectious diseases with nearly 33.3 million infected individuals worldwide in the year 2009. An effective way to study the severity of AIDS is to measure CD4 cell proportion in blood samples of patients, which is then used to detect, initiate and monitor the therapy for

HIV. In order to make frequent immune health monitoring a common practice, there is a need for less expensive, user friendly and disposable flow cytometers that can not only detect HIV but also give a quantitative measure of immune health.



**Taslimarif Saiyed**  
C-CAMP



**H. Krishnamurthy**  
NCBS



**Anil Prabhakar**  
IIT-M

The objective of the project was to develop a low-cost flow-analyzer with the aim of enabling flow analysis in resource-limited settings for applications such as HIV therapy follow-up.

A laboratory scale prototype of a low cost flow analyzer will be developed by integrating novel microfluidics, semi-conductor optics and electronics. As a scientific principle, the combination of above techniques allow the product to work with minimal preparation, where the sample flows through microfluidics channel in which chosen laser detects the presence of fluorescent CD4 cells. The detection data is collected and processed on electronics board resulting in reliable measure of the level of CD4 cells in the patient. The same technology can also be adapted to cell culture assays, detection of water contamination, platelet and other blood cell counts and oncological tests.

The lab-scale prototype may be transitioned to a product that can be manufactured at low cost using existing infrastructure by partnering with microfab expert team (identified) and IIT-M (Chennai, India). The result will be a mass-manufacturable microfluidic system built using standard semiconductor fabrication technology, in combination with low-cost instrumentation for low-cost point-of-care flow analysis for applications such as HIV therapy follow-up.

The approach will lead to a robust, stable and low-cost disposable flow cell cytometer. BIRAC funding allowed us to begin working on this ambitious project, which has a tremendous potential of societal impact by bringing down cost for flow analyzers by at least 1 log scale. It also allowed us to build capability at C-CAMP and IIT-M for high-end microfluidics and flow cytometry. ■

## India Glycols Limited & Institute of Chemical Technology

# Blending it right



**S.R. SONI**  
India Glycols Limited

The objective was to set up for the first time in India, second generation cellulosic ethanol demonstration plant with an expected processing capacity of 10 ton biomass using totally indigenous technology. The project had 2 distinct phases:

**Phase 1 :** Discontinuous plant for testing the five process stages (completed June 2012)

**Phase 2:** Integrated continuous plant (to be completed by December 2014)

Salient features of the technology and plant:

- Integrated process and common plant for the conversion of any agricultural residue to sugars and ethanol
- More than 85% recovery of sugars and lignin, and more than 85% conversion to ethanol
- Zero waste generating technology
- Low CAPEX and low OPEX technology to yield sugars and ethanol at competitive cost

**Further possibilities in this context include:**

- Feedstock independent technology coupled

with a strong analytical platform for evaluating and deploying all biomass types and varieties

- Use of defined enzyme concoction for efficient hydrolysis of cellulose for every biomass feedstock
- Partial processing of the product streams to other high value products to lend economic viability to commercial plants
- Development of the Sugar Platform for production of multiple bio-based products and different bio-refineries like
  - Energy/Fuel Bio refinery
  - Chemical Bio refinery
  - Biomaterial Bio refinery
  - Sugar Bio refinery
  - Combinations

The technical knowhow for the complete process is conceived, developed and designed at DBT-ICT Centre for Energy Biosciences, Institute of Chemical Technology, Mumbai.

Each individual module has been developed and perfected by scientists and research scholars from both the teams. ■

## Workshop on Emerging Needs & Regulation on Phytopharmaceuticals

BIRAC in collaboration with Clinical Development Services Agency (CDSA) conducted a workshop on 'Emerging needs and regulations on Phytopharmaceuticals' which was attended by various eminent scientists from industries, academic institutes and Indian regulatory bodies on 18 June 2014 at IIC Annexe, New Delhi. The objective of the workshop was to provide direct, relevant and valuable information on key aspects of phytopharmaceuticals including its regulations in India. It emerged out that India wants 'holistic health' of all types of therapies and all systems of medicine to work together, making Phytopharmaceutical hence an important component.



## BIRAC at BIO International Convention

BIRAC participated in BIO International Convention held at San Diego, California from 23rd – 26th June 2014. The India pavilion at BIO was formally inaugurated by Prof. K. VijayRaghavan, Secretary, DBT and Chairman, BIRAC. BIRAC stall attracted a large number of visitors who were interested in understanding the various initiatives of BIRAC for promoting entrepreneurship in India.



## EARLY TRANSLATIONAL ACCELERATOR

BIRAC's mission is to facilitate translation of innovative ideas into biotech products and as part of meeting this objective BIRAC conceptualized Early Translational Accelerator (ETA) which identifies early academic discoveries with possible commercial and societal impact and processes them to industry ready technologies. BIRAC has funded Early Translational Accelerator to C-CAMP which is expected to be functional shortly in the area of healthcare.

## Achievements of BIRAC Grantees

- Robio – the device developed by Perfint, Chennai, for tumor ablation using image guided interventional procedure received US FDA clearance.
- BIRAC's fund recipient Advanta India has developed resistant R-lines for bacterial Blight and Blast in rice through marker assisted selection.
- Seagull Biosolutions has filed patents on 'Two plasmid mammalian expression system' in EU, US, AU & India with BIRAC support.





# BIOTECHNOLOGY INDUSTRY RESEARCH ASSISTANCE COUNCIL

**Empowering and Enabling the Biotech Innovation Ecosystem for Affordable Product Development**

BIRAC is a 'Not-for-Profit Company' set up by Dept. of Biotechnology, Govt. of India as its interface agency to serve emerging biotech industries. BIRAC is guided by an independent Board of Directors comprising of senior professionals, academicians, policy makers and industrialists. BIRAC operates a variety of schemes to serve various dimensions of its mandate.

## BIG

Biotechnology Ignition Grant (BIG) is available to scientist entrepreneurs from research institutes, academia and start ups. It is designed to stimulate commercialization of research discoveries by providing very early stage grants to help bridge the gap between discovery and invention. The BIG Innovators receive mentoring and networking help from five BIG Partners (C-CAMP Bangalore, IKP Hyderabad, IIT Delhi, NCL Venture Center Pune and KIIT-TBI Bhubaneswar).

## SBIRI

Small Business Innovation Research Initiative (SBIRI) is the first of its kind, early stage, innovation focussed PPP initiative to support incremental R&D in the area of Biotechnology to facilitate innovation and risk taking by SMEs. SBIRI support is in the form of a mix of soft loans and grants.

## BIPP

Biotechnology Industry Partnership Programme (BIPP) seeks to provide support for early to late stage high risk biotech R&D by industry and/or accelerate commercialization of new indigenous technologies.

## CRS

Contract Research and Services (CRS) scheme supports academic institutes across the country to take forward research leads through a validation and translation cycle by the industry. Funding is in the form of grant given to both the academic as well as the industrial partner. While the industry performs its role as a validation partner and engages on a contractual basis, the IP rights reside solely with the academic partner.

## SPARSH

SPARSH combines social innovation and biotechnology for the well-being of the society by helping identify and support cutting edge innovations towards affordable product development with potentially significant social impact. SPARSH provides support in the form of impact funding and fellowships.

## BISS

In order to foster techno entrepreneurship in biotechnology, BIRAC has initiated a scheme for Strengthening and Up-gradation of the existing Bio-incubators and also to establish New World Class Bio-incubators. These Bio-incubators will provide the incubation space and other required services to start-up companies for their initial growth.

## UIC

The University Innovation Cluster Initiative (UIC) focuses on Universities, where conducive environment for biotechnology collaboration and innovation thereof exists and where all stakeholders including industry can be brought together in synergy with each other. UIC initiative seeks to create an entrepreneurial culture in the Universities and help students to take their novel ideas to proof of concept.

## DBT-BMGF

BIRAC manages the DBT-Bill and Melinda Gates Foundation project to support collaborative scientific and technological research to alleviate some of the world's most critical global health and development issues.

## Wellcome Trust

The BIRAC-Wellcome Trust Joint Call in Translational Medicine aims to fund translational research projects to deliver safe and effective healthcare products for India at affordable costs, under the current theme of "Diagnostics for infectious diseases".

## CEFIPRA

BIRAC, French Embassy in India, Ministry of Foreign Affairs, Government of France and Indo-French Centre for the Promotion of Advanced Research (CEFIPRA) are supporting research on Molecular diagnostics for prediction of disorders like cardiac stroke, Alzheimers and /or dementia, cerebral palsy and generation of new assistive technologies for mobility of physically challenged.

For further information please contact:

**Biotechnology Industry Research Assistance Council (BIRAC)**

A-254, Bhisham Pitamah Marg, Defence Colony, New Delhi – 110 024 INDIA

Tel: Direct- 91-11-47744500-10 / Fax: + 91-11-47744511

E-mail: BIRAC.dbt@nic.in | Web: www.BIRAC.nic.in