New INDIGO project

Bringing Europe and India closer


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India and the European Union have a lot going between each other that lends itself to efforts aimed at creating synergy in scientific R&D for acheiving goals that are common to not only India and Europe, but the the world as a whole. New INDIGO Project is a manifestation of this complimentarity of objectives.

The ability to generate, adapt and apply new knowledge, particularly through science and technology (S&T), has become a prerequisite for the international competitiveness of modern economies and their sustainable development. Moreover, scientific research and technological development are themselves becoming increasingly globalised endeavours.

International cooperation in the field of S&T is a standard practice in top-tier science, more than what it was ever before. In the face of of global challenges on one hand, and new possibilities for 'open innovation' on the other, it is also strongly needed and actively sought after.

Evidence shows that a significant and increasing part of the global research output is produced cooperatively and presented in international co-publications. This is particularly true for emerging scientific "hotspots" like, in addition to India, Singapore, Israel, South Korea, China and Brazil or South Africa.

THE EUROPEAN UNION S&T COOPERATION POLICY

The European Union has acknowledged the existence of a densely interconnected global science world and has introduced specific activities to add to and bundle the respective policies within the different European countries.

Within its current Research Framework Programme 7 (FP7; runtime 2007-2013), the European Commission welcomes the participation of research teams from any country in the world and can support financially most of them. In addition, it has created a dedicated programme line for *International Scientific Cooperation* (INCO).

The INCO-Programme supports different types of non-research projects, all contributing to opening the European Research Area (ERA) for non-European researchers and to widening ERA by linking it to other scientific communities in the world. Some of the project types focus specifically on bi-regional S&T policy dialogue, others on the implementation of S&T agreements between the European Commission and relevant partner countries, still others on highlighting possibilities for European researchers to access third-country research funding.

The so-called international (or "horizontal") European Research Area Network (ERA-Net) project type pursues the alignment ▶▶

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of existing national programmes and the implementation of joint multilateral funding schemes as additional goals. The 'New INDIGO' (www.newindigo.eu) project is the ERA-Net project bringing together India and Europe.

THE NEW INDIGO PROJECT

New INDIGO has been launched in January 2009 with the objective of enhancing EU-India cooperation in S&T through a series of networking activities and joint funding of collaborative research. The project, currently scheduled to run until the end of 2012, is coordinated by the French National Centre for Scientific Research (CNRS) and brings together 27 partner organisations from 10 European countries and India. Current participants from India are, in addition to DBT, CSIR (co-coordinator) and DST. The Indian Councils for Agricultural (ICAR) and Medical Research (ICMR) as well as the Indian Institute of Science (IISc) are included in the network as observers.

New INDIGO aims at reducing the fragmentation within the European Research Area with regard to cooperation with India. It is based on the conviction that dialogue and knowledge about different European countries' activities avoids duplication, helps to exchange practices and, most importantly, makes it easier for the Indian partners to engage in science cooperation with Europe. Discussing issues separately with all EU member states and associated countries would be very resource consuming for the Indian funding agencies, particularly regarding the smaller European countries.

With this perspective, New Indio works to align different

NEW INDIGO ERA-NET

The Department of Biotechnology is part of the International European Research Area Network project named NEW INDIGO which is aimed at fostering and coordinating the scientific cooperation between Europe and India. DBT is the lead partner in identifying and developing joint multi-lateral proposals in biotechnology and health. There are six other countries in this network:

- **Austria** – Federal Ministry of Science and Research
- **France** – National Centre for Scientific Research, Ministry of Higher Education and Research, Ministry of Foreign and European Affairs, and the National Institute for Health and Medical Research
- **Germany** – Federal Ministry of Education and Research
- **Portugal** – Foundation for Science and Technology
- **The Netherlands** – The Netherlands Organisation for Scientific Research
- **Turkey** – Scientific and Technological Research

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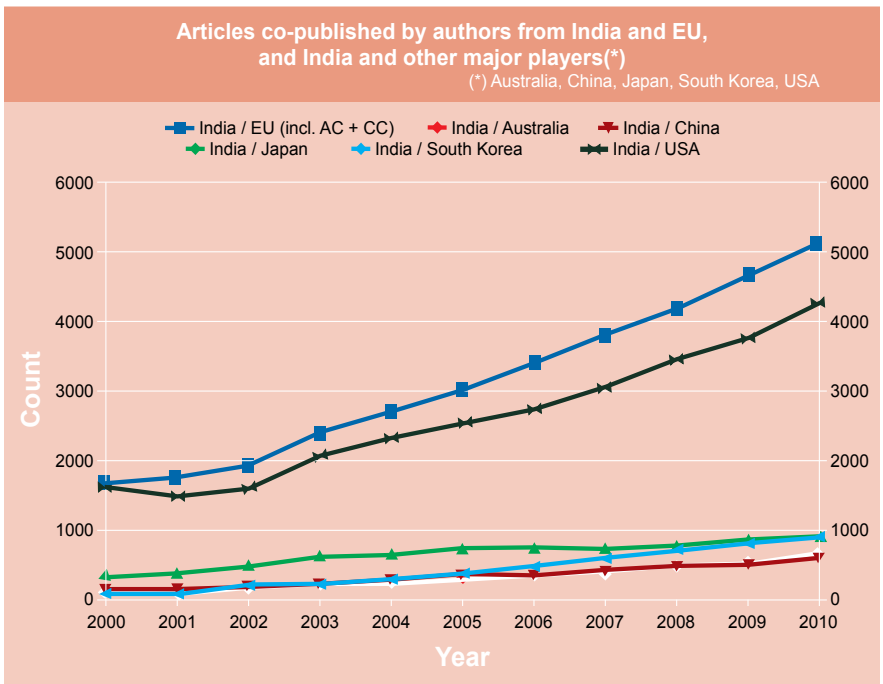

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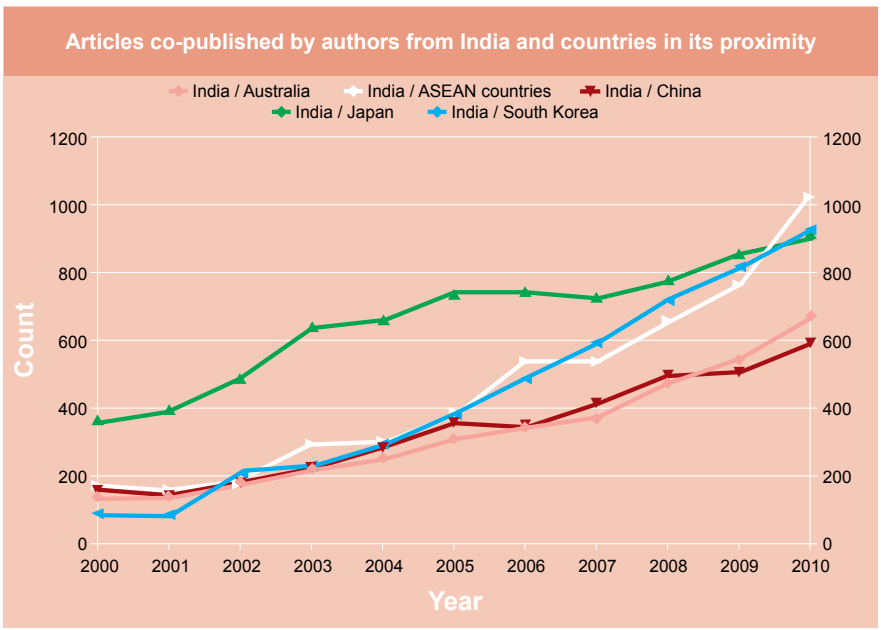
New Indigo ERA-Net partners at a coordination meeting in Lisbon, June 2010

national programmes and discuss areas of common interest where multilateral science cooperation could create additional value as compared to traditional bilateral cooperation. The project activities go way beyond strategic conversation and aim for concrete joint funding: The activities carried out within the project focus on enhancing interactions of Indian and European research organisations by preparing and conducting the implementation of joint calls through the New INDIGO "*Networking Pilot Programme*" (NPP).



THE NEW INDIGO NETWORKING PILOT PROGRAMME

New INDIGO's NPP (www.newindigo.eu/npp) has been implemented successfully and two Calls for Proposals have already been launched through this channel. Together with European funding agencies from Austria, Germany, France, Spain, Portugal, the Netherlands and Turkey, DBT has to a great extent been responsible for the success of the first and pioneer NPP Call in the area of biotechnology and health (concretely: biomarkers and diagnostics, bioinformatics for health as well as structural biology for health). The call got a good response and spurred India's top biotech institutes to establish consortia with European scientific institutions: more than 40 eligible

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proposals were finally submitted. 13 two-year Euro-Indian multilateral networking and mobility projects in the area of biotechnology and health had been brought on the way by September 2010 thanks to the contributions from the funding partners. Detailed information on these projects can be found at stories.newindigo.eu.

The first results obtained by these NPP funded projects will be presented during a major event co-organised by New INDIGO: the *EU-India S&T Cooperation Days 2011*, in Vienna/Austria on 1-2 December 2011 (www.euindiacoop.org/2011). The S&T Cooperation Days will give scientists, representatives of industry, and policy-makers from Indian and European an opportunity to learn more about funding opportunities on biotechnology and health sector research, participate in a brokerage event (the Vienna Reseachers' Café) and present their work and projects to a wider international audience.

Currently, a second call for networking and mobility projects, implemented by DST and a number of European partner countries and focusing on waste water management and green chemistry for water purification, has entered the proposal evaluation phase. Discussions are also under way on a possible future call for research projects, going beyond mobility and networking.

NEW INDIGO ANALYSES

Apart from the call implementation, one of New INDIGO's core tasks is to provide analytical support to collaborative S&T policy making as reflecting continuously about future cooperation is crucial for shaping it in a that makes it as useful as possible to the scientific community in particular, and to society as a whole. Towards this goal, an initiative called "Foresight Exercise on the future of S&T cooperation between India and Europe in 2020" has been launched in February 2011. In that context, New INDIGO is running extensive scientist consultations (online and in workshops) and is in constant dialogue with policy and programme makers with a goal is to engage the relevant stakeholders in a dialogue on the future S&T cooperation between the regions. More details can be found at www.newindigo.eu/foresight.

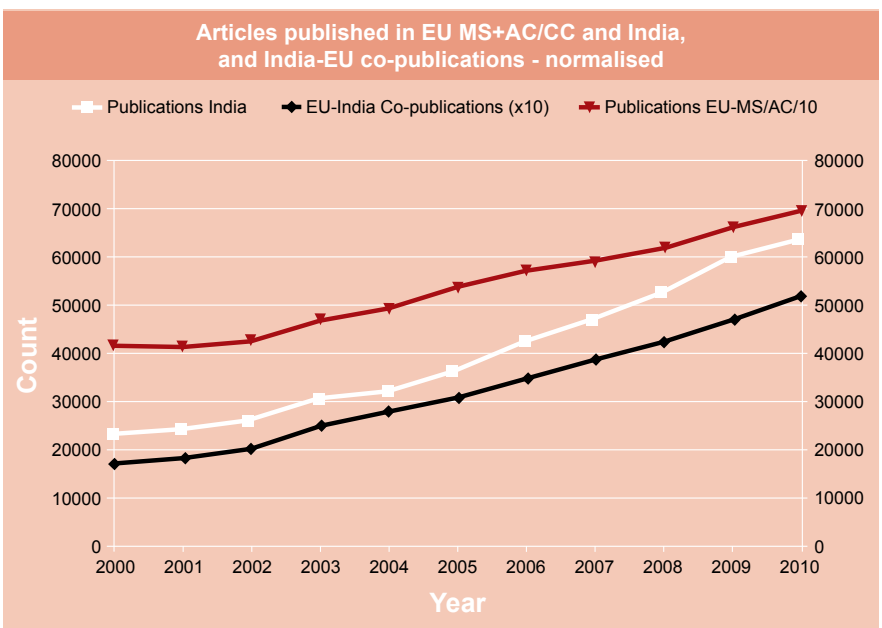
As an input to the Foresight exercise, New INDIGO has engaged itself in an analyses of current cooperation patterns. Concretely, the project is in the process of conducting an extensive bibliometric study on *international India-Europe co-publications* (having at least one Indian and one European author).

As a part of the exercise, and in order to get an image as complete as possible, two major databases of academic literature, namely SCOPUS by Elsevier and Web of Science by Thomson Reuters were consulted.

It is evident that since the year 2000, 51,825 different India-Europe co-publications (articles, academic letters and reviews) have been registered. The annual number of India-Europe co-publications has increased steeply over the last decade. While in 2000, around 1,700 India-Europe co-publications were recorded, the figure has risen to over 5,000 in 2010. Europe is the most important co-publication partner of India, even ahead of the US. (see graph) Other partner regions have also registered an increase, but still remain at a much lower levels when compared with Indo-Europe co-publications.

The chart below further elaborates the co-publication levels between India and other regions, excluding the US and Europe from the picture:

One can that see that co-publication levels between authors from India and authors from ASEAN are above co-publications



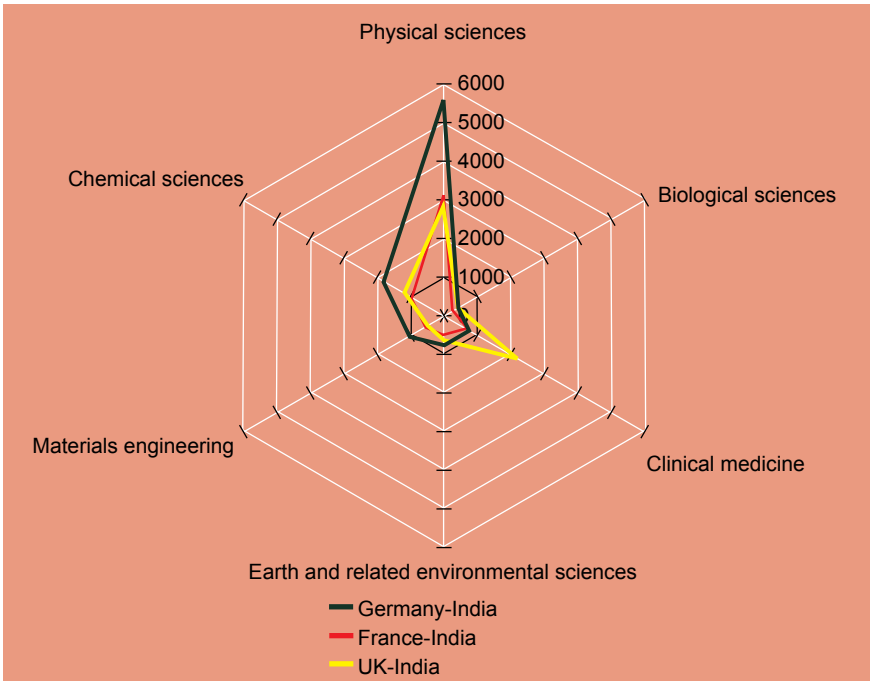
with, for instance, China. Co-publications with ASEAN also show the highest growth rate since the year 2000.

When comparing the growth in India-Europe co-publications with the overall statistics, one can notice that the number of co-publications has quadrupled over the last decade. This growth is comparable to the increase of Indian publications in general, but much higher than the increase in European publications. It indicates that the share of India-Europe co-publications in overall European publications is increasing significantly.

A normalised comparison of these figures, with India-Europe co-publications multiplied by ten and European publications divided by ten in order to fit the scale is depicted in the chart below which allows a comparison of growth rates while disregarding absolute numbers.

When looking at the most important subject areas in India-Europe co-publications since the year 2000, the primacy of physical sciences is quite visible. However, two aspects have to be taken into account in the interpretation of the data: First, the subject area of physical sciences covers a wide range of topics; a certain prominence is, thus, natural. Second, co-publications in biotech-nology are distributed over several of the standardised OECD FRASCATI manual subject areas. Concretely, biotech-nology-related articles can appear in the subject areas of clinical medicine, biological sciences, chemical sciences, etc. The prominence of biotech-nology becomes clear when it is recognised that all of these appear in the list of the 10 most important areas.

Frascati Code	Name	Count
1.3	Physical sciences	26237
3.2	Clinical medicine	7647
1.6	Biological sciences	7562
1.4	Chemical sciences	7127
2.5	Materials engineering	3529
1.5	Earth and related environmental sciences	3191
3.1	Basic medicine	2524
3.3	Health sciences	2281
1.1	Mathematics	1509
2.11	Other engineering and technologies	1406



As collaboration in the field of Biotech-nology is central to New Indigo, the analysis team generated dedicated keywords that allowed for a tailor-made enquiry for co-publications in the field of food, agriculture and biotechnology. This resulted in a total-count of 1110 co-publications within the years 2000 – 2010, with each of them being cited 14.1 times on average. Within this period, the most important cooperation partners of Indian biotechnologists were UK (381), Germany (233); France (196); Netherlands (115), Italy (94), Sweden (75), Switzerland (72), Spain and Belgium (59), Denmark (41), Finland (32), Austria (28), Norway (26), Portugal (24), Israel and Hungary (15). Splitting this

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NEW INDIGO ERA-NET PROJECTS ON BIOTECHNOLOGY AND HEALTH

1. **PotBio, GENERATING BIOMARKERS FOR BREEDING HEALTHY POTATOES.**

   India: Central Potato Research Institute, Shimla; EU: Laboratory of Plant Breeding, Department of Plant Sciences, Wageningen, The Netherlands; Friedrich Alexander University, Germany; Nacional de Biotecnologia, Spain; and Scottish Crop Research Institute, UK.

2. **CML STANDARDIZATION, MRD STANDARDIZATION, STANDARDIZATION OF RESPONSE ASSESSMENT IN CHRONIC MYELOID LEUKEMIA.**

   India: Institute of Rotary Cancer Hospital, All India Institute of Medical Sciences, New Delhi; EU: Universitatsklinikum Jena, Jena, Germany and Universite Victor Segalen Bordeaux, Bordeaux, France.

3. **NITROXDIAB, POST-TRANSLATION MODIFICATIONS INDUCED BY NITROXIDATIVE STRESS AS BIOMARKERS OF VASCULAR DAMAGE IN DIABETES.**

   India: Central Drug Research Institute, Lucknow; EU: Centra de Biologia Molecular Institute de Biologia, Madrid, Spain; CSIC, Madrid, Spain; and Goethe University, Frankfurt, Germany.

4. **ALZBIOIDIGO, ACCELERATING THE DEVELOPMENT OF NEW MOLECULAR BIO MARKERS FOR ALZHEIMER'S DISEASES.**

   India: Nizam Institute of Medical Sciences, Hyderabad; EU: Centre National del la Recherche Scientifique, Marseille, France; University of Lisbon, Lisboa, Portugal; Centre National del la Recherche Scientifique, Montpellier, France; and Ruhr-uni-bochum, Bochum, Germany.

5. **PLANTY, VALORISATION OF PLANT-DERIVED BYPRODUCTS AS FUNCTIONAL INGREDIENTS IN ANIMAL AND HUMAN HEALTH.**

   India: National Chemical Laboratory, Pune; EU: Institute of Applied Botany and Pharmacognosy of the University of Veterinary Medicine Vienna, Austria; University of Bologna, Spain; Wageningen UR (University & Research Centre), The Netherlands; International Council of Medicinal and Aromatic Plants,Turkey; and Hohenheim University, Germany.

6. **HEARTSEN, SURFACE ENGINEERED COATINGS ON MECHANICAL HEART VALVES; DIAGNOSTICS OF THROMBOSIS.**

   India: Indian Institute of Technology-Madras, Chennai; EU: INM – Leibniz-Institut fur Neue Materialien, Saarbrucken, Germany; Saarland University Faculty of Medicine, Homberg/Saar, Germany; and Laser Technologies Research and Application Centre, KOCAELI, Turkey.

7. **TRICONT, TARGET SPECIFIC SMALL MOLECULES TO CONTROL INFECTIONS DUE TO TRYPANOSOMATIDS.**

   India: National Institute of Pharmaceutical Education and Research, Mohali, Punjab; EU: Institute for Molecular and Cell Biology, PORTO, Portugal; University of Modena and Reggio Emilia, Modena, Italy; and Centro de Investigacion Biomedica en Red sobre Enfermedades Neurodegenerativas (ISCIII), Madrid, Spain.

8. **PLASFALSYN, STRUCTURE/FUNCTION STUDIES OF PLASMODIUM FALCIPARUM GMP SYNTHETASE.**

   India: Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur, Bangalore; EU: Centre National de la Recherche Scientifique, LYON, France; University of Groningen, Groningen, The Netherlands; and CNRS, Public Research Centres, LYON, France.

NEW INDIGO ERA-NET PROJECTS ON BIOTECHNOLOGY AND HEALTH

9. **ANTI-CHIK, STRUCTURE-BASED DISCOVERY OF ANTIVIRALS FOR THE TREATMENT OF CHIKUNGUNYA VIRUS INFECTIONS.**

India: University of Madras, Chennai; EU: Institute of Biochemistry, Luebeck University, Germany; and University of France, Paris.

10. **SAP, ELUCIDATING THE PATHOGENESIS OF STAPHYLOCOCCAL DISEASES BY STUDYING VIRULENCE FACTORS OF INDIAN COMMUNITY ASSOCIATED METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS.**

India: Sir Dorabji Tata Centre for Research in Tropical Diseases, Bangalore; EU: Centre for Molecular Biology: Institute for Biology, Madrid, Spain; Spanish National Research Council (CSIC), Madrid, Spain; and Goethe University, Frankfurt, Germany.

11. **NANOLINEN, NANOTOXICOLOGY LINK BETWEEN INDIA AND EUROPEAN NATIONS.**

India: Indian Institute of Toxicology Research, Lucknow; EU: Faculty of Pharmacy, Gazi University, Ankara, Turkey; Medical University of Innsbruck, Innsbruck, Austria; Instituto Nacional de Saude Dr Ricardo Jorge, Porto, Portugal; Netherlands Center for Occupational Diseases, Amsterdam, The Netherlands; The Federal Environment Agency, Germany; and French Atomic Energy Commission, Paris, France.

12. **MTBSS, MYCOBACTERIUM TUBERCULOSIS: BIOINFORMATIC AND STRUCTURAL STRATEGIES TOWARDS TREATMENT.**

India: Centre for DNA Fingerprinting and Diagnostics, Hyderabad; EU: Instituto de Tecnologia Quimica e Biologica, Oeiras, Portugal; Centro de Investigacion Principe Felipe, Valencia, Spain; and Instituto Gulbenkian de Ciencia, Oeiras, Portugal

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total into two six-years terms, one gets 319 co-publications during the years 2000 – 2005 and 877 during 2005 – 2010.

Against this background, one may see a need for explanation when realising that physical sciences is not among the most important subject areas and way less dominant than biotechnology when it comes to EU-Indian collaborative research funded by the European Commission's 6th (2004-2007) and 7th (2007 – 2013) Framework Programmes. This is simply due to the fact that physical sciences were comparably less in the focus of FP6 and FP7 calls in comparison to biotechnology (health, KBBE, environment), which explains the much higher counts of Indian participants.

It is also interesting to look into country-specific thematic data of most relevant subject areas in co-publications since 2000. The network diagram shows, as an example, the most important subject areas in co-publications between India on one hand, and Germany, France and UK on the other. It is notable that while physical sciences are an important field in all cases, the relevance of cooperation in clinical medicine is a distinct feature of India-UK relations.

Within the New Indigo analytical activities, similar data for India's co-publication relationships with all European Member States and Associated Countries and results regarding trends over time has been collected (e.g.: What subject areas have been relevant in 2000-2005 compared to 2005-2010?). It is, however, not possible to present the entire set of available information, here. Readers interested in these or similar analyses are encouraged to to contact members of the New INDIGO Analyses team as per details given at the end.

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THE FUTURE

Final results of New INDIGO's bibliometric analyses as well as the foresight exercise on the future of India-Europe S&T Cooperation will be presented on the net (www.newindigo.eu) and at the *EU-India S&T Cooperation Days* in Vienna on 1 and 2 December 2011 (www.euindiacoop.org/2011). We warmly invite scientists, science administrators, R&D managers and policy-makers to join us in Vienna!

We believe that New INDIGO has much on offer for different stakeholder groups. This includes, a) multilateral Calls for Proposals with comparatively easy-to-access funds dedicated to establishing India-Europe links in S&T, b) analyses of current cooperation patterns and the New INDIGO Foresight's dialogue on successful future cooperation, c) other activities aiming at integrating the Indian and European research areas, d) a web portal offering targeted information for scientists and policy makers interested in India-Europe S&T cooperation.

In case you have specific questions or ideas on how to further improve our services and increase India-Europe science cooperation, we would be happy to be in touch!

Further information: www.newindigo.eu and www.euindiacoop.org

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AUTOIMMUNE DISEASES RESEARCH

INVITATION FOR LETTERS OF INTENT

The Department of Biotechnology, invites Letters of intent in the board area of autoimmune diseases. Autoimmune diseases affect 3-5% of the population and occur during the prime of life, causing significant morbidity and mortality. The etiology of most autoimmune diseases remains unknown and understanding of the underlying molecular mechanisms is limited. Recent advances in Immunology, Molecular Biology and Biotechnology provide exciting opportunities for the delineation of factors influencing disease initiation, progression and pathogenesis. New leads in these critical areas can lead to early and accurate diagnosis, better prediction of disease course and improved therapeutics. Applications may cover following broad areas:

1. **Development of tests for diagnostic and prognostic indicators in autoimmune disease.**
   - Indigenization and validation of diagnostic tests using established biomarkers for systemic and organ-specific autoimmune diseases.
   - Development and validation of new biomarkers in Indian patients.
   - Identification and characterization of new triggers/autoantigens involved in the initiation of autoimmune diseases.
2. **Development and validation of new theories of etiology of autoimmune diseases in the Indian context, including but not restricted to:**
   - Influence of genetic and epigenetic factors in disease onset and pathology.
   - Development of new animal models bas on clinical leads.
3. **Therapeutics of Autoimmune Disease:**
   - Pharmacogenomics; Determination of the action and/or targets of established drugs in Indian patients, enabling the establishment of predictive models of responsiveness or toxicity.
   - Investigations into the therapeutic benefits of traditional Indian medicines and their active compounds.
   - Study of the antigenic specificity and plasticity of murine and human T regulatory cells and Th17 cells.
   - Study of the biology and immunosuppressive activity of mesenchymal stem cells.

How to Apply:
Applications would be submitted online/e-mail as per the Proforma given below and available on DBT's website: www.dbtindia.nic.in on or before 15th October, 2011 to: Bindu Dey, Adviser, Department of Biotechnology on the e-meil Id: bindu@dbt.nic.in Selected applicants would be required to submit the full proposal be December 2011 and final decision conveyed by February/March 2012.

Who Can Apply:
Investigators/Interdisciplinary groups within and across Universities, Science, Engineering or Medical Institutions who desire long term engagement in such R&D programme, are encouraged to apply.

COMPONENT 'A'	COMPONENT 'B'
1. PROJECT/PROGRAMME TITLE 2. BOARD AREA 3. SPECIFIC AREA 4. SINGLE OR MULTI-CENTRIC 5. NAME(S) OF THE INVESTIGATOR(S). 6. INSTITUTE ADDRESS, CONTACT NUMBERS ETC.	1. SCIENTIFIC HYPOTHESIS AND KEY QUESTIONS TO BE ADDRESSED AND PRIMARY OBJECTIVES (100 WORDS) 2. HOW WILL YOU TEST THE HYPOTHESIS OR APPROACH TOWARDS DEVELOPMENT OF TECHNOLOGY AND SOLUTIONS (300 WORDS) 3. WHAT IS THE RELEVANCE TOWARDS HUMAN HEALTH?