

DBT's Bilateral and Multilateral Co-operations in Research to Solve a Myriad of Socio-Economic and Environmental Problems

The collaborative research is indispensable for science driven society. The Department of Biotechnology (DBT), Government of India, has joined hands with different nations such as UK, Finland, Sweden, Denmark, USA, Brazil, Cuba, South Korea, Australia, Canada, Germany, Netherlands, Spain, Russia, and European Union to promote collaborative research to solve a multitude of socio-economic and environmental challenges. All such collaborations aim at pursuing complementary targeted research that will take forward Indian science and research community to the next level of innovation, transformation and skill development.



The DBT has implementing many international collaborative programmes in different scientific domains. Some of the important initiatives are discussed in detail.

- a) **India-UK Cancer Research Initiative:** The initiative will identify a core set of research challenges to address issues of affordability, prevention and cancer care by experts across clinical research, demographic research, new technologies and physical sciences from Indian and UK. The initiative will provide funding to develop new research alliances and undertake impactful research to enable significant progress against cancer outcomes. In this direction, a Memorandum of Understanding (MoU) was signed between the Union Cabinet of India and U.K. on 4th November 2018, in which an ambitious 5-year bilateral collaborative research initiative was undertaken to make significant progress against cancer consequences. The Cancer Research UK (CRUK) and the DBT will invest £5 million each for developing affordable approaches for cancer care.

- b) **MoU between DBT and Business Finland:** in 2008, the Union Cabinet approved a MoU between India and Finland for funding and implementing ambitious industry-led innovative and transnational projects within the broad scope of research development and innovation in biotechnology domain. The collaborative program will focus research and innovation in mission innovation, bio-future platforms, environmental and energy applications of biotechnology, business development of start-up and growth companies, education technologies in life sciences etc.
- c) **Joint Industrial R&D programme between India and Sweden:** On 11th April 2019, India-Sweden Collaborative Industrial Research & Development Programme was signed to address a range of global challenges through technology and innovation. The Joint programme is co-funded by Department of Science and Technology (DST) and Sweden's Innovation Agency, Vinnova. The initiative will bring together the world class excellence of Sweden and India to address challenges in the area of smart cities and clean technologies and digitalization / internet of things (IoT). The major subject areas of cooperation shall be, but not limited to: circular and bio-based economy, including biomaterials, health and life sciences including biomedical devices and start-ups, incubators, testbeds and bioclusters.
- d) **Cooperative programme between India and Denmark:** The Innovation Fund Denmark (IFD) and DST launched joint research project to develop and strengthen the Danish-Indian research cooperation in the areas renewable energy on 22nd May 2018. Prioritised research and innovation areas include development and integration of renewable energy based solutions and energy efficiency in electricity and heating systems.
- e) **Programme of Cooperation with United States of America (USA):** The DST has implemented a collaborative programme with the National Institute of Health (NIH). Major efforts have been implemented through the National Institute of Allergy and Infectious Disease, and through National Institute of Eye-and National Cancer Institute of NIH.
- f) **The Indo-US Vaccine Action Programme (VAP):** The VAP is a bilateral program which supports a broad spectrum of immunization and vaccine related research activities. The program included vaccine related laboratory-based research, epidemiological studies, field trials, vaccine quality control, and delivery systems. The collaborative research was

carried out by Indian and U.S. scientists for development of vaccines and immunodiagnostic reagents, and to address vaccine research related issues. The VAP programme is under implementation since 1987 and is recognized internationally and considered as a model bilateral programme in biomedical research.

- g) **Indo-US collaboration on Vision Research:** The collaboration includes expansion of vision research with the Department of Health & Human Services, USA. The major objective of the collaboration was to develop potential interventions to reduce eye disease such as diabetic retinopathy, genetics of ophthalmic diseases and ocular inflammation in both countries.
- h) **Indo-US Joint Programme on Cancer Research:** An international collaboration between National Cancer Institute of AIIMS, ICMR, DBT, and National Cancer Institute of NIH aims at cooperation on research, prevention, control and management of cancer, and to promote and conduct high quality cancer research in order to strengthen the evidence base essential for cancer prevention, treatment and management. The International Collaborative Research Center (ICRC) at AIIMS, New Delhi was established to translate research in prevention and cure of India centric cancers like tobacco related cancers, carcinoma gall bladder and carcinoma cervix, and other widespread cancers such as breast cancer, carcinoma lung and evolving trends in cancer diagnostics and treatment.
- i) **Programme of Cooperation with Brazil:** A collaborative programme was signed between Ministry of Science, Technology, Innovation and Communication of Brazil and Ministry of Science & Technology of India on 30th May 2018 to broaden and deepen cooperation in S&T in biotechnology domain, and to support industrial R&D in biotechnology. Programme also intends to promote transparency through exchange in information and cooperation among other related institutions.
- j) **Programme of Cooperation with Cuba:** A MoU was signed between both countries on 22nd June 2018 to widen and deepen cooperation in S&T, to encourage industrial and basic R&D, and investment flows in the field of biotechnology.
- k) **Programme of Cooperation with South Korea:** Another MoU signed between Indian and South Korean government aimed at expanding and developing bilateral and multilateral relations and cooperation in the field of S&T in biotechnology.

- l) **Programme of Cooperation with Australia:** The DBT and Australian Department of Innovation, Industry, Science and Research (DIISR) entered into a cooperative program in 2006 to fund Indian and Australian scientists working in the field of biotechnology. The scientists had to collaborate on leading cutting edge research that actively contributes to the economic, social and environmental well being of both countries.
- m) **Programme of Cooperation with Canada:** Collaboration was formed between DBT and India Canada Centre for Innovative Multidisciplinary Partnerships to Accelerate Transformation and Sustainability (IC-IMPACTS), Canada International Science and Technology Partnerships, Canada, Grand Challenges, Canada and NRC: PBI, Canada in all areas of biotechnology.
- n) **Programme of Cooperation with Germany:** The DBT partnered a collaborative programme with German Federal Ministry of Education, Science Research and Technology (BMBF) and German Research Foundation (DFG) to work areas of biotechnology.
- o) **Programme of Cooperation with Netherlands:** The DBT is also partnering with The Directorate General for Enterprises and Innovation, Ministry of Economic Affairs, Agriculture and Innovation of Netherlands to work in areas of plant biotechnology, food and nutrition, and medical biotechnology.
- p) **Programme of Cooperation with Spain:** The DBT collaborates with Centre for the Development of Industrial Technology (CDTI), Spain to promote and fund market driven R&D and to promote partnerships and business led R&D in biotechnology.
- q) **Programme of Cooperation with United Kingdom:** The DBT, Department for International Development (DFID), INNOVATE, British Council, Academy of Medical sciences (AMS) and Cambridge University has agreed to collaborate in major areas of biotechnology.
- r) **Programme of Cooperation with Russia:** Both India and Russia has agreed to collaborate in areas of genomic & proteomics instrumentation, nano-devices, photosynthesis based bioenergy and bioreagents.
- s) **Programme of Cooperation with European Union:** The DBT has collaborated with European Union in all areas of biotechnology.

Such collaborations have increased India's R&D output. India has made significant growth in publishing science and engineering research papers in co-authorship with international institutions, and patents granted in collaboration with foreign inventors during last decade.

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