

### **Technologies Transferred to Industries during last 04 Years by ICGEB**



The International Centre for Genetic Engineering and Biotechnology (ICGEB) aims at transferring technology to industry in member states as its core goal. The annual reports of 2016-19 have shown that ICGEB is actively involved in technology transfer to industries across the globe. In January 2019, ICGEB signed a new R&D agreement with an Indian company for the development of biotherapeutic product for Rhesus hemolytic disease found among newborns. Simultaneously, technology transfers (TT) and collaborations were explored with partners from Iran and Ethiopia.

The institute also provided training to scientific and research personnel on non-GMP facilities. The training was provided by experts engaged in development of high quality biosimilar active pharmaceutical products (API). The quality control (QC) of API's was carried out by internationally recognized scientific guidelines such as the European Pharmacopoeia Monographs.

In year 2018, the Biotechnology Development Unit (BDU) has finalized two agreements for the TT of insulin and long-lasting insulin with 2 industrial partners in Iran and Italy. The BDU also finalized a 'Material Transfer Agreement' for research grade EPO with an Egyptian company and hosted scientists from a company during a training programme. In the same year, the ICGEB developed the BIOSIMA project indented to foster domestic capacity for production of biosimilars to augment the access- and availability of cost effective and quality life-saving drugs in Africa. The scheme was implemented in partnership with UNIDO and WHO, and it is currently being presented to prospective donors and partners.

In 2018, the Bacteriology Laboratory in Trieste, Italy, also entered into 2 license agreements (LA), one with a company based in Spain for the license of a set of bacterial strains to be used as plant probiotics, and another with a company based in the US on consortia of bacterial strains that are used as plant fertilizers. One exploratory R&D agreement was signed with a leading coffee producing company of USA for the root microbiome of coffee plants grown in different locations.

The Industrial Biotechnology Group at Buenos Aires is actively involved in plant bacterial endophytes research and has entered into three agreements with different companies working in the same domain. The ICGEB Mouse Molecular Genetics Laboratory has been instrumental in developing gene therapy for Crigler-Najjar syndrome. In 2018, the first person affected by the disease was treated with such gene therapy and its clinical trial was promoted by Généthon, France.

The Cytokines and Disease Group, Cape Town, South Africa collaborated with a leading pharma company to assess anti-fibrotic candidate compounds used during chronic murine schistosomiasis, a neglected tropical disease, induced by *Schistosoma mansoni*, which is a prevalent parasite in humans.

Other important developments include licensing of Dengue Vaccine Technology to Sun Pharmaceuticals Ltd., and the lab scale technology transferred to a German CMO for further development of vaccine. A randomized, double-blind, placebo-controlled trial to evaluate the efficacy and safety of this drug in adult patients with dengue fever was planned for 2019.

At ICGEB, New Delhi, the Microbial Engineering laboratory, signed an agreement with an Indian Oil Corporation for development of a genetically engineered hyper-cellulase producing fungal strain with enhanced hydrolyzing capacity for pre-treated lignocellulosic biomass.

In year 2017, the ICGEB received a grant of 3 million Euro from the Friuli Venezia Giulia Region to expand its Biosimilars Development Facility in Trieste. The institutes also provided reliable GMP cell banking service to its industrial partners for biosimilars manufacture, and bioanalytical services QC of API's and biosimilar finished products.

In year 2016, based on the work of the Recombinant Gene Products Group, the ICGEB, New Delhi entered into a partnership with one of the largest pharmaceutical companies of India to develop a novel dengue vaccine. The same research group has produced over 26 high sensitivity, and low-cost diagnostic kits for viral infections, including HIV, HBV, HCV and dengue virus.

The kits manufactured in India are distributed in several Asian and African countries and are used by the WHO in different purposes.

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