Translating Knowledge for Health Care

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TRANSLATIONAL HEALTH SCIENCE
AND TECHNOLOGY INSTITUTE

Synergizing knowledge is a constant process at THSTI. Networking with leading institutions, national and international, is routine to fast-track multidisciplinary translation of knowledge from the laboratory bench to the bedside and onwards to the community. The process is bidirectional.

THSTI Mission

By integrating the fields of medicine, science, engineering and technology into translational knowledge and making the resulting biomedical innovations accessible to public health, to improve the health of the most disadvantaged people in India and throughout the world.

The THSTI Energy

THSTI is energized with a core of distinguished scientific minds with a flair for innovative work. Coveted awards and distinctions adorn their illustrious careers. This core has attracted and put together a young dynamic scientific team from acknowledged global seats of learning. The team brings decades of research experience, substantiated by a formidable corpus of published knowledge. THSTI consistently attracts high calibre scientific talent to grasp the complexities of the translational process.

THSTI has an assemblage of projects underway and proposals for several new projects in priority concerns are in the pipeline. Quest for new research leads is always a priority.

THSTI has established International and National Chairs to inspire the course of translational work. The Chairs provide perspective and mentor the multifaceted process of translational research. THSTI is mentored by a Scientific Advisory Group of Experts (SAGE).

To create future scientific capacity, faculty, clinicians and scientists at THSTI guide young translational scientists in their scientific and academic careers. The scientific efforts at THSTI are buttressed with young technicians, IT professionals, nursing staff, and administrative personnel. An equal opportunity employer, THSTI accords staff development and employee welfare as valuable tenets in its evolution process.

The THSTI Infrastructure

THSTI's interim infrastructure is installed on over 45000 sq. ft. of leased space, in three buildings, at Udyog Vihar , Gurgaon, on the outskirts of Delhi. When relocated at Faridabad, THSTI will have 130,000 sq. ft. of customized space.

THSTI has invested in laboratories with good scientific practices, state-of-the- art infrastructure that are a crucial for safe translational research. THSTI also has access to and will soon acquire a sophisticated instrumentation including advanced DNA sequencers. The new campus at Faridabad will host a BSL-3 laboratory.

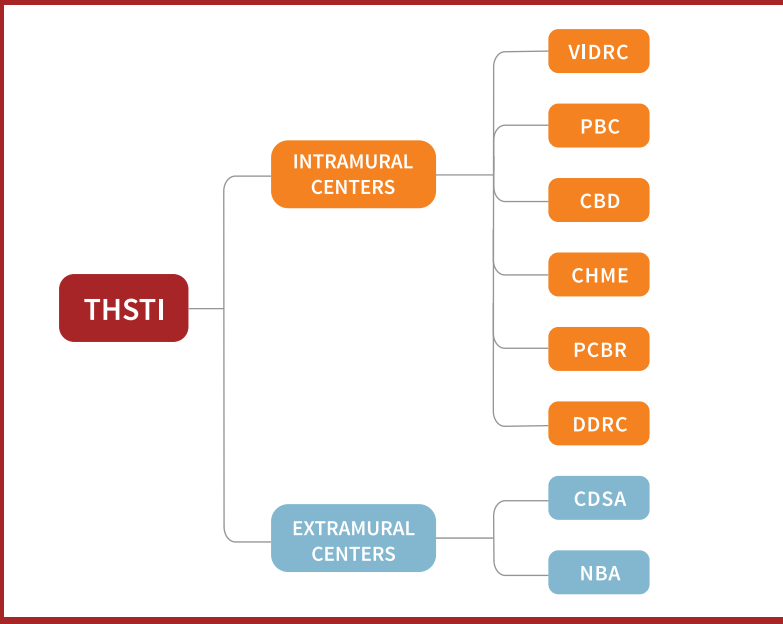
Investment in scientific equipment is progressively incremental at THSTI. Well-equipped Seminar Halls and Conference Rooms create a work ethos for collaborative scientific pursuits. The talent pool at THSTI operates in an ecosystem conducive for innovative endeavours.

THSTI Academia

Consistent with THSTI's holistic approach to the translational process, education as a means to create future capacity is an important cornerstone. THSTI complements its research objectives with academic programs in Biotechnology.

Academic programs at THSTI are directed by the Dean who heads the Academic Council. Faculty and scientists at THSTI together play a significant role in academia. Consistent with the system, most job titles are academic. Professors, Assistant Professors, Fellows and Adjunct Faculty from collaborating institutions cohesively manage academics as well as niche research centers.

- THSTI has enrolled four successive batches of research fellows for its PhD programs in Biotechnology. THSTI associates with two Indian Universities and Osaka University, Japan for these programs. The selection process fozzr academic programs is intensely competitive.
- A post-doctoral program with the University of Turku, Finland is also established.



The THSTI Organization

THSTI is a society formed by a galaxy of leading science administrators, registered with the Registrar of Societies, Govt. of NCT, Delhi. Within three years, THSTI rapidly selected areas for immediate attention and addressed these through niche research centers. While two niche centers were formed at inception, four others were rapidly created. Working in close conjunction, these centers play convergent roles when such efforts are vital. THSTI has all components, including extramural centers, to meet its objectives of contemporary translational research.

The functioning of the institute is managed by a set of functional Committees steered by the Institute Management Committee. For regulatory compliance, the Institutional Human Ethics committee at THSTI, operates within in the framework prescribed by the Constitution of India and follows the guidelines for research on human subjects, set by the Indian Council of Medical Research.

The Institutional Animal Ethics Committee and the Biosafety Committee govern relevant research processes. Administrative and financial management are compliant with the Government of India Rules and Guidelines.

Vaccine and Infectious Disease Research Centre (VIDRC)

Infectious diseases are the most common cause of deaths in India. Air, water and mosquito borne diseases continue to distress public health. Study of infectious diseases, generation of knowledge on causes; to develop methods of defence and cure of such diseases is VIDRC's domain. VIDRC is focused on studying infectious viral and bacterial diseases, developing vaccines and vaccine delivery systems to counter such infections.

Specifically, VIDRC is actively engaged in:

- Vaccine Development: Rotavirus 116E vaccine is in an advanced stage of evaluation (phase III clinical trials).
- Japanese Encephalitis vaccine – preclinical development
- Vaccine delivery platforms using: Animal adenoviruses, BCG
- Respiratory infection : Tuberculosis
- Enteric infections : Rotavirus, Hepatitis E Virus (HEV)
- Mosquito-borne infections : Japanese Encephalitis, Dengue

The HIV vaccine development is a joint program with the International AIDS Vaccine Initiative (IAVI), USA, and THSTI.

Going forward, VIDRC is prepared to:

a) Study human immune responses and biomarkers to predict the outcomes of vaccination.

b) Study human immune responses in natural infections and to identify measurable parameters for protection against diseases.

c) Set up a technology platform for discovering potential pathogens.

d) Develop high throughput assays for screening antiviral agents and their adjuvants.

Paediatric Biology Center (PBC)

The center is an interdisciplinary research center for research on the biological basis of childhood health and disease. Its objective is to create knowledge-driven interventions and technologies for sustainable implementation. This multi-disciplinary team of paediatricians, immunologists, biologists, and epidemiologists bridges the gap between classical clinical and population epidemiology on one hand and the mechanics of disease biology on the other. PBC is one of the centers pro-actively engaged in cutting edge of Translational work.

PBC's current research focuses on:

- Nutritional regulation of immunity and infections
- Biology of specific paediatric diseases
- Patho-biology of renal diseases in children
- Innovative technology for child health
- Building stable clinical partners

PBC collaborates with AIIMS, Gurgaon General Hospital and institutes like Regional Center for Biotechnology, Christian Medical College and other THSTI Centers to establish stable partners to accomplish its translational objectives.

At PBC future initiatives include:
A new inter institutional program is to study the biology of birth with specific reference to prematurity and intrauterine growth retardation.

Centre for Biodesign & Diagnostics (CBD)

The CBD aims to provide new diagnostics technology in India for affordable healthcare. It will adopt and evolve a "bio-design process" to develop in-vitro diagnostic and medical devices. To achieve this CBD utilizes knowledge gained from clinical-care settings, to innovate or improve existing designs. Its mission is to promote science and applications related to affordable implants, devices, in-vitro diagnostics and imaging. It will map an effective translational route for basic findings into routine applications of significance, for public good.

Important products under development are:

- Affordable robust, rapid, simple and sensitive test technology and system, for simultaneous testing for infections in blood banks. Typically these are HIV, HCV, HBV and Syphilis.
- Diagnostic kits for Celiac disease, cardiac diseases and tuberculosis..
- Human recombinant antibody library.
- Identification of new protein biomarkers for early diagnosis of pregnant women at risk from pre-term births.

CBD plans to extend its range of focus to:

a) Development of diagnostic solutions for illnesses symptomized by fever e.g. Dengue, typhoid/paratyphoid, leptospirosis, malaria and chikungunya.

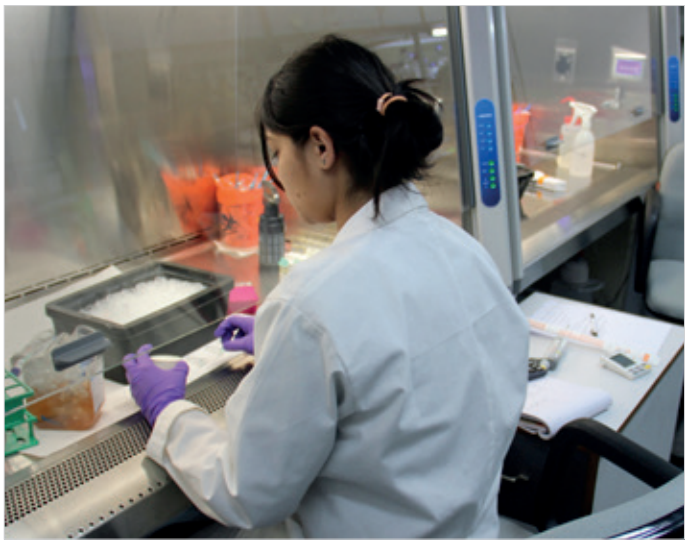
b) Creation of Synthetic antibody libraries for the isolation of monoclonal antibodies against target cells or proteins.

c) Construction of a platform for the production of recombinant antigens and antibodies in commercially viable manner.

Centre for Human Microbial Ecology (CHME)

CHME analyses the compositions, dynamics and contributions of microbes that are associated with the human body - the human microbiota. Disruption of the normal balance of microbiota is associated with wide range of diseases like obesity, malnutrition, inflammatory bowel disease, neurological disorders, cancer, premature birth among others.

The orientation of CHME is to understand the effect microbiota has on health and disease with an ecological approach that considers the microbial community as a whole rather than individual pathogens. The purpose is to provide knowledge-based solutions for public health. Keeping with the requirements of this complex task, the center is in the process of creating leading edge infrastructure.



At CHME the current research focus is on:

- Composition and functional changes in the gut flora of siblings with opposing nutritional status.
- Role of gut microbiota in pre-diabetes and patients with type 2 diabetes.
- Role of vaginal microbiata in pre-term birth.
- Role of gut microbiota in the evolution of drug resistance of human pathogens.

Policy Centre for Biomedical Research (PCBR)

Created by DBT, the center is now under the aegis of THSTI and is mandated to:

a) Generate intelligent ideas for innovation.
b) Explore strategies for implementing existing opportunities for intervention.
c) Examine technology diffusion and demand creation.

The center although recently established will evolve strategies for selection of priorities and extend its focus to advocacy. In doing this the PCBR will facilitate the formulation and adoption of appropriate public health policies.

Drug Discovery Research Centre (DDRC)

The Drug Discovery Research Centre (DDRC) is a multi-disciplinary research centre that integrates basic translational research with the field of drug discovery. The Centre's mission is to combine multiple disciplines to generate a robust and versatile pipeline for drug discovery. This will also include capabilities for analysing large-scale data to identify the most promising targets for drug development.

The DDRC will be technology-intensive base to spur human health-related research in India. At one level, it will facilitate on-going programs in different laboratories by providing the means for translating early leads, through target identification or preliminary biological activity, to candidate drugs. This it will achieved by providing platforms for target and activity validation, *in silico* inhibitor design, high-content screening, structure-activity optimization of lead molecules, chemical synthesis of template structures, and pharmacological evaluation of lead compounds. In addition, the DDRC will also actively collaborate with on-going research programs related to public health (especially those at THSTI) in order to translate the findings into possible strategies for chemotherapy. Thus, data obtained from such studies could be further refined at DDRC by experiments at the cellular level.

Clinical Development Services Agency (CDSA)

CDSA was formed in 2010 as an extramural unit of THSTI. The objective was to develop and enhance clinical research capacity in India at par with international standards. CDSA is an important link in translational process. It provides the means to test and the efficacy and reliability of medical innovations for public health. CDSA's core staff comprises of Program Director, Director-Training, Director of Clinical Trial Management, Biostatistician, IT administrator, Finance Manager, CRAs, and Support staff. Three senior consultants focus on regulatory affairs, pre-clinical and clinical product development and organization building.

Focus Areas for CDSA are:

- Training in Clinical Research: The workshops are conducted to provide expertise in Clinical Trials and Good Clinical Practices (GCP), in collaboration with prestigious Institutions in India and International agencies like NIH.
- Establishment of a consortium of Centers of Excellence (COEs) from selected premier clinical research organizations in India. CDSA will provide core grants help them develop sustainable human resources and infrastructure.
- Clinical Trial Services: CDSA provides end to end services for all four phases of regulatory compliant Clinical Trials.

The National Biodesign Alliance (NBA)

A multi-institutional partnership program on biodesign and in-vitro diagnostics, anchored by a secretariat located at THSTI, was initiated by the Department of Biotechnology (DBT), Government of India in September, 2010. The alliance forms the other extra mural activity THSTI actively engages in. This network of bio-medical and engineering institutions of considerable repute is engaged in blazing an effective route for translation of basic research into routine multi-disciplinary applications of significant clinical importance in India.

The initiatives in this program include:

- Development of a rapid diagnostic tests for tuberculosis, meningitis and Chikungunya.
- DXPhone – Mobile Phone Diagnostic Platform.

A formal MoU was signed by THSTI on behalf of the NBA and University of Turku under the DBT Indo-Finnish program in January 2011. This initiative is to establish a program of cooperation between the University of Turku and NBA for research, innovation, higher education, training and capacity building for developing diagnostics for human health. Finland has demonstrated capabilities in this area.

THSTI Future

Installed on a foundation of noble intent, THSTI has demonstrated how much can be achieved even in a short span of time. Creating an environment and culture conducive for the demanding task of translational research is a conscious effort at THSTI. Providing catalysis to the process are vibrant young minds in a quest for finding a balance between individual aspirations and Institutional objectives. At THSTI progressions are in place for the long run, which is inherent for translational research.

THSTI has the potential be the nerve center for translational research in India. It aspires to serve as a model institute in the nation for delivery of affordable health care.

A model of the NCR Biotech Science Cluster

The campus under development in Faridabad

With the provision of affordable health care solutions to India's under privileged as an imperative the Translational Health Science and Technology Institute (THSTI) was established in 2009. The urgency was significant; THSTI promptly commenced functioning from provisional premises at Gurgaon. THSTI, is an autonomous institute of the Department of Biotechnology, Ministry of Science and Technology, Government of India. It will relocate to its permanent campus at Faridabad, near New Delhi and function as member of the National Capital Region (NCR) Biotech Science Cluster.

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TRANSLATIONAL HEALTH SCIENCE AND TECHNOLOGY INSTITUTE

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An autonomous institute of the Dept. of Biotechnology, Ministry of Science & Technology, Govt of India