2021 Technology & Innovation Development Office

ANNUAL REPORT

Boston Children's Hospital

Where the world comes for answers

TIDO in FY21

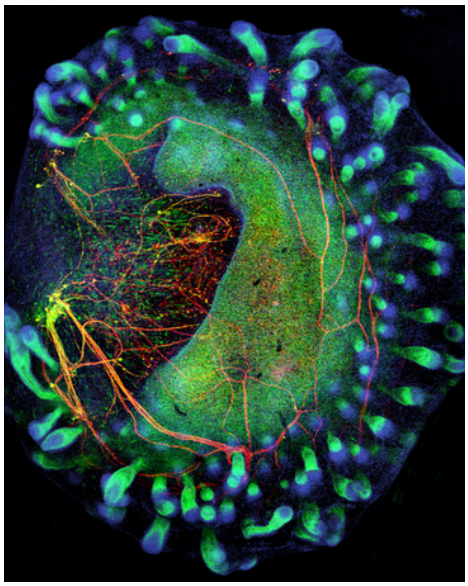
RESEARCH EXPENDITURES **$426,609,000**

NEW INDUSTRY-SPONSORED RESEARCH FUNDING **$18,077,682**

RESEARCH AGREEMENTS **77**

LICENSING AGREEMENTS **64**

GROSS LICENSING REVENUE **$11,796,365**



On the cover

Platelet accumulations around vessels in a mouse spleen.
Isabelle Becker of the Italiano Lab
Vascular Biology Program
Boston Children's Hospital

FY21

Agreements

LICENSE, OPTION, & RESEARCH AGREEMENTS **141**

CONFIDENTIALITY **143**

RECEIPT OF EQUITY **3**

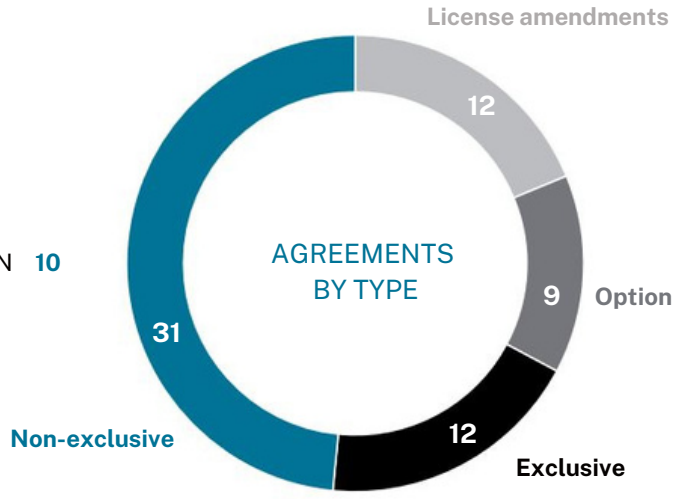
MATERIAL TRANSFER **416**

INTER-INSTITUTIONAL INVENTION ADMINISTRATION **10**

CONTRACT RESEARCH ORGANIZATIONS **10**

AMENDMENTS **62**

OTHER **58**



Revenue

REVENUE FROM FY21 LICENSES AND OPTIONS **$1,255,303**

GROSS REVENUE **$11,796,365**

Impact

ACADEMIC PARTNERSHIPS **255**

INDUSTRY PARTNERS **257**

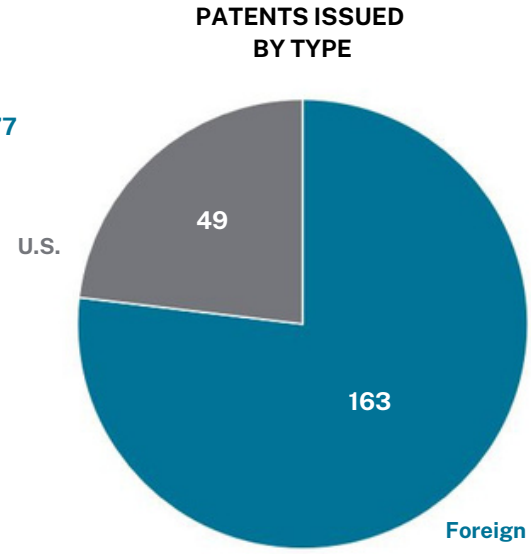
CORPORATE-SPONSORED RESEARCH & COLLABORATIONS **77**

Intellectual Property

NEW DISCLOSURES **250**

PATENTS ISSUED **212**

PATENT APPLICATIONS FILED **203**



FY21 Highlights

Licences

Ipsen exclusively licenses botulinum neurotoxin

Ipsen, a global specialty-driven biopharmaceutical group focused on innovation and specialty care in oncology, neuroscience and rare disease, has entered into an exclusive license agreement for the therapeutic use of a novel botulinum neurotoxin (BoNT) subtype. The BoNT/X toxin was discovered by searching *Clostridium botulinum* public genomic sequencing databases and was characterized by Min Dong, PhD, an Associate Professor of Urology at Boston Children's Hospital, and his postdoctoral fellow Sicai Zhang PhD, in collaboration with Pal Stenmark PhD, an Associate Professor at the department of Biochemistry and Biophysics Arrhenius Laboratories for Natural Sciences, at Stockholm University. While all seven currently identified BoNT subtypes (A-G) have a similar mechanism of action, binding to specific receptors on neurons to block neurotransmitter release, only BoNT A & B are approved by the FDA for therapeutic and cosmetic applications due to toxicity concerns. BoNT A & B can still cause major side effects via the diffusion of injected toxins to other regions that can result in serious medical consequences or even death, or via the generation of patient-neutralizing antibodies that can render future treatments ineffective. However, these side effects can be decreased by improving BoNT A & B efficacy so that a lower dose is used to target neurons to reduce both toxin diffusion and antibody responses. In-vitro experiments identified that BoNT/X blocks neuronal activity by cleaving a key host protein in neurons that is distinct from other known BoNTs, and can be used to create point-specific mutations to engineer a new class of BoNTs. In-vivo mouse experiments found that the engineered new class of BoNT/B not only have improved safety and efficacy, but can also be used to replace the receptor binding domain of BoNT/A to generate a modified chimeric toxin with enhanced efficacy and specificity for humans.

Spring Discovery exclusively licenses small molecules for treatment of inflammatory diseases

Spring Discovery LTD, an early-stage biotech startup that focuses on accelerating the discovery of novel therapies for aging by targeting the biological processes of inflammation that lead to aging as well as infectious diseases, has entered into an exclusive license agreement for the development of novel small molecule inhibitors against Gasdermin D (GASMD). The recently discovered GSDMD molecule has been proposed to be a key gatekeeper in the initiation of cell inflammation and propagation of the inflammatory cascade that ultimately causes cell death responsible for the pathogenesis of serious conditions like sepsis, gout, arthritis, inflammatory bowel disease, metabolic, cardiovascular and neurodegenerative diseases. Using biochemical high-throughput screening assays, Judy Lieberman, MD, PhD, and Hao Wu, PhD, the Chair and Senior Investigator, respectively, of Cellular and Molecular Medicine at Boston Children's Hospital, jointly identified a number of small molecules that can successfully inhibit GSDMD pore formation in vitro and in cells. One of the identified compounds used in nano concentrations was even able to significantly improve survival in mice that were given an endotoxin injection known to have poor survival. The goal of this research, with these promising preclinical results, is to develop novel targeted therapies for life-threatening inflammatory conditions like sepsis, which is a leading cause of death in children and about a third of hospitalized patients worldwide.

FY21 Highlights

Sponsored Reseach

Northsea sponsors research for fatty acid as a treatment for intestinal failure-associated liver disease

Northsea Therapeutics, a clinical-stage biotech company developing first-in-class, oral, structurally-engineered fatty acid therapeutics, has sponsored research from the lab of Mark Puder, MD, PhD, in the Department of Surgery, to investigate a structurally engineered fatty acid for the prevention of systemic inflammation induced by intraperitoneal injection of lipopolysaccharide (LPS) in a murine model of intestinal failure-associated liver disease (IFALD). IFALD is a multifactorial condition characterized by the development of hepatic inflammation, cholestasis, and steatosis in patients with intestinal failure and/or short bowel syndrome. It occurs after prolonged use of total parenteral (intravenous) nutrition. The development of hepatic fibrosis, which can progress to cirrhosis and liver failure, is a major concern for patients with this condition. No approved drug therapy exists for this population.

BCH Researchers receive funding from the Blavatnik Family Foundation

The Blavatnik Family Foundation, a charitable trust, awarded funding to various projects from Boston Children's Hospital as part of the Blavatnik Therapeutics Challenge Award.

Daniel Bauer, MD, PhD, Director of the Gene Therapy Program, designed a novel genomic editing approach that can provide a functional cure for blood disorders like sickle cell disease and β-thalassemia that result in defective hemoglobin production. Using CRISPR technology to make precise DNA edits to block the repressor BCL11A in autologous hematopoietic cells (HSCs) (i.e. bone marrow cells that produce red blood cells) can increase fetal hemoglobin (HbF) levels, an alternative type of hemoglobin that can replace the defective hemoglobin. Although HbF levels are turned off after birth by the BCL11A repressor gene, precise genomic edits using CRISPR can facilitate HbF reactivation through a gene-therapy approach that is programmed to maintain lifelong beneficial effects by only targeting the BCL11A expression in the patient's HSCs without affecting BCL11A expression in other cells of the body. The research will test the in-vitro ability of the edited cells to retain the properties of true blood stem cells, such as the ability to self-renew and mature into all blood cells, and if the edited cells possess the capacity to express high levels of HbF, with the goal of advancing the clinical development of innovative genome editing therapies of blood stem cells.

Vijay Sankaran, MD, PhD, an Assistant Professor of Pediatrics at Boston Children's Hospital, also received funding for a project concerning the development of a viral-vector-based gene therapy approach targeting the GATA1 gene to increase its expression, based on recent in-vitro Diamond-Blackfan anemia (DBA) model findings. DBA is a rare, inherited bone marrow failure syndrome, typically diagnosed in children during their first year of life. Children with DBA cannot make sufficient red blood cells to carry oxygen to other parts of the body, resulting in anemia, congenital abnormalities, and cancer predisposition. Around 50% of DBA cases are associated with genetic mutations, particularly defects in the ribosomal protein GATA-1 gene, which processes the cell's genetic instructions to create proteins that control the growth and division of immature blood and platelet cells. The proposed therapeutic approach would be the first gene therapy cure that could be used to treat all patients with DBA.

Suneet Agarwal, MD, PhD, of the Department of Medicine and Division of Hematology/Oncology, was also awarded a Blavatnik Therapeutics Challenge Award for identifying small-molecule therapies for telomere diseases. Telomere diseases encompass a spectrum of rare and fatal syndromes, including dyskeratosis congenita (DC) and pulmonary fibrosis (PF), caused by mutations in genes regulating telomere biology. Despite genetic discoveries in the past two decades, there has been no translation of this knowledge and there are no curative treatments for DC and PF. However, by studying DC mutations, Dr. Agarwal and his team were able to identify post-transcriptional factors that regulate the accumulation of the non-coding telomerase RNA component (TERC). By inhibiting one of the factors, the researchers restored TERC and telomere maintenance in induced pluripotent stem cells (iPSCs) from DC patients. The strategy could prove to be a novel approach toward the more effective treatment of telomere diseases as well as other degenerative disorders.

FY21 Highlights

Milestones

Vertex to Lead CTX001 Development with CRISPR Therapeutics

CRISPR Therapeutics entered into a co-development agreement with Vertex Pharmaceuticals focused on the development of CTX001, a new gene editing therapy for sickle cell disease and beta-thalassemia. CTX001 was jointly developed by CRISPR and Vertex and is based on scientific discoveries made by Stuart Orkin, MD, and Daniel Bauer, MD, PhD. Clinical testing of CTX001 started in 2018 when it was the first company-backed trial of a CRISPR-based medicine in humans. The treatment gained Fast Track designation from the U.S. Food and Drug Administration, and in December 2020, CRISPR and Vertex presented new clinical trial data showing consistent and sustained health improvements in patients treated with the therapy.

Scholar Rock Receives Fast-Track Designation for Apitegromab for the Treatment of Patients with Spinal Muscular Atrophy

Scholar Rock, founded on scientific discoveries by Timothy Springer, PhD, and Leonard Zon, MD, received Fast Track designation by the U.S. Food and Drug Administration for apitegromab, a selective inhibitor of myostatin activation for the treatment of patients with Spinal Muscular Atrophy (SMA). The therapy had been previously named an orphan drug in the U.S. and Europe, as well as given rare pediatric disease status in the U.S. and priority medicines (PRIME) designation in Europe. All are meant to speed its development and regulatory review. The investigational therapy works by preventing the conversion of the latent form of myostatin, a protein mainly produced by skeletal muscle and that suppresses muscle growth, into its active form.

Through this mechanism of action, apitegromab is thought to boost patients' muscle mass and strength, with fewer side effects than conventional suppressors of myostatin's active form.

Top-line data from the ongoing proof-of-concept Phase 2 TOPAZ trial (NCT03921528) showed that apitegromab was safe, and improved or stabilized motor function in children and young adults with SMA types 2 and 3 (later-onset disease) over one year.

CAMP4 Raises $45 Million to Usher in a New Era of Programmable Therapeutics to Upregulate Genes

CAMP4 Therapeutics, a biotechnology company harnessing the power of RNA to restore healthy gene expression, has raised $45 million in funding. The company, co-founded Leonard Zon, MD, will use the new funding to propel the next phase of its scientific strategy, expand its platform, and advance multiple preclinical RNA therapies into human testing.

CAMP4 is combining its proprietary RNA Actuating Platform (RAP) with state-of-the-art oligonucleotide technology to develop precise and programmable therapeutics that enable tunable upregulation of gene expression to treat disease. CAMP4's approach targets a new class of RNA known as regulatory RNAs ("regRNAs") that control the expression of proteins, making this approach applicable to any genetic disease where a small increase in gene output can lead to meaningful therapeutic outcomes.

FY21 Highlights

Bridging the translational gap

Strategic Alliances

TIDO's mission is to advance novel therapeutics developed at Boston Children's Hospital from the laboratory bench to the patient's bedside. To support this vision we have several multi-year strategic alliances with industry partners to significantly reduce the administrative and resource hurdles that can hinder collaborative scientific progress. Some of our partners include:

Alliance News

This year Boston Children's Hospital and ElevateBio, a cell and gene therapy technology company focused on powering transformative cell and gene therapies, announced a five-year collaborative agreement. The agreement will allow Boston Children's Hospital and ElevateBio to develop multiple cell and gene therapy companies together, provide Boston Children's researchers with access to ElevateBio's core-enabling technologies, manufacturing, and leading expertise to advance their programs. It will guarantee Boston Children's Hospital researchers dedicated viral-vector manufacturing space at ElevateBio's BaseCamp, a centralized, world-class research and development manufacturing center. In addition, under this agreement, ElevateBio has committed to sponsoring research agreements with Boston Children's Hospital investigators as part of the company formation process.

Last year, Boston Children's Hospital and Deerfield Management Company, a healthcare investment firm, announced a major research collaboration to advance promising therapeutics that will address unsolved medical needs and find cures for disease. As part of the collaboration, Deerfield will provide up to $65 million in funding for a new research collaboration with Boston Children's Hospital focused on drug discovery and development.

Boston Children's physicians and scientists will have the opportunity to submit proposals for review to a committee of scientific leadership from both the Hospital and Deerfield. To manage this collaboration, Deerfield has created a new entity, Blackfan Circle Innovations, named in honor of Kenneth Blackfan, MD, an early leader in childhood blood disorders and pediatric diseases and a distinguished late faculty member from Boston Children's Hospital.

FY21 Highlights

Bridging the translational gap

The Technology Development Fund

The Technology Development Fund (TDF), established in 2009, is Boston Children's Hospital's internal mechanism for translating high-impact new technologies into the independently validated, later-stage opportunities sought by industry partners and investors. Technologies funded by TDF range from therapeutics and devices to diagnostics and vaccines in both pediatric and adult indications.

The Technology Development Fund provides:

- Mentoring and coaching through an advisory board of industry leaders in product development to identify and reach key milestones toward product development
- Funds to execute the scope of work agreed upon with the mentors
- Technical support and expertise through a network of service providers and collaborators
- Active project management to maintain focus on development goals

The 2021 Awardees

Selected from 20 applications

Medical Equipment Adaptable Travel Restraint (MEATR), Supporting Mobilization of Individuals with Complex Medical Needs

Michele DeGrazia, PhD, RN, NNP-BC, *Nursing Research*
Kathryn Gustafson, BSN, RN, CCRN, *Nursing Research*

Durable Medical Equipment (DME) includes items such as oxygen and feeding pumps necessary to deliver life-sustaining support for children and adults with complex medical needs. They can become a projectile in a motor vehicle and cause passengers significant bodily injury or death. With support from a 2015 Boston Children's Hospital Innovation Grant, the first-of-its-kind Medical Equipment Adaptable Travel Restraint (MEATR) was developed. Every child and adult that utilizes life-sustaining DME can benefit from the MEATR. Currently, there are no commercial products like it available.

With support from Boston Children's Technology Development Program, Dr. DeGrazia and her team are looking to bring the MEATR to market by conducting a crashworthiness test to demonstrate its performance as outlined in Federal Motor Vehicle Safety Standard (FMVSS) No. 208, which may encourage the development of a federal safety standard for DME securement.

Proning Device

Heung Bae Kim, MD, *Surgical Research*

Evidence has shown that proning patients during early stages of Acute Respiratory Distress Syndrome (ARDS) where there is significant fluid buildup in lung alveoli leads to better distribution of this fluid and thereby decreases patient morbidity and mortality while increasing extubation rates. Given that the COVID-19 pulmonary disease progression is similar to ARDS, there has been an initiative to prone COVID positive patients both in the early disease stages (self-proning prior to intubation) and once intubated. There are proning beds that exist to prone patients mechanically, however, these beds are expensive and often not readily available as they require onsite delivery to the hospital which can take an extended period of time. The device proposed by Dr. Kim's research team is designed to address the ease of patient turning, safety, and organization during proning.

With support from Boston Children's Technology Development Program, the team is looking to design and manufacture prototype devices with CROs. Following prototyping, the team will perform user testing in-house with ICU caregivers before returning to the CRO for design and/or material changes. The goal will be to demonstrate the device's ease of use, efficacy, and safety and lower the barrier to prone positioning, allowing providers to prone patients more readily and earlier in their clinical course.

FY21 Highlights

Bridging the translational gap

Prolonged Pain Relief with Aromatized Liposomes

Daniel Kohane, MD, PhD, *Anesthesiology, Critical Care & Pain Medicine*

Millions of surgical cases are performed every year in the United States. Perioperative analgesia is commonly (and sometimes inadequately) addressed with the use of opioids. Alternatively, prolonged pain relief can be achieved by the placement of indwelling catheters for continuous infusions of local anesthetics, which involve tethering the patients to devices and may cause infections, and which are resource-intensive, necessitating skilled personnel for administration.

Dr. Kohane and his team have developed liposomes in which the acyl chains of the constituent lipids are modified with aromatic groups (aromatized liposomes), thus increasing drug loading and sustained drug release compared to unmodified liposomes. They have demonstrated a proof-of-principle application of aromatized liposomes in local anesthesia, an area where liposomal products are used clinically. With support from Boston Children's Technology Development Program, Dr. Kohane and his team aim to move the platform toward clinical translation by identifying the formulations with the best combination of the duration of effect and lack of systemic toxicity.

Self-Expanding Shunts for Treatment of Fetal Lower Urinary Tract Obstruction

Michael Kurtz, MD, MPH, *Urology*

Fetal lower urinary tract obstruction (LUTO) is a life-threatening condition in which the bladder outlet is blocked during prenatal development. It has been shown in a randomized trial treatment that the placement of a shunt in utero to drain the bladder into the amniotic space results in approximately triple the odds of neonatal survival as it restores the amniotic fluid. While shunts are effective, device-related complications of the current shunts are common and severe. All shunts currently on the US market are extruded plastic tubes, unchanged in design since the 1980s.

Dr. Kurtz and his team have shown that in fetal lambs a self-expanding nitinol shunt delivered through a system designed in-house has significantly fewer design, usage, and use issues than the shunts currently on the market. This could allow for a one-step fetal treatment of LUTO, providing improved pregnancy outcomes.

With support from Boston Children's Technology Development Program, they are aiming to refine the shunt and deployment system in preparation for a human trial. A handful of prototype designs will be evaluated and some will be brought all the way through production to animal testing at BCH's ARCH animal testing facility.

A New Lipid Emulsion for Premature Neonates

Mark Puder, MD, PhD, *Department of Surgical Research*
Scott Fligor, *Vascular Biology Program*

Parenteral nutrition (PN) is a life-saving treatment for patients who cannot eat. PN has improved the survival of premature infants, but long-term use of the standard lipid emulsions (the fat source in PN) results in severe liver disease and increases the risk of retinopathy of prematurity and bronchopulmonary dysplasia. These lipid emulsions are also very low in critical fatty acids for brain development: docosahexaenoic acid (DHA) and arachidonic acid (ARA). DHA and ARA accumulate rapidly in the brain in the third trimester and first year of life.

With support from Boston Children's Technology Development Program, they are aiming to generate a new pharmaceutical-grade lipid emulsion specifically formulated to support neurodevelopment with sufficient DHA and ARA, prevent liver toxicity, and minimize fluid requirements for administration. Following formulation, the emulsion will be tested for safety in mice and then evaluated in two mouse models of liver disease that mimic the premature infant.

Bridging the translational gap

Boston Children's Hospital
Drug, Device and
Diagnostic Accelerator (D3A)

Drug, Device, and Diagnostic Accelerator

The Drug, Device, and Diagnostic Accelerator (D3A) launched at Boston Children's Hospital in 2020. D3A is an internal accelerator focused on the development of high-potential drug, device, and diagnostic inventions that may lead to advanced commercialization and significant patient impact. Building on the successful efforts of the Technology Development Fund (TDF) and Translational Research Program (TRP), D3A works with BCH physicians and scientists to identify innovations that will benefit from expert advice, additional investment of capital, program management, and external technical resources to fast-track ideas into full-scale development.

Goals

- **Enhance translation of science** into novel and innovative new therapies, devices and diagnostics that meet a significant, unmet medical need for children while doing so in a capital and time efficient manner
- **Improve commercialization** and expedited clinical development awareness and skill among faculty
- **Increase value** of BCH scientific discoveries and expedite the translation of these into our clinical mission and/or increase ROI of research investments to BCH
- **Unite similar existing programs** into one comprehensive new structure that will simplify and efficiently manage high-value discovery programs

D3A Team

William Clarke, MD
Faculty Director

Mei-Mei Huang, PhD. MBA
Program Manager

For more information about D3A, please email D3A@childrens.harvard.edu or contact Bill Clarke, MD, Faculty Director, at William.Clarke@childrens.harvard.edu.

FY21

Issued U.S. Patents

10,881,647
Neosaxitoxin combination formulations for prolonged local anesthesia
Berde, Charles
Kohane, Daniel

10,905,795
Autonomously growing implantable device
Feins, Eric
Del Nido, Pedro
Hammer, Peter
Vasilyev, Nikolay
Perrin, Douglas

10,806,793
Mucosal delivery of therapeutic molecules, proteins, or particles coupled to ceramide lipids
Lencer, Wayne
Chinnapen, Daniel

9,950,060
Biochemically stabilized HIV-1 Env trimer vaccine
Harrison, Stephen
Chen, Bing

10,865,252
Lin28-mediated control of let-7 biogenesis
Gregory, Richard

11,045,439
Compounds for the treatment of obesity and methods of use thereof
Ozcan, Umut
Majzoub, Joseph

11,072,818
Selective oxidation of 5-methylcytosine by TET-family proteins
Rao, Anjana
Agarwal, Suneet

10,793,899
Methods for identifying hydroxylated bases
Rao, Anjana
Agarwal, Suneet

10,918,697
Co-activation of mTOR and STAT3 pathways to promote neuronal survival and regeneration
He, Zhigang

11,124,794
Compositions and methods to treating hemoglobinopathies
Williams, David
Gregory, Richard

10,912,862
Multi-layer biomaterial for tissue regeneration and wound healing
Estrada, Carlos

11,076,845
11,076,846
Methods and procedures for ligament repair
Murray, Martha

11,065,036
Instrument port for minimally invasive cardiac surgery
Del Nido, Pedro

11,053,285
Nucleic acids encoding human immunodeficiency virus type 1 (HIV-1) N-terminal deleted gp120 immunogens and methods of use
Harrison, Stephen

11,116,818
Compositions and methods for inhibiting viral entry
Umetsu, Dale

10,842,914
Collagen scaffolds
Murray, Martha

10,435,756
Selective inhibitors of tumor-initiating cells
Lieberman, Judy

11,065,258
Calmodulin inhibitors for the treatment of ribosomal disorders and ribosomapathies
Zon, Leonard

11,065,356
Magnetic separation using nanoparticles
Kohane, Daniel

11,129,854
ABCB5(+) stem cells for treating ocular disease
Frank, Markus

10,806,395
Pain detection system and method utilizing near-infrared spectroscopy
Borsook, David
Becerra, Lino

10,881,729
Vaccine adjuvant compositions
van Haren, Simon
Levy, Ofer
Dowling, David

10,844,118
Treatment of inflammatory skin disease
Winau, Florian

10,842,852
Methods of delivering a polypeptide molecule to Otx2 target cells using an Otx2 targeting peptide
Hensch, Takao

11,097,090
Mechanical assist device
Vasilyev, Nikolay
Del Nido, Pedro

10,973,912
Treatment for myopathy
Beggs, Alan

11,021,696
Nuclease-mediated regulation of gene expression
Orkin, Stuart

10,835,599
Methods to identify prime and boost immunogens for use in a B cell lineage-based vaccination protocol
Harrison, Stephen

10,876,177
Compositions and methods relating to nucleic acid-protein complexes
Wong, Wesley

11,104,713
Modified integrin polypeptides, modified integrin polypeptide dimers, and uses thereof
Springer, Timothy

10,981,990
Antibody molecules to TIM-3 and uses thereof
Umetsu, Dale

10,914,733
High-throughput structure determination using nucleic acid calipers
Wong, Wesley

11,027,112
Apparatuses for cleaning catheter ports
Kheir, John
Dupont, Pierre
Polizzotti, Brian
Goldberg, Sarah
Ataollahi, Asghar

11,071,714
ModifiePoly(ketals) and related compositions and methods
Kohane, Daniel
Guo, Shutao

11,090,413
10,898,443
Modified alginates for anti-fibrotic materials and applications
Langer, Robert

10,842,460
Automated apparatus to improve image quality in X-ray and associated method of use
MacDougall, Robert

11,021,443
Charged ion channel blockers and methods for use
Woolf, Clifford
Roberson, David

11,110,175
Compositions with permeation enhancers for drug delivery
Kohane, Daniel

FY21

Issued U.S. Patents

10,906,980
Compositions and methods for non-myeloablative conditioning
Rossi, Derrick

11,028,055
Compounds for treating proliferative diseases
Zetter, Bruce

10,948,401
Spinning apparatus for measurement of characteristics relating to molecules
Wong, Wesley

10,913,786
Compositions and methods for inhibiting Wnt signaling
Dong, Min

11,104,891
Engineered botulinum neurotoxins
Dong, Min

10,919,037
Systems and apparatus for detecting compounds in human biological samples
Wong, Wesley
Hansen, Clinton

10,980,808
Calmodulin inhibitors, Chk2 inhibitors and RSK inhibitors for the treatment of ribosomal disorders and ribosomapathies
Zon, Leonard

10,959,662
Seizure prediction using cardiovascular features
Loddenkemper, Tobias

10,912,862
Multi-layer biomaterial for tissue regeneration and wound healing
Estrada, Carlos

11,104,955
MAP2K1 (MEK1) as a therapeutic target for arteriovenous malformations and associated disorders
Greene, Arin

10,966,826
Geometrically-accommodating heart valve replacement device
Del Nido, Pedro
Hammer, Peter

10,799,552
Methods for treating diabetic neurotherapy
Benowitz, Larry
Del Nido, Pedro

11,090,367
Restoration of tumor suppression using mRNA-based delivery system
Zetter, Bruce

11,084,852
Ubiquitin interacting motif peptides as therapeutics
Chen, Hong

10,870,689
ApoM-Fc fusion proteins, complexes thereof with sphingosine 1-phosphate (S1P), and methods for treating vascular and non-vascular diseases
Hla, Timothy
Swendeman, Steven

11,071,779
Biofilm matrix-boosted vaccine
Watnick, Paula
Liao, Szu Yu

Technology & Innovation Development Office

The Technology & Innovation Development Office (TIDO) maximizes the impact of Boston Children's Hospital innovations on patient health while enhancing the research endeavor. The TIDO team is comprised of specialists in licensing, patenting, business development, marketing, startup formation and legal matters. We work closely with Boston Children's investigators and clinicians to develop innovations, protect and license intellectual property, and enable collaborations with companies at all stages of development.

The FY21 TIDO Team

DIRECTORS

Irene Abrams *Vice President, Technology, Development, and New Ventures*
Catherine Ives, PhD *Senior Director, Business Development and Licensing*
Greg Baker, PhD *Director of Business Development*
Tamar Alon, PhD, MBA *Director of Business Development & Strategic Alliance*s
Mikael Bristow, MBA *Director of Administration and Operations*
Gregory Pivarnik, JD *Assistant Director of Contracts*

TEAM MEMBERS

Uyi Agho, JD *Senior Contracts Specialist*
James Degar *Licensing Specialist*
Inez Falcon-Haus, PhD *Licensing Specialist*
Nazita Gamini, JD *Licensing Manager*
Mei-Mei Huang, MBA *Entrepreneur in Residence*
Monica Jang *Senior Licensing Manager*
Sabrina Kamra, PhD *Strategic Alliance Manager*
Rebecca Jones *Marketing and Communications Specialist*
Sharon Jordan-Prioleau,MBA *Business Manager*
Alice Li, JD *Contracts Specialist*
Ayan Pal, PhD *Licensing Manager*
Lisa Pight *Financial Assistant*
Ingrid Robison *Executive Assistant*
Jennifer Roy *Executive Assistant*
Shreya Sawant *Strategic Alliances and Communications Specialist*
Sheila Shahri, *Licensing Specialist*
James Simmons, PhD *Senior Licensing Manager*
Stanley Tabi, JD *Patent Coordinator*
Walter Tebbs, JD *Licensing Specialist*
Grace Yu, *Program Coordinator–Technology Development Fund*

TIDO Fellows Program

Last year, TIDO initiated a fellows program to invite several BCH post-doc fellows onto our team to learn about the field of technology transfer. Within the program, the fellows work part-time to assist our licensing managers in their assessments of the technical and market potential of BCH inventions. The fellows work alongside the licensing managers to design marketing materials to bring innovative BCH science to the outside world while learning about the field of technology transfer and intellectual property management, gaining first-hand experience in market research, competitive landscape, and prior-art research.

FY21 TIDO FELLOWS

Dijana Vitko, PhD
Since 2017, Dijana has been a postdoctoral fellow in the Department of Urology at Boston Children's Hospital. In the lab, she focuses on translational research and clinical mass spectrometry for the discovery and validation of disease biomarkers that have diagnostic and prognostic potential. Dijana holds an MS in Molecular Biotechnology from the University of Zagreb, Croatia, and a secondary MS in Bioindustrial Techniques from the University of Orléans, France. She completed her PhD at The CeMM Research Center for Molecular Medicine, where she specialized in mass spectrometry-based proteomics and earned her doctoral degree in Immunology from the Medical University of Vienna, Austria.

Adam Fiseha Kebede, PhD
Adam joined TIDO as a fellow in September 2020 to support the licensing team in evaluating BCH-born technologies, perform prior art searches, and analyze commercialization potential while actively learning about how technology transfer works at the intersection of science and business. Adam is a postdoctoral research fellow in the Shi laboratory, currently studying potential therapeutic vulnerabilities of a pediatric brain cancer known as DIPG through biochemical and genomics approaches. Originally from Ethiopia, Adam moved to Germany for his undergraduate studies where he also started graduate school at the Max Planck Institute in Freiburg and earned his PhD in 2016.

Davood Karimi, PhD
Davood obtained his PhD in Electrical and Computer Engineering from the University of British Columbia (UBC) in Canada. His dissertation was focused on image reconstruction and enhancement for cone-beam computed tomography. After completing his PhD, he worked as a postdoctoral research fellow at UCLA and UBC, focusing on projects centered on developing machine learning-based methods for medical image segmentation, cancer detection, and grading in digital histopathology. His current work at IMAGINE involves the development of new algorithms and techniques for motion-robust fetal imaging and the analysis of early brain development.

About Boston Children's Hospital

Boston Children's Hospital is ranked the #1 children's hospital in the nation by U.S. News & World Report and is the primary pediatric teaching affiliate of Harvard Medical School. Home to the world's largest research enterprise based at a pediatric medical center, its discoveries have benefited both children and adults since 1869. Today, 3,000 researchers and scientific staff, including 9 members of the National Academy of Sciences, 22 members of the National Academy of Medicine, and 12 Howard Hughes Medical Investigators comprise Boston Children's research community. Founded as a 20-bed hospital for children, Boston Children's is now a 415-bed comprehensive center for pediatric and adolescent health care. For more, visit our Discoveries blog and follow us on social media @BostonChildrens, @BCH_Innovation, Facebook and YouTube.

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