TRANSPLANT BIOBANK | Participant **Newsletter**

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Your Participation

You are receiving this newsletter because you consented to be a participant of the Transplant Biobank Registry. We thank all of our participants who took the time to learn about this initiative and donated samples and their medical histories to create this rich resource for researchers working at improving outcomes after organ transplant. Your contribution has fueled and continues to fuel important practice-changing research.

1,145 SOLID ORGAN TRANSPLANT PARTICIPANTS

282
HEART

24
LUNG

385
LIVER

359
KIDNEY

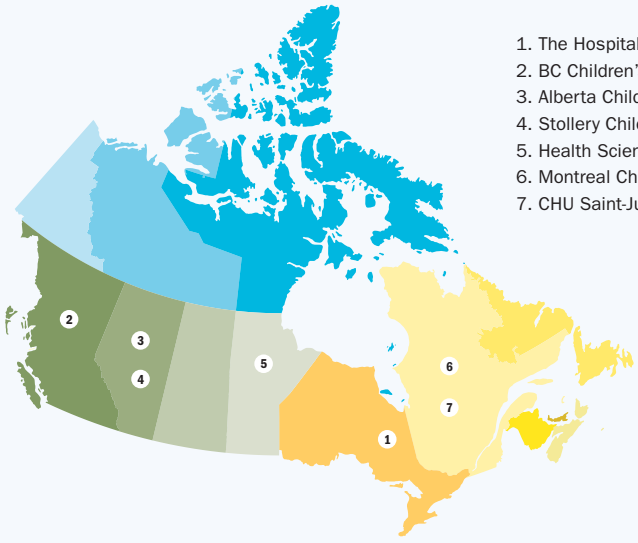
14
MULTI-ORGAN

81
LISTED FOR TRANSPLANT

361 ORGAN DONORS CONTRIBUTED SAMPLES TO BIOBANK RELATED STUDIES

The Transplant Centre Biobank – a pan-Canadian Initiative

2020 marked the 10-year anniversary of the Transplant Centre Biobank Registry, a pan-Canadian initiative launched at SickKids Hospital in Toronto through support from the SickKids Transplant and Regenerative Medicine Program and the Labatt Family Heart Centre. We expanded it to 7 pediatric hospitals across Canada (Vancouver, Edmonton, Calgary, Winnipeg, Toronto and 2 centres in Montreal). Over the past decade, over 1,500 transplant recipients, donors and transplant candidates across Canada have contributed samples and data towards this effort. We are forever grateful to our participants that are working alongside us in striving to improve outcomes and quality of life of transplant recipients.



1. The Hospital for Sick Children (SickKids)
2. BC Children's Hospital
3. Alberta Children's Hospital
4. Stollery Children's Hospital Foundation
5. Health Sciences Centre Winnipeg
6. Montreal Children's Hospital
7. CHU Saint-Justine

Canadian Donation and Transplant Research Program (CDTRP)

In 2013, through the Canadian National Transplant Research Program (CNTRP), a large transnational network funded by the Canadian Institutes for Health Research, we launched the POSITIVE study i.e. "Pediatric Outcomes in Transplant: PersOnaliSing Immunosuppression To ImproVe Efficacy". The goal of the study was to personalize immunosuppression after transplant based on age, genetics, and immune function, and identify ways to improve medication adherence among adolescents and young adults[2]. Some of the exciting research findings are described.

Twitter: (@CNTRP)
Website: cdtrp.ca

The Canadian DONATION and TRANSPLANTATION Research Program

CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

Thank you for participating and for your continued support!

For the most up-to-date news, check us out at www.transplantbiobank.ca

Personalizing Tacrolimus Dosing after Transplant: From Discovery to Clinical Practice

We conducted the first solid organ transplant clinical trial in children where after transplant we adjusted the dose of tacrolimus based on age and genotype.[3] We found that children who received a personalized starting dose were more likely to have target blood levels of tacrolimus compared to those who received an unadjusted starting dose. Reducing fluctuation in drug levels means fewer drug side-effects and better success at preventing rejection. These findings have led to routine pharmacogenetic testing in patients listed for heart transplant at SickKids Hospital. Our next goal is to develop a prescription tool that integrates genetic information into electronic records for personalised tacrolimus dosing. Dr. Seema Mital, Staff Cardiologist, Heart Function and Transplant Program, speaks of the potential of pharmacogenetic testing being offered as a clinical test.
"We are excited to see that the fruits of our research will be able to make a difference in the care of transplanted patients by making drugs safer."

Improving Precision of Tacrolimus Dosing Models

Further research done through this registry using machine learning showed that other genetic factors besides CYP3A5 genotype influence how a child metabolizes tacrolimus after transplant. These genetic effects vary by the age of the child as well as the type of organ transplant they received[4]. This study highlights the importance of artificial intelligence in helping guide personalised drug dosing.

What does the future hold for pharmacogenetics in the care of transplant patients?

Iris Cohn, Clinical Research Pharmacogenetic Advisor at The Hospital for Sick Children, says "pharmacogenetic profiling is a step forward towards a more individualized approach when prescribing medications and can be seen as an added layer of medication safety. Children are exposed to many medicines after transplant. In the future, our plan is to offer pharmacogenetic testing and integrate this knowledge into the daily clinical care for all our children at SickKids."

What comes next?

In the coming year, we look forward to sharing with you many exciting new findings. These include using genetics to identify which patients are at risk for rejection after transplant, and which patients are at risk for developing Epstein Barr virus infection after transplant. We have also identified age-related differences in immune system maturation that can inform dosing of immunosuppressive drugs by age. We have identified healthcare system supports that can improve medication adherence in adolescent and young adult patients during a vulnerable age of transition.

Recent Publications

1. Hebert M-J, et al. Transdisciplinary tour-de-force: The Canadian National Transplant Research Program. Transplantation. 2016 Mar;100(3):466-70.

2. Papaz T, et al. Pediatric Outcomes in Transplant: PersOnaliSing Immunosuppression To Improve Efficacy (POSITIVE Study): The Collaboration and Design of a National Transplant Precision Medicine Program. Transplant Direct. 2018 Nov 27;4(12):e410

3. Min S, et al. A randomized clinical trial of age and genotype-guided tacrolimus dosing after pediatric solid organ transplantation. Pediatr Transplant. 2018 Nov; 22(7):e 13285.

4. Min S, et al. An Integrated Clinical and Genetic Prediction Model for Tacrolimus Levels in Pediatric Solid Organ Transplant Recipients. Transplantation: Feb 22, 2021.

Additional funding:

Ashley's Angels

astellas

Transplant Biobank Registry Team & Contacts

Transplant Biobank Principal Investigators: SickKids Hospital: Dr. Seema Mital (Lead PI), Dr. Rulan Parekh, Dr. Binita Kamath, Dr. Upton Allen, Dr. Harmut Grasemann

National site PIs: Dr. Patricia Birk (Winnipeg Children's), Dr. Tom Blydt-Hansen (BC Children's), Dr. Bethany Foster (Montreal Children's), Dr. Lorraine Hamiwka (Alberta Children's), Dr. Veronique Phan (CHU Sainte-Justines), Dr. Simon Urschel (Stollery Children's)

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