THE LIFE SCIENCES INSTITUTE

iTARGET AUTISM

A unique approach to autism

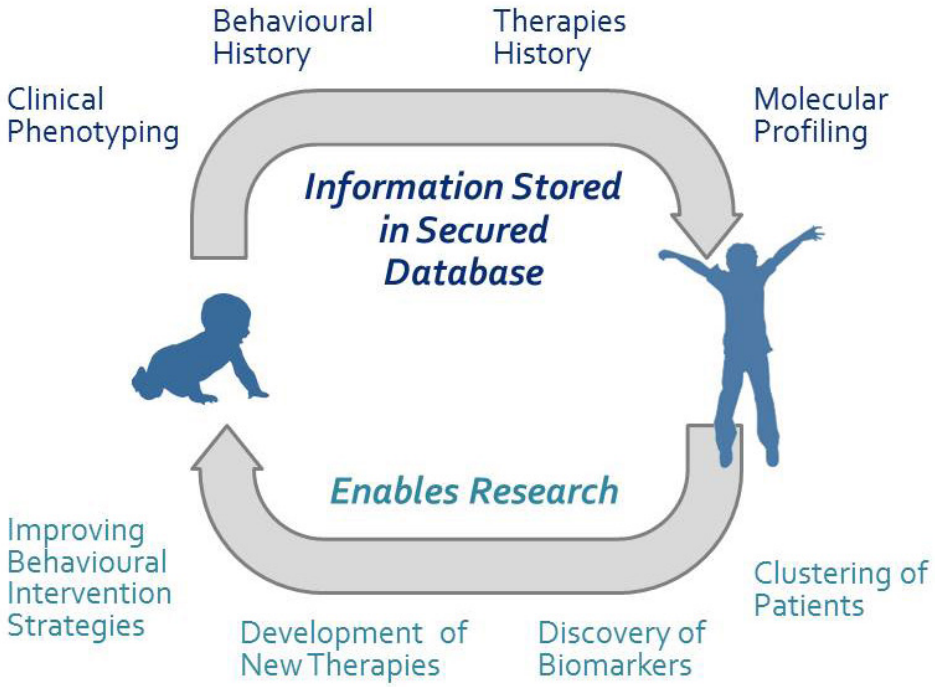
Individualized Treatments for Autism Recovery using Genetic-Environmental Targets (iTARGET) Autism is a collaborative research initiative consisting of a core team of 21 researchers at the University of British Columbia and Western University, who bring together expertise in clinical, genetic, neuroscience, and microbiome research. Their aim is to identify the earliest causes, more informative subtypes, and prospective novel therapies of Autism Spectrum Disorders. For the first time, this initiative will create a highly beneficial collaboration between clinicians and families in BC, through partnerships with the Pacific Autism Family Center (PAFC) and the Ministry of Child and Family Development (MCFD).

Autism in society: the costs and consequences

The Autism Spectrum Disorders (ASDs) are defined by significant challenges with communication, social reciprocity, and structured behaviour. ASDs are currently the most common childhood developmental disabilities, and they becoming increasingly common at an alarming rate. Indeed, 1 in 68 individuals is currently diagnosed with ASD, indirectly impacting more than 1 in 20 people, including parents, siblings, and grandparents. The lifetime cost for educational, health-care, and social services averages $3.2 million per person with ASDs, and provinces are contributing hundreds of millions of dollars to intensive behavioural intervention programs in an effort to help treat those with ASDs. While beneficial, these programs are not enough to treat the many causes and changing symptoms of patients on the spectrum as they mature from children to adults in society. These growing numbers are alarming and present serious social and economic implications for BC and Canada. Despite significant evidence that early intervention greatly improves behavioral outcomes (including IQ, adaptation, and language), children with ASDs are often not diagnosed until they are at least three to four years old. Furthermore, an ASD diagnosis does not determine a person's needs and capabilities, currently or during their lifetime (i.e., they may be high-functioning with possible savant qualities, or low functioning, non-verbal, and have an intellectual disability). It is clear that we need strategies to identify children with or at risk for ASDs much earlier, along with a framework to classify patients with ASDs in a way that will lead to more effective and personalized treatment.

The benefits of big data

A family-centric approach integrating community and research makes iTARGET Autism Canada's first fully integrated initiative to uncover the underlying causes, life-course changes, and treatment outcomes of ASDs. This initiative aims to define the most effective therapies for children and why those therapies work. Currently, most global research to identify the common genetic pathways of autism is limited by focusing on autistic behaviours. No matter how readily observed or reproducible, ASD behaviours represent the end points of complex biological systems and are constantly changing, creating a "moving target". As with all diseases, ASDs have molecular triggers that are altered by both the environment and the patient's response to that environment. For example, more than 50% of individuals with ASDs also have gastrointestinal issues, and the diversity of microorganisms in the gut can influence behaviour in important ways.



With current genomics technologies, it is possible to capture a molecular profile of patients through their genetic material, gut and organ microbes, metabolomic byproducts, and the physical outcomes caused by the interaction of these factors with the environment. Unlike other research, iTARGET Autism explores the patterns and interactions between these whole body features in ASDs and aims to understand their impact on brain development and function, eventually identifying the key factors that cause ASDs. This information is essential for developing the most beneficial treatment pathway for each unique patient.

Most importantly, the data will be collected from the same patients over a period of many years and linked to a single dedicated database, ASDBase. This data will enable researchers to unlock a wide range of collected genetic information and compare it across populations and years. By combining patients' treatment and outcome data with their molecular data (like genetic, metabolic, and microbiological information), researchers will also be able to define patterns within each bodily system that will determine specific subgroups of individuals with ASDs. Researchers will then compare unique genes from each subgroup with the behavioural changes observed during their treatment. Through this interconnected data and analyses, an autism screening test and risk scoring tool will be created to enable earlier and more accurate diagnosis (ASDx), identify the risk of certain symptoms and guide the most effective treatment plan, as well as refine and develop new treatment methodologies. Earlier and more accurate diagnoses of ASDs will lead to clinical trials for new treatments to help ASD patients and their families manage the disorder with the best possible results. The outcomes of clinical trials will also inform government policy and direct funding for a personalized medicine approach to diagnosis and treatment.

Goals and timeline of the iTARGET Autism

Within three years of initiating phase 1, the iTARGET Autism initiative aims to diagnose people with ASDs earlier and classify ASD patients into subgroups or "clusters" based on their unique clinical, medical, molecular, and genetic profiles. Together, the outcomes of phase 1 will enable more personalized treatments for behavioural and bio-medical therapies beginning in phase 2, which hold tremendous promise for the development of effective medical treatments for ASD.

To learn more about the iTARGET Autism project, please contact Stuart Bowyer, Business Development Manager at: stuart.bowyer@ubc.ca or 604-827-2518

To learn more about how to access Medical Genetics services or to inquire about participating in this initiative, please contact Dr. Suzanne Lewis' team at: AspireBC@cw.bc.ca

To learn more about the Pacific Autism Family Centre (PAFC) see: http://www.pacificautismfamily.com/ or contact info@pacificautismfamily.com