Market Need: Schizophrenia (SZ) and bipolar disorder (BD) are severe and chronic mental illness with symptoms of disturbances in thinking, perception, and mood, resulting in long lasting health, social and financial burdens. The lifetime prevalence of SZ and BD is estimated at 0.6% and 4.4%, respectively, in the United States (US). In the US alone, healthcare costs for SZ were $30.3 billion in 2002 and $151 billion in 2009 for BD. Additionally, the global market for commercialized biomarker tests was estimated at $23.2 billion in 2011, and sales for psychiatric tests are expected to reach $100 million by the year 2016, representing a growing market segment.

Identifying risk factors for developing major psychosis disorders (SZ and BD), using epigenetic biomarkers, may play an integral role in classifying individuals at risk of disease. Analysis of epigenetic DNA methylation changes for diagnostics is more advantageous than analysing genetic changes because research indicates that the epidemiological, clinical, and molecular peculiarities associated with major psychosis cannot be explained by genetic and environmental factors alone.

Technology Description: Our researches, having developed a proprietary microarray-based technology for DNA methylation profiling in large genomes, have identified a number of epigenetic markers associated with major psychosis (SZ and BD). Dr. Petronis’ team performed a large-scale microarray-based epigenomic profile and detected over 50 loci exhibiting statistically significant DNA methylation differences in the post-mortem brains of individuals affected with major psychosis, compared to controls. Epigenetic disease markers will enable us to identify individuals at risk and enroll them in prevention programs. They will also create new opportunities for the rational design of the next generation of drugs for psychiatric disease. The new medications can be small interfering RNAs that directly rectify the epigenetic misregulation, or small organic molecules that interact with the protein products of epigenetically misregulated genes.

Stage of Development:
- Data for the differences in specific epigenetic markers associated with major psychosis were obtained from human frontal cortex postmortem brain tissue (35 SZ subjects, 35 BD subjects, and 35 healthy controls)
- Both inter-individual and sex differences were shown in the underlying epigenetic DNA changes in psychosis between male and female subjects.

Advantages:
- Analyzing unmethylated DNA fractions for epigenetic changes is more sensitive, effective, and reproducible
- Samples could be from the blood, brain, or sperm, or any other tissues that provide genomic DNA
- Allows for efficient high-throughput analysis of large samples
- Can help determine the risk of having or developing a psychosis-associated disease

Notable Publication:

Intellectual Property:
Patent applications filed in US and Canada

Business Opportunity: The Centre for Addiction and Mental Health is leading the commercialization of these technologies. With developmental financing in place around these technologies, we are seeking partners to leverage additional capital and out-licensing opportunities for these technologies individually or as a portfolio.

For more information contact:
Dr. Klara Vichnevetski
Director, Industry Partnerships & Technology Transfer
klara.vichnevetski@camh.ca; 416-595-6056

Centre for Addiction and Mental Health
33 Russell Street, Suite 4039
Toronto, ONT, CDA M5A 2S1
http://www.camh.ca