

2018 Talent Development Competition Awardees

Title: The origins of schizophrenia: uncovering the role of genetic and epigenetic interactions

Edward Oh

Supervisor: Arturas Petronis

Abstract: Schizophrenia affect 300.000 Canadians and millions worldwide. Like many other diseases, schizophrenia is partially heritable which indicates that DNA risk factors are involved. In addition to genetics, epigenetics is required to explain why only one of two identical twins is affected with schizophrenia or why it takes decades before the first clinical symptoms appear in genetically predisposed individuals. Traditionally, genetic factors have been investigated separately from epigenetic ones. Our earlier studies, however, show that DNA sequences should be investigated together with their epigenetic counterparts, which dubbed as genetic - epigenetic (GE) duets. When investigated separately, neither isolated DNA sequence- nor epigenetic- variation may be sufficient to relate them to disease. My working hypothesis is that lack of GE duet harmony leads to a disharmonic brain, i.e. misregulation of genes in the brain of SCZ patient which manifests as delusions and hallucinations. We believe that analysis of GE duets can offer a simple way to assess the likelihood of disease risk factors to develop into a full-blown psychiatric disease. Our effort to uncover this mechanism may open very promising avenues in research of other psychiatric diseases. Our overarching goal is to identify molecular signatures that can be used for precise prediction of psychiatric diseases, and the principles developed in this project can create the foundation for new diagnostic, prognostic, and therapeutic tools in precision psychiatry.