Profiling the infectome of *A. tumefaciens* and *N. benthamiana* with quantitative proteomics for molecular farming

Plant-based production systems for biopharmaceutical proteins provide an attractive alternative to mammalian cell, yeast, or bacterial systems. Benefits of this system include a reduced cost of drug development, scalability, rapid delivery of new products to the market, and an ability to provide safe and efficacious medicines for diseases. PlantForm Corporation, a Canadian biotech company, has developed a system to produce biosimilar versions of therapeutics, as well as innovative products through its *vivoXPRESS®* technology. *vivoXPRESS®* uses a common plant pathogen, *Agrobacterium tumefaciens*, to deliver genes encoding for a specific protein product to *Nicotiana benthamiana* plant cells. Although the *vivoXPRESS®* platform offers excellent potential for therapeutic protein production, barriers still exist which impact the product yield and limit wider adoption of the technology. Plant defense responses have been identified as an important yield-limiting factor. To overcome their impact on target protein production, the proposed project will conduct a comprehensive analysis of proteins and metabolites that are produced during *Agrobacterium* preparation and plant infection. This analysis will provide an improved understanding of the systems-level responses of plant infection from both host and pathogen perspectives, aiding in refinement of the *vivoXPRESS®* platform. In doing so, this project will support the production cost-effective therapeutics in Canada.