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Quantum Dot Diagnostics: Simultaneous Genomic and Proteomic Profiling of Multiple Pathogens at Point-of-Care

Status	Current
Competition	III
Sector	Development of New Technologies
Genome Centre	Ontario Genomics Institute
Project Leaders	Kevin Kain, Michael Greenberg & Warren Chan

Project Description

World wide, infectious diseases cause billions of infections and over 17 million deaths each year. With its well-traveled population and cultural diversity, Canada is at risk of global diseases such as SARS (severe acute respiratory syndrome), malaria and avian influenza (bird flu).

But Canada is developing cutting-edge expertise in the rapid and accurate diagnosis of infectious diseases, based on nanotechnology.

Dr. Kevin C. Kain, Director of the McLaughlin-Rotman Center for Global Health and Senior Scientist in the division of genomic medicine at the Toronto General Research Institute, and Dr. Michael Greenberg, FIO Corp, are project leaders of Quantum dot diagnostics: simultaneous genomic and proteomic profiling of multiple pathogens at point-of-care.

They have assembled a research team that will incorporate advances in nanotechnology with pathogen genomics and proteomics, in order to create a high-throughput diagnostic system capable of detecting multiple global infectious diseases within minutes. The system is based on quantum dots - tiny fluorescent probes that can be used as biomarkers to tag organic molecules and track them during biological processes. The research team plans to develop this diagnostic system specifically for use at point of care, in order to detect or exclude the presence of pathogens related to five major infectious diseases - SARS, HIV/AIDS, malaria, hepatitis B and hepatitis C. The social and economic potential of this innovative system is underscored by the fact that these five diseases account for over 2 billion infections and 5 million deaths world wide each year.

The project is organized into a continuous discovery pipeline, making it possible to accelerate discovery of diagnostic tools, commercialize them and translate them into clinical use. According to Dr. Kain, "the ability to definitively detect or exclude multiple pathogens at point of care within minutes would be a breakthrough with impact on our healthcare system, the quality of life of Canadians as well as global communities."