

# ENVIRONMENT SECTOR

Biotechnology Research Institute

INFORMATION

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*"We are expert at using the high specificity of genes to develop sensitive, 'fingerprint' methods for detecting cells, microorganisms, and viruses. Our work has applications in environmental protection, medical diagnostics, and agriculture."*

**Environmental Genetics**  
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## ENVIRONMENTAL GENETICS

BRI's Environmental Genetics Group develops methods for pathogen identification based on DNA microarray technology, a rapid, accurate, relatively inexpensive approach to testing for disease-causing strains of cells, microorganisms, and viruses in the environment, humans, and animals. The work, done in concert with the **MicroArray Lab**, circumvents classical microbiological or immunological approaches with their problems of slow response and cross-reactivity.

### Our Research Activities

- ▶ Development of DNA microarray diagnostics based on the synthesis of virulence genes specific to pathogenic strains of bacteria and other microorganisms.
- ▶ Development of parallel probes for environmental pathogens involving microarrays plated with pathogen DNA sequences and PCR probes.
- ▶ Studies of the biological role of genes in viruses that attack insects.

### Our Services

We develop diagnostics for specific cells, bacteria, fungi, or viruses. This includes applications such as:

- ▶ Safeguarding water and groundwater potability for government agencies and corporations.
- ▶ Tracking infectious diseases for medical professionals.
- ▶ Monitoring animal health for veterinarians.
- ▶ Developing diagnostics (environmental, medical, agricultural applications) for Canadian biotechnology companies.

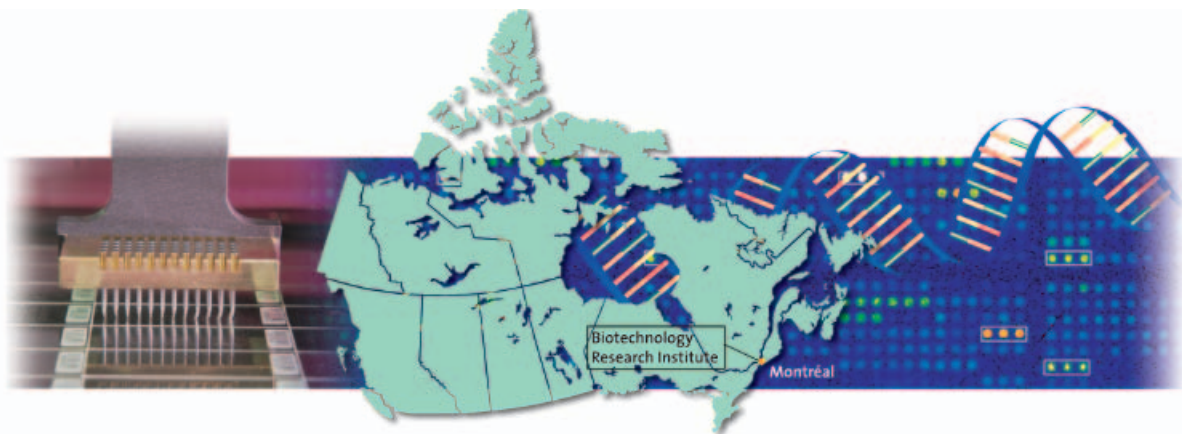
### Research Examples

- ▶ DNA microarrays containing over 100 'virulence' genes specific to pathogenic strains of *Escherichia coli* (e.g. the Walkerton/hamburger disease *E. coli* O157:H7) that speed the time to identify pathogens from days to a few hours, and are more accurate. This research is performed in collaboration with Université de Montréal, Canadian Research Network on Bacterial Pathogens of Swine and with Hôpital Notre-Dame.
- ▶ Development of microarrays capable of detecting the presence of hundreds of different organisms in water, probed in parallel. The parallel probing approach is potentially capable of detecting up to 500 different pathogens simultaneously. They are less expensive and much faster than methods now in use, and without culture problems. This research is performed in collaboration with Environment Canada, the Water Environment Research Foundation (WERF), and the Canadian Water Network (CWN).
- ▶ Use of DNA microarrays to study the sub-lethal effects of *Bt* insecticidal toxins on sensitive insects. Extends safety analysis of *Bt* bioinsecticide to subtle, non-lethal or multigenic effects. Dividends include knowledge of synergistic approaches for improving control of insect pests.

### Our Business Approach

We are flexible, tailoring our collaborations to address the needs of our partners. We engage in service contracts and license out our technologies. With the BRI, you have access to advanced technologies and a broad diversity of researchers who publish regularly in leading scientific journals.

**Contact us for more details.**



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