The Infection, Inflammation & Immunity (I³) Research Group focuses on how micro-organisms cause infections and how the immune system combats infections and prevents disease.

Research Strengths & Facilities

Both newly emerged pathogens (e.g. H5N1 pandemic flu, West Nile Virus) and pathogens making a comeback in immune compromised persons (e.g. tuberculosis) represent major threats to human health.

At the same time, disease caused by uncontrolled or inappropriate immune responses are now a leading health problem in the developed world. This includes chronic diseases such as type 1 diabetes, multiple sclerosis, inflammatory bowel disease, arthritis, asthma, atherosclerosis, and immune cell cancers.

Many cancers also silence or subvert the immune system, suggesting that modulating the immune system could provide new cancer treatments.

Together, these diseases are a significant cause of deaths and cost the health care systems billions of dollars for patient care. Although the underlying causes of these diseases are diverse, they are linked by a common theme, inappropriate or insufficient immune function.

To improve human health and reduce the suffering caused by these diseases, the 70 trainees, technicians, and faculty members who comprise the I³ Research Group are dedicated to understanding:

• How the immune system functions to prevent disease
• How immune deregulation can cause disease
• How targeting pathogens and manipulating the immune system could lead to new drugs and vaccines for curing or preventing infectious diseases, inflammatory and autoimmune diseases, and cancer

Graduate Programs

Cell & Developmental Biology (MSc, PhD)
Biochemistry & Molecular Biology (MSc, PhD)
  Bioinformatics (MSc, PhD)
Microbiology & Immunology (MSc, PhD)
Pathology & Laboratory Medicine (MSc, PhD)
  Experimental Medicine (MSc, PhD)
Zoology (MSc, PhD)
Understanding fundamental mechanisms of the body’s immune response against pathogens and during inflammation is the focus of I³ research.

Diseases studied by I³ labs:

**Infectious diseases:** West Nile Virus, Hepatitis C, pandemic flu, HIV, tuberculosis, Epstein-Barr virus, Coxsackievirus, Dengue Fever Virus.

**Inflammatory diseases:** colitis, inflammatory bowel disease, arthritis, atherosclerosis.

**Autoimmune diseases:** Type 1 diabetes, Multiple Sclerosis, Autoimmune myocarditis.

**Immune cell cancers:** T and B cell lymphomas, multiple myeloma.

**Metastatic cancers:** Melanomas, breast and ovarian cancer.

**Major research themes:**
- How pathogens cause infections, manipulate host cells, and evade the immune system - Drs. Jean, Harder, Horwitz, Perona-Wright.
- How immune cells respond to pathogens and tumors can be enhanced - Drs. Johnson, Gold, Abraham, Harder, Matsuuchi, Perona-Wright.
- How immune cells travel to sites of infection; How cells move and how these processes influence immune cell trafficking and tumor cell metastasis - Drs. Gold, Roskelley, Weeks.
- How immune cells cause and resolve inflammation; How immune dysfunction leads to autoimmune and inflammatory diseases - Drs. Horwitz, Harder, Gold, Johnson.
- How immune cells are transformed into leukemias and lymphomas - Dr. Abraham.

**Research approaches:**
- In vitro and in vivo models of disease including model organisms
- Multi-color flow cytometry
- Confocal microscopy and live cell imaging
- Proteomics, genomics and systems biology

**Recent Publications**


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**UBC Faculty of Graduate Studies**

Establishes common minimum academic requirements. One of the major requirements for LSI graduate programs is securing a research supervisor.

**Contact**

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