



Centre for Biologic Imaging and Research & Development

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Technology description

The Centre for Biologic Imaging Research and Development (C-BIRD) at the University of Saskatchewan, applies the principles of antibody engineering to develop the next generation molecular imaging agents for three main purposes: early and definitive diagnosis, improved disease characterization, and guiding therapeutic intervention.

C-BIRD is built around a vertically integrated infrastructure, covering state-of-the-art imaging technologies, medical radionuclide production, and antibody engineering, which together enable the development and translation of biologic molecular imaging agents from mice to humans in one centre. Mission: As a leading Canadian innovator, our mission is to develop biologic imaging technologies to visually characterize disease before symptoms appear while engaging industry and the academic scientific community to leverage C-BIRD infrastructure to advance molecular imaging agents and therapeutics from basic research to translation in patients.

Solutions:

C-BIRD has established a size variant antibody fragment platform for development of molecular imaging agents with high affinity and avidity while displaying optimal pharmacokinetics. This antibody platform enables the development of optimal nuclear, optical or acoustic imaging agents with desired imaging contrast, perfusion and clearance from circulation in the body.

Services:

C-BIRD offers pre-clinical molecular imaging services as an integral part of our targeted imaging probe development and efficacy program.

Novel probe development

- ▲ Engineered antibodies: Fab, ScFv, ScFv – Fc, Vhh
- ▲ Lariat cyclic peptides

Radiotracer development and production using 24MeV or linear accelerator

- ▲ Tc-99
- ▲ Zr-89
- ▲ In-89
- ▲ F-18

(Additional radiotracers are available for conjugation)

Optical probes

- ▲ Near infrared fluorescence

Radiochemistry (PET and SPECT) -conjugation of radionuclide to biological molecules (peptides, antibodies, proteins) under GMP conditions

- ▲ Automated synthesis

- ▲ Separation and purification

Probe validation

- ▲ In-vitro validation including flow cytometry

- ▲ In-vivo fluorescence imaging

- ▲ In-vivo small animal biodistribution

- ▲ Large animal dosimetry studies

- ▲ Small animal toxicology studies

Imaging Modalities

- ▲ Hybrid micro PET (Positron Emission Tomography) / SPECT (Single Photon Emission computed Tomography) / Optical (3D Optical) Imaging

- ▲ Clinical PET / SPECT

Technology Platform Core:

C-BIRD has established a molecular imaging technology platform core to advance targeted molecular imaging technologies from preclinical development to human application through the following core competencies at the University of Saskatchewan:

- ▲ Antibody Development and Engineering: Saskatchewan Therapeutic Antibody Resource (STAR) has developed a high throughput antibody production platform for producing humanized antibodies and antibody fragments.

- ▲ Radionuclide Production and Radiopharmaceutical Development: Canadian Centre for Nuclear Innovation (CCNI) and Linear accelerator (Linac): CCNI houses and operates a recently commissioned 24MeV cyclotron and GMP radiochemical facilities. Canadian Light Source Linac is the first of its kind facility able to produce Technetium 99 and can produce other medical isotopes.

- ▲ Animal Imaging: The College of Medicine houses and operates facilities with preclinical and clinical PET, SPECT, MRI, and optical, and acoustic non-invasive scanners for anatomical and functional imaging of living organisms.

- ▲ Large Animal Imaging: Western College of Veterinary Medicine (WCVM) operates a large animal vivarium and provides non-rodent animal models of diseases, which enable advances in diagnostics and drug therapies for animal and human health.

- ▲ Toxicology and ADME: The College of Pharmacy and Nutrition provides formulation and toxicology analysis infrastructure and expertise.

Facilities

- ▲ Vavarium

- ▲ cGMP Radiochemistry

- ▲ Imaging

Research and Development:

C-BIRD research and development programs consists of multidisciplinary researchers dedicated to the advancement of preclinical biologic molecular imaging agents for pre-clinical and clinical applications. The center focuses on biologic imaging probe and technology development and collaborates with industry, government, and academic researchers to advance molecular imaging agents and therapeutics from basic research to translation in patients.

Our research and development programs in oncology, cardiology and inflammatory disease are driven through our own initiated development efforts as well as in partnership with industry, academic and government institutions.

Institution

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