# Molecular Proteomics

The Molecular Proteomics laboratory is focused on understanding the molecular function of nano-sized extracellular vesicles and how their intercellular signalling is important in normal physiology and pathologies; including cancer and cardiometabolic disease with the goal of identifying new deliverable therapeutic targets. We use a multi-disciplinary approach to understand the molecular function of extracellular vesicles incorporating proteomics, cell biology, molecular biology, nanobiotechnology, functional assays, cell and animal models, with the goal of understanding mechanisms of cell signalling and function, identifying deliverable therapeutic targets and engineering nanoparticles for next generation cell-free therapies.
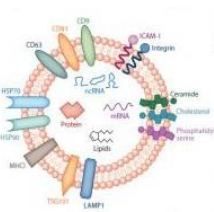
- Defining composition
- Biological insight
- Mechanism of function, delivery
- Interactome

- Quantitative profiling
- Protein variation, modifications, signalling.
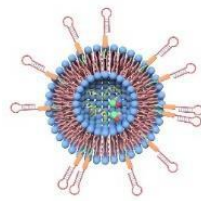
- Nano-carriers
- Re-engineering

Routine techniques

- Cell culture (small/large scale, iPSCs).
- Extracellular vesicles purification and characterisation.
- Nanocarrier (cell-derived) generation.
- Quantitative proteomics (high resolution).
- Data science and informatics.
- Functional assays.
- Fluorescence microscopy.
- Microwestern blotting (dot blot).

Current research projects

- Understanding targeted delivery of biological and engineered extracellular vesicles.
- Barcoding circulating extracellular vesicles — understanding organ-specific intercellular signaling.
- Repairing a broken heart: exosomes and nanocarriers in cardiac repair.
- Demystifying what makes up a heart using ultra-sensitive proteomics.
- Mechanisms of cellular reprogramming by extracellular vesicles.

Lab members

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Research team
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