### Autoimmune Disease & Inflammatory Conditions

**DISEASE PATHOLOGY & NOVEL TARGET DISCOVERY**
- Development of models of cytokine-induced BBB disruption
- Viral immunology and subversion of immune response
- Human immune modelling
- Interactions of bacteria with the immune system

**THERAPEUTIC DEVELOPMENT**
- Identification of therapeutic molecules/pathways in infection and autoimmunity
- Novel marine compounds in inflammatory disease

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### Cardiovascular Disease (CVD)

**DISEASE PATHOLOGY & NOVEL TARGET DISCOVERY**
- Integrin signalling, activation and regulation (eg. adhesion and migration)
- Cytoskeletal and actin dynamics
- Investigation of uPAR-integrin interactions and signalling pathways in CVD and inflammation
- Epigenetic and microRNA-mediated regulation in Cardiovascular disease
- Megakaryocyte and platelet functional biology
- In vitro modelling of vascular smooth muscle and endothelial cells
- Animal models of Cardiovascular disease
- Bioinformatics and molecular biology of Cardiovascular disease
- Cellular signalling mechanisms in endothelial homeostasis and dysfunction
- Impact of blood flow-associated haemodynamic forces on endothelial signal transduction, gene expression and barrier regulation

**THERAPEUTIC DISCOVERY & DEVELOPMENT**
- In vitro and in vivo testing of adverse effects of biologics and drugs using novel cellular and molecular biomarkers (stratification of clinical trials, personalised medicine, pharmacogenomics)
- Diagnostic development

**MEDICAL DEVICES DEVELOPMENT**
- Stent coating
- Cardiovascular tissue engineering and design of minimally invasive intravascular devices
- In vitro modelling of in-stent restenosis
- Development of vascular tissue engineering platforms
- Cardiovascular biomechanics
- Numerical modelling of intravascular stents
- In vitro and in vivo testing of adverse effects of devices (microparticles as biomarkers)

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### Diabetes

**DISEASE PATHOLOGY & NOVEL TARGET DISCOVERY**
- Isolation and purification of the islets cells
- Protein, mRNA and microRNA profiling of islets
- Pathophysiology of insulin resistance
- Insulin and non-insulin mediated glucose transport
- Whole body and cellular regulation of energy expenditure
- Animal models of diabetes and diabetic nephropathy
- Bioinformatics and molecular biology of the kidney glomerular filtration barrier
- Epigenetic and microRNA-mediated regulation in diabetes

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