MANCHESTER
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The University of Manchester

BUSINESS
ENGAGEMENT
& KNOWLEDGE
EXCHANGE

Faculty of Biology, Medicine & Health
School of Medical Sciences
Divisional Research Priorities

Structure of Faculty of Biology, Medicine and Health (FBMH)
↓
Comprises Three Schools:

🏥 **School of Medical Sciences**

Includes the following six divisions;
- Cancer Sciences
- Cardiovascular Sciences
- Dentistry
- Medical Education
- Developmental Biology
- Diabetes, Endocrinology and Gastroenterology

🧬 **School of Biological Sciences**

Includes the following divisions; Cell Matrix Biology and Regenerative Medicine, Evolution, infection & genomics, Neuroscience, Division of Immunology, Immunity to Infection & Respiratory Medicine, Molecular & Cellular function and Musculoskeletal and Dermatological Sciences

🩺 **School of Health Sciences**

Includes the following divisions; Nursing, Midwifery & Social work, Pharmacy & Optometry, Population Health, Health Services Research & Primary Care, Psychology & Mental health
Informatics imaging & Data science and Human Communication, Development and Hearing

Cardiovascular Sciences

🧬 Cardiovascular Genomics
Focus: Genetic underpinnings of cardiovascular disease
Technologies: Human cardiac organoids & Arrhythmia patient iPSC models
Disease Expertise: Congenital heart disease, Hypertrophic cardiomyopathy, Conduction nodal disease
Goals: Identify genetic drivers and develop precision therapies

❤️ Translating Heart Failure Pathophysiology
Focus: Mechanistic insights into heart failure and therapeutic development
Technologies: Human heart slice biomimetic system, Sheep cardiovascular disease models,
MRI modality imaging, Troponin detection kit
Disease Expertise: Heart failure (HPrEF, HFpEF), Diabetic Cardiomyopathy, Preeclampsia
Goals: Bridge discovery science to clinical efficacy and advance treatment strategies for heart failure

🧠 Inflammatory Drivers of Cardio- & Cerebrovascular Disease
Focus: Role of inflammation in vascular pathology
Technologies: EGC multiple-lid chest vest, Shark tissue bank
Disease Expertise: Hypertension, Small vessel dementia, Atrial fibrillation, Ventricular arrhythmia (CVPT)
Goals: Understand and target inflammatory mechanisms, Improve outcomes in vascular disease

📊 Cardiovascular Data Science & Education
Focus: Data-driven insights and innovative teaching tools
Technologies: Human heart virtual teaching model
Disease Expertise: Cross-cutting support across cardiovascular conditions
Goals: Advance cardiovascular research through analytics, Enhance education and training

🌟 Leading Researchers

Research Theme	Key researchers
Cardiovascular Genomics	Professor Bernard Keavney, Professor Maciej Tomaszewski
Translating Heart Failure Pathophysiology	Professor Delvac Oceandy, Professor Andy Trafford, Professor Xin Wang, Professor Elizabeth Cartwright,
Inflammatory Cardio- Cerebrovascular disease	Dr Adam Greenstein, Professor Craig Smith

Dentistry

🧪 **Biomaterials & Biomechanics**

- Focus on regenerative scaffolds, implant design, biocompatibility

- Utilises advanced biomaterials and biomechanics

- Linked with regenerative medicine and prosthetic innovation

Goal: Develop next-gen materials for craniofacial and dental repair

🧬 **Craniofacial Genetics & Development**

- Explores genetic and developmental causes of craniofacial anomalies

- Combines dental genetics and stem cell biology

- Investigates congenital and developmental conditions

Goal: Drive precision healthcare through genetic and regenerative insights

🦷 **Oral/Dental & Allied Healthcare**

- Evidence-based research to improve oral health and quality of life

- Includes systematic reviews and applied health studies

- Evaluates urgent care, antimicrobial resistance, and primary dental care

Goal: Strengthen oral health outcomes through impactful research and policy

🌟 Leading Researchers

Research theme	Key Researchers
Biomaterials & Biomechanics	Professor Nik Silikas, Professor Julian Yates, Dr Evgeny Kushnerev
Craniofacial Genetics & Development	Professor Michael Dixon, Professor Julian Yates, Dr Evgeny Kushnerev
Digital Dentistry & 3D Technologies	Dr Polyvios Charalambous
Oral/Dental & Allied Healthcare	Professor Anne-Marie Glenny, Professor Tanya Walsh, Dr Phil Riley, Dr Wendy Thompson, Dr Matthew Byrne

Cancer Sciences

🔍 **Discovery & Translational Research**

This area bridges laboratory discoveries with clinical applications, enabling rapid movement from bench to bedside. Strong clinician-scientist partnerships and biobanking initiatives support Translational breakthroughs across multiple cancer types.

Technologies/Expertise: MCRC Biobank, rapid autopsy program, RAS biobank

Goals: Improve patient outcomes through integrated research and clinical translation

🧬 **Personalised /Precision Medicine**

Precision medicine is central to the Division's strategy, using molecular diagnostics and early-phase trials to tailor treatments to individual patients. This approach is especially impactful in CUP, lung, and prostate cancers.

Technologies/Expertise: Circulating biomarkers, genomic profiling, early-phase clinical trials

Goals: Deliver targeted therapies with enhanced efficacy and reduced toxicity

🛡️ **Immuno-Oncology**

Immuno-oncology research focuses on activating or modulating the immune system to fight cancer. The Division is developing cellular therapies and immune-based strategies to improve treatment outcomes.

Technologies/Expertise: Cellular therapeutics, immune profiling

Goals: Harness the immune system to develop novel cancer therapies

🎯 Radiotherapy-Related Research

Radiotherapy research is driven by advanced technologies like proton beam therapy, which allow for highly targeted treatment
 with fewer side effects. This area supports both clinical innovation and translational studies.
Technologies/Expertise: Proton beam therapy
Goals: Refine radiotherapy protocols and improve precision in cancer treatment `

🔬 Prevention & Early Detection

Efforts in this area aim to identify cancer at its earliest stages and prevent progression. Through biomarker research and clinical trials, the Division is working to reduce cancer incidence and improve survival rates.
Technologies/Expertise: Biomarker discovery, early-phase trials
Goals: Detect cancer earlier and prevent disease progression

🧠 Disease-Specific Strengths

The Division has deep expertise across multiple cancer types, with standout programs in lung, breast, ovarian, CNS, and haematological malignancies. These areas benefit from strong clinical services, translational research, and advanced modelling systems.
Technologies/Expertise: RAS biobank (lung), organoids (breast), PDX models (ovarian), pre-clinical models (CNS)
Goals: Advance disease-specific therapies and improve clinical outcomes through targeted research

🌟 Leading Researchers

Research Area	Key Researchers
Brain Tumours – Pre-clinical and translational research	Professor Petra Hamerlik
Ovarian Cancer	Professor Stephen Taylor, Dr Rob Morgan, Dr Christine Schmidt, Professor Richard Edmondson
Breast Cancer	Professor Rob Clarke, Dr Frances Turrell, Dr Sacha Howell
Lung Cancer/ RAS research	Dr Colin Lindsay, Professor Angeliki Malliri
Immuno-Oncology and cell based therapies	Dr Jon lim, Dr Simona Valletta
CUP/ Precision Medicine (early phase trials)	Dr Natalie Cook, Dr Matt Krebs

Diabetes, Endocrinology and Gastroenterology

🕐 **Biological Timing**
Focus: Circadian clock network from molecular biology to epidemiology
Technologies: Circadian studies, diurnal rodent models
Disease Expertise: Metabolic disorders, obesity, diabetes
Goals: Understanding biological rhythms and their impact on health

⚖️ **Obesity, Diabetes & Endocrinology**
Focus: Metabolic regulation, energy balance, endocrine function
Technologies: Whole-animal physiological monitoring (telemetry, indirect calorimetry, feeding/drinking tech)
Disease Expertise: Diabetes, obesity, metabolic disorders
Goals: Deciphering mechanisms of metabolic disease and hormonal control

🧬 **Gastroenterology & Hepatology**
Focus: Gut and liver physiology, mechanisms of health and disease, diagnostic innovation
Technologies: Imaging, opto-/chemogenetics, systems neuroscience approaches
Disease Expertise: Liver disease, inflammatory bowel disease
Goals: Advancing diagnostics and treatments for digestive and hepatic conditions

🫀 **Organ Function, Disease & Regeneration**
Focus: Organ development, chronic disease mechanisms, regenerative medicine
Technologies: Multielectrode electrophysiology (in/ex vivo), advanced imaging, opto-/chemogenetics
Disease Expertise: Inflammatory arthritis, liver disease
Goals: Restoring organ function and understanding disease progression

Research Theme	Researchers
Biological Timing	Dr Bea Bano Otalora, Professor David Bechtold, Professor Timothy Brown, Professor Julie Gibbs, Dr Louise Hunter
Gastroenterology & Hepatology	Dr Elizabeth Mann, Professor John McLaughlin, Professor Shaheen Hamdy
Obesity, Diabetes & Endocrinology	Dr Jean-Michel Fustin, Professor Simon Luckman
Organ function, disease & regeneration	Dr Matthew Birket, Dr Rachel Jennings, Professor Karen Piper Hanley

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Medical Education

🔬 **Major Strengths**

- Health workforce research - pedagogical , behavioural science to optimise health workforce, internationalisation of health workforce, health partnerships and alliances for improving health workforce.

- History of science, technology and medicine research

Research priorities

- Antimicrobial resistance, health inequalities, health professional education and practise.

- Development and evaluation of interventions to improve the quality and quantity of health workforce.

- Development and delivery of bespoke teaching and novel teaching tools.

🌟 Leading Researchers

Research Theme	Lead Researchers
Behavioural Science & education and training of international health workforce	Professor Jo Hart & Professor Lucie Byrne- Davis
Health professional education, differential attainment and EDI	Professor Gabrielle Finn & Dr Aaron Drovandi
History of the NHS	Professor Stephanie Snow

Developmental Biology and Medicine

🧪 **Disease Modelling in Developmental Biology**

Focus: Using model organisms and cell systems to study developmental processes

Technologies: Fruit fly, zebrafish, and cell-based disease models, CRISPR-based precision, genome editing

Disease Expertise: Orphan/non-orphan developmental disorders

Goals: Recreate human pathologies in controlled systems to understand developmental mechanisms across species

🧬 **Advanced Genomic & Multiomic Techniques**

Focus: High-resolution mapping of gene expression and molecular interactions

Technologies: smiFISH (single molecule FISH), Spatial RNA sequencing, Functional multiomic profiling

Disease Expertise: Placental pathology in diverse maternal populations

Goals: Decode spatial and temporal gene regulation and Integrate multiomic data across developmental stages

🧠 **Computational & Dynamic Modelling**

Focus: Systems-level understanding of developmental biology

Technologies: Hypergraph modelling for biological networks, Oscillatory gene expression modelling

Disease Expertise: Cross-cutting relevance to developmental disorders

Goals : Simulate complex developmental rhythms and predict regulatory interactions and outcomes

🔬 High-Resolution Imaging & Visualization

Focus: Visualizing cellular and molecular processes in development

Technologies: Single-cell and single-molecule imaging, Multiplexed smiFISH across tissues

Disease Expertise: Developmental abnormalities and placental dysfunction

Goals: Capture dynamic transcriptional activity and map cellular architecture during development

🌟 Leading Researchers

Name	Research Area
Professor Alex Heazell	Clinical Placental Pathology
Dr Adam Stevens	Child growth & multiomic data modelling
Dr Paul Brownbill	Placental perfusion
Professor Nancy Papalopulu	Cell differentiation
Dr Cerys Manning	Oscillatory gene expression in development
Dr Veronica Biga	Oscillatory gene expression in development

Professor Richard Unwin - School Academic Business Engagement Lead)

Iqra Malik – Business Engagement Lead for Medical Sciences

Dr Matthew Krebs - Business Engagement Lead, Division of Cancer Sciences)

Dr Adam Stevens - Business Engagement Lead, Division of Developmental Biology & Medicine

Professor Julian Yates - Business Engagement Lead, Division of Dentistry

Professor Lucie Byrne-Davis - Business Engagement Lead, Division of Medical Education

Professor Xin Wang - Business Engagement Lead, Division of Cardiovascular Sciences

 Professor Timothy Brown - Business Engagement Lead, Division of Diabetes, Endocrinology & Gastroenterology