Histology and Microscopy Laboratories

The Histology Laboratory is equipped to process a wide range of specimens from paraffin-embedded sections to non-decalcified bone including specimens with orthopaedic implants and to perform a variety of histological and immunohistochemical analyses on bone, cartilage and tissue samples.
The Bio-imaging Facility contains a dedicated microscopy room equipped with a wide range of standard and fluorescent microscopes and an Image Analysis Studio with high power workstations equipped with state-of-the-art software for post-acquisition customized image analysis.

- Specimen cutting and grinding system (EXACT 310 & EXACT 400CS)
- Cryostat (Leica CM3050S)
- Microtome (Leica RM 2235)
- Paraffin Bath (Technicon 2C)
- Tissue embedding Centre (Tissue Tek II)
- Slide Staining Stations (Honeywell GLS 360)
- Stereo microscope (Nikon SMZ800)
- Fluorescence microscope (Eclipse 80i)
- Image Analysis Workstations

Biomedical Engineering Laboratory and Computer-Assisted-Surgery Suite

CHHM researchers pioneered novel techniques to investigate why joints become afflicted with osteoarthritis, advance our understanding of why and how bones break and to develop, design and test novel implants to replace fractured or diseased bones and joints. Fully equipped with state-of-the-art biomedical engineering and imaging equipment, this lab also contains a Surgical Solutions Suite to advance surgical techniques related to hip fracture, joint protection/restoration, and joint replacement surgery. The dedicated Machine Shop is used to build, customize and modify systems that simulate real life injury, the separate clean room is used for implant design and the Anatomy Prep lab with walk-in freezer is used to prepare and store of ex vivo samples or specimens.

- Customized Dual High Speed X-Ray
- Materials Testing Units (low force and high force)
- Optotrak
- Data Acquisition (DAQ)
- Hip and Knee Rigs
- C-Arm (Siemens ARCADIS Orbic 3D)
- Computer-Assisted Surgery Unit (Surgiqual)

www.hiphealth.ca
Contact Us for more information about the Centre for Hip Health and Mobility and the research resources at equipment@hiphealth.ca.

CENTRE for HIP Health and Mobility

UBC

Vancouver Coastal Health Research Institute
Healthier lives through discovery

Centre for Hip Health and Mobility

TECHNOLOGY AND RESEARCH RESOURCES

State-of-the-art facilities, equipment and cutting-edge technologies at the Centre for Hip Health and Mobility (CHHM) foster a research environment with a focus on innovation. Our research strengths include bone and joint imaging for the early detection of osteoporosis and osteoarthritis; interventions that enhance bone health, cognitive function and mobility and prevent falls and fracture; bone and joint biomechanics and biomaterials engineering; population health and epidemiology, health economics, innovations to reduce infection and the overall burden of orthopaedic surgeries and molecular and cellular physiology of bone, muscle and tendon.

Robert H.N. Ho Research Centre

The seven-storey, 69,350 sq ft facility on the Vancouver General Hospital campus is slated for completion mid-2011 and is named after one major donor, Robert H.N. Ho. CHHM research laboratories and offices will be housed on the upper four floors of the new building. In addition, CHHM will maintain 12,500 sq ft of space within the VCHRI Research Pavilion, located one block east of the new facility.

CENTRE for HIP Health and Mobility

Medical Imaging Suites

CHHM researchers are recognized leaders in the field of bone and joint imaging; the CHHM medical imaging suites have a unique combination of clinical bone imaging and advanced research instruments that together provide an enhanced understanding of bone from the micro- to the macro-structure level. Some of these systems are housed in only a few other facilities in the world.

- Dual-Energy x-ray Absorptiometry (Hologic QDR4500)
- Peripheral Quantitative Computed Tomography (Stratec XCT2000, XCT3000)
- High Resolution Peripheral Quantitative Computer Tomography (Scanco Medical AG XtremeCT)
- vivaCT High Speed Micro Computed Tomography System (Scanco Medical AG vivaCT 40-Scanco)
- MicroCT (Scanco MicroCT35)
- 3D Ultrasound (Ultrosounix RP)
- 3D Laser (Konica Minolta Vivid 9i)

Open MRI

CHHM houses one of two vertical open MRI systems in the world that are wholly dedicated to research. An important advance from traditional MRIs, the CHHM Open MRI system allows bones, joints and cartilage to be imaged during weight bearing – information that is critical to better understand joint function. Located within the Radiology Department at the Vancouver General Hospital, the MROpen (PARAmed) is part of the UBC MRI Research Centre.

Exercise Prescription Suite (EPS)

CHHM efforts to determine the substantial benefit of physical activity on cognitive function, mobility, balance, and bone health in seniors are internationally acclaimed. The EPS is a safe and structured exercise environment which enables researchers to pioneer evidence-based exercise prescription in clinical trials with high-risk populations (e.g. those who are post-hip fracture or have osteoporosis. The EPS is a fully functional gym environment with compliant flooring that reduces the risk of injury during exercise.

- Air-Pressure (Keiser) Exercise Equipment
- Free Weights & Exercise Tubing
- Treadmills
- Biodex (Biodex Medical Systems Multi-joint System Pro 850-000)
- Advanced video and sound systems
- GAITRite (CIR Ststems GAITRite Platinum 20′ Portable)

Mobile Research Laboratory

A first in Canada, the CHHM Mobile Research Laboratory is a fully functional stand-alone research facility that is linked through satellite technology to the main CHHM laboratories. The mobile unit houses clinical and advanced research bone imaging equipment, falls risk screening tools and other state-of-the-art equipment. It is designed to be used off-site within an urban environment or it can travel to remote and/or rural regions of the province. The Mobile Research Laboratory provides researchers the ability to assess diverse and/or remote populations that have previously been inaccessible and, as a result, unstudied.

- Dual-Energy x-ray Absorptiometry (Hologic QDR4500)
- Peripheral Quantitative Computerized Tomography (Stratec XCT3000)
- Physiological Profile Assessment (PPA)
- Force Plate (NOVOTEC Medical Lonardo Mechanograph GRFP)
- Wireless Electromyography Unit
- Morphometry
- Venipuncture
- Satellite Communication System

Population Health Laboratories

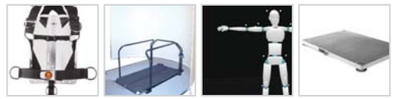
CHHM researchers are leaders in population-based studies that provide a better understanding of risk factors, effective prevention strategies and novel interventions for arthritis, fractures and falls. Overall CHHM researchers aim to better understand how the burden of disease, surgery and recovery affects the quality of life and emotional well-being of individuals and how this might be improved on a population level. Facilities include state of the art videoconferencing, focus group laboratories and high powered database analysis workstations and servers.

Bone Health and Falls Prevention

A major focus for CHHM researchers is the assessment of effective ways to develop and maintain healthy bones across the lifespan and to develop effective interventions to prevent or mitigate falls and fracture in later life. The laboratories facilitate clinically relevant intervention trials designed to modulate falls risk factors in vulnerable seniors and to develop and assess targeted exercise programs for children and youth.

Safe Movement Environment (SME)

The SME motion capture studio is unique worldwide in providing a protected setting for assessing the mobility patterns of volunteer research participants, using balance platforms, virtual reality, and motion capture, with the goal of better understanding why people fall, and the best ways to prevent or recover from a fall. This knowledge is being combined with field studies to allow researchers to improve the safety of environments where older adults live. THE SME workshop is also used to develop new materials and devices for injury prevention, such as compliant flooring and wearable hip protectors to prevent fractures due to falls, and wearable sensors and video systems to monitor imbalance and falls in daily life. The SME is a full motion capture studio equipped with state-of-the-art, custom-designed infrastructure.



- Recessed, Instrumented Treadmill
- Cutomized Perterbation Platform
- Force Platform
- Prototype Compliant Flooring and Gait Analysis track
- Virtual Reality
- 8-camera High Speed Motion Capture Cameras and Adjustable Overhead Grid
- Overhead Trolley and Fall Prevention Harness System

Cartilage Tendon Muscle Unit (CTMU)

CTMU researchers lead the way in novel investigations that advance our understanding of soft tissue mechanisms of injury, rehabilitation, and repair. The CTMU integrates bioengineering, cellular physiology, biochemistry and molecular biology equipment allowing researchers to evaluate the relationships between bone and the soft tissues of the joint - with a focus on cartilage and tendon - at the cell, gene and cellular protein levels.

- FlexCell (Mfr FlexCell 4000)
- Laser Doppler (LEA Medizintechnik O2C 1010)
- Animal Ultrasound (E-technolgies MHF-1)
- Li-Cor (LI-COR Biotechnology Odyssey infrared Imaging System)
- Small Animal Treadmill (Exer-6M Six Lane Treadmill)
- Tissue Culture Facility and fully Functional Biochemistry and Molecular Biology Laboratory
- Laser Capture Microdissection (Veritas)