

FACULTY OF DENTISTRY RESEARCH “SNAPSHOT” / PEOPLE, STRENGTHS & TARGETS

WEBSITE PROFILES OF EACH AT: <http://www.mcgill.ca/dentistry/research/our-researchers>

Pain and the Neurosciences

Research: Pain research at McGill is amongst the best in the world, based on a large critical mass of exceptional pain researchers, and on a tradition of outstanding accomplishments in the neurosciences. The legacy of Ron Melzack’s proposal of the gate-control theory of pain in 1965 continues with McGill pain studies appearing in the world’s most influential journals.

Prominent researchers in Dentistry: Gary Bennett, Fernando Cervero, Petra Schweinhardt, Laura Stone, Ana Velly and Ji Zhang.

Links: McGill and Alan Edwards Centre for Research on Pain, MUHC Alan Edwards Pain Management Unit, FRQ-S Réseau de recherché sur la douleur, Alan and Louise Edwards Foundation, pharmaceutical industry.

Knowledge translation targets (5-10 years): Our research will: (1) help in understanding the physiological basis of a number of unexplained chronic pain conditions, (2) provide new therapies for chronic and acute pain conditions, (3) provide novel animal models for pain conditions such as neuropathic pain, migraine, complex regional pain syndrome, functional abdominal pain, interstitial cystitis, back pain, fibromyalgia and vulvodynia, (4) help explain the influence of genetic, environmental and dietary factors in the development of chronic pain, and (5) understand the influence of psychological factors on pain.

Mineralized Tissues and Extracellular Matrix Biology

Research: Skeletal and dental biology research at McGill is world-class, with a long history of excellence dating originally from the work of Charles Leblond. A large group of researchers has been assembled that consolidates our strength in this area, covering practically every area of fundamental skeletal and dental biology, translational research and clinical trials. McGill is a world hub of skeletal research rivaled by no other.

Prominent researchers in Dentistry: Merv Gornitsky, Mari Kaartinen, Svetlana Komarova, Marc McKee, Monzur Murshed, Dieter Reinhardt, Rene St-Arnaud, Louis Touyz, Hojatollah Vali.

Links: McGill Centre for Bone and Periodontal Research, Canadian Multi-centre Osteoporosis Study (CaMOS; Headquarters McGill), McGill Facility for Electron Microscopy Research, McGill Institute for Advanced Materials, FRQ-S Réseau de recherche en santé buccodentaire et osseuse.

Knowledge translation targets (5-10 years): Our research will: (1) provide new therapies that enhance mineralization in soft bones and teeth, and limit ectopic, debilitating pathologic calcification, (2) provide new animal models to study connective tissue disorders, (3) provide tissue-engineered, synthetic, bioactive extracellular matrix grafts for implantation into connective tissues, and (4) provide protein/peptide-activated implantable devices for connective tissue and mineralized tissue healing and regeneration in collaboration with the biomaterials and tissue engineering group.

Biomaterials, Nanobiotechnology and Tissue Engineering

Research: An emerging area of excellence for Dentistry, with outstanding new recruits investigating nanometre-scale bone cements / biomaterials, synthetic tissue-engineered scaffoldings and controlled-release systems for bone reconstruction and salivary gland regeneration, and bioactivation of implants by surface nanostructuring and protein nanopatterning.

Prominent researchers in Dentistry: Jake Barralet, Marta Cerruti, Showan Nazhat, Maryam Tabrizian, Faleh Tamimi, and Simon Tran with significant collaborations from the Mineralized Tissues and Extracellular Matrix Biology investigators listed above.

Links: McGill Facility for Electron Microscopy Research, McGill Institute for Advanced Materials.

Knowledge translation targets (5-10 years): Our research has a focus on bone replacement and regeneration, salivary gland replacement, implant fixation and biosensors for patient diagnosis and treatment. More specifically, this research will (1) allow for early detection of biochemical changes associated with disease, and monitoring of wound healing, (2) provide new materials for repair of mineralized tissues following trauma or elective surgery, (3) develop new regenerative strategies for oral and skeletal hard and soft tissues, thereby accelerating or inducing healing with an aim of faster patient recovery and faster restoration of function, (4) create cell-based therapies for restoration of salivary gland function, and (5) create new strategies for integration of prostheses with bone allowing new and improved designs of oral implants to be developed with findings that may be translated to the cementless fixation of orthopaedic implants.

Clinical & Health Services Research

Research: This outstanding group of researchers uses a variety of qualitative, quantitative, observational and interventional research methodologies to investigate issues such as access to care, technology transfer, determinants of oral disease and interventions to improve oral and general health and quality of life. Particular fields of interest for members of the group include infant caries, oral cancer, edentulism and oral health and poverty.

Prominent researchers in Dentistry: Paul Allison, Christophe Bedos, Shahrokh Esfandiari, Jocelyne Feine, Eduardo Franco, Chantal Galarneau, Richard Hovey, Mary Ellen MacDonald, Belinda Nicolau, and Marie-Claude Rousseau.

Links: McGill consensus conference that set a new standard of dental care for the edentulism in the elderly, the FRQ-S Réseau de recherche en santé buccodentaire et osseuse.

Knowledge translation targets (5-10 years): By its nature, the research we do is translational. We are all working with health care professionals, patients, as well as individuals and groups in the community. The latter include government, representatives of under-privileged groups and professionals. We are developing and testing interventions to improve knowledge and technology by relevant professional and patient groups. Specific targets are: (1) to develop and test methods of promoting the implant-supported over-dentures as the standard of care for Canada, (2) to develop and test means to train dental students and dentists to improve care for under-privileged groups such as the poor and the elderly, (3) to develop and test a means to identify risk and prevent caries in pre-school children, and (4) to develop and test a means to improve quality of life and survival in oral cancer patients.