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**DEPARTMENT OF SURGERY GRADUATE PROGRAM SUPERVISORS****Adesida, Adetola**

Dr. Adesida, PhD was recruited in late 2009 as a basic scientist. He is an Associate Professor within the Department of Surgery, Divisions of Orthopaedic Surgery and Surgical Research. The goal of his research group is to develop autologous cell-based tissue engineering strategies to repair knee cartilage and meniscus defects. Adult-derived mesenchymal stem cells (MSCs) have the capacity to form a variety of mesenchymal tissues including bone, adipose, cartilage and meniscus fibrocartilage. In addition, MSCs secrete a myriad of bioactive molecules (i.e. trophic factors) that have the potency to promote cell proliferation and enhance the differentiated status of mature cells. Dr. Adesida's current focus is to investigate the interplay between MSCs from bone marrow or adipose sources and mature cartilage cells (chondrocytes) and meniscus cells for cartilage and meniscus tissue formation. The scientific questions addressed are related to (i) optimal stem cell source of factors promoting cell proliferation and differentiation, (ii) differentiation and anatomical privilege, (iii) identification of potent bioactive molecules for chondrogenic and fibrochondrogenic differentiation, (iv) effect of oxygen tension on profiles of bioactive agents in (iii) and (v) fabrication of bioactive molecules in (iii) into clinically applicable matrices for cartilage and meniscus formation. These projects are at the interface of basic and applied research fostering the expertise and collaborative efforts of chemists, biologist, clinicians, bio-engineers and material scientists. Collaboration exists with Dr. Jomha (Orthopaedic Surgeon), Dr. Korbitt (Scientist), Dr. Berry (Scientist), Dr. Uludag (Engineer) and Dr. Osswald (Prosthodontist) Contact Dr. Adesida: [adesida@ualberta.ca](mailto:adesida@ualberta.ca).

**Agrawal, Babita**

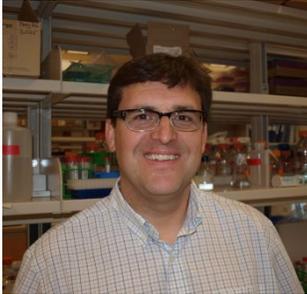
The general research interests of Dr. Agrawal's lab are in the area of T cell responses and their regulation in context of cancer and viral infections (Hepatitis C virus and Influenza virus, Human immunodeficiency virus). Dr. Agrawal is studying the components of T cell immune responses important in clearing specific viral infection, and the correlates associated with chronic disease progression, viral clearance and/or protection against disease progression using cell culture and laboratory models. The ultimate goal of these studies is to identify the role of cellular immune responses in protecting or combating acute or chronic infections, in order to design and study novel vaccine and immunotherapeutic strategies. Dr. Agrawal is developing an understanding of the exact role of MUC1 on T cell activation and the connection with tumors and/or tumor immunotherapy. In earlier studies, Dr. Agrawal has demonstrated that MUC1 mucin, largely considered to be an epithelial antigen and a marker for epithelial tumor cells, is also expressed by activated human T cells. However, the exact role and the mechanism of MUC1 mucin in T cell activation and regulation are not clear yet. Basic cellular & molecular immunology, and molecular biology approaches are utilized in these studies. Contact Dr. Agrawal: [bagrawal@ualberta.ca](mailto:bagrawal@ualberta.ca).

**Anderson, Colin**

In order to study how the immune system can learn to be tolerant of self antigens vs. immune to some ‘nonself’ antigens, such as in a donor transplant, Dr. Anderson’s lab uses transgenic and gene knockout T cells reactive to self or donor antigens. In this way they can track the fate of the donor specific T cells, both under conditions of immunity or tolerance. Dr. Anderson is using these models to study natural peripheral tolerance and to dissect out the factors that control indirect recognition of transplants and killing of ‘bystander’ cells in proximity to donor tissue. Using gene knockout cells they are studying the function of co-inhibitory receptors in: natural self tolerance, the control of homeostatic T cell activation, the control of innate immunity, and in transplant tolerance and immunity. In order to generate tolerance protocols for islet cell transplantation Dr. Anderson is developing new methods of establishing chimerism with donor bone marrow cells. These studies are carried out in collaboration with many other researchers at the University of Alberta, and members of other Faculties / Departments / Institutions in the USA, Europe and Japan. Dr. Anderson’s basic research has been supported by the Canadian Institutes of Health Research, AIHS/Alberta Heritage Foundation for Medical Research, Juvenile Diabetes Research Foundation, NIH. Contact Dr. Anderson: [colinand@ualberta.ca](mailto:colinand@ualberta.ca).

**Bédard, Eric**

Dr. Eric Bédard is a member of the Division of Thoracic Surgery with an adjunct appointment in the Division of Surgical Oncology at the University of Alberta. My current research focuses on the clinical application of a microRNA panel for screening, diagnosis and follow-up of patients with suspected or treated lung cancer. Our group is studying the panel in a prospective cohort study and validating it using an external lung cancer tumour bank. The next phase of the study will be the wider application of the microRNA panel in a broader patient population and, in collaboration with Dr. Jie Chen (engineering), the development of a rapid response test using nanotechnology based test. I am also interested in educational research with projects examining surgical resident attitudes to smoking cessation counselling and the development of a synoptic Thoracic Surgery specific operative competency evaluation to be used in the setting of training programs. Contact Dr. Bédard: [elbedard@gmail.com](mailto:elbedard@gmail.com).

**Berry, Fred**

Dr Berry holds the Shriners Hospital for Children Endowed Chair in Pediatric Scoliosis Research. His research focuses on the genetic networks that regulate the correct formation of the axial skeleton. He utilizes genetic and molecular biology techniques to identify how these structures form and how dysfunction in these pathways leads to skeletal malformations. Dr. Berry also investigates the regulatory networks that control osteoblast and chondrocyte differentiation from mesenchymal progenitors. Idiopathic Scoliosis (IS) - The heritable contribution to IS has been recognized for a number of decades, however little is known regarding the genetics of this vertebral malformation. Dr. Berry's research is aimed at identifying genetic variants associated with scoliosis that will ultimately aid in their understanding of the etiology of this disorder and lead better and more effective treatment regimens. Bone repair and remodeling - The pathways involved during the initial formation of bone during embryogenesis are utilized in bone remodeling and fracture repair throughout a lifetime. Dr. Berry's goals are to identify molecular pathways that regulate fracture repair mechanisms and to identify factors that influence the favorable outcome of bone repair. Dr. Berry aims to manipulate these pathways in an effort to improve fracture healing outcomes and to develop novel bone anabolic therapies. Contact Dr. Berry: [fberry@ualberta.ca](mailto:fberry@ualberta.ca).

**Bigam, David**

Dr. Bigam's major contributions to research are in the areas of neonatal physiology, abdominal organ transplantation and hepatopancreaticobiliary oncology. His work on neonatal physiology is related to resuscitation following hypoxia and reoxygenation. This work has led to 36 peer-reviewed papers over the last 13-years and a significant translational change in regards to the clinical delivery of care of the asphyxiated neonate. His papers have been quoted in the new resuscitation standards for neonates, particularly in regards to the use of 21% vs. 100% oxygen in resuscitation. His multiple studies in inotropic support of the asphyxiated newborn have also led to changes in clinical practice both at this institution and elsewhere. There have been 10 MSc and 1 PhD student(s) that have come through his lab as Surgeon-Scientists. Their work in neonatal asphyxia is continuing unabated with a major focus on moving to a translational model and moving the study results directly into clinical studies in neonatal intensive care units. This work has been externally funded and presented at national and international conferences.

Dr Bigam's next major area of contribution in research is in regards to abdominal organ transplantation. He has 6 articles published directly related to intestinal preservation for transplantation and numerous presentations at national and international meetings. This research has been externally funded and has a great potential in terms of translational research to human intestinal preservation. Also, he has been involved in islet transplant research for the past 11-years, during which he has co-authored multiple papers on the clinical aspects of islet transplantation. In addition he has published several papers in regards to liver and pancreatic transplantation; these papers have been presented at multiple national and international meetings. Collaborations exist with Dr. PoYin Cheung, Thomas Churchill, James Shapiro and others. Contact Dr. Bigam: [david.bigam@albertahealthservices.ca](mailto:david.bigam@albertahealthservices.ca).

### Birch, Daniel



Dr. Daniel W. Birch is the Medical Director of the [Centre for the Advancement of Minimally Invasive Surgery \(CAMIS\)](#), based at the Royal Alexandra Hospital and a Professor, Department of Surgery. He practices as a minimally invasive gastrointestinal surgeon at the Royal Alexandra Hospital. Dr. Birch completed his residency at McMaster University in 1998 and Fellowship training in minimally invasive surgery at the Minimal Access Training Unit in Guildford, Surrey (UK) and at the University of Kentucky in Lexington, Kentucky. He was recruited to Capital Health in July 2004 and as an Associate Professor in the Department of Surgery, to lead the development of a centre of excellence in minimally invasive surgery. He is the Past Chair of the Canadian Association of General Surgeons (CAGS) Committee on Laparoscopy and Endoscopy and Secretary and founding member of the Canadian Association of Bariatric Physicians & Surgeons (CABPS). He completes advanced minimally invasive procedures for a wide variety of gastrointestinal diseases, including GERD, Paresophageal hernia, Achalasia, Gastric tumors, Colorectal cancer and inflammatory bowel disease, Abdominal wall hernia, Surgery for morbid obesity (gastric bypass and adjustable gastric band). Dr. Birch's research has been presented at the Canadian Surgery Forum; SAGES annual meeting; North Pacific Surgical Association annual meeting; American Society for Metabolic & Bariatric Surgery. Contact Dr. Birch: [dbirch@ualberta.ca](mailto:dbirch@ualberta.ca).

### Churchill, Thomas



"Dr. Churchill, PhD is a basic scientist in the Department of Surgery and his research focuses on studying the metabolism of tissues and organs during exposure to hypothermia and ischemia/reperfusion (such as those conditions experienced during organ preservation). Over the past several years, Dr. Churchill has made significant strides in developing a novel strategy of luminal administration of a unique nutrient-rich preservation solution that is effective in preserving small bowel during cold storage and upon reperfusion. Many studies Dr. Churchill and others have conducted indicate that, in addition to addressing the fundamental principles of organ preservation established by studying other organs (liver, heart, pancreas), the small bowel has a unique set of metabolic properties that must be addressed in order to achieve successful preservation of mucosal architecture, metabolic status and function. The success of this research will bring the scientific and surgical community closer to making small bowel transplantation a more feasible surgical solution for those who will otherwise be at the mercy of long-term intravenous nutrition and its costly and potentially lethal complications. Contact Dr. Churchill: [tachurch@ualberta.ca](mailto:tachurch@ualberta.ca)."

### El-Hakim, Hamdy



Dr. El-Hakim is an associate professor in the Division of Otolaryngology, Head and Neck Surgery has three major areas of research interests. 1) *Sleep disordered breathing in children*; epidemiological studies directed mainly to characterize high risk groups with respect to peri-operative morbidity, findings on sleep nasopharyngoscopy, and response to management modalities.

2) *Laryngeal paralysis*; using laryngeal electromyography and prospective documentation. Dr. El-Hakim is aiming at better documentation of the natural history, pathogenesis with respect to neurophysiological features, and a staging system with potential for prognostication. He also uses botulinum toxin for neuromodulation and enhancing resolution.

3) *Impaired salivary control*. The main focus is on using a graded, consistent approach to this clinical problem and measuring changes in the quality of life of the neurologically challenged children and their care givers using standard tools. In addition to gauging the response to minimally invasive surgery, and botulinum toxin to enhance the control, we aim at documenting the wider clinical problem in mild cases and non-neurologically challenged children. Contact Dr. El-Hakim: [hamdy.elhakim@albertahealthservices.ca](mailto:hamdy.elhakim@albertahealthservices.ca).

### Gomaa, Nahla



Dr. Nahla Gomaa is an Associate Clinical Professor at the Division of Otolaryngology- Head and Neck Surgery. She is interested in educational research, and is an active member in many National and International societies and associations including international associations for medical education, Society of Teaching and Learning in Higher Education in which she actively contributes to the Scholarship of Teaching and Learning subgroups. She is also an experienced research peer reviewer and her

passion is directed to students-lead projects. She has mentored a number of multi-disciplinary students in these domains. In addition, she has collaborative work with Peter S. Allen Research Centre, Neuroscience Institute and Surgical Simulation Research Lab [SSRL] at the University of Alberta. She is on the jurisdiction boards for research and educational grants. On the clinical side, her main research interests funded by a number of grants are in the hearing and balance research. Clinical and basic science research in these areas include:

- Auditory Evoked Potentials.
- fMRI role in central auditory defects.
- Tinnitus diagnosis and intervention
- Vertigo Diagnosis and treatment.
- Knowledge translation in hearing and balance research and research of the inner ear.
- Qualitative studies
- Quality Improvement in clinical as well as educational settings

To contact Dr. Nahla Gomaa, e-mail her at [ngomaa@ualberta.ca](mailto:ngomaa@ualberta.ca)

### **Jomha, Nadr**

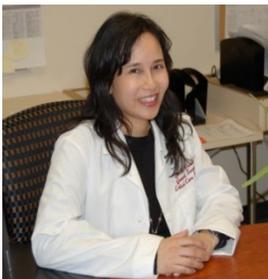


Dr. Jomha, FRCSC, PhD is an orthopedic surgeon in the Department of Surgery and has a strong interest in research targeting the repair, regeneration and transplantation of articular cartilage (AC). Our cryopreservation group is the first group to successfully cryopreserve intact human articular cartilage (AC) on its native bone base using the process of vitrification as published in *Biomaterials* in 2012. Briefly, this technique entails immersing the tissue in 4 different cryoprotective agents (CPAs) at progressively lower temperatures until a total concentration of CPAs sufficient to vitrify (approximately 6.5M) is obtained. The tissue is immersed into liquid nitrogen where it is stored. Once warmed, it was determined that approximately 75% of the cells survived the process and this was

confirmed using a metabolic assay as well as cell pellet cultures. Our objective now is to optimize the protocol to decrease total protocol time and increase cell recovery. We will accomplish this by using mathematical models and various experiments. Furthermore, we will extend the knowledge that we have gained to vitrifying the meniscus. Eventually this will lead to the development of a tissue bank for AC and meniscus for transplantation.

Our three main researchers include a lower extremity reconstructive Orthopaedic surgeon with a PhD in the cryopreservation of AC (NM Jomha), a world leader in cryobiology (LE McGann) and a world leader in thermodynamics (JAW Elliott). This multidisciplinary group has successfully mentored many graduate students that now have leading positions in various fields. We have an excellent publication and presentation record in the area of cryobiology. We are looking for a PhD student with a strong interest and background and some experience with cryobiology. A biology background will also be beneficial. This program will consist of the optimization of the current vitrification protocol and extension of this information to meniscus. Contact Dr. Jomha: [njomha@ualberta.ca](mailto:njomha@ualberta.ca).

### **Khadaroo, Rachel**



Dr. Khadaroo is a surgeon, critical care medicine specialized, and scientist at the University of Alberta Hospital and an assistant professor in the Division of General Surgery. Her clinical interests are in Acute Care Surgery and critical illness. Her PhD was obtained in the Surgical Scientist Program at the University of Toronto with her thesis in oxidant-induced lung injury following trauma. Dr. Khadaroo's research interests are Intestinal Ischemia/Reperfusion injury, Sepsis, Multiple organ dysfunction. Dr. Khadaroo has developed clinically relevant laboratory models. Specifically, the lab is working on:

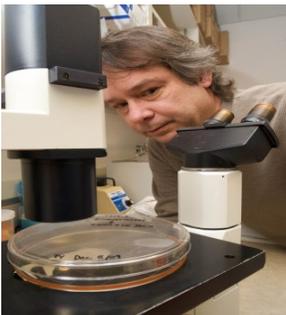
1. Understanding the cellular and molecular mechanisms whereby intestinal ischemia/reperfusion injury causes distant organ injury leading to patient morbidity and mortality.
2. Discovering unique biomarkers to better diagnose intestinal injury.
3. Examining how these biomarkers act through intracellular signaling leading to an augmented inflammatory response.
4. Validating these biomarkers in a clinical setting and examining the role of acute intestinal ischemia/reperfusion plays in resultant multiple organ dysfunction, acute lung injury, and sepsis.

Contact Dr. Khadaroo: [khadaroo@ualberta.ca](mailto:khadaroo@ualberta.ca).

**Kneteman, Norman**

Dr. Norman Kneteman trained in surgery at the University of Alberta and did his Fellowship in multi-organ transplantation at Washington University School of Medicine in St. Louis, Missouri. He is currently Professor of Surgery at the University of Alberta, Director of the Division of Transplantation and Zone Clinical Section Chief of Transplants at the University of Alberta Hospital and for Alberta Health Services. He heads the Alberta Liver Transplant Program and performed the first liver transplant at the University of Alberta Hospital in 1989. While continuing his practice in hepatobiliary/pancreatic surgery and liver transplantation, his current research interests include the role of liver transplantation in the treatment of hepatocellular carcinoma and development and evaluation of therapy for hepatitis C and B in his chimeric mouse model.

More specifically, Dr. Kneteman's current research activities include basic and translational work centered around his lab's model of an immunodeficient transgenic mouse with a humanized liver (the uPA/SCID chimeric mouse), and on clinical research studies in the field of liver transplantation. His clinical research studies in the field of liver transplantation are mainly in the form of outcomes research that helps craft the next generation of clinical care. Dr. Kneteman's team has led the field in the development of the antirejection drug, rapamycin, for immunosuppression in liver transplant patients with hepatocellular carcinoma. Dr. Kneteman is also leading efforts to develop improved criteria for selecting appropriate patients with hepatocellular carcinoma for liver transplantation. This criteria looks at both the amount of cancer in the patient's liver (morphological criteria) as well as the level of a chemical marker called alpha-fetoprotein (biomarker criteria) that predicts how aggressive the tumor will act. This later work has the potential to allow a greater number of people to receive liver transplantation for unresectable hepatocellular carcinoma with a parallel reduction in the rate of recurrent cancer after transplant. New work focuses on development and application of novel machine learning systems that allow accurate prediction of survival curves for individual patients potentially undergoing transplantation or other high impact therapies. Contact Dr. Kneteman: [kneteman@ualberta.ca](mailto:kneteman@ualberta.ca).

**Korbitt, Gregory**

Dr. Korbitt's recent work on co-transplantation of islets with Sertoli cells is very exciting. Using this novel approach, he has been able to protect laboratory model islets from immune attack long term without any antirejection drug therapy. This work could very well allow the transplantation to diabetic patients using an unlimited source of tissue with no anti-rejection drug therapy. Contact Dr. Korbitt: [korbitt@ualberta.ca](mailto:korbitt@ualberta.ca).

### **McMullen, Todd**



Dr. McMullen is a clinician-scientist in the Dept of Surgery with a major research interest. Dr. McMullen's research focuses on developing diagnostic biomarkers and establishing therapeutic targets for metastatic papillary thyroid cancer. Cancer of the thyroid is the most common endocrine malignancy and papillary thyroid cancer (PTC) comprises >90% of all cases. Biomarkers for PTC are needed to aid clinicians in diagnosis and blockade of ERK and STAT3 pathways may be useful therapeutic targets for metastatic PTC. Dr. McMullen has undertaken tissue microarrays (TMA) in large patient cohorts comprised of benign thyroid tumors and variants of PTC with and without lymphatic metastases. He is outlining the role of the ERK and STAT pathways in local and metastatic forms of PTC and how genes controlling cell proliferation, apoptosis, invasion and angiogenesis are subverted in PTC. Biomarkers that demonstrate a potential to distinguish local and metastatic forms of PTC from benign or low risk tumors will be tested for immunostaining in cytologic specimens as a means to developing a clinically useful test. Possible long-term innovations include development of ERK/STAT3 inhibitors for metastatic PTC and other cancers. Contact Dr. McMullen: [todd.mcmullen@ualberta.ca](mailto:todd.mcmullen@ualberta.ca).

### **Metcalfe, Peter**



Dr. Metcalfe's current laboratory research involves the development of a laboratory model of partial bladder outlet obstruction. His ability to replicate the clinical scenarios of BPH, spina bifida, and posterior urethral valves has allowed him to characterize new molecular pathways that lead to the development of an "end-stage" bladder. Dr. Metcalfe has demonstrated the up-regulation of TGF-B, CTGF, and HIF-1 after prolonged exposure to increased intra-vesical pressures.

The next phase of these experiments involves the use of novel medications, targeting these pathways, and assessing their effect with urodynamics, histology, RT-PCR, and immunofluorescence. Dr. Metcalfe will also be attempting to characterize the role of fibrocytes with bladder fibrosis.

Dr. Metcalfe's future plans include the testing of bio-engineered bladder substitutes in their laboratory model. He feels this is an important model, as the fibrotic, end-stage bladder provides a much more challenging environment for the placement of an avascular graft. Contact Dr. Metcalfe: [pmetcalf@ualberta.ca](mailto:pmetcalf@ualberta.ca).

### Meyer, Steven



Dr. Meyer is focused on clinical outcomes in cardiac surgery. The majority of this research is done using the APPROACH database through case series and retrospective cohort studies. Recent areas of focus have included indications for surgical revascularization, outcomes in octogenarians, and perioperative complications. As the surgical lead in the regional transcatheter aortic valve replacement (TAVI) program, research has also focussed on outcomes in this clinical niche. Dr Meyer also has a major interest in randomized controlled clinical trials and is the site Principal Investigator for a number of multi centre international trials (both investigator-initiated and industry-sponsored). More recently he has become involved with surgical innovation and participating in early feasibility

studies. Contact Dr. Meyer: [srmeyer@ualberta.ca](mailto:srmeyer@ualberta.ca).

### Moore, Ronald



Dr. Moore's research focuses on novel modalities/therapeutics for treating urinary tract cancers (bladder, kidney and prostate). This research has included laser surgery (including PDT), development of lasers and light delivery/detection equipment, drug development, drug testing, drug delivery, biochemical and biological modifiers, molecular markers, predictive assays, gene therapy and clinical trials. These projects have required the development of in-vitro and in-vivo models that mimic the clinical entity being targeted. He has a multidisciplinary team consisting of biologists, chemists, physicists, engineers and physicians, with national and international collaborators to translate preclinical investigations into clinical application. Dr. Moore's state of the art

chemistry and tissue culture, and laser (optics) laboratories are funded by peer reviewed grants, commercial contracts, and directed donations. Currently Dr. Moore is investigating: the selective intra-arterial delivery of a Hypocrellin derivative (SL052), a second generation photosensitizers for the treatment of prostate cancer in a phase I-II clinical trial. He has a clinical trial using <sup>124</sup>Iodo-azomycin arabinoside (IAZA) to monitor clinical response of tyrosine kinase inhibition (TKIs) in kidney cancer. A clinical trial for intravesical reovirus for non-muscle invasive urothelial cancer of the bladder is being planned. In the laboratory Dr. Moore is currently studying Tumor necrosis factor Related Apoptosis Inducing Ligand (TRAIL) and antisense Bcl-2 and TKIs for treating urothelial cancer; and renal cell carcinoma (RCC). Contact Dr. Moore: [Ronald.moore@ualberta.ca](mailto:Ronald.moore@ualberta.ca)

### Nagendran, Jayan



Dr Nagendran's research focus is the study of chronic rejection in cardiac and thoracic allografts. Cardiac allograft vasculopathy (CAV) and Obliterative Bronchiolitis (OB) are the primary cause of death after the first year post heart and lung transplantation, respectively. Though these processes are thought to be the clinical outcomes of chronic rejection, increased immunosuppression is associated with other morbidity including increased lethal infection/sepsis and risk of malignancy. In both CAV and OB, there is concentric hypertrophy and obliteration of the lumen in the coronary arteries and distal airways, respectively. Interestingly, there are other disease processes with similar concentric intimal hyperplasia, as seen in pulmonary arterial hypertension (PAH) in the pulmonary vasculature. In PAH, disease can be regressed by targeting a pathologic metabolic phenotype, which is characterized by increased glycolysis and decreased glucose oxidation. The dysfunctional metabolism can be rescued with metabolic modulators (dichloroacetate and trimetazidine) and lead to apoptosis of the intimal hyperplasia and regression of PAH. Dr. Nagendran seeks to characterize the metabolic phenotype of CAV and OB and determine if dysfunctional metabolism exists and can be therapeutically targeted. He will use in-vitro cell culture and in-vivo laboratory models of CAV and OB. This work hopes to bring a new axis of therapeutic targets that involve mitochondrial function and improved bioenergetics to combat chronic rejection. Contact Dr Nagendran: [jayan@ualberta.ca](mailto:jayan@ualberta.ca).

### Nagendran, Jeevan



Dr. Jeevan Nagendran was born and raised in Edmonton. Upon attaining an undergraduate degree in Chemical Engineering followed by a Doctor of Medicine at the University of Alberta, Dr. Jeevan Nagendran completed his postgraduate cardiac surgery residency training at the Mazankowski Alberta Heart Institute. During his time as a resident in cardiac surgery, he also completed a PhD in Experimental Medicine through the Royal College of Physicians & Surgeons of Canada via the Clinical Investigator Program. Following residency training, Dr. Jeevan Nagendran completed fellowship training at Western University. His fellowship experience at Western was focused on minimally invasive cardiac surgery and aortic surgery. This included endoscopic/robotic techniques, transcatheter valve implantation and open surgery for thoracic aortic pathology. Currently, he is the surgical director of the minimally invasive and transcatheter valve surgery program for the division of Cardiac surgery at the University of Alberta and his research lab focus is on valvular heart disease.

### **Pepper, Andrew**



Dr. Andrew Pepper completed his PhD at the University of Western Ontario where he became interested in clinical islet transplantation and beta-cell biology. Post-doctoral research in Dr. James Shapiro's Laboratory at the University of Alberta forged his passion for translational therapies for the treatment of type 1 diabetes (T1D).

Dr. Pepper is an Assistant Professor in the Department of Surgery at the University of Alberta. His group is interested in understanding the underlying mechanisms that govern pancreatic beta-cell survival and function in the context of islet transplantation and T1D onset. Elucidating the relevant cell death pathways, which contribute to islet graft dysfunction, has the potential to promote long-term beta-cell transplant survival and aid in our understanding of the causation of T1D. Furthermore, his laboratory develops and examines efficacy novel extrahepatic transplant sites and localized immunosuppression delivery to improve islets engraftment. His laboratory is optimistic that cellular replacement therapies will become the mainstay treatment for a broader spectrum of T1D patients through developing innovative 'islet-friendly' transplant modalities. Contact Dr. Pepper: [apecpper@ualberta.ca](mailto:apecpper@ualberta.ca)

### **Rayat, Gina**



Islet transplantation is an attractive alternative treatment for type 1 diabetes because it requires minimal invasive surgical procedures and has been shown to successfully manage type 1 Diabetes. Currently, islet transplantation is a treatment alternative for a very select patient population, and is not available for children with type 1 diabetes partly due to the requirement for continuous use of harmful immunosuppressive drugs to prevent rejection of the islet grafts. The shortage of human donor pancreatic tissue is further compounded by the requirement of typically more than two donor pancreases to completely free patients from exogenous insulin injection. Islets from laboratory models are an attractive alternative source of islets for transplantation because large numbers of islets can be easily isolated. To make xenotransplantation a clinical reality

one of the principal challenges that must be met is overcoming the rejection barrier using clinically applicable anti-rejection regimens and ultimately, tolerance induction strategies to minimize the continuous use of harmful immunosuppressive drugs. Dr. Rayat has previously shown that short-term administrations of a combination of biologic agents in the form of monoclonal antibodies (mAbs) are highly effective in preventing the rejection of xenogeneic islets. This combined mAb therapy can induce dominant species and tissue-specific tolerance to xenografts that is mediated by T regulatory cells. These studies demonstrate a proof of concept that tolerance to xenografts could be achieved without continuous use of conventional immunosuppressive drugs. Dr. Rayat's studies will provide clinically useful method of preventing rejection of islet xenografts without chronic use of immunosuppressive drugs. Contact Dr. Rayat: [grayat@ualberta.ca](mailto:grayat@ualberta.ca).

**Seikaly, Hadi**

Dr. Hadi Seikaly is a professor of the departments of Surgery and Oncology at the University of Alberta in Edmonton. He is the Director of the division of Otolaryngology – Head and Neck Surgery and the Edmonton Zone Clinical Section Head for Alberta Health Services. Dr. Seikaly is the Co-editor of the Journal of Otolaryngology Head and Neck Surgery.

Dr. Seikaly graduated from the University of Toronto medical school and completed his residency training at the University of Alberta in Otolaryngology Head and Neck Surgery. He then obtained fellowship training at the University of Texas Medical Branch in advanced head and neck oncology, and microvascular reconstruction. Dr. Seikaly returned to the University of Alberta as an attending in the division of Otolaryngology Head and Neck Surgery, department of surgery in 1996.

Dr. Seikaly has a large practice dedicated to head, neck, and skull base oncology and reconstruction. His research interests include functional surgical and reconstructive outcomes, microvascular head and neck reconstruction, submandibular gland transfer medical modeling and digital surgical planning as it applies to the head and neck region. Dr. Seikaly is the Director of Head and Neck Surgery Functional Assessment Laboratory (HNSFAL) at the Institute of Reconstructive Sciences in Medicine and is the director of the Head and neck Research Network. He has been a PI or collaborator on numerous research grants receiving funding from various agencies, including CIHR, Terry Fox Foundation and Alberta Cancer Foundation. He has published over 160 peer reviewed papers and book chapters.

Dr. Seikaly is the recipient of the many prestigious awards including the Edmonton Zone Medical Staff Association researcher of the year, the Canadian Society of Otolaryngology Head and Neck Surgery award for national educational excellence and the Mentor of the year. He is a member of numerous surgical societies, nationally/internationally and has been invited as a visiting professor to over 50 institutions lecturing on all aspects of Head and Neck Oncology and reconstruction. Contact Dr. Seikaly: [hadi.seikaly@albertahealthservices.ca](mailto:hadi.seikaly@albertahealthservices.ca).

### Shapiro, James



James Shapiro holds the Canada Research Chair in Transplantation Surgery and Regenerative Medicine at the University of Alberta, and is Director of the Clinical Islet Transplant Program. He is Professor of Surgery, Medicine and Surgical Oncology. He led the team that developed and tested the “Edmonton Protocol” and was the lead author on their seminal NEJM paper in 2000. This protocol revolutionized the treatment for Type 1 Diabetes, as for the first time a series of patients were able to completely stop their life-sustaining insulin injections. He is currently leading a National Canadian project in *ex vivo* organ transplant repair (CNTRP), and has active clinical trials in Edmonton testing out caspase inhibitors and new subcutaneous devices for islet transplantation.

Dr. Shapiro has a prolific basic science laboratory at the Alberta Diabetes Institute that is currently investigating techniques to improve islet survival by switching off apoptosis pathways, a series of approaches designed to induce immunological tolerance, is investigating new sites for islet implantation. He is running clinical trials in *ex vivo* normothermic perfusion of human livers for transplantation, in efforts to expand the limited organ donor pool and improve organ quality. He is running a first-in-human clinical trial of human embryonic stem cell derived insulin producing beta cells transplanted beneath the skin of patients with type 1 diabetes. The cells are transplanted within an immunisolating membrane device that avoids the need for lifelong immunosuppression. Dr. Shapiro is an active clinical transplant and hepatobiliary surgeon. Contact Dr. Shapiro through his assistant at: [cherry@islet.ca](mailto:cherry@islet.ca)

### Tredget, Ted



The Plastic Surgery Wound Healing Research Group is involved in basic science and clinical research that focuses on hypertrophic scarring. Hypertrophic scarring is the raised, red and sensitive scars that develop following deep injury to the skin. As many burn patients suffer burns to a large body surface area, the subsequent scarring often affects mobility and movement, especially over joints and fingers, as well as being cosmetically deforming. The quality of their clinical and research activity has been well described in several published manuscripts, both scientific and clinical, from a number of internationally recognized journals.

The next phase of research and development within the Plastic Surgery Wound Healing Research Group will focus on the development of a skin substitute that can be readily available to the increased number of massive burn injuries that are being admitted and treated at the Firefighters’ Burn Treatment Unit. This incentive will address the frequent problem that results when the successful resuscitation and critical care management of major burn patients is complicated by an inability to close wounds because of insufficient uninjured skin to serve as skin graft donor sites. Although there are skin substitutes available, no uniformly successful, one-stage approach that allows immediate wound closure exists. Contact Dr. Tredget: [etredget@ualberta.ca](mailto:etredget@ualberta.ca).

**White, Jonathan**

MB BCh BAO BMedSci(Hons) MSc(Med Ed) PhD FRCS(Gen Surg) FACS FRCSC

Dr Jonathan White is a Professor of Surgery. He holds a PhD in Surgery from the Queen's University of Belfast and a Masters Degree in Medical Education from the University of Calgary. He is the University of Alberta's first Tom Williams Endowed Chair in Surgical Education and is the first surgeon ever selected as a 3M National Teaching Fellow. He teaches in a variety of settings in medical school and residency and has won national, university, faculty and departmental awards for innovation and leadership in education. He is the co-creator of the 'Surgery 101' podcast series which has been downloaded more than 3.5 million times in over 200 countries worldwide. He was selected as the John Provan Canadian

Outstanding Surgical Educator for 2010/11 and held the University of Alberta's McCalla Professorship for Research in Teaching. He is also the recipient of the University of Alberta's Rutherford Award for Excellence in Teaching. He has published over 40 peer-reviewed papers and 120 peer-reviewed podcasts, and has given over 200 presentations at national and international meetings.

In 2017, Dr White founded the Department's new MSc in Surgical Education. He is an active clinical surgeon and supervisor, and is interested in a number of research areas in surgical education, including the development of professional expertise and identity in surgeons, and innovation, mentoring and leadership. He holds positions in both the Faculty of Medicine & Dentistry (Department of Surgery) and the Faculty of Education (Department of Educational Psychology) and he collaborates widely within these two Faculties and beyond. He is available to supervise students pursuing Masters Degrees and PhDs in surgical education.

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## Zheng, Bin



Differing to most medical researches focusing on patients and their health problems, Dr. Bin Zheng put surgeon under the spotlight. Explicitly, Bin is a Human Factors scientist with a special interest in understanding surgeon's performance in the operating room. By identifying and removing harmful factors that cause stresses of surgeons and implement safe measures and training program, Dr. Zheng aims to improve the skills and work efficiency of surgeons in their work places. Since more and more advanced technologies are introduced to the operating theatre, surgeons face new challenges in maintaining their confidence under image-guided and remote-controlled environment. Equipped with eye-tracking and 3D motion tracking system, Dr. Zheng studies the eye-hand coordination, spatial orientation, and the skills acquisition process of surgeons in image-guided surgeries, including laparoscopic, endoscopic and robotic surgery. Dr. Zheng's researches aim to

shorten the learning curve of surgeons and strengthen their competence in performing image-guided surgeries using simulation. Currently, Dr. Zheng is the *Endowed Research Chair in Surgical Simulation* in the Department of Surgery of the University of Alberta. He collaborates with surgeons, educators, computing scientists and psychologists to develop simulation and simulation-based programs for surgical training. The long-term goal is to promote the use of simulation in surgery for improving care quality and patient safety. Contact: Dr. Bin Zheng: [bin.zheng@ualberta.ca](mailto:bin.zheng@ualberta.ca)

### Key Research Area:

Surgical simulation: design, assessment, and application

Image-guided surgery: technology, training, and patient safety

Human Factors in Surgery: eye-hand coordination, team collaboration, workload assessment, motor control and skills acquisition.