TRAINEE SECTION

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The 2nd Annual Clinical Scientist Trainee Symposium, August 22, 2017, London, Canada

Introduction

Clinician scientists play a critical role in bridging research and clinical practice. Unfortunately, the neglect of research training in medical schools has created clinicians who are unable to translate evidence from literature to practice. Furthermore, the erosion of research training in medical education has resulted in clinicians who lack the skills required for successful scientific investigation. To counteract this, the Schulich School of Medicine & Dentistry has made an effort to engage trainees, at all levels, in the research process.

The 2nd Annual Clinician Scientist Trainee Symposium was held in London, Ontario, Canada on August 22, 2017. Organized each year since 2016 by the Schulich Research Office, the symposium features research being conducted by trainees in Schulich's Clinical Research Training Program. The focus this year was on the current state of clinician scientist training in Canada and visions for the path ahead.

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Clinician scientists play a critical role in bridging research and clinical practice. Unfortunately, the neglect of research training in medical schools has created clinicians who are unable to translate evidence from literature to practice [1]. Furthermore, the erosion of research training in medical education has resulted in clinicians who lack the skills required for successful scientific investigation [2]. To counteract this, the Schulich School of Medicine & Dentistry has made an effort to engage trainees, at all levels, in the research process.

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Symposium proceedings

Opening address

Attendees were welcomed by Dr. Jim Lewis, MD, Director of Clinical Research Training. The opening address was delivered by Dr. David Hill, DPhil, Scientific Director of Lawson Health Research Institute and Integrated Vice President, Research for London Health Sciences Centre and St. Joseph's Health Care London. Dr. Hill spoke about the importance of the work by of clinician scientists. A "State of the Program" address was made by Charles Yin (MD/PhD Program; Microbiology and Immunology), who presented data on clinician scientist training in Canada and discussed challenges to this training.

Clinician Investigator Program presentations

Jonathan Lau (Neurosurgery) studied distortion in ultra-high field MRI in image-guided stereotactic surgery. Lau has identified regions of geometric distortion in ultra-high field MRI images, and concluded that traditional surgical targets are minimally affected by distortion. Asher Mendelson (Critical Care) used intravital microscopy techniques and animal models of critical illness to investigate the microcirculation of skeletal muscle. He has designed a novel biomedical optical system that can monitor the microcirculation in human patients in the ICU. Jason Lee (Clinical Pharmacology and Toxicology) studied the effects of knocking out the SIRT6 gene—a member of the sirtuin family of histone deacetylases—in mice, which induces induced accelerated aging and increased mortality associated with early cardiovascular disease.

MD/PhD presentations

Alex Levit (Anatomy and Cell Biology) is looking at behavioral and neuroanatomical changes in a transgenic rat model of Alzheimer disease. Levit has characterized the cognitive and neurobiological changes in these rats with age and hypertension, and found that the transgenic rats experienced a greater degree of cognitive impairment and white matter inflammation with age. Adrienne Elbert (Biochemistry and Pediatrics) is studying the impact of chromatin factors on neurodevelopment in schizophrenia and autism. Elbert has found that haplo-insufficiency of the transcriptional repressor CTCF in mice resulted in decreased sociability, delays in learning, and spontaneous hyperactivity.

Aaron Johnson (Microbiology and Immunology) is investigating novel means of targeting HIV-1 in the treatment of AIDS. Johnson has shown that the HIV pathogenic factor, Nef, is was able to interact with the host restriction factor SERINC5 and target it for degradation or exocytosis. Ian Lobb (Microbiology and Immunology) is studying ischemia-reperfusion injury during kidney transplantation. Lobb has shown that the addition of a hydrogen sulfide donor, which is targeted to the mitochondria, in the preservation solution significantly improved graft function and recipient survival in a rat model of syngeneic renal transplantation.

Theo Wigle (Clinical Pharmacology and Toxicology) is applying precision medicine to the treatment of colorectal cancer. Using mass spectrometry, Wigle is developing novel protocols for monitoring 5-fluorouracil levels in blood to ensure that patients are receiving proper therapeutic doses of this drug. Kara Ruicci (Pathology and Laboratory Medicine) is studying the development of drug resistance in head and neck cancers. Ruicci uses cutting-edge sequencing technology to study the evolution of resistance in these cancers at the genomic level and to identify mechanisms of resistance. Cory Lefebvre (Anatomy and Cell Biology) is studying triple negative breast cancer, which currently has no currently targetable receptors for therapy. Lefebvre is using a kinomics-based approach to study the effects of tyrosine kinase inhibitors on triple negative breast cancer to better understand mechanisms of drug inhibition. Nick Tonial (Physiology and Pharmacology) is exploring the impact of chronic kidney disease on the effects of tetrahydrocannabinol. With a the predicted rise in cannabis use, it will be increasingly important to understand whether kidney disease will leads to altered drug clearance.

Dental Clinician-Scientist program

Trainees enrolled in the Dental Clinician-Scientist (DCS) program complete a PhD degree in a field relevant to oral health followed by a Doctor of Dental Surgery (DDS) degree. Kim Beaucage (Physiology and Pharmacology) studied the role of equilibrative nucleoside transporter 1 (ENT1) in the mineralization of orofacial tissues. Mice lacking ENT1 develop a phenotype resembling diffuse idiopathic skeletal hyperostosis, which is found in humans. Kim identified ectopic mineralization lesions developing in the mandibular symphysis of mice lacking ENT1.

Keynote address

This year's keynote address was delivered by Dr. Andrew I. Schafer, MD, Professor of Medicine, Weill Cornell Medical College. The talk, entitled "Is the Physician-Scientist Vanishing?", presented data from the U.S. National Institutes of Health on a rise in the length of training; showing that the average age at which a clinician scientist obtained their first R01 grant increased from 37 years in 1985 to 44 years in 2011 [3]. Dr. Schafer also discussed the mounting pressures in training, especially a lack of flexibility in training, and poor support for early career faculty. He concluded that there is a need for change in the way that clinician scientists are being trained to decrease the length of training, increase the flexibility in training, and provide a more individualized approach.

Summary

The 2nd Annual Clinician Scientist Trainee Symposium showcased the high-quality research being conducted by clinician scientist trainees at the Schulich School of Medicine & Dentistry, and presented a forum for trainees and faculty to discuss the challenges facing trainees. Institutions should encourage the development of clinician scientists and we believe that clinician scientist trainee forums should be supported in medical schools across Canada.

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