



CONFERENCE PROGRAM AND ABSTRACTS

NORTHERN HEALTH RESEARCH CONFERENCE

2009



MAY 29 - 30



Northern Ontario
School of Medicine

Lakehead
UNIVERSITY

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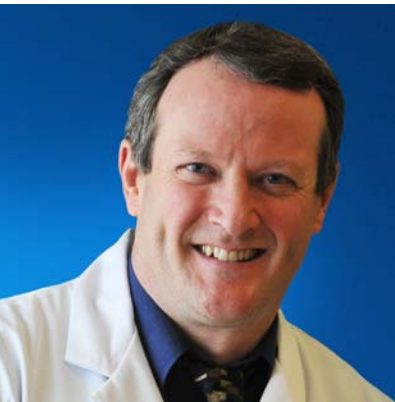
*For information on the Northern Ontario
School of Medicine's Research programs,
please contact us at research@normed.ca
or through NOSM's website at
www.nosm.ca*

Welcome.

Message from the Northern Ontario School of Medicine



Dr. Roger Strasser
NOSM Dean



Dr. Greg Ross
NOSM Associate Dean, Research

On behalf of the Northern Ontario School of Medicine (NOSM), we welcome you to the 2009 Northern Health Research Conference (NHRC). In this year of historic milestone achievements at NOSM – just this month we will celebrate our first graduation of medical school undergraduates and the completion of our first group of family medicine residents from the Family Medicine Residents of the Canadian Shield (FM RoCS) program – we are pleased to be hosting the fourth annual NHRC at Lakehead University, home of the School's West Campus. We extend to the University and the City of Thunder Bay our sincerest thanks for their hospitality and continued support.

Research at NOSM is reflective of the School's mandate to be socially accountable to the diverse cultures of Northern Ontario. Tackling questions that will help improve the health of people in Northern Ontario is a key mandate for the research program at NOSM, and this conference is one of many initiatives that allow the School to facilitate this objective.

We are pleased to welcome to the conference our Keynote Speaker, Dr. Kue Young, Professor and TransCanada Pipelines Chair in Aboriginal Health at the Dalla Lana School of Public Health,

University of Toronto. Dr. Young has spent much of his career in northern Canada, and in developing countries, working in primary health care, public health administration, and research. He has published five books on Aboriginal and circumpolar health, and brings with him a wealth of experience with Aboriginal health.

It's an honour to have a distinguished Keynote Speaker who is extremely knowledgeable in Aboriginal health. When the medical school started in 2005, a study entitled *Creating Sustainable Health Research Industry in Northern Ontario* was published to provide a framework and direction for the research programs. Many of the recommendations from that report served as the basis for further initiatives in Aboriginal programs at NOSM. As a follow-up to one of those recommendations, the School is currently recruiting a chair in Aboriginal and Rural Health for the purpose of conducting research into accessibility issues and the implications around Northern health care.

In addition to this latest initiative, the medical school hosted a forum last November in Thunder Bay. The *Partnership Opportunities in Research Gathering* brought together Aboriginal

people, researchers, and organizations to address future practices as NOSM investigates areas of research that have a direct relevance to Northern populations.

Over the next couple of days you will have the occasion to view posters and hear oral presentations that focus on research specific to the people and communities in Northern Ontario.

To everyone on the organizing committee that dedicated many hours to ensure that each of us enjoys an exceptional Northern Health Research Conference over the next two days, we sincerely thank you.

Please enjoy the conference and the networking opportunities that it has to offer!

Sincerely,



Dr. Roger Strasser
NOSM Dean



Dr. Greg Ross
NOSM Associate Dean, Research

NOSM'S *Milestone* CELEBRATIONS

THIS ACADEMIC YEAR MARKS A SIGNIFICANT ACCOMPLISHMENT AS WE PREPARE TO CELEBRATE NOSM'S FIRST GRADUATION OF MEDICAL SCHOOL UNDERGRADUATES, AND THE COMPLETION OF OUR FIRST GROUP OF FAMILY MEDICINE RESIDENTS FROM THE FAMILY MEDICINE RESIDENTS OF THE CANADIAN SHIELD (FM RoCS) PROGRAM.

THIS IS A HISTORIC OCCASION OF WHICH ALL OF NORTHERN ONTARIO CAN BE PROUD. THANK YOU FOR YOUR VALUABLE CONTRIBUTIONS TO THIS MILESTONE.



Greetings.

Message from the President of Lakehead University



Dr. Frederick F. Gilbert

President of Lakehead University
and Vice-Chancellor

Lakehead University welcomes you to the Northern Health Research Conference in Thunder Bay. The conference objectives – to create collaboration, communication and networking opportunities among researchers, health-care professionals and Northern Ontario communities – are especially appropriate as the University celebrates the first graduating class of the Northern Ontario School of Medicine.

The NOSM program, in collaboration with Lakehead and Laurentian Universities, represents vision, work and dedication that have produced results. As the west campus of NOSM and home to both the Faculty of Medicine and a

new Faculty of Health and Behavioural Sciences, Lakehead University, too, is committed to health care, education, and to the people of Northern Ontario.

May your conference be successful and productive.

Sincerely,

A stylized, handwritten signature in blue ink, appearing to read 'F. Gilbert'.

Dr. Frederick F. Gilbert

President of Lakehead University
and Vice-Chancellor

Lakehead
UNIVERSITY





Message from the Mayor of Thunder Bay



On behalf of my colleagues on Council and the citizens of Thunder Bay, it is my pleasure to welcome you to the 2009 Annual Northern Health Research Conference.

Thunder Bay is proud to be the host city for this important event that brings together researchers, health care professionals, students and residents who will explore research activities within Northern Ontario arising from community-based activities.

I would like to extend our warmest hospitality to our out-of-town guests who have joined us for this two-day conference. Thunder Bay has the best of both knowledge and nature; please take time to enjoy our spectacular landscape and many attractions. We hope you enjoy your stay in our City that is Superior by Nature.

This year's agenda offers a vital opportunity for researchers, health-care professionals and representatives from Northern Ontario communities to network and share information. Special thanks to Lakehead University for hosting the event and for all your hard work leading up to the conference.

On behalf of the City of Thunder Bay, best wishes for a successful conference.

Sincerely,

Lynn Peterson
Mayor of Thunder Bay



Micheal Gravelle
MPP for Thunder Bay -
Superior North

Message from Micheal Gravelle, MPP Thunder Bay - Superior North

I want to take this opportunity to welcome all of you to Thunder Bay and to the fourth annual Northern Health Research Conference. I am very pleased that the City of Thunder Bay is hosting this important conference.

The Northern Ontario School of Medicine has been at the forefront of health-care delivery and research in Northern Ontario since its inception in 2005, and this conference speaks to the importance that the school of medicine places on the advancement of health care in the North.

Northern Ontario is a region with unique challenges and unique opportunities

with regards to health-care research and delivery, and this conference will allow for the sharing of critical ideas and research methods that will go a long way towards ensuring that Northerners will continue to benefit from high quality health care and health-care practitioners.

Once again, welcome to Thunder Bay and please accept my best wishes for a successful conference.



Bill Mauro
MPP for Thunder Bay - Atitokan

Message from Bill Mauro, MPP Thunder Bay - Atitokan

As the Member of Provincial Parliament for Thunder Bay – Atitokan, I would like to take this opportunity to welcome you to our city for the fourth annual Northern Health Research Conference.

As advances occur in the ever changing field of medicine, it is important that the unique health care needs of the north are addressed at the research stage. Creating partnerships between health-care professionals, researchers and Northern Ontario communities is vital to the integrity of our health-care system. Our government recognizes the importance of investing in research and innovation. We have made significant financial investments in

the Molecular Medicine Research Centre within the Thunder Bay Regional Research Institute and will continue to support these initiatives.

As you gather this weekend, I hope you find an opportunity to enjoy many of the amenities that Thunder Bay has to offer. Our community provides a number of activities and experiences that are sure to make your visit a memorable one.

Best wishes for an enjoyable and informative conference.



Conference Keynote Speaker

Dr. Kue Young

Dr. Kue Young is a graduate of McGill University (BSc in biological sciences and MD), University of Toronto (MSc in community health) and the University of Oxford (D.Phil in biological anthropology). He is a Fellow of the Royal College of Physicians of Canada, with specialty certification in community medicine.

Dr. Young spent much of his professional career in northern Canada, including as a general practitioner with the University of Toronto Sioux Lookout Program and later Medical Director of the Sioux Lookout Zone of Medical Services Branch, Health and Welfare Canada. He served as a CUSO volunteer in Tanzania training “medical assistants”, a cadre of front-line rural health workers who underwent an intensive 3-year course after secondary school in order to provide primary health care in the rural areas. He has also served as consultant for CIDA and CPHA in the Philippines, India and Zimbabwe.

In 1983 he joined the Department of Community Health Sciences of

the University of Manitoba, where he founded the Northern Health Research Unit. From 1998 to 2001 he was Department Head. In January 2002 he began his new appointment as Professor in the Department of Public Health Sciences of the University of Toronto. In 2004 he was appointed to the TransCanada Pipelines Chair in Aboriginal Health at the University of Toronto.

Dr. Young's major research interest is in the area of northern and Aboriginal health, particularly in the epidemiology and prevention of chronic diseases such as diabetes and cardiovascular diseases. He has published over 100 articles in both the biomedical and social science literature and six books. He was recipient of the Senior Investigator award of the Canadian Institutes of Health Research for two terms. In 1993 he was elected President of the International Union for Circumpolar Health, a federation of scientific organizations in Canada, USA, Scandinavia and Russia, devoted to improving the health of the populations in countries around the North Pole.

Accreditation

This program meets the accreditation criteria of the College of Family Physicians of Canada and has been accredited for 13 MAINPRO-M1 credits. This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification program of the Royal College of Physicians and Surgeons of Canada, approved by University of Toronto for 13 hours.

Acknowledgements

Organizing Committee

Denise Adams

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Agenda.

Northern Health Research Conference 2009

■ Thursday, May 28

5:00 - 9:00 p.m.

"Meet and Greet" BBQ at the Outpost,
Lakehead University

■ Friday, May 29

8:00 - 9:00 a.m.

Registration / Continental Breakfast /
Poster Set-Up (University Centre – Agora)

9:00 - 9:05 a.m.

Welcome and Opening Remarks

Dr. Roger Strasser, Dean, Northern
Ontario School of Medicine (NOSM)

9:05 - 9:30 a.m.

Welcome Messages from Dignitaries and
Special Guests

SESSION CHAIR: DR. CARITA LANNER

9:30 - 9:45 a.m.

**Emmanuel Abara, M.B., FRCS(C),
Richmond Hill Urology Practice and
Prostate Institute**

Office Based Urotelehealth - Bringing
Urology Health Care Nearer Home:
A Work In Progress

9:45 - 10:00 a.m.

**Kashif Ahmed, B.Sc., Third Year
Medical Student, NOSM**

Quality of Diabetes Care Among
Aboriginal and Non-Aboriginal Patients
with Type II Diabetes on Manitoulin
Island and the Canadian Population:

A Comparative Analysis on Compliance
with the CDA Clinical Practice Guidelines

10:00 - 10:15 a.m.

Jenna Theriault, NOSM, East Campus
Complex Urogenital Infections in a Rural
Community Urology Practice -
A Northern Ontario Experience

10:15 - 10:45 a.m.

Poster Viewing / Nutrition Break

SESSION CHAIR: DR. PATRICIA SMITH

10:45 - 11:00

**Sean Bryan, Department of Biology,
Lakehead University**

Hydrogen Sulfide in Cardiac Hypoxia:
Redox Regulation and Apoptosis

11:00 - 11:15 a.m.

**Dr. Joel Lanphear, Associate Dean,
Undergraduate Medical Education and
Senior Associate Dean, West Campus,
NOSM**

A Model for Providing Equity in Clinical
Education Opportunities for Distributed
Community Engaged Medical Education

11:15 - 11:30 a.m.

**Dr. Bob Chaudhuri, M.D., Clinical
Lecturer/Tutor, NOSM and David
Harris, Second Year Medical Student,
NOSM**

Interprofessional Collaboration and
Potential Differences in Generational
Cohorts

11:30 - 11:45 a.m.

**Erin Frank, R.D., Public Health
Dietitian, North Bay Parry Sound
District Health Unit**

Development of an Implementation
Strategy for Algoma Public Health's
Inactivity Kits: A Resource for Elementary
School Teachers

11:45 - 12:00 noon

**Marie Matte, Director, Undergraduate
Medical Education Programs, NOSM**
Social Accountability for Medical Schools:
A Model to Examine the Perceptions of
a Medical School's Stakeholders on the
Achievement of the School's Explicit
Social Accountability Mandate

12:00 - 12:15 p.m.

**Aidan Wharton, B.Sc. Biochemistry
Candidate, Laurentian University,
NOSM**

Regulation of NO and NOS in the
Spontaneously Hypertensive Rat

12:15 - 1:15 p.m.

Lunch / Poster Viewing

SESSION CHAIR: DR. ZACH SUNTRES

1:15 - 1:30 p.m.

**Patricia M. Smith, Ph.D., Associate
Professor, NOSM**

Integrating Brief Tobacco Cessation
Interventions into Acute Care Nursing
Practice

Conference Agenda



1:30 - 1:45 p.m.

Dr. Bill McCready, Associate Dean, Faculty Affairs, NOSM, Thunder Bay Regional Health Science Centre
Diabetic Renal Failure in First Nations Patients in Northwest Ontario

1:45 - 2:00 p.m.

Dr. David Topps, Director, eLearning, NOSM
Developing an Education Informatics Research Infrastructure

2:00 - 2:15 p.m.

Dr. William Hettenhausen, DDS FACD, Assistant Professor, NOSM, YTFL Foundation and Chief of Dentistry, Thunder Bay Regional Health Sciences Centre
Oral/Medical Health Evaluation and Clinical Diagnostic System Research

2:15 - 2:30 p.m.

Dr. Rachel Ellaway, Assistant Dean, Education Informatics, NOSM
Design Patterns in Case-Based Education

2:30 - 2:45 p.m.

Bruce Weaver, Assistant Professor of Biostatistics, NOSM
Free Advice for Power-Hungry Researchers: Do Not Categorize Continuous Variables!

2:45 - 3:15 p.m.

Nutrition Break / Poster Viewing

SESSION CHAIR: DR. BILL MCCREADY

3:15 - 4:15

KEYNOTE SPEAKER

Dr. Kue Young, Professor and TransCanada Pipelines Chair, Dalla Lana School of Public Health, University of Toronto

4:15 - 5:00 p.m.

Poster Viewing

7:00 - 9:30 p.m.

Dinner and Social Evening

■ Saturday, May 30

8:00 - 8:30 a.m.

Continental Breakfast / Poster Viewing

SESSION CHAIR: DR. NEELAM KHAPER

8:30 - 8:45 a.m.

L.J. Shewchuk, NOSM
Potential Protective Role of Beta-3 Integrin Against Cardiomyocyte Apoptosis Induced By Oxidative Stress

8:45 - 9:00 a.m.

Denise Taylor, Physiotherapist, St. Joseph's Care Group and Willow Fiddler, Communications Officer, Sandy Lake First Nation Health Authority
Sandy Lake Primary Stroke Prevention Program: Collaboration, Development, and Implementation

9:00 - 9:15 a.m.

Ms. Yun Jenny Jiang, University of Western Ontario
Correlation of Carotid Stump Pressure with Carotid Back Flow During Carotid Endarterectomy

9:15 - 9:30 a.m.

Nancy Jokinen, Post Doctoral Fellow, Centre for Education and Research on Aging and Health, Lakehead University
Adults Aging with Developmental Disabilities, Perceptions of Health



9:30 - 9:45 a.m.

Alison Buckner, Biomolecular Sciences, Laurentian University

A Role for Flaxseed Oil in Chemotherapy: Enhancing Taxol-mediated Cell Death

9:45 - 10:15 a.m.

Poster Viewing / Nutrition Break

SESSION CHAIR: DR. IAN NEWHOUSE

10:15 - 10:30 a.m.

Avdesh Mathur, MS(Surgery); FRCS(Cardiovascular and Thoracic Surgery), Sudbury Regional Hospital, Sudbury Cardiac Research Laboratory and NOSM

Relation Between Preventability of Death After Coronary Artery Bypass Surgery and All Cause Risk-Adjusted Mortality Rates

10:30 - 10:45 a.m.

Dr. Mary Ellen Hill, Senior Researcher, Centre for Rural and Northern Health Research, Lakehead University

"Tip of the Iceberg": Effects of Forestry Closures on Health in Northwestern Ontario

10:45 - 11:00 a.m.

Mary-Ann Harrison, Research Assistant/Ph.D. Student, Northeast Mental Health Centre, Department of Medical Research and Biomolecular Sciences Program, Laurentian University

Raf-1 Regulates NFATc1 Signaling in THP-1 Monocyte-Like Cells: Potential Control of Osteoclast Differentiation

11:00 - 11:15 a.m.

Helle Moeller, Ph.D. Candidate, Lecturer, Department of Anthropology, University of Alberta
"When I Work I am White": The Experience of Being an Inuit Nurse in a Western Health-care Setting

11:15 - 11:30 a.m.

Nadia Mullen, Postdoctoral Fellow, Interdisciplinary Program for Research on Safe Driving, Lakehead University
Driving Assessment on Simulators: Are There Differences Between Drivers Who Complete the Circuit and Those Who Stop Early Due to Simulator Sickness?

11:30 - 12:00 noon

Nutrition Break / Poster Viewing

SESSION CHAIR: DR. MARINA ULAONVA

12:00 - 12:15 p.m.

Ian Newhouse, Ph.D., Professor, School of Kinesiology, Lakehead University and NW Local Health Integration Network
Interprofessional Care and Education Models in Northwest Ontario

12:15 - 12:30 p.m.

Scott M. Sellick, Associate Scientist and Director of Supportive Care, Thunder Bay Regional Health Sciences Centre

Psychological Distress Experienced by Blood Disorder Patients: Is it Real? Is Access to Psychosocial Services Justifiable?

12:30 - 12:45 p.m.

Veronica Brown, B.HSc. (Hons.), M.PH. Candidate, Lakehead University
Incidence of Invasive Haemophilus Influenzae Disease in Northwestern

Ontario 12:45 - 1:00 p.m.

Ashley Smith, Graduate Student, Laurentian University, Biology and NOSM

Utilizing the Microdialysis Technique for Examining Interstitial Mediated Vasodilation in Skeletal Muscle

SESSION CHAIR: DR. GREG ROSS

1:00 - 1:10 p.m.

Closing Remarks / Conference Evaluation / Wrap Up

1:15 p.m.

Transportation to Milestone Celebrations at the Hanger, Lakehead University

Poster Presentations

■ Friday, May 29

8:00 - 9:00 a.m.

Poster Setup / Open Viewing

10:15 - 10:45 a.m.

Group #1 Viewing

Poster Station #1:

Dietary Antioxidants: Natural therapeutic agents in the prevention of Parkinson's Disease – *Zouleika Abdallah*

Poster Station #3:

Development of carboplatin, docetaxel, and combined carboplatin/docetaxel resistant ovarian cancer cell line – *Stephen Armstrong*

Poster Station #5:

As the Rivers Flow: Creating a Stroke Education DVD for Aboriginal People – *Pauline Bodnar*

Poster Station #7:

Effects of Particulate Air Pollution on Airway Antigen Presenting Cells: The Role of Oxidative Stress in the Activation of Dendritic Cells – *Jane E. Bulloch*

Poster Station #9:

Functional Analysis of Aggressive Behavior in Youth Inpatients with Alcohol Related Neurodevelopmental Disorder – *Bruce Cook*

Poster Station #11:

Cloning and characterization of a

functional Mycobacterium tuberculosis laccase gene – *Johanna DeLongchamp*

Poster Station #13:

New Insights for Pain Management: Multi-potent Neurotrophin Antagonist Targets Brain-Derived Neurotrophic Factor and Nerve Growth Factor – *Joseph K. Eibl*

Poster Station #15:

Assessing Attitude Changes in Undergraduate Medical Learners – *Siobhan Farrell*

Poster Station #17:

Lung Epithelial Cell Inflammatory Responses to Clinical Isolates of Pseudomonas aeruginosa – *Sean K. Gravelle*

Poster Station #19:

Accuracy of Patients' Self-estimates of Weight in Outpatient Echocardiography – *Neil Harding McAlister*

Poster Station #21:

Role of Aldo-Keto Reductases in Resistance to Doxorubicin and Epirubicin in MCF-7 breast cancer cells – *Allan Heibein*

Poster Station #23:

An Examination of Unmet Need in Primary Care Psychiatry – *Janelle A. Jarva*

Poster Station #25:

Radiation response in BRCA1

g.56490A>G Mutation carriers – *Neelam Khaper*

Poster Station #27:

An isoform of actin is associated with the cancer status of ovarian and breast epithelial cells – *Carita Lannér*

Poster Station #29:

The Effect of Titanium Dioxide and Platinum Coated Titanium Dioxide Nanoparticles on Cardiomyocytes – *Adiel Mallik*

Poster Station #31:

Synthetic Saponin Analogues and Anticancer Activity – *Mac Mok*

Poster Station #33:

Regulation of the phenylethanolamine N-methyltransferase gene in the heart of the spontaneously hypertensive rat – *Heather Peltsch*

Poster Station #35:

Use of polyphenolic compounds to treat oxidative stress-induced cytotoxicity in PC12 cells – *James A.G. Crispo*

Poster Station #37:

Effects of polyphenolic compound pre-treatment on oxidative stress-induced apoptosis in PC12 cells – *Matthew Piché*

Poster Station #39:

Assessment of the Bioavailabilities of Copper and Nickel Metal Contaminants

from the Gastrointestinal Tract into Systemic Circulation when Ingested in a Soil Matrix – A Pilot Study
– Sarah Schoenau

Poster Station #41:
Examination of Tobacco Use Rates Among Hospitalized Smokers in NW LHIN 14 Hospitals – Patricia M. Smith

Poster Station #43:
BRCA1 and BRCA2 germline mutations as predictive biomarkers of clinical response to cancer therapy – Mary Lynn Tassotto

Poster Station #45:
A Gentle Introduction to Multilevel Regression Models – Bruce Weaver

Poster Station #47:
Leptin polymorphism and cancers in the population of Northwestern Ontario
– Kylie Williams

Poster Station #49:
Developing Palliative Care in First Nations Communities: Participatory Action Research in Northwestern Ontario
– Holly Prince

12:45 - 1:15 p.m.

Open Viewing

2:45 - 3:15 p.m.

Group #2 Viewing

Poster Station #2:
The Regulation of Gene Expression by Sphingosine 1-Phosphate in Endothelial Cells – Laura Rossi

Poster Station #4:
Antimicrobial activity of plant extracts on select microorganisms – Jana Belanger

Poster Station #6:
Can exposure to particulate matter alter disease progression and autoimmune responses in an animal model of type-1

diabetes? – Catherine Brummer

Poster Station #8:
Gestational diabetes: Assessment of compliance with postpartum blood sugar screening and identification of barriers and facilitators to screening
– Amanda Cividino

Poster Station #10:
In vivo Validation of Ultrasound-based Harmonic Motion as a Control for Focused Ultrasound Therapy
– Laura Curiel

Poster Station #12:
Using Visual Driving Instructions to Resemble a GPS on a Simulated Driving Course – Laura Diamond

Poster Station #14:
Edge Devices, Edge Services
– Rachel Ellaway

Poster Station #16:
Cultural Border Crossing and Science Assessments – John Friesen

Poster Station #18:
Comparison of EMS utilization on and off aboriginal reserves – Steven Green

Poster Station #20:
Pseudomonas aeruginosa Strains Isolated from Chronically Infected CF Patients Show Reduced Abilities to Interact with Lung Cells
– Nicole Hawdon

Poster Station #22:
Selected Ion Flow Tube-Mass Spectrometry: Headspace Analysis of Polygala Senega, Valeriana Officinalis and Cannabis Sativa – Liana Iachetta

Poster Station #24:
Curcumin as a Potential Spleen Tyrosine Kinase Inhibitor in Cellular Responses to Pseudomonas aeruginosa – Sarah Khan

Poster Station #26:
Modulation of the Expression of Bcl-2 Family Proteins in Breast Cancer Cells by ERK inhibition
– Tom Kovala

Poster Station #28:
The Role of Antioxidants in Chemotherapy – Patricia Lyle

Poster Station #30:
The role of free- and liposomal-N-acetylcysteine in paraquat-induced cytotoxicity – Panagiotis Mitsopoulos

Poster Station #32:
Mode conversion: A numerical study.-A 2D Array for transcranial ultrasound focusing using shear – Samuel Pichardo

Poster Station #34:
Nitric Oxide Regulation of Catecholamine Biosynthetic Enzymes
– Dominique R. Ansell

Poster Station #36:
A preliminary study of oral and lung breath in patients with oral malodour using selected ion flow tube mass spectrometry – Brian Ross

Poster Station #38:
The Role of Integrin Receptors in the Internalization of Pseudomonas aeruginosa – Pouya Sadeghi Aval

Poster Station #40:
Systems-Level Tobacco Cessation Clinical Practice Guidelines for Hospitals
– Patricia M. Smith

Poster Station #42:
Does Therapeutic Equivalence follow Bioequivalence? A Randomized Trial to Assess Clinical Effects after switching from Clozaril™ to generic clozapine (Gen-Clozapine™)
– Timothy Rico

Poster Station #44:

The Acid pH Responses of *Mycoplasma capricolum* at the Secretome Level
– *Amanda Voros*

Poster Station #46:

Integrins as potential therapeutic targets for cervical cancer – *Jeff Werner*

Poster Station #48:

The effect of skeletal muscle 5'-ectonucleotidase activation and inhibition on the production of adenosine in the interstitial space
– *Yi Zhao*

4:15 - 5:00 p.m.

Open Viewing

■ Saturday, May 30

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Open Viewing

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Poster Station #3:

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– Stephen Armstrong

Poster Station #5:

As the Rivers Flow: Creating a Stroke Education DVD for Aboriginal People
– Pauline Bodnar

Poster Station #7:

Effects of Particulate Air Pollution on Airway Antigen Presenting Cells: The Role of Oxidative Stress in the Activation of Dendritic Cells – Jane E. Bulloch

Poster Station #9:

Functional Analysis of Aggressive Behavior in Youth Inpatients with Alcohol Related Neurodevelopmental Disorder
– Bruce Cook

Poster Station #11:

Cloning and characterization of a functional Mycobacterium tuberculosis laccase gene – Johanna DeLongchamp

Poster Station #13:

New Insights for Pain Management: Multi-potent Neurotrophin Antagonist Targets Brain-Derived Neurotrophic Factor and Nerve Growth Factor
– Joseph K. Eibl

Poster Station #15:

Assessing Attitude Changes in Undergraduate Medical Learners
– Siobhan Farrell

Poster Station #17:

Lung Epithelial Cell Inflammatory Responses to Clinical Isolates of Pseudomonas aeruginosa
– Sean K. Gravelle

Poster Station #19:

Accuracy of Patients' Self-estimates of Weight in Outpatient Echocardiography
– Neil Harding McAlister

Poster Station #21:

Role of Aldo-Keto Reductases in Resistance to Doxorubicin and Epirubicin in MCF-7 breast cancer cells
– Allan Heibein

Poster Station #23:

An Examination of Unmet Need in Primary Care Psychiatry – Janelle A. Jarva

Poster Station #25:

Radiation response in BRCA1 g.56490A>G Mutation carriers
– Neelam Khaper

Poster Station #27:

An isoform of actin is associated with the cancer status of ovarian and breast epithelial cells – Carita Lannér

Poster Station #29:

The Effect of Titanium Dioxide and Platinum Coated Titanium Dioxide Nanoparticles on Cardiomyocytes
– Adiel Mallik

Poster Station #31:

Synthetic Saponin Analogues and Anticancer Activity – Mac Mok

Poster Station #33:

Regulation of the phenylethanolamine N-methyltransferase gene in the heart of

the spontaneously hypertensive rat
– Heather Peltsch

Poster Station #35:

Use of polyphenolic compounds to treat oxidative stress-induced cytotoxicity in PC12 cells
– James A.G. Crispo

Poster Station #37:

Effects of polyphenolic compound pre-treatment on oxidative stress-induced apoptosis in PC12 cells – Matthew Piché

Poster Station #39:

Assessment of the Bioavailabilities of Copper and Nickel Metal Contaminants from the Gastrointestinal Tract into Systemic Circulation when Ingested in a Soil Matrix – A Pilot Study
– Sarah Schoenau

Poster Station #41:

Examination of Tobacco Use Rates Among Hospitalized Smokers in NW LHIN 14 Hospitals – Patricia M. Smith

Poster Station #43:

BRCA1 and BRCA2 germline mutations as predictive biomarkers of clinical response to cancer therapy – Mary Lynn Tassotto

Poster Station #45:

A Gentle Introduction to Multilevel Regression Models – Bruce Weaver

Poster Station #47:

Leptin polymorphism and cancers in the population of Northwestern Ontario
– Kylie Williams

Poster Station #49:

Developing Palliative Care in First Nations Communities: Participatory Action Research in Northwestern Ontario
– Holly Prince

Oral Abstracts.

The research work in the following abstracts are all original and innovative.

Abstracts have been published exactly as submitted.

Office Based Urotelehealth--Bringing Urology Health Care Nearer Home: A Work In Progress

Presenting Author

Emmanuel Abara, MB., FRCS(C)

Authors

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Affiliations

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Abstract

OBJECTIVE We assessed the role of telemedicine in the management of urology patients in remote communities. **MATERIALS AND METHODS** Application to the Ontario Telemedicine Network (OTN) to build an office-based studio was approved. Urotelehealth Studio #0285 was certified in November 2006. The Clinic was planned to operate 4 hours/month. The OTN staff received referrals and scheduled these every 15 minutes. A schedule was faxed to the urologist 24 to 48 hours early. Patients were seen in hospital-based studios run by OTN nurses. Primary health care providers and family were welcome to attend. The urologist's and OTN records were reviewed to determine the number of clinics, patient encounter and type of clinical encounter. Patient demographics, diagnoses and time utilized were studied. **RESULTS** There were 22 clinics between 2006 and 2008. A total of 389 patients: 276 males and 113 females between 3 and 96 (mean 64) years. Patient encounter included: counseling (35), consultation (85), and follow-up to review test results and surgical outcomes (269). There was a wide range of urological diagnoses. The time logged was 71 hours, average 3.2 hours/month. The average time per encounter was 11 minutes. Cancellation due to a technical problem occurred once. **CONCLUSION** Telemedicine resulted in rapid follow-up and review of test results and surgical outcomes. Counselling of patients and families enhanced care. Time management for the urologist was efficient exceeding the goal of 352 encounters by 37. Travel time for both the urologist and patient was greatly reduced.

Quality of Diabetes Care among Aboriginal and Non-Aboriginal Patients with Type II Diabetes on Manitoulin Island and the Canadian Population: a Comparative Analysis on Compliance with the CDA Clinical Practice Guidelines

Presenting Author

Kashif Ahmed, BSc, 3rd Year Medical Student, Northern Ontario School of Medicine

Authors

Kashif Ahmed, BSc; Marion Maar, PhD; Danusia Gzik, MD; Tricia Larose, Ba BSC

Affiliations

Northern Ontario School of Medicine

Abstract

Type II diabetes is a chronic disease that has become a burgeoning problem on health care systems worldwide and a leading cause of morbidity and mortality. In Canada the Aboriginal population is most widely affected with rates 3-5 times higher than the general population. A high morbidity load is related to macrovascular and microvascular complications that result from uncontrolled blood glucose levels and associated risk factors. The complex management of diabetic patients is largely done by primary care physicians. Evidence-based clinical practice guidelines have been developed to aid management and decrease the risk of complications. However, health services research shows that there are significant gaps between guidelines and the care that patients are receiving in Canada. The deviations from clinical guidelines in glycemic, blood pressure and lipid control has been shown to be particularly pronounced in Aboriginal people with type II diabetes. However, investigators associated with the Northern Ontario School of Medicine's Initiative for Clinical Evaluation in Primary Health Care have recently found that Aboriginal people with diabetes who receive care in medical clinics on Manitoulin Island compare more favorably to other Aboriginal diabetes studies. While a significant number of patients fell short of clinical guideline targets, patient outcomes also compared favorably with national data. In this paper we compare the Manitoulin data to recent research done elsewhere in northern Canada and discuss potential reasons for these observed differences

Complex Urogenital Infections in a Rural Community Urology Practice---A Northern Ontario Experience

Presenting Author

Jenna Theriault, 3rd Year Medical Student

Authors

J. Theriault (1), O. Abara (2), S. Sogbein(3), E. Abara (4)

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Abstract

OBJECTIVE: Genitourinary tract infections caused by different microbes occur commonly and are treated successfully by physicians. Sometimes, these organisms may cause conditions that are life threatening, complex in presentation and require acute and long-term urologic care. A 20-year review of patients with some of these conditions was done to understand the challenges for care in remote communities.

MATERIALS AND METHODS: This was a retrospective case study from two community urologists' offices in Northern Ontario. The clinic notes, diagnostic imaging studies, pathology reports, socio-economic factors, co-morbid medical conditions, various treatments administered, response and follow-up were studied.

RESULTS: There were 3 conditions found in the charts reviewed so far: 1. Xanthogranulomatous pyelonephritis in a 60-year old diabetic female who presented with fulminating urosepsis. She required nephrectomy following antibiotics, diagnostic imaging studies and supportive therapy. She lived for many years and died from complications of diabetes. 2. A case of diffuse condylomata accuminatum in a 46- year old lady--the disease affecting the cervix, vagina and vulva but also the urethra bladder and ureter-- with associated bilateral hydronephrosis. Failure of conservative treatment led to cystectomy and urinary diversion. She is alive 15 years later with recurrent disease in the vulva. 3. Genitourinary tuberculosis in a man was managed successfully with surgery and antituberculous chemotherapy

CONCLUSIONS: Potentially lethal complex urogenital infections are uncommon. They constitute a challenge for the patient, relatives and the health practitioner. Timely diagnosis, appropriate management and long-term follow-up are important. Socio-economic factors in Northern Ontario may constitute determinants in treatment outcomes.

Hydrogen Sulfide in Cardiac Hypoxia: Redox Regulation and Apoptosis

Presenting Author

S.A. Bryan

Authors

S.A. Bryan, R. Wang, N. Khaper

Affiliations

Department of Biology, Lakehead University

Abstract

Hydrogen sulfide (H₂S), the newest gaseous signaling molecule of the gasotransmitter family, exerts pronounced physiological effects, including the relaxation of blood vessels, lowering of blood pressure, cell death and neurotransmission. Importantly, H₂S has also been implicated in ischemic preconditioning and injury, where it is known to have a variety of cardioprotective roles. Hypoxia is a defining feature of ischemia, and recent evidence points to an oxygen-sensing role for H₂S, further underscoring its apparent importance in the highly oxygen-dependent cardiac tissues. Recognizing that H₂S's specific functions in cardiac hypoxia remain unclear, we have elected to study this via in vitro adult murine and human cardiomyocyte models of true hypoxia and simulated hypoxia via the hypoxia mimetic cobalt chloride (CoCl₂). Our results show pronounced time and concentration-dependent effects of CoCl₂ on cell viability, oxidative stress, and apoptosis that correspond to changes in protein expression of cystathione-gamma-lyase (CSE), the major source of cardiovascular H₂S. Moreover, CSE mRNA expression correlates closely with that of hypoxia-inducible transcription factor-1-alpha (HIF-1-alpha), a master regulator of hypoxia signalling. We are currently investigating H₂S's potential role in the hypoxic stress response via chemical inhibition of CSE as well as H₂S supplementation to achieve altered H₂S levels. This research will expand H₂S's therapeutic potential in ischemic heart disease, as well as providing new insight as to its role in oxygen homeostasis. (Funding: This work was supported by Northern Ontario School of Medicine. S.A. Bryan acknowledges the Heart & Stroke Foundation of Ontario Master's Studentship).

A Model for Providing Equity in Clinical Education Opportunities for Distributed Community Engaged Medical Education

Presenting Author

Joel Lanphear, Associate Dean, Undergraduate Medical Education; Senior Associate Dean, West Campus

Authors

Joel Lanphear

Affiliations

Northern Ontario School of Medicine

Abstract

Introduction: The Northern Ontario School of Medicine (NOSM) was founded in 2003 with a specific social accountability mandate to be innovative and creative in meeting the health care needs of a specific population – the people of Northern Ontario, Canada. Against this background an innovative four-year curriculum was designed with five major courses running through the four-year curriculum. **Purpose:** As a new medical school, NOSM has been required by its joint accrediting bodies – the Committee on Accreditation of Canadian Medical Schools (CACMS) and the Liaison Committee on Medical Education (LCME) – to demonstrate that it is meeting the accreditation standards while implementing a curriculum that is significantly different than many North American models. In keeping with its mandate and principle of distributed community engaged medical education, the Northern Ontario School of Medicine implemented a compulsory longitudinal clerkship for fifty-six medical students in ten widely distributed community sites in September 2007. In doing so NOSM has developed and tested a model for insuring equity of learning opportunities and instituting quality assurance measures for all students. **Methodology:** This paper presents an educational equity and accountability model that includes methods for comprehensive review of community resources; the creation and presentation of outcomes based on an objectives structure; data on the systematic assessment of student performance; a system for monitoring clinical encounters; the development of faculty competence and outcomes from an external review process. **Results:** Analysis of the data supports the equity of learning opportunities across all CCC sites at the Northern Ontario School of Medicine. **Keywords** Distributed medical education Quality control Evaluation Accreditation

Interprofessional Collaboration and Potential Differences in Generational Cohorts

Presenting Authors

Bob Chaudhuri, MD - Clinical Lecturer/Tutor at NOSM and David Harris, NOSM Student Year 2

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Abstract

Having health professionals with a variety of different scopes of practice work collaboratively is central to the provision of optimal patient-centered health care. Interprofessional collaboration is positively correlated with job satisfaction, patient satisfaction, and negatively correlated with job turnover. Generational cohorts and societal values are changing rapidly in response to academic and technological advancements. Thus, it is important to understand the enabling and impeding factors to interprofessional collaboration and education within and amongst the different generational cohorts. It is also important to have students graduate from their professional schools knowing how to collaborate. A few questions need to be answered: Is interprofessional collaboration affected by generational characteristics of the workforce? Is interprofessional education affected by the generational characteristics of the classroom? Are students prepared to collaborate upon entering the workforce? Using two different surveys, one for Professionals and the other for Students in a variety of Health Care Disciplines we shall be testing this hypothesis. Our research tests the hypothesis that there is a large difference in the way the different generational cohorts perceive the concept of interprofessional collaboration. In our presentation, we outline the research completed to date, our ongoing research, and identify topics for further research in interprofessional collaboration and education.

Development of an Implementation Strategy for Algoma Public Health's Snactivity Kits: A Resource for Elementary School Teachers

Presenting Author

Erin Frank, RD, Public Health Dietitian, North Bay Parry Sound District Health Unit

Authors

Erin Frank, RD; Lindsay Fera, RD

Affiliations

Algoma Public Health; Northern Ontario Dietetic Internship Program

Abstract

Objective: To determine an implementation strategy for Algoma Public Health's Snactivity Kits. Methods: Public health key informants, including Public Health Nurses and Registered Dietitians, with experience in school health were interviewed. Two elementary schools from Algoma District School Board and two from Huron Superior Catholic District School Board in Algoma were randomly selected and teachers were asked to participate in a focus group. One school from each board agreed to participate. Key informant interviews and focus group responses were coded and analyzed for themes. Results: Eight key themes were highlighted as important when implementing public health school resources; 1. Ensure school boards are supportive of the implementation, 2. Provide teachers with an incentive during the information session, 3. Identify a public health contact person for the resource, 4. Make the information session interactive, 5. Be on the agenda of a staff meeting/PD day to introduce the resource, 6. Follow up on use of the resource and provide additional support if necessary, 7. Make the information session easily accessible and 8. Utilize public health staff attached to schools. The most effective method of information delivery to teachers was identified as providing an in-service on the resource to each school. Conclusions: Schools have individual needs; what works well for one school may not work well for another. Utilizing public health staff attached to schools can be an effective strategy for implementing public health school resources, as they are able to assist with in-servicing and identifying individual needs of each school.

Social Accountability for Medical Schools: A Model to Examine the Perceptions of a Medical School's Stakeholders on the Achievement of the School's Explicit Social Accountability Mandate

Presenting Author

Marie Matte, Director, UME Programs, Northern Ontario School of Medicine

Authors

Marie Matte

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Abstract

Introduction: Canadian society is demanding more and more social responsiveness and social accountability from all institutions of higher education including medical schools, and academic health science centers. The identified needs for social accountability are reflected in a growing number of medical schools both nationally and internationally. They provide a basis for creating an educational framework aimed at the improvement of the delivery of health care to Canada's diverse, under-serviced, and geographically distributed populations. **Purpose:** The Northern Ontario School of Medicine (NOSM) was created with an explicit social accountability mandate to provide innovative undergraduate and postgraduate medical education programs that are designed to meet the needs of the students, and the health care needs of the populations of Northern Ontario. At this point in the school's development, what is needed is a "report card" that will assist the school in determining where it stands with regards to the perceived achievement of the social accountability mandate. **Methodology:** This study provides a model for examining the perceptions of NOSM stakeholders about the school's achievement of its social accountability mandate in the first four years of operation. The study utilizes an adaptation of the Social Accountability Grid designed by Boelen, 1995. The adapted model is framed around the five values of relevance, equity, cost-effectiveness, quality, and cultural competence, which are measured against the four domains of medical education – service, research, education, and community engagement. The researcher is currently collecting qualitative and quantitative data through a series of focus groups and survey instruments. **Keywords** Social accountability mandate Social responsiveness Culturally competent Stakeholders

Regulation of NO and NOS in the Spontaneously Hypertensive Rat

Presenting Author

Aidan Wharton, B.Sc. Biochemistry Candidate, Laurentian University / Northern Ontario School of Medicine

Authors

Aidan Wharton (1,2), Dominique Ansell (1,3), Phong Nguyen (1,3), James Crispo (1,2), David MacLean (1) and T.C. Tai (1)

Affiliations

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Abstract

Hypertension is a complex polygenic disease afflicting 1 in 5 adults in North America, with essential hypertension representing 90% of all diagnosed cases. Currently, the underlying cause or mechanism(s) involved in the pathogenesis and maintenance of essential hypertension is poorly understood. Increased outflow from the sympathetic nervous system has been linked to essential hypertension. Recent studies suggest sympatho-adrenal outflow is upregulated by the ubiquitous signalling molecule nitric oxide (NO). Conversely, NO also acts as a smooth muscle relaxant through the classic cyclic cGMP pathway, lowering blood pressure. NO's biosynthetic enzyme, nitric oxide synthase (NOS) is expressed in nearly all tissues in three isoforms: neuronal, endothelial and inducible. The purpose of this study was to assess the NO and NOS levels in the adrenal gland and the four heart quadrants of Spontaneously Hypertensive (SHR) and normotensive Wistar Kyoto Rats (WKY) by nitric oxide and western blot analyses, respectively. Both NO production and neuronal NOS expression in the adrenal gland was found to be significantly lower in SHR (compared with WKY, $p < 0.05$). Endothelial NOS was upregulated in the left ventricle of SHR ($p < 0.05$), although NO concentrations were unaffected. Plasma NO concentration is currently under investigation. Results from the current study suggest that altered regulation of NO synthesis and concentration may contribute to the pathophysiology of essential hypertension.

Integrating Brief Tobacco Cessation Interventions into Acute Care Nursing Practice

Presenting Author

Patricia M. Smith, PhD, Associate Professor, Northern Ontario School of Medicine

Authors

Patricia M. Smith, PhD; Scott M. Sellick, PhD

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Northern Ontario School of Medicine; Thunder Bay Regional Health Sciences Centre

Abstract

Background. This presentation reports on the development and implementation of a brief tobacco cessation intervention into all hospitals in NW LHIN. The intervention was based on the Registered Nurses Association of Ontario (RNAO) 4A protocol (ask, advise, assist, arrange). **Methods.** A baseline assessment was performed, and a bedside intervention was developed and integrated into nursing care maps. **Results.** Baseline assessment revealed: 1) average case-loads for tobacco intervention would be 5 patients/month in community hospitals and 107 patients in the regional hospital; 2) 86% of nurses believed that brief tobacco interventions were effective; and 3) 80% of nurses ask and advise patients to quit smoking but few assist or arrange follow-up. The new intervention developed and implemented into daily nursing practice included: asking patients about tobacco, advising patients to quit, assessing readiness to quit, recommending pharmacotherapy, assisting patients to quit, and arranging follow-up. An intervention tracking form was added as part of standard charting, and a contract was signed with the provincial smokers' helpline for ongoing replenishment of cessation materials and a fax referral program. All hospital nurses in NW LHIN were trained on the protocol. **Conclusion.** Support for the integration of the intervention into nursing practice was strong because it was based on RNAO nursing best practice guidelines. Keys to sustainability include integrating the intervention into clinical pathways, integrating outcomes for evaluation into program delivery, and partnering with the smokers' helpline for patient follow-up and ongoing provision of patient materials.

Diabetic renal failure in First Nations patients in North West Ontario

Presenting Author

Dr. Bill McCready, Associate Dean, Faculty Affairs, Northern Ontario School of Medicine

Authors

McCready, W.G

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Northern Ontario School of Medicine, Thunder Bay Regional Health Science Centre

Abstract

Diabetic renal failure is the leading cause of end stage renal failure in Canada. There is a particularly high incidence of both diabetes and diabetic renal failure in First Nation patients. The presentation will cover the demographic of First Nation patients in the North West over the past decade and will examine the statistics of patients receiving dialysis and transplant care at the Thunder Bay Regional Health Science Centre.

Developing an Education Informatics Research Infrastructure

Presenting Author

David Topps, Director, ELearning Unit, Northern Ontario School of Medicine

Authors

Rachel Ellaway, David Topps, Craig Symington, Roger Sanche, Roger Strasser

Affiliations

Northern Ontario School of Medicine

Abstract

The Northern Ontario School of Medicine faces many challenges arising from its distributed approach to education and research. These in turn create a requirement for appropriate and well-aligned interventions and methods, thereby affording opportunities for academic research and development. The 'Virtual Educational Research Services Environment' (VERSE) project is the last phase of the 'Lakehead University Virtual Centre for Advanced Research in Teaching and Training' project (LUV CARTT) that was funded by the Canada Foundation for Innovation (CFI) in 2004. To date the work carried out and completed by LUV CARTT has included the creation of some pilot toolsets and programming environments that support 3D anatomy visualization, simple volumetric models with haptic interfaces, and tomographic to volumetric dataset conversion tools. VERSE is in the process of developing a series of technology-enabled platforms and tools to be used by researchers in the Northern Ontario health education context such as: Second Life services, light surface services, volumetric rendering services, simulation services, haptic services and telemetrics services. The intended outcome will be for researchers working in the distributed NOSM context to be able to work and collaborate in a number of interconnected virtual environments that act either as the primary context or as an augmentation of their work in other media and contexts. This presentation will outline the research platform development and demonstrate some of the work completed to date including a quick tour of 'Nossum Island' in Second Life.

Oral/Medical Health Evaluation & Clinical Diagnostic System Research

Presenting Author

Dr. William Hettenhausen DDS FACD

Authors

Dr. William Hettenhausen DDS FACD

Affiliations

Chief of Dentistry, Thunder Bay Regional Health Sciences Centre

Abstract

The mouth is the gateway to the human body and the ideal location to develop an oral/medical health evaluation and clinical diagnostic system. Oral gingival tissue vascular immune response, to the chronic irritation caused by the resident bacterial flora in common dental biofilm or plaque, is a measurable expression of the human body's systemic immune reaction to bacterial infection. When a specific target area is selected in the mouth such as the lingual of the mandibular first molar(4,6), it becomes possible, to disclose and observe the invisible bacterial biofilm(1) and the adjacent gingival tissue vascular response. By noting plaque accumulation density(2), and degree of gingival tissue erythema or inflammation (3), it becomes possible to non-invasively assess the current status of the body's immune system. This also makes it possible to monitor the effects of various, diet patterns, lifestyles, and therapeutic interventions on host resistance to chronic bacterial infection over time. This non-invasive clinical approach to monitoring the status of the body's immune system orally, has dramatic implications in the early diagnosis of Type II Diabetes, HIV/AIDS and other systemic diseases or conditions that impair host immuno-competency.

(1) 0.75% Fluorescein Sodium (FDC #8 Yellow [C₂₀H₁₀Na₂O₅] in buffered glycerol) + blue filtered light

(2) Under gel filtered blue light, Fluorescein Sodium fluoresces a brilliant yellow-green making oral plaque accumulations highly visible. (3) Redness/infrared density = degree of gingival immune vascular response.

Design Patterns in Case-based Education

Presenting Author

Dr. Rachel Ellaway, Assistant Dean, Education Informatics, Northern Ontario School of Medicine

Authors

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Northern Ontario School of Medicine

Abstract

Design patterns are recurring descriptions, templates or arrangements of components that can be used and reused in larger designs. Originating in computer programming, the identification and use of design patterns is proving useful in other areas such as instructional design, reflected for instance in the development of educational modeling languages (such as IMS Learning Design) and reusable learning objects (RLOs). Potentially there are many recurring patterns in healthcare practice that can be reified and reused to support more effective and objective approaches to constructing and developing the learning environment. For instance, the progression through history, examination, investigation, diagnosis through to therapy is a master pattern within which there are sub patterns such as a mental health exam, bloodwork or the process of refining a differential diagnosis. There are two projects conducting interlinked work in healthcare education design patterns in Northern Ontario. The Pathways in Narrative Education project has been funded by Inukshuk Wireless to develop 60+ virtual patient cases to be released for public access, use and reuse. PINE involves NOSM, Laurentian, McMaster, Ryerson and Confederation College. The IDEAS project is one of the NOSM startup projects running until the end of April 2009 a part of which is to conduct baseline evaluation and analysis in support of sustainable simulation services for the School. This presentation will highlight the design pattern work arising from PINE and IDEAS and demonstrate how it is being used for developing and evaluating educational resources and practice in healthcare education.

Free Advice for Power-Hungry Researchers: Do Not Categorize Continuous Variables!

Presenting Author

Bruce Weaver, Assistant Professor of Biostatistics, Northern Ontario School of Medicine

Authors

Bruce Weaver

Affiliations

Northern Ontario School of Medicine; Public Health Program, Lakehead University

Abstract

Every now and then, articles appear in medical research journals warning of the consequences of categorizing continuous variables prior to statistical analysis (e.g., Streiner, 2000; Royston et al., 2006). The major consequence such articles describe is decreased statistical power due to loss of information when continuous variables are categorized. Unfortunately, these warnings often fall on deaf ears, as one can see by browsing recent medical journals. One reason for the ineffectiveness of the warnings may be that they are sometimes given in too abstract a format. The purpose of this talk is to demonstrate by means of a concrete example how power is lost when continuous variables are categorized prior to analysis.

Potential Protective Role of Beta-3 Integrin Against Cardiomyocyte Apoptosis Induced By Oxidative Stress

Presenting Author

L.J. Shewchuk, Northern Ontario School of Medicine

Authors

L.J. Shewchuk, M. Ulanova, N. Khaper

Affiliations

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Abstract

Integrin receptors are essential in the regulation of the vital cardiac function. Oxidative stress is known to be involved in apoptosis and cardiac remodeling suggesting that it could have a profound effect on integrin regulation. The aim of this study was to determine the expression pattern and functional role of integrins in HL-1 cardiomyocytes under oxidative stress condition. Using RT-PCR, the mRNA expression for several integrin subunits (alpha-v, 5, 6, and beta-1, 3, 4, 5) was detected under basal conditions. Protein surface expression was detected with immunostaining for integrins alpha-v, 5, beta-1, 3 using flow cytometry. Among the various subunits, the expression of the beta-3 integrin was significantly increased at both the mRNA and protein level in cardiomyocytes exposed to 100 micro-molar hydrogen peroxide for three hours. HCMa (human adult cardiomyocytes) also demonstrated an increased surface expression of beta-3 integrin after oxidative stress. Changes in beta-3 integrin expression correlated with increased oxidative stress and a decrease in cell viability as evident from using 5-(and-6)-chloromethyl-2',7'-dichlorodihydrofluorescein diacetate (CM-H2DCFDA) and MTT assays, respectively. Gene silencing of beta-3 integrin using short interfering RNA resulted in a 2-fold increase in cardiomyocyte apoptosis upon hydrogen peroxide treatment. This increase in apoptosis as measured by Annexin V staining correlated with an increase in caspase-3,7 activation. Our findings suggest that beta-3 integrin plays a vital role in protecting cardiomyocytes against apoptosis caused by oxidative stress. Supported by the FedNor and the Northern Ontario School of Medicine.

Sandy Lake Primary Stroke Prevention Program: Collaboration, Development, and Implementation

Presenting Author

Denise Taylor, Physiotherapist, St. Joseph's Care Group and Willow Fiddler, Communications Officer, Sandy Lake First Nation Health Authority

Authors

Denise Taylor, Willow Fiddler, Rod Fiddler, Connie Kakegamic, Jason Mawakeesic, Joan Rae, John McKay, Alan Chan, Marika Bellerose, and Maria Huijbregts

Affiliations

St. Joseph's Care Group, Sandy Lake First Nation Health Authority, Baycrest Centre (Toronto)

Abstract

Background: In Northwestern Ontario, stroke is the leading cause of morbidity with a 25% higher prevalence than the rest of Ontario. First Nation people are at particularly high risk with higher prevalence of most risk factors: 3-5 times higher Diabetes, 4 times higher smoking, and double rates of hypertension, dyslipidemia, and obesity. In addition, Sandy Lake is a geographically isolated, fly-in community with limited healthcare services. Methods: Sandy Lake First Nation established a partnership with St. Joseph's Care Group, Thunder Bay and Baycrest Centre, Toronto to develop and implement a stroke prevention program for their community. Key principles include: collaboration, equal partnership, community-based, delivered by Sandy Lake community members, and sustainability. Input from Chief and Band Council, Nursing Station staff, and the Diabetes Program was sought throughout project development. Results: The following has been accomplished: 1. A survey established baseline community stroke awareness, 2. A local poster and radio stroke awareness campaign, 3. A 7-week primary stroke prevention self-management and exercise program was developed, and 4. Two fitness trainers were certified and trained to facilitate the program. Team members communicated regularly using face-to-face and videoconference meetings, ongoing phone and email. Discussion: Sandy Lake has demonstrated strength and capacity for community participation, collaborative partnerships, and proactive commitment to their community's health Conclusion: Primary stroke prevention is worthwhile and feasible in First Nation communities. Ongoing collaboration between health promoters and community leaders is necessary to implement a successful health promotion intervention that is both community and culturally appropriate. Communication technology facilitates developing sustainable partnerships.

Correlation of carotid stump pressure with carotid back flow during carotid endarterectomy

Presenting Author

Yun Jenny Jiang, University of Western Ontario

Authors

Yun Jenny Jiang, Andrew Leung, David Holdsworth, Stephen Lownie

Affiliations

Medical Biophysics, Medical Imaging, Clinical Neurological Sciences

Abstract

Background: The circle of Willis is the primary provider of collateral blood flow during carotid endarterectomy. Hypoperfusion due to inadequate collateral flow is one of the main causes of intraoperative stroke. To reduce such risk, pre-surgical evaluations have been conducted to assess the efficiency of the circle to determine if a shunt is required during surgery. One indicator, the carotid stump pressure (CSP), has been shown to correlate significantly with carotid retrograde back flow (BF) and indirectly predict collateral circulation (DeLaurentis et al. 1993). A lower CSP correspondingly yields less BF. A mean CSP of 60% or more of the patient's mean systemic pressure usually indicates good collateral circulation (Kurata et al. 1996). We wished to conduct an investigation of CSP in relation to BF.

Methods: A prospective database of surgical carotid endarterectomies was used to select cases in which both CSP and BF were measured. Mean CSP versus BF were plotted using a linear regression model. Analysis was done with $y = mx + b$ ($y = \text{BF}$, $m = \text{slope}$, $x = \text{CSP}$, $b = \text{intercept}$). R^2 was noted.

Results: A positive correlation was observed between CSP (mm Hg) and BF(cc/min). A higher stump pressure yielded more back flow ($y = 2.634x + 25.157$) on a linear scale. R^2 was 0.5199.

Conclusion: Internal carotid arteries normally transmit a mean blood flow of approximately 200 cc/min (ranging from 112 to 348) (Schebesch et al. 2004). Stump pressure can be useful in predicting the volume of carotid back flow during endarterectomy. Further studies may help determine whether one or both measurements reliably predict the efficiency of the circle of Willis.

Adults Aging with Developmental Disabilities, Perceptions of Health

Presenting Author

Nancy S. Jokinen, Post Doctoral Fellow, Centre for Education & Research on Aging & Health, Lakehead University

Authors

Nancy S. Jokinen, MSW, PhD

Affiliations

CERAH, Lakehead University

Abstract

Adults with a developmental disability (DD) are living longer due to better health and social care. Most live in community settings and access healthcare from physicians and other healthcare professionals. The literature, however, identifies health service issues for this population. This paper highlights these concerns alongside findings of a mixed methods study that explored, in part, perceptions of health. Participants included parents (aged 60-91), siblings (aged 43-69), and adults with a DD (aged 40-55).

Method: Participants were drawn from a pool residing in Ontario. The participants (N=44) were involved in one of 19 interviews or 7 focus groups. Additionally, 28 survey questionnaires were completed by parents and siblings. Focus groups and interviews were audio-taped, transcribed, and analyzed individually, and then grouped by family standing. The questionnaire was coded and statistically analyzed. Common themes and topics of importance emerged and a synthesis of findings developed.

Results: Most participants reported good health yet also identified multiple medical conditions. Active lifestyles were valued despite age and health problems. Changes in health altered priorities and care arrangements. Adults with DD had a basic understanding of health and relied on others. Many parents and siblings relied on DD services to monitor the health of their relative with DD. Concerns were raised about access to healthcare, sedentary lifestyles, nutrition and knowledge of aging and DD.

Conclusion: The impact aging has on adults aging with DD is emerging. Healthcare professionals need to develop information and strategies to assist adults with DD to maintain health as they age.

A role for flaxseed oil in chemotherapy: Enhancing taxol-mediated cell death

Presenting Author

Alison Buckner, Laurentian University

Authors

Alison Buckner(1), Carly Buckner(1), Robert Lafrenie(123)

Affiliations

Biomolecular Sciences-Laurentian University, (2) Sudbury Regional Hospital, (3) Northern Ontario School of Medicine

Abstract

Flaxseed oil is widely recognized for its exceptional nutritional value, high concentration of fiber-based lignans and large amounts of omega-fatty acids. It is one of a generic group of functional foods often taken by cancer patients as a potential treatment. We have examined the anti-cancer effects of flaxseed oil by studying its direct effects on cancer cell growth in vitro. Treatment with flaxseed oil was associated with a rapid slowing of growth by the aggressive murine melanoma cell line B16-BL6. Interestingly, non-malignant cell lines such as HSG cells, showed an increase in cell growth following flaxseed treatment. Treatment with flaxseed oil inhibited growth of all 6 tested malignant cells in a dose-dependent manner and did not inhibit growth of non-malignant cell lines. DNA laddering and acridine-orange staining showed that the treated cells were undergoing apoptosis. We have also examined the effects of adding flaxseed oil on the ability of chemotherapeutic agent taxol to kill breast cancer cells in vitro. The addition of flaxseed oil decreased the amount of taxol which was necessary for a 50% reduction (ie: EC50) in cellular survival. Our studies show that flaxseed oil and taxol induce cell death by different mechanisms. These results indicate that flaxseed oil may provide another agent to aid in the optimization of cancer treatment regimes. Flaxseed oil has the potential to improve the health of patients and may provide a source of anti-cancer drugs.

Relation Between Preventability of Death After Coronary Artery Bypass Surgery and All Cause Risk-Adjusted Mortality Rates

Presenting Author

Avdesh Mathur, MS(Surgery);FRCS(Cardiovascular &Thoracic Surgery), Northern Ontario School of Medicine

Authors

Veena Guru MD; Jack Tu MD, PhD; Edwards Etchells, MD, MSc; Geoffrey M Anderson MD PhD; C. David Naylor MD, DPhil; Richard J. Novick MD; Christopher M Feindel MD, MSc; Fraser Rubens MD, MSc; Kevin Teoh MD; Andrew Hamilton MD; Daniel Bonneau MD; Charles Cutrara MD; Peter Austen PhD; Stephen Fremes MD,MSc; Avdesh Mathur MD,MS I;

Affiliations

Sudbury Regional Hospital And Sudbury Cardiac Research Laboratory

Abstract

OBJECTIVE- To identify preventable coronary bypass deaths for measure of quality of care: thus stimulating opportunities for further improvements. Current provider quality "Report-cards" may not be sufficient in predicting preventability. **METHODS-**We retrospectively analysed 347 randomly selected in-hospital deaths after isolated coronary bypass surgery at 9 Ontario institutions including Sudbury from 1998 to 2003. Nurse-abstracted summaries were reviewed by 2 experienced cardiac surgeons who were blinded to patient, surgeon and hospital and used a standardised implicit tool to identify preventable death. Third reviewer re-assessed cases in which initial reviewers disagreed. Preventable deaths were estimated and compared with risk-adjusted mortality rates. A structured adverse event audit was completed. **RESULTS-**A total of 111 of 347 deaths (32%) were judged preventable despite a low risk- adjusted mortality range (1.3%to 3.3%). No significant correlation was found between all-cause risk-adjusted in-hospital mortality rates and the proportion of preventable deaths at the hospital level (Spearman coefficient,-.42; P=0.26). Large proportions of preventable deaths were related to problems in the operating room (86%) and intensive care unit (61%). Many deaths were associated with deviations in peri-operative care (32%) based on concurrence of 2 reviewers, and 42% in cases where 1 reviewer reached that conclusion. **CONCLUSIONS-**Approximately one third of in-hospital deaths were judged preventable by surgeon reviewers. All-cause risk-adjusted mortality rates are convenient measures of institutional quality of care but were not correlated with preventable mortality in our clinical study. Providers should conduct detailed adverse event audits to drive meaningful improvements in quality. **KEY WORDS:** bypass*health policy*hospital mortality*quality of health care*surgery.

“Tip of the Iceberg”: Effects of Forestry Closures on Health in Northwestern Ontario

Presenting Author

Dr. Mary Ellen Hill, Senior Researcher, Centre for Rural and Northern Health Research, Lakehead University

Authors

Mary Ellen Hill, Irene Pugliese, Jungwee Park, Bruce Minore (CRaNHR), Heather Gray, Cory Russell (NWLHIN)

Affiliations

Mary Ellen Hill, Irene Pugliese, Jungwee Park, Bruce Minore (CRaNHR), Heather Gray, Cory Russell (NW LHIN)

Abstract

This presentation highlights findings from “Forestry and Health: an Exploratory Study of Health Status and Social Well-Being Changes in Northwestern Ontario Communities,” commissioned by the Northwest Local Health Integration Network (NW LHIN). The mixed-methods study was designed to determine whether and to what extent, recent restructuring in the forestry industry has affected the health of people living in the NW LHIN. Using quantitative and qualitative data, it examined health and service delivery issues in 16 challenged communities, all of which have experienced both forestry closures and significant population losses in the past five years. Analyses of data from the 2005 Canadian Community Health Survey revealed community rates of stroke, heart disease and high blood pressure were far above provincial norms. Residents also were more likely to report fair or poor health and unhealthy lifestyles and less likely to have a regular doctor. Interviews with 15 health care administrators and front-line providers confirmed that the negative health and social effects of forestry closures were widespread, both among unemployed workers and those who were still employed, as well as their families and the larger community. They reported seeing more clients with poorly controlled blood pressure and diabetes, increased stress, depression and anxiety, and concerns about suicide among the unemployed. They also discussed the challenges of meeting increased demands for health and social services, difficulties clients were having accessing care, and, as “the tip of the iceberg,” additional negative effects on community well-being that would occur as the economic situation worsened.

Raf-1 regulates NFATc1 signaling in THP-1 monocyte-like cells: potential control of osteoclast differentiation

Presenting Author

Mary-Ann Harrison, Research Assistant/PhD Student, Northeast Mental Health Centre Department of Medical Research and Biomolecular Sciences Program, Laurentian University

Authors

Mary-Ann Harrison and Dr. Robert Lafrenie

Affiliations

Northeast Mental Health Centre - Dept of Medical Research and Biomolecular Sciences Program Laurentian University

Abstract

Osteoclasts are giant multinucleated cells derived from the monocyte/macrophage hematopoietic lineage. Osteoclasts resorb bone, thus are critical for normal skeletal development and calcium homeostasis. Recently, an explosion of interest into osteoclast biology has coincided with the inception of “osteimmunology”-a discipline developed from insights that bone and immune cells perpetually cross-talk, are profoundly affected by factors produced during the other’s activation and are inextricably drawn into each other’s pathology (i.e. pathologic bone loss is a common sequela associated with autoimmunity and cancer). Salient to these observations is the discovery that the Ca^{2+} /calcineurin-responsive transcription factor, Nuclear Factor of Activated T Cells (NFATc1), a central player in T-lymphocyte activation, is also the master regulator of osteoclast differentiation. Studies have independently reported increased osteoclast and NFAT activity in several cancers types, particularly in highly invasive and aggressive metastatic disease. In order to investigate the molecular mechanisms involved in NFAT activation and osteoclast differentiation, we employed genetic methods to alter the activity of Raf-1, a proto-oncogenic protein, in THP-1 cells (human acute monocytic leukemia). Raf-1 is a characterized modulator of monocyte activation and controls NFAT activity in other cell types. We assessed cell lines for indices of osteoclast differentiation and alterations in cell signaling and gene expression. THP-1 cell lines stably expressing constitutively active Raf-1 bore a profile consistent with a pre-active osteoclast: increased TRAP activity, expression of NFATc1, multinucleation, α -v-beta-3 integrin, PI3K, p38 MAPK, NF-kB, osteopontin, and ERK. These data suggest Raf-1 acts upstream of NFAT in monocytes and may be important in osteoclast differentiation.

“When I work I am white”: The experience of being an Inuit nurse in a Western healthcare setting

Presenting Author

Helle Moeller, PhD candidate, lecturer, Dept of anthropology, University of Alberta

Authors

Helle Moeller

Affiliations

University of Alberta

Abstract

This ethnographic study examines the experiences of Inuit and Greenlandic nurses and nursing students who are being educated and practice in institutions dominated by western culture and language. It was conducted through 12 months of fieldwork between August 2007 and June 2009 in five Greenlandic and two Nunavut communities. Methods used included observation, participant observation, interviews, questionnaires and document review. Results include that an Inuit language is the mother tongue of almost all participating nurses and nursing students. The majority of participants, however, felt more at home with western culture and language than people from the general populations and many had been schooled almost exclusively in Western languages after grade five. Almost all participants noted differences in the ways that Inuit and Western nurses care for Inuit patients. Most differences were rooted in language but also culture played a part. While almost all participants preferred to read, write and be taught in a Western language, most said that they lacked and wanted to learn medical and health care vocabulary in their mother tongue. Still, almost all participants felt that it would be impossible or even undesirable to deliver the nursing education in Inuktitut or Greenlandic. As many participants did, I connect this feeling with having been schooled mostly in a Western language, and with a continued dependency on Western health professionals who speak a Western language. I understand the feeling to be systemically based, a result of Western educational and health care policy.

Driving assessment on simulators: Are there differences between drivers who complete the circuit and those who stop early due to simulator sickness?

Presenting Author

Nadia Mullen, Postdoctoral Fellow, Interdisciplinary Program for Research on Safe Driving, Lakehead University

Authors

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Affiliations

Lakehead University, Northern Ontario School of Medicine, St. Joseph's Care Group

Abstract

Driving simulators offer a safe alternative to on-road assessment of seniors' driving performance. However, many seniors experience symptoms of simulator sickness and are unable to complete the drive. This study examined whether participants who failed to complete a simulator drive due to simulator sickness (drop-outs) differed from those who completed the simulation (completers). To test the hypothesis that drop-outs and completers would differ, 13 healthy older adult drop-outs (mean age of 74.8 years) and 12 comparable healthy older adult completers (mean age of 74.8 years) were compared on the Useful Field of View test, Attention Network Test, and the Trail Making Test Part A. Participant's on-road driving performance was also compared. Results showed that of 13 comparisons based on their cognition, only 1 was statistically significant. Given that the family-wise alpha for a set of 13 contrasts is somewhere between .487 and .650, these results suggest that cognitive differences are not associated with drop-out rates in driving simulations. However, the effect sizes suggest that differences may be found with larger sample sizes. Results also showed that completers scored more demerit points during the on-road drive than drop-outs, suggesting that in our sample of healthy senior drivers, simulator sickness did not prevent examination of those who needed it most (i.e., those with the poorest on-road driving performance). On the basis of this evidence, we can continue using driving simulator assessment for seniors without undue concern that drop-outs due to simulator sickness are systematically poorer drivers.

Interprofessional Care and Education Models in NW Ontario

Presenting Author

Ian Newhouse, Ph.D., Professor, Lakehead University/NW LHINs School of Kinesiology

Authors

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Affiliations

Lakehead University and NW Local Health Integration Network

Abstract

The purpose of the proposed research is to conduct an environmental scan of what interprofessional (IP) care and education models are being used across North West Ontario. This scan will include examination of the barriers, opportunities, learning needs, best practices and projected health human resource needs related to IP care and education. The North West Local Health Integration Network hopes to use this scan to develop strategic, financial and performance plans related to IP care. To accomplish this goal, we will be asking key informants (~10) and focus groups (~9) (individual(s) with unique knowledge and/or experience about health care delivery and/or interprofessional health education) about their perceptions and experience related to interprofessional education and care. Efforts will be made to attain representation from a broad range of health professions, health care organizations and geographic regions. It is expected that determinants of successful collaborative patient centred practice will emerge, with some being specific to a NW Ontario context. This research is currently underway with completion targeted for March 31, 2009.

Psychological distress experienced by blood disorder patients: Is it real? Is access to psychosocial services justifiable?

Presenting Author

Sellick, Scott. M., Associate Scientist and Director of Supportive Care, Thunder Bay Regional Health Sciences Centre

Authors

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Abstract

At the Thunder Bay Regional Health Sciences Centre, patients with diagnosed or suspected blood disorders are seen by a hematologist at the Cancer Centre. As with all patients of the Centre, psychological distress is monitored using the Hospital Anxiety and Distress Scales (HADS; Zigmond & Snaith, 1982). All patients of the Centre have access to Supportive Care, and counsellors contact patients with HADS scores exceeding threshold. That said, given the limited staff and finite resources that characterize healthcare institutions, the questions are: "Is it appropriate that patients with blood disorders be seen at the Centre's Supportive Care; Do patient levels of emotional distress and need for services warrant their ongoing referral to Supportive Care?" We retrospectively analyzed data from our supportive care database on both blood disorder (n=3,043) and cancer patients (n=7,702). HADS scores for cancer versus blood disorder patients were compared on anxiety m=6.69 versus 6.43, depression m=4.37 versus 4.24, and overall distress m=11.05 versus 10.65. 21.3% of male and 29.2% of female cancer patients scored above threshold on the HADS, compared to 18.8% of male and 25.6 % of female blood disorder patients. Of those scoring above threshold, 69.4% of cancer patients and 9.8% of blood disorder patients became clients of Supportive Care. Number of visits to Supportive Care, demographics, smoking status, and the relationship between age and anxiety scores for blood disorder patients, $r = -1.38$, $p < 0.001$ is also analyzed. Findings will be discussed in the context of patient need and resource allocation.

Incidence of Invasive *Haemophilus influenzae* Disease in Northwestern Ontario

Presenting Author

Veronica Brown, BHSc (Hons.), MPH Candidate, Lakehead University

Authors

Sharen Madden, MD, Assistant Professor, Northern Ontario School of Medicine, Sioux Lookout; Len Kelly, MD, MCISc, CCFP, FCFP, Associate Professor, Northern Ontario School of Medicine, Sioux Lookout; Frances Jamieson, MD, FRCPC, Ontario Agency for Health Protection and Promotion, Toronto; Raymond Tsang, M.Med.Sc., PhD, National Microbiology Laboratory, Winnipeg; Marina Ulanova, MD, PhD, Associate Professor, Medical Sciences Division, Northern Ontario School of Medicine, Thunder Bay

Affiliations

Lakehead University

Abstract

Before the late 1980s, *Haemophilus influenzae* type b (Hib) was the most common cause of meningitis and epiglottitis in children. After the conjugate Hib vaccine was introduced, the incidence of invasive Hib disease decreased dramatically. Recently, non-b serotypes of *H. influenzae* have been observed. This study examined invasive *H. influenzae* disease in Northwestern Ontario. Health records from 2002-2007 from Thunder Bay Regional Health Sciences Centre (TBRHSC; Thunder Bay, ON) and Meno-Ya-Win Health Centre (Sioux Lookout, ON), were examined to determine the demographic and clinical characteristics of cases of invasive *H. influenzae* disease. The Ontario Public Health Laboratory (Toronto, ON) provided data on serotypes of clinical *H. influenzae* isolates. Ethics boards at Lakehead University, TBRHSC, and Meno-Ya-Win Health Centre approved this project. Thirty-five cases of invasive *H. influenzae* disease were identified in Northwestern Ontario from 2002-2007. Fifteen cases (42.9%) were in children (0-9 years); 71.4% of children were Aboriginal. Of the serotyped isolates, 40% were *H. influenzae* type a, 32% were nonserotypeable, type e and f were also observed; no Hib was identified. The incidence rate of invasive *H. influenzae* disease in Northwestern Ontario was higher than the rate of invasive Hib disease in Ontario in the pre-vaccine era, reaching 2.98/100,000 in 2006 and 2007. In 2006 the incidence in children (0-4 years) was 30.9/100,000; 100% of these children were Aboriginal. Invasive *H. influenzae* disease is a public health concern for Northwestern Ontario. The prevalence of non-b serotypes and proportion of Aboriginal children affected calls for enhanced surveillance of this pathogen.

Utilizing the microdialysis technique for examining interstitial mediated vasodilation in skeletal muscle

Presenting Author

Ashley Smith, Graduate Student, Laurentian University / Northern Ontario School of Medicine

Authors

Ashley A. Smith, Yi Zhao, Sergio Fabris, David A. MacLean

Affiliations

Northern Ontario School of Medicine & Laurentian University, Biology, Sudbury, ON

Abstract

It has been proposed that increased extracellular L-Arginine (L-Arg) or ATP stimulates nitric oxide synthase activity producing nitric oxide (NO). In the present study we used the microdialysis technique to alter the interstitial concentration of L-Arg and ATP to examine whether elevations in these compounds results in nitric oxide formation in rat skeletal muscle. Male Sprague-Dawley rats were anaesthetized and had microdialysis fibers (1 cm diffusion length) inserted into the gastrocnemius muscle of each leg. Following 20 min. of baseline collection (saline), the microdialysis probes were perfused at a rate of 5 μ L/min with either 20 mM L-Arg (20 min., n = 10) or 60 μ M ATP (20 min., n = 15). Interstitial NO concentrations were 7.2 ± 1.1 and 5.2 ± 0.7 μ M during saline perfusion and did not change ($P > 0.05$) following L-Arg (6.5 ± 0.8 μ M) or ATP (5.6 ± 0.9 μ M) perfusion. These data clearly demonstrate that elevated interstitial L-Arg as well as ATP concentrations did not alter the basal interstitial concentrations of NO. Furthermore, these data suggest that the independent manipulation of L-Arg and ATP in the interstitial space alone does not promote NO production and release from surrounding tissues. Supported by NSERC.

Poster Abstracts.

The research work in the following abstracts are all original and innovative. The poster presentations are available for viewing throughout the conference.

Abstracts have been published exactly as submitted.

Dietary Antioxidants: Natural therapeutic agents in the prevention of Parkinson's Disease

Presenting Author

Zouleika Abdallah, Post Doctoral Fellow, Northern Ontario School of Medicine

Authors

Zouleika Abdallah, Greg Ross

Affiliations

Northern Ontario School of Medicine

Abstract

Free radicals play an important role in a number of biological processes necessary for life. However, because of their intrinsic reactivity, these same free radicals can participate in unwanted side reactions resulting in cell damage, broadly termed as oxidative stress. Prolonged oxidative stress has been implicated in cancer, neurodegenerative and cardiovascular disease. To counteract these free radicals, our body uses an array of antioxidant defense mechanisms like glutathione and metallothionein. This defense can be reinforced by dietary antioxidant. In general, an antioxidant is a chemical capable of slowing or stopping oxidative damage. Previous studies suggest that oxidative stress and oxidation of dopamine are important factors leading to the development of Parkinson disease. Indeed, oxidation of dopamine produces radical intermediates that, in presence of thiol compounds (such cysteine and glutathione) lead to the formation of thionyl-dopamine conjugates. The aim of our work is to identify efficient dietary antioxidants able to inhibit the formation of thionyl-dopamine conjugates. The antioxidants used for this study are polyphenols: flavonoids and phenolic acids compounds. They are abundant in fruits like berries, vegetables, and beverages like tea and red wine. Our preliminary results demonstrate that these polyphenols have different properties depending on their structures.

Nitric Oxide Regulation of Catecholamine Biosynthetic Enzymes

Presenting Author

Dominique R. Ansell, Graduate Student, Laurentian University/Northern Ontario School of Medicine

Authors

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Affiliations

Biology Laurentian University (1), Chemistry & Biochemistry Laurentian University (2), Northern Ontario School of Medicine (3)

Abstract

The neurotransmitters/neurohormones catecholamines (CA) are involved in the sympathetic control of arterial blood pressure and cardiac function. Recent studies show that nitric oxide (NO) can regulate the synthesis and release of CA from the adrenal medulla. The in vitro PC12 cell line was used to examine the effect of NO on the regulation of the CA biosynthetic enzymes: tyrosine hydroxylase (TH), dopamine-beta-hydroxylase (DBH) and phenylethanolamine N-methyltransferase (PNMT). Results obtained from drug treatments with the NO donor, sodium nitroprusside (SNP) constitute an assessment of its effects in PC12 cells. Treatment of cells with SNP for 6 hours significantly increased TH and PNMT mRNA levels; in contrast, DBH mRNA levels were unchanged. Combination drug studies with SNP and intracellular kinase activators (forskolin, PMA, 8-Br-cGMP), cholinergic activators (nicotine, muscarine & carbamylcholine) and inhibitors for PKA (H-89), cGMP (6-anilinoquinone) PKG (DT-2) and PKC (GF109203X) were also conducted. Synergistic increases in transcript levels for TH and PNMT were observed under combination drug treatments of SNP and activators of PKA and PKG ($p < 0.05$). In contrast, DBH transcript levels were increased under the combination drug treatments of nicotine with SNP. mRNA transcript levels of TH, DBH and PNMT showed significant decreases when cells were pre-treated with PKA, PKC and PKG inhibitors. Furthermore, preliminary transfections showed activation of the PNMT promoter by SNP treatment. Results from this study suggest that NO is capable of regulating CA biosynthetic enzymes, TH and PNMT via activation of the PKA and PKG pathways and DBH via cholinergic pathways.

Development of carboplatin, docetaxel, and combined carboplatin/docetaxel resistant ovarian cancer cell lines

Presenting Author

Stephen Armstrong, Graduate Student, Laurentian University

Authors

1Armstrong S., 1,2,3Parissenti A., 1,2Lannér C.

Affiliations

1 = Laurentian University; 2 = Northern Ontario School of Medicine; 3 = Sudbury Regional Cancer Centre

Abstract

Carboplatin and docetaxel are two standard chemotherapeutics used to treat ovarian cancer. Patients often exhibit resistance to single agent therapy, and dual agent chemotherapy was developed to overcome this resistance. However, when combination therapy is used, resistance still occurs in many cases. Specific changes in gene expression occur in platinating agent resistance and taxane resistance, but it is not known whether resistance to combined chemotherapy involves novel changes in gene expression or whether resistance is just the sum of gene expression changes seen in single agent resistant cells. Using the chemo-naïve A2780 ovarian cancer cell line, we will be generating carboplatin, docetaxel, and carboplatin/docetaxel resistant cell lines, and measuring the inhibitory concentration at which 50% of the cells will die (IC₅₀) compared to the parent line using a clonogenic assay. Microarray analysis will be performed to compare changes in gene expression between these lines. We have performed a clonogenic assay to determine the IC₅₀ for carboplatin and docetaxel of the A2780 parent line, which are 1×10^{-6} M and 1×10^{-10} M, respectively. Selection will begin using drug concentrations 1000x below the IC₅₀ for each drug. The starting carboplatin and docetaxel drug concentrations will be combined to generate the beginning dual selection dose. Once resistance is established, we will isolate RNA from resistant lines to generate cDNA for microarray analysis. Changes in gene expression associated with dual drug resistance may be used to develop clinically relevant biomarkers for carboplatin/docetaxel resistance in ovarian cancer.

Antimicrobial activity of plant extracts on select microorganisms

Presenting Author

Jana Belanger, M.Sc. Candidate, Department of Biology, Laurentian University

Authors

Jana Belanger, Leo G. Leduc, Garry D. Ferroni

Affiliations

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Abstract

Plant extracts are increasingly explored for novel antimicrobial agents in the battle against antimicrobial resistance. This study evaluated the potential antimicrobial activity of 86 naturally-occurring compounds/extracts against pathogens with known antimicrobial resistance, namely, *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Candida albicans*. A microtiter plate assay was used to determine the minimum inhibitory concentration (MIC) values of plant extracts against the target microorganisms using the antibacterial ciprofloxacin and the antifungal amphotericin B, as positive controls. Results indicated antimicrobial potential for 7 of the 86 compounds/extracts tested. Pine bark extract, green coffee bean extract, acacia rigidula, malic acid, citric acid, gallic acid, and morin showed consistent MICs of 1 mg/mL against the susceptible microbes, while the MIC for gallic acid against *Staphylococcus aureus* was 0.125 mg/mL. The positive results shown by the microtiter plate assays are being confirmed using viable cell counts and time-kill curves. The results will contribute to confirming the potential use of these plant extracts as antimicrobials.

As the Rivers Flow: Creating a Stroke Educational DVD for Aboriginal People

Presenting Author

Pauline Bodnar, Community & Long Term Care Specialist, Northwestern Ontario Regional Stroke Network

Authors

Bruce Minore, PhD, Research Director; Mary Ellen Hill, PhD, Senior Researcher; Pauline Bodnar, MHSA, HBSW

Affiliations

Northwestern Ontario Regional Stroke Network, Thunder Bay Regional Health Sciences Centre; Centre for Rural and Northern Health Research, Lakehead University

Abstract

This innovative “DVD-in-poster” presentation highlights a new DVD developed by the Northwestern Ontario Regional Stroke Network (NWORSN) working in partnership with the Centre for Rural and Northern Health Research. It was designed to educate Aboriginal peoples about stroke, specifically what a stroke is, signs and symptoms, effects, and how to respond appropriately. Cultural content was identified through participatory research, using talking circles and informal, one-on-one discussions with 105 Aboriginal individuals in six sites (3 rural, 2 remote, 1 urban) throughout Northwestern Ontario. Findings from research confirmed significant knowledge gaps, regarding stroke signs and symptoms, risk factors and need for rapid response. There was, for example, little awareness that risk factors for diabetes, such as high blood pressure, are also related to stroke. As well, there was lack of consensus about appropriate ways to respond to stroke, especially in rural and remote communities, where access to care is limited. The resulting DVD, produced under the guidance of the NWORSN Aboriginal Advisory Group, addresses Aboriginal peoples’ desire for culturally-appropriate stroke education, not just for individuals with stroke and their families, but for the entire community, including children. Using First Nations Elders, natural settings, and story-telling, the DVD presents stroke information that respects Aboriginal people’s preference for holistic teachings and supports their communities’ desire for wellness. The poster also highlights innovative dissemination strategies, including a workbook, that have been developed to insure that needed information is accessible to health care providers, their Aboriginal clients, family caregivers and community groups.

Can exposure to particulate matter alter disease progression and autoimmune responses in an animal model of type-1 diabetes?

Presenting Author

Catherine Brummer, M.Sc. Candidate, Department of Chemistry and Biochemistry, Laurentian University

Authors

Catherine Brummer (1,3), Chloe Ashick-Stinson (2), Jane Bulloch (2), and Stacey A. Ritz (1,3)

Affiliations

(1) Department of Chemistry and Biochemistry, Laurentian University, Sudbury, Ontario; (2) Department of Biology, Laurentian University, Sudbury, Ontario; (3) Northern Ontario School of Medicine (East Campus), Sudbury, Ontario

Abstract

Epidemiological studies have highlighted a possible correlation between higher urban particulate matter (PM) exposure and earlier type-1 diabetes development in children, but this possible relationship has yet to be shown experimentally. A pilot study suggested that exposing non-obese diabetic (NOD) mice to an aerosolized urban PM sample, EHC-93, may accelerate autoimmune diabetes and increase circulating insulin auto-antibodies in sera, although statistically significant results were not obtained. In the current study, NOD mice were exposed to aerosolized diesel exhaust particles (DEP, SRM-2975) by whole body inhalation 5x weekly at concentrations of 1000 ug/m³ (HI) or 250 ug/m³ (LO); a “sham” group was similarly exposed to 0.9% saline as a control (SAL). Incipient diabetes was monitored by urinalysis twice weekly, with subsequent diabetic confirmation by blood glucose of >14 mmol/L. Unlike exposure to EHC-93, exposure to DEP was not associated with earlier diabetes development, and may in fact decrease levels of cytokines associated with autoimmune diabetes, such as IFN-gamma. Studies are ongoing to further investigate the differing effects of both EHC-93 and DEP exposure on immune responses in the NOD mouse, as well as in vitro.

Effects of Particulate Air Pollution on Airway Antigen Presenting Cells: The Role of Oxidative Stress in the Activation of Dendritic Cells

Presenting Author

Jane E. Bulloch, MSC Candidate, Laurentian University, NOSM

Authors

Jane E. Bulloch, Catherine G. Brummer, Stacey A. Ritz

Affiliations

Northern Ontario School of Medicine, Laurentian University

Abstract

Dendritic cells are professional antigen presenting cells active in various immune responses such as allergies and asthma. Particulate air pollution aggravates symptoms of allergy and asthma, and is associated with significant morbidity and mortality. The activation of dendritic cells by particulate air pollution has previously been shown in vitro. This study aims to show activation of dendritic cells by pollution particulates in vivo. Balb/c mice were exposed to diesel exhaust particles (DEP) as a model for particulate air pollution. Four doses of DEP (0, 10, 50, 250ug) were administered by intranasal instillation, and mice were sacrificed after four time-points (3, 6, 12, 24h). Lung inflammation and dendritic cell activation were measured by flow cytometric analysis of cell surface markers such as CD4, CD8, CD25 and CD69 to characterize T-cells, and MHCII, CD11c, CD80, CD86, CD40 and CD54 to differentiate dendritic cells and examine activation status. Preliminary results show that DEP are associated with white blood cell infiltration into the lungs as evidenced by CD4 and CD8 expression, as well as some signs of dendritic cell activation and migration out of the lungs, as evidenced by increased expression of adhesion molecule CD54. Further study will investigate the role of oxidative stress in mediating dendritic cell activation by administration of antioxidants prior to DEP exposure. This study will enhance our understanding of the immunological impact of exposure to air pollution, which has relevance for diseases such as allergy, asthma, and autoimmunity.

Gestational diabetes: Assessment of compliance with postpartum blood sugar screening and identification of barriers and facilitators to screening.

Presenting Author

Amanda Cividino, Registered Dietitian, Northern Ontario Dietetic Internship Program

Authors

Amanda Cividino, RD; Joanne Guizzo, RD; Marilyn Gravelle, RD.

Affiliations

Northern Ontario Dietetic Internship Program; Sudbury Regional Hospital

Abstract

Objectives: Women with a history of gestational diabetes mellitus (GDM) are at greater risk for developing subsequent type 2 diabetes. The Canadian Diabetes Association (CDA) 2003 Clinical Practice Guidelines recommend postpartum blood glucose screening within the first six months of delivery to facilitate early detection of type 2 diabetes. The purpose of this study is to determine the number of women who have received screening according to CDA guidelines, and to identify possible barriers and facilitators to postpartum screening. **Methods:** Women who received prenatal GDM education from a local diabetes education centre were contacted (n=29) for a telephone interview. The information gathered in the interview was used to determine the number of women who received screening for type 2 diabetes after delivery and when this test took place. Participants were also asked to identify personal barriers or facilitators to screening. **Results:** Of those who participated (n=27), 70% reported receiving screening for type 2 diabetes; however, only 42% reported having been screened within six months postpartum. A frequently reported barrier to screening included participants' unawareness of the screening recommendation. The most frequently reported facilitator to screening was hearing the recommendation from a physician or through the diabetes education centre. **Conclusions:** Less than half of the women contacted received screening in compliance with the CDA guidelines. Local healthcare providers appear to influence whether a woman receives screening or not; consequently, efforts may be needed to increase the awareness of and adherence to the CDA guidelines among healthcare providers involved in postpartum care.

Functional Analysis of Aggressive Behaviour in Youth Inpatients with Alcohol Related Neurodevelopmental Disorder

Presenting Author

Bruce Cook, Medical Student, Northern Ontario School of Medicine

Authors

Bruce Cook, Carolyn Houlding, & Peter Braunberger

Affiliations

Northern Ontario School of Medicine

Abstract

Youth with 'Alcohol Related Neurodevelopmental Disorder' (ARND) commonly present with aggressive behaviours, which in residential or hospital facilities may result in aversive interventions (such as medical or physical restraints) and possible injury to patients, staff and/or family members. Six hundred and forty nine aggressive incidents of thirty ARND children in two programs (Assessment and Brief Treatment Residential Services (ABTRS), Dilico Anishinabek Family Care; Child and Adolescent Mental Health Unit (CAMHU), (Thunder Bay Regional Health Sciences Centre) were assessed in retrospective chart review in which antecedents; behaviours and consequences were examined using a "functional analysis" model. Results found that of the 648 aggressive incidents reviewed, the most common were verbal abuse of staff or parents (26%), physical abuse of staff or parents (19%) and minor abuse of property (16.5%) with a relatively small number of incidents directed toward peers (9%). The most frequent trigger to aggressive behaviour was 'enforcement of rules' (46%). Mood (2%) and anxiety (4%) did not feature prominently as antecedents to aggressive incidents. Limitations of the study and implications of results for the prevention and management of aggression in in-patient youth with ARND, based on antecedents and the hypothesized function, are discussed.

Use of polyphenolic compounds to treat oxidative stress-induced cytotoxicity in PC12 cells

Presenting Author

James A.G. Crispo, M.Sc. Chemical Sciences Candidate, Laurentian University/Northern Ontario School of Medicine

Authors

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Affiliations

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Abstract

Elevated reactive oxygen species (ROS) have been implicated in the pathogenesis of many diseases, including atherosclerosis and Parkinson's. Foods rich in polyphenols such as fruits, wines and teas have proven to decrease oxidative stress. Further, antioxidant properties of polyphenols increase cell viability under oxidative stress conditions and increase overall health. In the current study, 12 polyphenols were screened for their ability to increase viability in PC12 cells subject to oxidative stress induced via cobalt chloride (CoCl₂) and hydrogen peroxide (H₂O₂). Results from MTT assays show that pre-treatment with 50 µM methyl gallate increased cell viability by 26.6% (P<0.01) under H₂O₂ stress and does not increase viability under CoCl₂ stress. Pre-treatment with 100 µM epigallocatechin gallate (EGCG) increases viability 63.4% (P<0.01) compared to control, however does not increase cell viability under stress conditions. Treatments with 50 µM myricetin and gallic acid had no effect on basal viability and decreased viability when delivered as a pre-treatment prior to H₂O₂ exposure. Remaining polyphenols did not alter basal viability or increase viability under stress. Lastly, DCFDA determination of intracellular ROS confirms the ability of screened polyphenols to significantly reduce ROS levels. These results suggest that methyl gallate and EGCG may have potential therapeutic properties.

In vivo Validation of Ultrasound-based Harmonic Motion as a Control for Focused Ultrasound Therapy

Presenting Author

Laura Curiel, PhD, Thunder Bay Regional Research Institute, Thunder Bay Regional Health Sciences Centre

Authors

Laura Curiel, Yuexi Huang, Kullervo Hynynen

Affiliations

Thunder Bay Regional Research Institute

Abstract

Purpose: To use localized harmonic motion (LHM) measurements to monitor and control Focused Ultrasound (FUS) exposures in vivo. **Materials and Methods:** After approval by the institutional animal care committee, multiple FUS exposures were performed on thirteen VX2-tumors implanted on 9 rabbits. A localized oscillatory motion was generated at the same time that a FUS lesion was made. The tissue motion was estimated at different instances and the change in amplitude during the exposure was used as a control value to stop the exposure. **Results:** For all the locations where a lesion was obtained the measured maximum amplitude of the induced harmonic motion before and after the FUS was significantly lower and between 9% ($p=0.03$) and 57% ($p<0.0001$) of the amplitude before. The system successfully controlled the exposure time in 72 cases (66.7%). For the 36 (33.3%) non successful exposures, 24 (22.2%) cases showed noise or severe changes in the acquired RF signal explaining an over or underestimation of the motion and the remaining 12 (11.1%) cases had diverse causes. **Conclusion:** It is possible to validate the presence of lesion after exposure showed by comparing the amplitudes before and after exposure. The use of motion amplitude measurements during exposure as a control is generally successful but sudden change or noise in the acquired RF signal make the control fail.

Cloning and characterization of a functional *Mycobacterium tuberculosis* laccase gene

Presenting Author

Johanna DeLongchamp, M.Sc. Student, Laurentian University

Authors

Johanna DeLongchamp, Dr. Mazen Saleh, Dr. Garry D. Ferroni

Affiliations

Laurentian University Department of Biology, Northern Ontario School of Medicine Division of Medical Sciences

Abstract

The genome of *Mycobacterium tuberculosis*, causative agent of the infectious respiratory disease tuberculosis, contains a putative laccase gene which, if it encodes a functional product, may contribute to the virulence of this pathogen. Laccases are copper-containing oxygen oxidoreductases found among various plants, fungi, insects and microorganisms. These enzymes non-specifically oxidize cellular substrates such as phenolic compounds, and specifically reduce oxygen to water, thereby circumventing an oxidizing environment. It has also been demonstrated that the laccase enzyme of certain fungal strains will oxidize mammalian host cell substrates to create reactive oxygen species. This project aims to clone the putative laccase of *M. tuberculosis*, with and without its signal peptide, into the pMCO3 vector, subsequently clone this vector into *Mycoplasma capricolum* and then measure the activity of laccase under varying conditions. Characterization of an additional *M. tuberculosis* virulence factor may lead to a better appreciation of this bacterium's pathogenesis as well as aid in the development of new therapeutics. Secondly, as *M. capricolum* lacks a cell wall and is enclosed only by a single lipid bilayer, it is of considerable interest how this bacterium handles a secreted protein, as it may further our understanding of the secretory apparatus of *M. capricolum* and other cell wall-less bacteria.

Using Visual Driving Instructions to Resemble a GPS on a Simulated Driving Course

Presenting Author

Laura Diamond, Researcher, Lakehead University

Authors

Laura Diamond, MASc¹; Michel Bédard, PhD¹⁻³; Bruce Weaver, MSc^{1,2}; Nadia Mullen, PhD¹; Michel Johnson, PhD⁴

Affiliations

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Abstract

New in-vehicle technologies, such as Global Positioning Systems (GPS's), force drivers to spend time looking away from the road while driving. The purpose of this study was to (1) determine the feasibility of using ocular electromyography to measure eye movement during simulated driving, (2) quantify the amount of time drivers spend looking away from the road at the visual instructions while driving in the simulator, (3) determine the effect of auditory and visual instructions on simulated driving performance. Ocular electromyography was used to track the gaze of thirty participants during a simulated drive. The participants were divided into three groups: GPS, Windshield, and Control. The driving simulator was programmed to replicate a GPS's visual driving instructions in the lower right hand corner of the screen (GPS) or in the middle of the screen (Windshield). The Control group received auditory turning instructions. Gaze presence, latency, and length were measured for 12 randomly selected visual instructions that occurred during the drive. The GPS group looked away from the road to the right during the time of instruction a mean of 8.4 times; this was significantly more ($p < 0.05$) than the other two groups (Windshield 1.0 times, Control 1.3 times). There were no significant differences between the groups with respect to gaze length or latency. The GPS group had a significantly higher ($p < 0.05$) total time gazing away from the road to the right during three seconds following 12 selected events. The Windshield group had significantly more ($p < 0.05$) driving mistakes than the other two groups.

New Insights for Pain Management: Multi-potent Neurotrophin Antagonist Targets Brain-Derived Neurotrophic Factor and Nerve Growth Factor

Presenting Author

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Authors

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Abstract

Brain-derived neurotrophic factor (BDNF) and nerve growth factor (NGF) are members of the neurotrophin family which normally play a role in the development and maintenance of the nervous system. However, neurotrophin dysregulation in either the peripheral nervous system (primarily NGF) and the central nervous system (primarily BDNF) are known to significantly promote neuropathic and inflammatory pain. Despite their central role in the nervous system, neurotrophins have proven to be an elusive pharmacological target. Y1036, binds BDNF and NGF preventing either the neurotrophin from interacting with their obligate receptor(s). Y1036 prevents both BDNF- and NGF-mediated trk activation and downstream activation of the p44/42 MAPK pathway. Identification of a BDNF- and NGF-specific antagonist is of considerable interest in the study and treatment of diseases where dysregulation of multiple neurotrophins has been implicated, including pain.

Edge Devices, Edge Services

Presenting Author

Dr. Rachel Ellaway, Assistant Dean, Education Informatics, Northern Ontario School of Medicine

Authors

Rachel Ellaway, David Topps

Affiliations

Northern Ontario School of Medicine

Abstract

There are many modes of simulation (role play, device-based, on-screen, PBL) and there are many simulation devices (mannequins, task trainers, virtual patients), typically used one at a time and independently. However, the integration of simulation and simulation-enabled learning environments is a growing need from educators and assessors as the limitations of these isolated simulation modalities increasingly limit the ways in which they can be used. The Healthcare Services Virtual Organization (HSVO) is a CANARIE-funded 24 month project involving NOSM, McGill, Lakehead, iDeal, CRC Ottawa, NRC Fredericton, liL, Stanford, and LaCrosse Wisconsin. The core part of this project is to create a set of networked-enabled platforms that allow participants working remotely from each other to access and even control a heterogeneous range of physical and electronic resources and devices particularly when such collaboration involves the rapid exchange of large amounts of data. Technically this involves the development of a stack of technologies, each of which enables the one above it. Use cases for the HSVO network-enabled platform including: Collocated learners prompted to move from device to device, their progression as reflected in the data and the scenario they are working on preceding them from device to device Distributed learners use the same mannequin, some physically (role playing paramedics) and others remotely (role playing physicians and nurses at the nearby hospital) with a tutor working remotely from both other groups This presentation will outline HSVO's research and development and demonstrate some of the tools and techniques developed so far.

Assessing Attitude Changes in Undergraduate Medical Learners

Presenting Author

Siobhan Farrell, Manager of Community-Based Learning, Northern Ontario School of Medicine

Authors

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Affiliations

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Abstract

Background: Community Learning Sessions (CLS) are a mandatory component of Years 1 and 2 of the NOSM medical undergraduate curriculum, incorporating interprofessionalism and distributed community-engaged learning. Specialty Enhancement Sessions (SES) continues this process in Phase 2 (Year 3), but in a more active fashion. CLS and SES are provided in physician/specialist, interprofessional, and community/social service sites. Evidence suggests that learners initially underestimate the value of community-based experiences with non-physician health providers. However, over time, learners develop a greater understanding, appreciation and knowledge base with respect to the role and value of other health professionals and social service workers as they have greater exposure to a variety of sites and staff. The presentation will provide a description of an upcoming survey of learners in all four years of the undergraduate curriculum. **Methods:** The presentation will include a brief overview of CLS and SES, the purpose of the research, goals of the survey and report on: 1. student perceptions regarding their experiences; 2. how previous health care employment and education impact on this process 3. how perceptions change over the course of the four years, and what students report regarding trust, conflict resolution and other interprofessional competencies **Results and Conclusions:** This descriptive presentation will provide a perspective on undergraduate medical learners in CLS and SES, while the evaluative component will be forthcoming. Potential future directions to enhance learning will also be discussed, including changes in assessing learner activities and integration of service learning.

Cultural Border Crossing and Science Assessments

Presenting Author

John Friesen, Coordinator of Evaluation, Northern Ontario School of Medicine

Authors

John Friesen

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Lakehead University, Faculty of Education

Abstract

This research focuses on determining best teaching practices to minimize cultural border crossing which occurs when students from non-Western cultures, like Aboriginal cultures, are confronted with the language and conventions of many Euro-American teachers in science classrooms. I argue that science educators must strive for minimizing the adverse effects of cultural border crossing by increasing the cultural responsiveness of their science instruction and assessment practices in order to develop meaningful and visible connections between Western science and Aboriginal science. Collateral learning, which provides the cognitive explanation for cultural border crossing, and other sociocultural perspectives of cognitive theory are explored. Assessment in science must include a student's cultural view as a starting point for the creation of appropriate assessments. Teachers need knowledge and an understanding of Aboriginal science in order to integrate traditional ecological knowledge, TEK, into the science curriculum so as to assess students in ways that are culturally valid for Aboriginal students. Teaching material, lesson plans, and assessment tools must include discussions of and reference to Aboriginal science as well as Western science.

Lung Epithelial Cell Inflammatory Responses to Clinical Isolates of *Pseudomonas aeruginosa*

Presenting Author

Sean K. Gravelle, Medical Student, Northern Ontario School of Medicine

Authors

S.K. Gravelle¹, R. J. Barnes¹, N. Hawdon¹, H. K. Johansen², N. Høiby², M. Ulanova¹

Affiliations

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Abstract

Pseudomonas aeruginosa is an opportunistic pathogen that is the leading cause of chronic pulmonary infection in cystic fibrosis (CF) patients. In the process of CF chronic pulmonary disease, the bacteria significantly change their phenotype as an adaptation to both host defence mechanisms and antibacterial therapy. These changes can include loss of virulence factors and conversion to mucoidy, however the effect of these changes on cellular responses to bacteria is incompletely understood. To address this question we infected A549 pneumocytes with 12 genotypically and phenotypically characterized isolates of *P. aeruginosa* from CF patients obtained during longitudinal observation, as well as reference *P. aeruginosa* strain PAK and isogenic mutants lacking pili, LPS, or flagella. Following infection we examined the production of pro-inflammatory cytokines (IL-1 beta, IL-6, GM-CSF, and TNF-alpha) and reactive oxygen species (ROS), and Beta1 integrin surface expression. We found that *P. aeruginosa* strain PAK infection caused significant production of cytokines and ROS, while these responses were not seen in the mutants lacking specific virulence factors. Furthermore, both mucoid and non-mucoid clinical isolates showed decreased ROS production, but increased production of IL-6 and GM-CSF. Our findings suggest that loss of virulence factors and phenotypic changes over the course of chronic infection result in altered host responses to *P. aeruginosa* and may provide survival advantages to the pathogen.

Funding: NSERC Discovery Grant (M.U.), NSERC Undergraduate Research Award (S.K.G.), NSERC Studentship and OGS (R.J.B.)

Comparison of EMS utilization on and off aboriginal reserves

Presenting Author

Steven Green, Northern Ontario School of Medicine and Thunder Bay Regional Health Sciences Center

Authors

Steven Green, Damian MacDonald, Tyler MacGregor

Affiliations

Northern Ontario School of Medicine and Thunder Bay Regional Health Sciences Center

Abstract

Background: Presently the Emergency Medical Services (EMS) utilization patterns of Canada's on-reserve aboriginal populations are not well characterized.

Purpose: To identify and compare EMS utilization patterns of an on-reserve population, Fort William Indian Reserve 52 (FWIR 52), and an off-reserve population, Forward Sortation Area P7K (FSA P7K), within the city of Thunder Bay.

Methods: The electronic medical record (EMR) at Thunder Bay Regional Health Sciences Center was searched for all calls originating from FWIR 52 and FSA P7K between 01 Jan 2007 and 31 Dec 2007, inclusive. Data extracted from the EMR included patient age, sex, chief complaint, and response interval (time between receipt of a call and EMS arrival on scene). Descriptive statistics were generated.

Results: FWIR 52 had a higher EMS utilization rate (EMS calls divided by population) than FSA P7K (8.8% vs 4.4%, $p < 0.001$). FWIR 52 had a higher proportion of cancelled calls (15% vs 0%, $p < 0.001$). Mean response intervals (12.13 min vs 12.47 min, $p = 0.54$) were similar between the groups. Patients from FWIR 52 were younger (median age 24.5 vs 64.0, $p < 0.001$) and more likely to be male (62.3% vs 45.0%, $p = 0.01$). There was no significant difference in the frequency of various chief complaints between the groups.

Conclusions: The on-reserve population of Thunder Bay utilizes EMS twice as frequently as the off-reserve population, and more frequently cancels calls prior to EMS arrival. Accessibility to EMS, represented by mean response intervals, is similar between the groups. Further research is needed to ascertain reasons for the observed differences.

Accuracy of Patients' Self-estimates of Weight in Outpatient Echocardiography

Presenting Author

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Authors

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Affiliations

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Abstract

117 consecutive outpatients who presented for transthoracic echocardiography estimated their own weight before their procedures. This parameter was then measured by the sonographer. 4 Patients could not state their weight. Of the 113 patients who furnished estimates, 5 estimated their weight in kilograms, the others in pounds and ounces. Data were converted to metric for analysis. The range of error in weight self-estimate was large, ranging from -8.17 kg to +7.71 kg. Mean estimated weight was 79.3 kg (SD=17.2, 95% CI= +/- 3.2 kg). Mean measured weight was 80.3 kg (SD=17.3, 95% CI= +/-3.2 kg). In comparison by a paired t test, the difference between the means was not statistically significant (two-sided P=0.69). Among echocardiography outpatients, the error in weight self estimation can be very large for an individual patient; but considered as a group, the errors are not systematic. This finding stands in contrast to obesity clinics, where patients tend to underestimate their own weight, and to studies of anorexia nervosa, in which patients tend to overestimate. In echocardiography, where weight is not the primary reason for the investigation, it appears that no correction factor can be applied to improve the accuracy of patients' self-estimates of their weight. Several useful parameters in echocardiography (stroke volume index, left ventricular mass index and left atrial volume index) are partly derived from weight. The results of this study suggest that weights must be measured, not estimated by the patients, in echocardiography labs if accurate results are to be obtained.

Pseudomonas aeruginosa Strains Isolated from Chronically Infected CF Patients Show Reduced Abilities to Interact with Lung Cells

Presenting Author

Nicole Hawdon, Lakehead University

Authors

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Affiliations

1. Northern Ontario School of Medicine, Lakehead University; 2. Copenhagen University Hospital

Abstract

Pseudomonas aeruginosa is the leading cause of chronic pulmonary infection in cystic fibrosis (CF) patients. In the process of CF pulmonary disease, the bacteria lose some virulence factors and convert to a mucoid phenotype. The effect of such phenotypic alterations on innate immune responses is poorly understood. We infected A549 pneumocytes with 27 isolates of *P. aeruginosa* from CF patients obtained during longitudinal observation, or with a reference *P. aeruginosa* strain PAK, or its isogenic mutants lacking virulence factors pili, flagella, or LPS. We assessed *P. aeruginosa* adhesion and internalization as these processes are potentially involved in bacterial clearance. Following infection, we examined the apoptosis of epithelial cells based on activation of caspase-3/7 and Annexin V binding. We found that *P. aeruginosa* strains significantly differed in their abilities to interact with epithelial cells. Similarly to the mutant strains, *P. aeruginosa* from chronically infected patients showed decreased adherence and internalization of A549 cells compared to bacteria from intermittently colonized patients. Both mutant strains and clinical isolates from CF patients with chronic *P. aeruginosa* infection caused lower apoptosis compared to wild type PAK. It has been suggested that bacterial internalization that results in apoptosis of infected cells can trigger innate immune defence mechanisms. We hypothesize that in CF lung, selection of strains that have reduced abilities to become internalized by epithelial cells may contribute to the establishing of chronic *P. aeruginosa* pulmonary disease. Funding: NSERC Discovery Grant and Lakehead University Biotechnology Program

Role of Aldo-Keto Reductases in Resistance to Doxorubicin and Epirubicin in MCF-7 breast cancer cells

Presenting Author

Allan Heibein, H.BSc., Department of Biology, Laurentian University

Authors

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Affiliations

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Abstract

Breast cancer is the most common form of cancer among women in Canada. While the growth of breast tumours can be strongly inhibited by the chemotherapy drugs doxorubicin and epirubicin, their administration to patients can cause resistance to these and other chemotherapy agents, resulting in failure of therapy. Our lab created variants of the MCF-7 breast adenocarcinoma cell line that are resistant to doxorubicin or to epirubicin (MCF-7DOX and MCF-7EPI cells, respectively). Subsequent microarray analysis identified certain members of a family of drug metabolizing enzymes, the Aldo-Keto Reductases, whose expression is upregulated in resistant cells compared to drug sensitive control (MCF-7CC) cells. AKRs are known to convert doxorubicin or epirubicin into 10-fold less toxic 13-hydroxymetabolites (doxorubicinol and epirubicinol, respectively). This study used isoform-specific qPCR to show that AKR1C2, AKR1C3, and AKR1B10 are indeed overexpressed in the MCF-7DOX and MCF-7EPI cell lines. Determination of intracellular doxorubicin and doxorubicinol via HPLC showed reduced levels of doxorubicin in MCF-7DOX and MCF-7EPI cells compared to MCF-7CC cells. Co-treatment of the cells with doxorubicin and the AKR1C inhibitor 5(beta)-cholanic acid resulted in increased intracellular levels of doxorubicin in MCF-7CC and MCF-7DOX cells, but not in MCF-7EPI cells. Cotreatment with cyclosporin A, an ABC drug transporter inhibitor, increased intracellular doxorubicin levels across all cell lines. Curiously, no significant changes in doxorubicinol levels were found across treatments or cell lines. Ongoing studies continue to investigate the relative roles which drug transporters and various AKR isoforms play in mediating resistance to doxorubicin and epirubicin in breast tumour cells.

SELECTED ION FLOW TUBE-MASS SPECTROMETRY: HEADSPACE ANALYSIS OF POLYGALA SENEGA, VALERIANA OFFICINALIS AND CANNABIS SATIVA

Presenting Author

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Authors

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Abstract

We are utilizing selected ion flow tube-mass spectrometry (SIFT-MS) to detect and identify volatile organic compounds (VOCs) emitted from *Polygala senega*, *Valeriana officinalis* and *Cannabis sativa*. Fresh plant material from each species was analyzed using SIFT-MS, resulting in complex mass spectra. Standard compounds were analysed to develop a library of individual spectra compounds. The data library product ions will be correlated to real time spectra plant material. SIFT-MS has many advantageous features which makes it an ideal device for natural product research. SIFT can be further used as a diagnostic tool to quantify compounds of interest, examine how plant developmental changes affect the presence and quantity of known VOCs and possibly discover novel compounds beneficial to flavour, cosmetic and pharmaceutical industries.

An Examination of Unmet Need in Primary Care Psychiatry

Presenting Author

Janelle A. Jarva, Research Assistant, St. Joseph's Care Group

Authors

Janelle A. Jarva & John M. Haggarty

Affiliations

St. Joseph's Care Group

Abstract

Background: There is a lack of literature involving the analysis of differences between individuals referred and treated at a shared care program, and those referred but not treated, an important factor in determining unmet need. The Shared Mental Health Care Service (SMHCS) provides psychiatric consultation and counselling within a primary care clinic. The purpose of this study is to compare those seen and those not seen for treatment in order to examine what needs are not being met by the SMHCS. **Method:** From July 2001 to May 2007, primary care physicians referred 2220 individuals to the SMHCS. Of the group of 2105 individuals with closed files, 1655 (78.6%) were seen for treatment and 450 (21.4%) were not seen for treatment. The two groups were compared using information provided by the primary care physician at the time of the referral. **Results:** Individuals not seen for treatment were slightly younger, and had higher levels of both psychiatric and psychosocial symptoms, than those seen for treatment. Those not seen for treatment were more likely than those who were to report: mood fluctuations; panic symptoms, personality problems, substance abuse problems, parent-child issues, family problems, unemployment, and financial issues. Those not seen for treatment were less likely to report alcohol abuse in a family member, and less likely to request advice regarding medication. **Conclusions:** There were differences between compare those seen and those not seen for treatment, with those who were not seen having higher levels of symptoms and higher likelihood of reporting certain symptoms.

Curcumin as a Potential Spleen Tyrosine Kinase Inhibitor in Cellular Responses to *Pseudomonas aeruginosa*

Presenting Author

Sarah Khan

Authors

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Affiliations

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Abstract

Spleen tyrosine kinase (Syk) is a non-receptor tyrosine kinase that has been recently recognized as a regulator of lung epithelial cell inflammatory responses. The food derivative curcumin has been shown to inhibit Syk kinase activity in various cell types but its effect has not been addressed either in bacterial infection models, or in the lung epithelium. We have developed an in vitro model to investigate the effect of curcumin on H292 human lung epithelial cells infected with *Pseudomonas aeruginosa*, in particular on inflammatory responses and changes in Syk activity. Experimental design: H292 cells pretreated with curcumin for 24 h are stimulated with *P. aeruginosa*. To determine the role of Syk in survival of infected cells, cell viability is measured following 18 h bacterial stimulation with or without curcumin treatment. Expression of an adhesion molecule ICAM-1 is studied to measure inflammatory response. We hypothesize that curcumin will inhibit Syk leading to a decrease in cellular inflammatory response and an improved cell survival. The expected results will indicate whether Syk is a promising therapeutic target in pulmonary infections. Funding: Ontario Lung Association and Northern Ontario School of Medicine Faculty Association Research Development Award

Radiation response in BRCA1 g.56490A>G mutation carriers

Presenting Author

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Authors

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Affiliations

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Abstract

Inherited germline mutations in the BRCA1 gene (BRCA1 susceptibility gene 1) lead to an increased risk for various cancers. The BRCA1 g.56490A>G mutation affects the splicing efficiency of mRNA in the region of exon 17 of the BRCA1 gene, and is classified as a mutation of unknown clinical significance. In this study, we compared the cellular response to ionizing radiation (IR) in lymphocytes isolated from breast cancer patients with the BRCA1 g.56490A>G germline mutation, healthy individuals from the same family who are not mutation carriers, and unrelated healthy controls. The MTT cell viability results show a greater decrease in cell viability in lymphocytes from individuals carrying the germline BRCA1 g.56490A>G mutation upon IR exposure. The IR-induced loss of viability correlated with an increase in DNA damage as measured by the comet assay. Measurement of gamma-H2A.X, an indicator of DNA double-strand breaks, also showed that lymphocytes from individuals with the BRCA1 g.56490A>G mutation were more sensitive to the DNA damaging effects of IR. These results suggest that the BRCA1 g.56490A>G mutation is a clinically significant splice site mutation. (Funding: NCRF and NOSM)

Modulation of the Expression of Bcl-2 Family Proteins in Breast Cancer Cells by ERK inhibition

Presenting Author

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Authors

Tom Kovala and Josée Poulin

Affiliations

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Abstract

Cell survival and proliferation is regulated by the extracellular signal-regulated kinase (ERK) pathway, a pathway which is often dysregulated in cancer cells. The inhibition of ERK kinase activity with the drug SU1498 has been demonstrated to sensitize breast cancer cells with constitutively active ERK to a form of cell death referred to as apoptosis. To identify the mechanisms involved, the expression of both anti-apoptotic (Bcl-2 and Bcl-xL) and pro-apoptotic (Bad, Bax, Bik and Bak) members of the Bcl-2 family of proteins were examined under conditions that favoured apoptosis. One “normal” breast cell line (MCF-10A) and three breast cancer cell lines (MCF 7, MDA-MB-231 and MDA-MB-468) were used to examine the effects of SU1498 and serum starvation on the expression of the Bcl-2 family proteins. The MCF-10A and MCF7 cells exhibited normal ERK regulation while the MDA-MB-231 and MDA-MB-468 cell lines had a constitutively activated ERK. Across all the cell lines, the combined treatments resulted in either decreased expression, or no changes in the expression, of the anti-apoptotic Bcl2 proteins. The expression of the pro-apoptotic proteins Bad or Bak were dramatically upregulated only in those cells with constitutive ERK activation, while they tended to demonstrate reduced expression in the cell lines with normal ERK regulation. The cell lines that upregulated Bad and/or Bak expression were also those most sensitive to SU1498 induced cell death. The ability of SU1498 to sensitize breast cancer cells to apoptosis by inhibition of ERK may have therapeutic uses.

An isoform of actin is associated with the cancer status of ovarian and breast epithelial cells

Presenting Author

Carita Lannér, Associate Professor, Molecular Genetics, Medical Sciences, NOSM

Authors

Carita Lannér¹, Laurie Turcotte¹, Amanda Boyle¹, Hailey Hobbs¹, Nicole Gauthier¹, Heather Peltsch¹, Facundo Cutuli¹, Stanislav Naryzhny², and Hoyun Lee².

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Abstract

An isoform of actin that appears to be associated with non-malignant ovarian and breast epithelial cells was detected in a study investigating whether cancer specific forms of the DNA replication processivity factor PCNA (proliferating cell nuclear antigen) occurred in ovarian and breast cancer materials. The actin isoform may contribute to the transition to malignancy and has potential as a biomarker for the cancer status of ovarian and breast epithelial cells. The novel isoform of actin was detected using an antibody (B1 antibody) generated against the interdomain connector loop in PCNA, an important binding domain involved in coordinating the activity of DNA polymerase and ligase. Since PCNA does not share significant sequence homology with any actin proteins, a local alignment between PCNA and beta-actin was performed using two programs (LALIGN and EMBOSS-Align) to determine if there might be significant homology between any domains in PCNA and beta-actin. Both programs detected a ten residue area (aa 358-368) of overlap with 50% homology between PCNA and beta-actin. The sequence of this region was used to generate another antibody specific for the overlap region. This antibody, ACTB358, is currently being investigated for binding specificity. In addition, using MALDI-TOF analysis, the B1 actin isoform from non-malignant immortalized breast epithelial cells exhibited a different peptide than spectra acquired from malignant epithelial cultures, indicating that the region between residues 358-368 may be differently modified in non-malignant and malignant cells.

The Role of Antioxidants in Chemotherapy

Presenting Author

Patricia Lyle

Authors

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Affiliations

Northern Ontario School of Medicine and Department of Biology, Lakehead University

Abstract

The role of antioxidants in chemotherapy. Patricia Lyle, Panagiotis Mitsopoulos, Zacharias Suntres, Northern Ontario School of Medicine and Department of Biology, Lakehead University. Taxol is known to inhibit cell growth and trigger significant apoptosis in various cancer cells. The primary mechanism of action of taxol involves suppression of spindle microtubule dynamics. It has also been found that the generation of reactive oxygen species (ROS) in different tumour cells was also increased by taxol treatment. ROS have been shown to cause both apoptotic and necrotic cell death. Antioxidants, such as N-acetylcysteine (NAC), are molecules known to prevent the effects of ROS. Accordingly, it was hypothesized that antioxidants would hinder a chemotherapeutic agent's actions in cancer treatment. In this study, A549 lung cancer cells were used to determine if NAC interferes with taxol's chemotherapeutic actions. Initially, the optimum concentrations of taxol and NAC on cell viabilities were established. In subsequent experiments, cells were pre-treated with 5.0 mM NAC for 4 hours and later were challenged with 1.0 μ M taxol for 6 and 9 hours. Treatment of cells with NAC did not have any significant effect on cell viability. Challenge of cells with taxol resulted in a dose- and time-dependent decreases in cell viability. However, pre-treatment of cells with NAC did not alter the taxol-induced changes in cell viability. These preliminary results showed that the antioxidant NAC does not alter the cytotoxicity of taxol in vitro.

The Effect of Titanium Dioxide and Platinum Coated Titanium Dioxide Nanoparticles on Cardiomyocytes

Presenting Author

Adiel Mallik

Authors

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Affiliations

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Abstract

Titanium dioxide (TiO₂) nanoparticles are currently used in many consumer products. However, recent studies have shown that TiO₂ nanoparticles can be cytotoxic. TiO₂ nanoparticles can be absorbed through inhalation, ingestion and dermal penetration, and can be distributed to many key organs such as the lung, lymph nodes, liver, kidney and brain. However, the potential effect of TiO₂ nanoparticles on the heart has not been investigated. The purpose of this study is to evaluate the effects of both TiO₂ and platinum (Pt)-coated TiO₂ nanoparticles on H9c2 cardiomyocytes. The cellular uptake of both TiO₂ and Pt-coated TiO₂ nanoparticles was measured via flow cytometry. Our results indicate that TiO₂ nanoparticles were taken up by H9c2 cells at a concentration range of 50-100 µg/mL. The influence of TiO₂ and Pt-coated TiO₂ nanoparticles on cell viability was assessed using MTT and AlamarBlue assays, and revealed a dose-dependent decline in cell viability. Evaluation via 2',7'-dichlorofluorescein diacetate (DCFDA) assay for oxidative stress and Annexin-V for apoptosis are currently underway to further determine the nature and mechanism(s) of TiO₂ nanoparticle cardiotoxicity. (Funding: This work was supported by a NSERC Discovery Grant and the NOSM. A. Mallik acknowledges the NSERC Undergraduate Student Research Award).

The role of free- and liposomal-N-acetylcysteine in paraquat-induced cytotoxicity

Presenting Author

Panagiotis Mitsopoulos

Authors

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Abstract

Paraquat (PQ), one of the most commonly used herbicides worldwide, is highly toxic to humans and exposure can result in severe clinical situations with no effective treatments available. The primary injury occurs in the lung, where it is able to continuously produce damaging reactive oxygen species (ROS) via redox cycling. Oxidants have been shown to induce the expression of several early response genes and to activate transcription factors, which may contribute to the inflammatory response associated with PQ injury. Recognizing that ROS play a major role in PQ-induced cytotoxicity, modulating the levels of antioxidants may serve as a potential treatment strategy. Since the delivery of many natural antioxidants exhibit poor bioavailability and cannot easily cross biological barriers, we investigated the in vitro effects of the thiol-containing antioxidant N-acetylcysteine (NAC) delivered to human alveolar epithelial A549 cells either in its free or liposome-encapsulated form (L-NAC). Liposomes are phospholipid vesicles used to encapsulate agents for enhanced delivery. Incubation of cells with PQ resulted in time- and concentration-dependent increases in intracellular PQ levels, with concomitant decreases in cell viability and glutathione content. Pre-incubation of cells with NAC or L-NAC protected against PQ-induced cytotoxicity (i.e. decreased ROS levels, increased thiol content and cell viability), which was more evident in cells pre-treated with L-NAC. Messenger RNA analysis revealed differential expression of inflammatory, apoptotic, and oxidative stress-related genes, and, coupled with current research into cytokine analysis, this may provide insight into the mechanisms of NAC cytoprotection. This work is supported by NSERC

Synthetic Saponin Analogues and Anticancer Activity

Presenting Author

Mac Mok

Authors

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Abstract

Saponins are glycosides commonly found in higher plants and marine organisms. The structure of a saponin consists of either a steroidal (27 carbon) or triterpenoidal (30 carbon) aglycone covalently linked to a varying number of sugar chains. Many combinations between sugar and aglycone are possible, producing saponins with a wide range of biological activities. Some saponins have been observed to possess anti-tumor properties either by arresting the cell cycle or by inducing apoptosis. Here we describe the synthesis of three new saponin analogues (1-3) and their anticancer activity.

Regulation of the phenylethanolamine N-methyltransferase gene in the heart of the spontaneously hypertensive rat

Presenting Author

Heather Peltsch

Authors

Heather Peltsch (1,3), C. Bizier (2), P. Nguyen (1,3), J. de Wit (1), A. Wharton (2), J. Crispo (2, 3), J. Eibl (3) and T.C Tai (1,3)

Affiliations

(1) Biology, Laurentian University, (2) Chemistry and Biochemistry, Laurentian University, (3) Medical Sciences Division, Northern Ontario School of Medicine

Abstract

Phenylethanolamine N-methyltransferase (PNMT) is the terminal enzyme in the catecholamine biosynthetic pathway involved in the synthesis of epinephrine from norepinephrine. Recent studies have identified cardiac PNMT and endogenous epinephrine in the heart. Genetic mapping studies have linked the PNMT gene to hypertension, and elevated PNMT levels are associated with higher blood pressure in hypertensive rats. The current study examined the expression of the cardiac PNMT gene in the genetic rodent model of hypertension, and associated changes in transcriptional regulators of the gene. Results show upregulation of PNMT mRNA in all four chambers of the heart in spontaneously hypertensive rats (SHR) compared to the normotensive Wistar-Kyoto (WKY) rats, with the greatest fold change in the right atrium (RA) ($p < 0.01$). The transcription factors Egr-1, Sp1, AP2 and the glucocorticoid receptor (GR) have been previously shown to be key regulators of the PNMT gene promoter. RT-PCR analyses show significant increases in Sp1 mRNA ($p < 0.01$) in all chambers of the heart of SHR. Further, Egr-1, AP2 and GR mRNA were upregulated in hearts of SHR ($p < 0.05$) compared to WKY. Western blot analysis showed significant increases in Sp1 in SHR for the RA, and the left and right ventricles. Egr-1 protein paralleled mRNA expression in SHR; in contrast, GR protein levels did not parallel mRNA expression in SHR. These results show that PNMT gene expression is elevated in SHR, and is likely mediated by altered transcriptional regulation of PNMT in the heart.

mode conversion: A numerical study.-A 2D-array for transcranial ultrasound focusing using shear

Presenting Author

Samuel Pichardo, Scientist, Thunder Bay Regional Research Institute

Authors

Samuel Pichardo

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Thunder Bay Regional Research Institute, Electrical Engineering Department of Lakehead University

Abstract

After considering the skull as a solid, an incident ultrasonic acoustic wave with a frequency around 1 MHz creates longitudinal and shear waves inside the skull. Both waves propagate independently through the skull and create two longitudinal waves after the skull: a purely-longitudinal wave and a longitudinal-shear-longitudinal wave. The process of the last wave is identified here as the shear-mode conversion (Sc). The interest of developing ultrasound techniques based on Sc resides in the fact that the transmitted wave due to Sc has less phase-shift. The present study shows the feasibility of focusing ultrasound after the skull using a 2D array (ScTX) conceived to take advantage of the Sc and with dimensions comparable to near-flat skull regions such as the anterior part of the frontal bone. Results showed that focus steering by using the Sc correction was feasible in the tissue located at 1, 2 and 4cm from the inner face of the skull. The ScTX device produced sharper focused fields compared to a conventional array.

Effects of polyphenolic compound pre-treatment on oxidative stress-induced apoptosis in PC12 cells

Presenting Author

Matthew Piché, Undergraduate Student, Laurentian University/Northern Ontario School of Medicine

Authors

M. Piché, J. Crispo, J. Eibl, D. Ansell, G.M. Ross, T.C. Tai

Affiliations

Division of Medical Sciences (NOSM), Department of Biology (Laurentian University)

Abstract

Apoptosis is a mechanism of controlled cell death which is critical to a variety of physiological and pathological processes such as proper immune system function, ischemic disease and organ transplantation. During the early stages of apoptosis, phosphatidylserine (PS) is translocated from the inner layer of the plasma membrane to the outer layer, thereby exposing PS to the cell's external surface, allowing for the quantification of apoptotic cells via flow-cytometry. Apoptosis is mediated by hypoxic/ischemic conditions and is accompanied by the production of reactive oxygen species (ROS) which alter the structure and function of DNA, lipids, and proteins as well as activate the apoptotic signalling cascade within the mitochondrial-mediated pathway. ROS have been linked to neurodegenerative diseases such as Parkinson's disease and Alzheimer's disease among others. Polyphenolic compounds have been shown to increase cell viability, reduce ROS production and are readily available in fruits, wines, coffees and teas. In the present study, polyphenolic compounds were screened for the ability to attenuate oxidative stress-induced apoptosis in PC12 cells subjected to oxidative stress insult induced via cobalt chloride (CoCl₂) and hydrogen peroxide (H₂O₂). Preliminary results from Annexin-V-PI staining indicate that N-acetyl-cysteine pre-treatment reduces H₂O₂ induced apoptosis 3 fold and leads to a 2 fold reduction in CoCl₂ induced apoptosis. EGCG and gallic acid pre-treatment followed by H₂O₂ insult lead to a 1.5 and 1.7 fold increase in apoptosis respectively when compared to H₂O₂ treatment on its own, with no effect on CoCl₂ treated cells, suggesting a unique mechanism for H₂O₂ mediated apoptosis.

Developing Palliative Care in First Nations Communities: Participatory Action Research in Northwestern Ontario

Presenting Author

Holly Prince, MSW, Aboriginal Research Coordinator, Centre for Education and Research on Aging and Health, Lakehead University

Authors

Holly Prince, MSW and Mary Lou Kelley, MSW, PhD

Affiliations

Kenora Chiefs Advisory, Kenora, Ontario and the Gizhewaadiziwin Health Access Centre, Fort Frances, Ontario

Abstract

The First Nation population is aging, and the incidence of chronic and terminal disease is increasing. Providing palliative care is a challenge in all rural and remote communities when there are no specialized programs and no providers with palliative care training. In particular, many First Nations communities have minimal health care infrastructure and limited access to services. There is also currently little research evidence to guide the development of palliative care programs within First Nations communities. This project begins to provide evidence and a community capacity development approach to addressing these gaps in knowledge by implementing and evaluating a conceptual model for developing palliative care programs. This poster will present an approach to developing palliative care in First Nations communities based on five years of research working with twelve First Nations communities in Northwestern Ontario. It will present an original model for developing and delivering palliative care in rural and remote communities based on concepts and principles of community capacity building. The model includes four sequential phases: assessing and strengthening antecedent community conditions; creating a local catalyst for change, forming the local community team and growing the local program. It will then describe the activities and findings of our current participatory action research project with First Nations communities which are guided by this model. Participatory action research interventions used to implement the model were providing education, mentorship and facilitating collaborative practice.

A preliminary study of oral and lung breath in patients with oral malodour using selected ion flow tube mass spectrometry.

Presenting Author

Brian Ross, Professor, Northern Ontario School of Medicine

Authors

Neema Dadgostar, Lynda McKeown, Marlene Bloom and Brian M. Ross

Affiliations

Division of Medical Sciences, Northern Ontario School of Medicine and Breath Odour Clinic, Thunder Bay.

Abstract

Oral malodour is a common disorder predominantly caused by bacterial metabolism of food stuffs in the mouth. It is routinely diagnosed and monitored by either subjective rating or the measurement of oral volatile sulphur compound (VSC) levels. Non-sulphur compounds are also believed to contribute significantly to the condition although there is currently no straightforward means to assess their levels. In this study we utilized Selective Flow Tube Mass Spectrometry (SIFT-MS) to measure, in real time, a range of sulphur and non-sulphur containing compounds in oral air to determine whether the technique can be used to objectively monitor oral malodour. Oral malodour was assessed using organoleptic scores in subjects with and without a history of oral malodour (n=18) by a trained rater, while the chemical composition of oral air was analysed by both a VSC sensor and SIFT-MS. Total VSC levels were significantly correlated with levels of hydrogen sulphide and methylmercaptan measured by SIFT-MS, but not with organoleptic scores. In subjects with elevated organoleptic score only levels of methylmercaptan were significantly elevated. In three subjects with elevated tongue organoleptic scores but normal total VSC levels, SIFT-MS suggested that one subject possessed high levels of oral acetone while another had high oral levels of acetic acid. Our data suggest that SIFT-MS can be used to assess a wide range of compounds in oral air in addition to VSC to provide a clearer picture of the chemical nature of malodour. This may assist in the diagnosis and monitoring of the condition

The Regulation of Gene Expression by Sphingosine 1-Phosphate in Endothelial Cell

Presenting Author

Laura Rossi, MSC Candidate, Laurentian University, NOSM

Authors

Laura Rossi and Tom Kovala

Affiliations

NOSM, Department of Chemistry and Biochemistry, Laurentian University

Abstract

Angiogenesis is the formation of new blood vessels from pre-existing ones, a process imperative for development and maintenance of tissues and organs in vascularized organisms. There are a number of well characterized factors that have been shown to stimulate the angiogenic response in endothelial cells, the most prevalent being vascular endothelial growth factor (VEGF). Research has shown an intrinsic link between some of the signaling mechanisms initiated by VEGF and sphingosine-1-phosphate (S1P), a potent lipid bioactivator of angiogenesis. Stimulation of human umbilical vein endothelial cells (HUVECs) with either VEGF or S1P activates Janus kinase (JAK)-1 and JAK-2; both are activators of signal transducers and activators of transcription (STAT) proteins, which alter gene expression. While Src kinase activation is required by either stimulus to activate the JAKs, the S1P-induced JAK activation is inhibited by pertussis toxin while VEGF-induced signaling is not. Inhibition of VEGF receptor-2 (VEGFR-2) also blocks JAK activation by either stimulus, indicating that VEGFR-2 transactivation is required for S1P signaling to JAK kinases. Given that VEGF and S1P are strong inducers of angiogenesis, and that the JAK/STAT pathway is involved in the regulation of gene expression, we have screened for changes in gene expression of soluble growth factors and cytokines in cells stimulated by either S1P or VEGF. Given the role of endothelial cells in pathological conditions such as diabetes and atherosclerosis, identification of the molecular mechanisms involved in regulating endothelial function will provide novel targets for therapeutic intervention.

The Role of Integrin Receptors in the Internalization of *Pseudomonas aeruginosa*

Presenting Author

Pouya Sadeghi Aval, Undergraduate Intern, NOSM Research Laboratory/Lakehead University Biology Department

Authors

Pouya Sadeghi Aval 1, Rebecca J. Barnes 2, Marina Ulanova 3

Affiliations

1 Pouya Sadeghi Aval, Undergraduate Intern, NOSM Research Laboratory/Lakehead University Biology Department. 2 Rebecca J. Barnes, MSc, NOSM Research Laboratory, Lakehead University. 3 Marina Ulanova, MD, PhD, Associate Professor, Division of Medical Sciences, Northern Ontario School of Medicine

Abstract

Integrins are a class of heterodimeric transmembrane receptors that are involved in cell-cell, cell-extracellular matrix and cell-pathogen interactions. Previous studies have suggested that lung epithelial cell (LEC) integrins and their ligands are involved in adhesion and internalization of several pathogens. However, the underlying mechanisms are poorly understood. Based on preliminary results in our laboratory, we hypothesize that LEC beta-1 integrins are involved in binding and internalizing the opportunistic pathogen *Pseudomonas aeruginosa*. We used an in vitro infection model of A549 human alveolar type II pneumocytes and *P. aeruginosa* strain PAK. Immunostaining and subsequent flow cytometry revealed a decrease in beta-1 integrin surface expression as early as 5 minutes of infection. Within this short time, adhesion and internalization of *P. aeruginosa* was also detected. The data suggest that *P. aeruginosa* can engage beta-1 integrins and through internalization, reduce their surface expression. To further confirm this finding, we will pursue the following experiments. First, the internal presence of beta-1 needs to be confirmed by permeabilizing cells followed by intracellular immunostaining and flow cytometry. Second, if beta-1 integrins are involved in internalizing *P. aeruginosa*, blocking these receptors will inhibit bacterial internalization. We plan to inhibit both integrin-mediated signalling and activity via various metal cations and pharmaceutical inhibitors. The anticipated findings may elucidate the role of integrins in host-pathogen interactions and provide some basis for potential use of these receptors as therapeutic targets. Funding: NSERC Discovery Grant

Assessment of the Bioavailabilities of Copper and Nickel Metal Contaminants from the Gastrointestinal Tract into Systemic Circulation when Ingested in a Soil Matrix - A Pilot Study

Presenting Author

Sarah Schoenau, M.Sc. Candidate, Laurentian University; MIRARCo CEM

Authors

Sarah Schoenau, Dr. Graeme Spiers, Dr. Stacey Ritz

Affiliations

Laurentian University Department of Biology; Centre for Environmental Monitoring MIRARCo

Abstract

Metals are natural constituents of soils, and may also be contaminants from industrial processes. Soil ingestion by children occurs both by inhalation of large dust particles trapped by mucus and rerouted to the digestive system, and frequent hand-to-mouth behaviour. This study will examine the potential for absorption from the gastrointestinal tract of contaminant copper and nickel from an ingested soil matrix via a mouse model of exposure to soil pelleted into a mouse diet (inclusion rates of 0, 3, 5, 8, or 12%). The study will define the upper limit of soil ingestion which does not induce taste aversion in mice. ICP-MS analyses of organs and tissues harvested from these mice will be compared to ICP-MS analyses of samples resulting from in vitro digestion of the test diets. Diet exposure to these soil samples will cause increases in the amount of bioaccessible and bioavailable copper and nickel, with increases being less than or equal to those observed in the in vitro digestion of the test diets. This study will provide the first in vivo examination of the impact of ingested copper and nickel-containing soils integrated with food on bioaccessible and bioavailable levels of metals, and also shed light on the actual risks posed to children who accidentally or intentionally ingest soil, eliminating overestimation in risk assessment as an experimental variable. Moreover, these studies will provide results which validate the accuracy of in vitro digestion models by allowing for the quantification of bioaccessible values of copper and nickel from soil samples.

Systems-Level Tobacco Cessation Clinical Practice Guidelines for Hospitals

Presenting Author

Patricia M. Smith, PhD, Associate Professor, Northern Ontario School of Medicine

Authors

Patricia M. Smith, PhD, Scott M. Sellick, PhD

Affiliations

Northern Ontario School of Medicine; Thunder Bay Regional Health Sciences Centre

Abstract

Background: This poster reports on the assessment and implementation of the 6 systems-level tobacco cessation guidelines in all hospitals in NW LHIN (14). The guidelines have been approved by the Ontario Guideline Advisory Committee, a joint venture of the Ontario Medical Association and the Ministry of Health and Long-term Care. **Methods:** All hospitals in NW LHIN participated (11 community hospitals, 1 regional hospital). Semi-structured interviews, based on the guidelines, were developed. Interviews covered: tobacco use identification and documentation systems; tobacco intervention training, resources, and feedback; dedicated tobacco cessation counsellors; policies to support tobacco cessation; counselling and pharmacotherapy services; and, expectations for clinician interventions. Individualized baseline reports, with recommendations for implementation mapped onto accreditation standards, were provided to all hospitals. Over 2 years (2006-2008), hospitals were assisted with recommendation implementation. **Results:** At baseline, none of the hospitals had implemented any of the systems-level guidelines; after 2 years, all had implemented all 6 guidelines to varying degrees. Hospitals were motivated by the opportunity to map guideline implementation onto accreditation. Implementation was eased by standardizing protocols across hospitals, implementing interventions consistent with provincial best practices for nurses and physicians, and by partnering with the provincial smokers' helpline to provide post discharge counselling services and ongoing replenishment of patient materials. **Conclusion:** This top-down approach, initiating change at the systems-level, was successful in institutionalizing tobacco cessation guidelines, whereby recent efforts by health professional associations championing institutional change via clinicians using a bottom-up approach have not been. This study provides a model for guideline implementation in Canada.

Examination of Tobacco Use Rates Among Hospitalized Smokers in NW LHIN 14 Hospitals

Presenting Author

Patricia M. Smith, PhD, Associate Professor, Northern Ontario School of Medicine

Authors

Patricia M. Smith, PhD, Scott M. Sellick, PhD, Peter Brink, PhD

Affiliations

Northern Ontario School of Medicine; Thunder Bay Regional Health Sciences Centre; Lakehead University

Abstract

Background. This presentation reports on an initiative in Northwestern Ontario to centralize and standardize the identification and documentation of tobacco use in hospitals' electronic admitting databases. Methods: A tobacco use question was added to the computerized admission forms in 11 of 12 hospitals in NW Ontario. Wording and data field placement were standardized across hospitals, and identification and documentation of tobacco use was centralized by having the admitting staff ask the question. Results: From January 2007 to June 2008, tobacco use was recorded for 86% of patients (169,258/196,000). Overall tobacco use prevalence was 33%, and ranged from 21% to 44% across hospitals. Prevalence rates for ER ranged from 22% to 46% across hospitals, and from 13% to 33% for inpatients. Tobacco users were significantly younger than non-users (39 yr vs. 51 yr, $p < .001$), a factor that affected differences in tobacco use prevalence rates across hospitals and between ER and inpatient admissions. Tobacco users also had significantly more readmissions than non-users ($M=7$ vs. $M=5$, $p < .001$), and males were significantly more likely than females to be tobacco users (35% vs. 32%, $p < .001$). Conclusion: Tobacco use prevalence among hospitalized patients in NW Ontario was substantially higher than the estimated general population rates of 26% for this region. The calculation of actual versus estimated tobacco use prevalence was made possible through the electronic system. Data collected through this system can also be used to determine caseloads for tobacco interventions, as well as used to track change in prevalence over time.

Does Therapeutic Equivalence follow Bioequivalence? A Randomized Trial to Assess Clinical Effects after switching from Clozaril™ to generic clozapine (Gen-Clozapine™)

Presenting Author

Timothy Rico, Northeast Mental Health Centre

Authors

Dr. Sandra Stewart, Dr. Toba Oluboka, Suzette Landry, Timothy Rico, Dr. Susan Adams

Affiliations

Northeast Mental Health Centre: Dr. Sandra Stewart, Timothy Rico, Dr. Susan Adams, Ms. Suzette Landry, *Dr. T. Oluboka (now at the University of Calgary, Calgary, Alberta); Dr. Sandra Stewart and Dr. Susan Adams are also affiliated with the Northern Ontario School of Medicine

Abstract

This study prospectively assessed outcomes in a group of patients who were randomly switched from Clozaril™ to generic clozapine (Gen-clozapine™). We examined data from rating scales administered before the switch and at points after the switch. No significant differences were observed in the two groups on most scores compared to baseline measures with three exceptions. In the group switched to the generic formulation, there was a significant increase in GAS scores by the end of the monitoring period. In the group of patients who remained on Clozaril, a significant decrease in BASIS-32 scores was observed. After five months, scores on the BPRS-Mannerisms and Posturing subscale were significantly lower for the Gen-Clozapine group compared to the scores obtained on those patients who remained on Clozaril. The results of this study suggest a tendency toward overall improved functioning in the group of patients who were randomly selected to switch to generic clozapine.

BRCA1 and BRCA2 germline mutations as predictive biomarkers of clinical response to cancer therapy.

Presenting Author

Mary Lynn Tassotto, Ph.D., Thunder Bay Regional Health Sciences Centre

Authors

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Abstract

The results of in vitro chemosensitivity studies have shown some consistency with response to chemotherapy in patients, indicating that this approach may be used to identify patients that are resistant to conventional chemotherapy regimens. However, this approach is not routinely used in an adjuvant or neoadjuvant setting as a treatment strategy. Treatment selection for breast and ovarian cancer is currently based on pathological classification of the tumour, without assessment of in vitro chemosensitivity. BRCA1 and BRCA2 germline mutations are considered to be both prognostic cancer biomarkers and predictive biomarkers of breast and ovarian cancer susceptibility; however, their utilization as predictive biomarkers of therapy response has not been investigated. Expression levels of BRCA1 modulate chemosensitivity in breast cancer cell lines, and epigenetic regulation of BRCA1 leading to decreased BRCA1 expression is often observed in sporadic breast cancer. We have hypothesized that cells with mutations in BRCA1 or BRCA2 may be differentially sensitive to DNA damaging agents used in cancer therapy due to decreased levels of BRCA1 or BRCA2 gene expression in these cells. Using lymphocytes isolated from individuals with germline mutations in BRCA1 and BRCA2, we will present results showing the in vitro response to ionizing radiation and chemosensitivity to Paclitaxel and Doxorubicin, two chemotherapeutic agents commonly used in the adjuvant systemic treatment of breast cancer.

The Acid pH Response of *Mycoplasma capricolum* at the Secretome Level

Presenting Author

Amanda Voros, Masters Student, Laurentian University

Authors

Amanda Voros, Samantha Conaty, Dr. Mazen Saleh

Abstract

Mycoplasmas are known as the smallest and simplest free-living bacteria (Rottem, 2003). Their simplistic nature makes them an important tool for understanding the genes involved in basic metabolic processes (Razin et al. 1998). Of particular interest are the genes and gene products involved in mycoplasma evasion of host immune responses and survival within phagocytic cells. The proteins secreted by mycoplasmas in the acidic and hydrolytic environment of a macrophage may help to uncover important virulence factors of this group of prokaryotes. This study examines the effect of pH on the secretome of *Mycoplasma capricolum*. After sufficient growth of *Mycoplasma capricolum*, cell free supernatant which contained the secretome was collected from an acidic and neutral culture at the same phase of growth. Two-dimensional electrophoresis was conducted on the protein samples which were visualized by silver staining (Blum 1987). The protein content was identified by MALDI-TOF mass spectrometry and bioinformatic work. The identification of neutral proteins revealed some interesting identities such as; lipoproteins, pyrophosphatases, nicotinamidase / pyrazinamidases, ribosomal protein S4 and aminopeptidases. The identification of acidic proteins such as; reductases, hemolysins, aminopeptidases, lipoproteins and kinases, demonstrated a shift in the types of proteins secreted at a lower pH. An API ZYM enzyme assay demonstrated that at an acidic pH the expression and secretion of certain enzymes was enhanced. The response of *Mycoplasma capricolum* to pH may shed light on the behaviour of *Mycoplasma pneumoniae*, the causative agent of pneumonia in many young adults, during the course of infection.

A Gentle Introduction to Multilevel Regression Models

Presenting Author

Bruce Weaver, Assistant Professor of Biostatistics, Northern Ontario School of Medicine

Authors

Bruce Weaver

Affiliations

Northern Ontario School of Medicine; Public Health Program, Lakehead University

Abstract

Nested structure (clustering) is very common in medical data. For example, patients may be nested within doctors, doctors nested within hospitals, etc. Traditional methods of analysis either ignore the clustering, or attempt to control for it by including an indicator (or dummy) variable for each category (save one) of the cluster variable. Both of these approaches are often sub-optimal. One major problem occurs when subjects within clusters are more similar to each other than they are to subjects within other clusters. This violates the assumption of independence between subjects, and results in confidence intervals that are too narrow. Another problem is that cluster variables are treated as if they are fixed rather than random. When the cluster variable is “doctor”, for example, including indicator variables for all but one of the doctors in essence treats those particular doctors as if they are the ones of interest. But in most studies, that is not so. Rather, doctors who contribute patients are considered a sample from some population of doctors, and it is that population of doctors to which we wish to generalize. Multilevel regression models provide a means for analyzing clustered data in a way that eliminates all of these problems. Unfortunately, most books and articles on multilevel models are written in a style that is inaccessible to many researchers. But “Applied Multilevel Analysis” by Jos Twisk (2006) is an exception. In this poster, I use Twisk’s simple examples to illustrate some of the basic concepts underlying multilevel models.

Integrins as potential therapeutic targets for cervical cancer

Presenting Author

Jeff Werner

Authors

Jeff Werner, Dr. Ingeborg Zehbe, Dr. Marina Ulanova

Affiliations

Jeff Werner - NOSM, Dr. Ingeborg Zehbe - TBRHSC Regional Cancer Care, Dr. Marina Ulanova – NOSM

Abstract

The human papillomavirus (HPV) is the causative agent of cervical cancer. It is suggested that persistent HPV infection is necessary, yet insufficient for the development of cervical cancer. Integrins are transmembrane heterodimeric glycoproteins which play pivotal roles in cell proliferation, migration, survival, and adhesion and are considered as therapeutic targets for cancer. The aim of this project was to examine the relationship between infection and integrin expression in cervical tissue. We used five different cervical cancer cell lines, HeLa, SiHa, Me180, and CaSki, which contain different HPV constructs, and C-33A which lacks HPV. Flow cytometry analysis of surface expression of integrins beta-1, beta-3, beta-4, beta-6, alpha-v, alpha-3, alpha-5, and alpha-6 revealed that C-33A cells expressed the lowest levels of integrins among the studied cell lines. These data suggest that integrin expression is influenced by HPV infection. To investigate the effect of bacterial infection on integrin expression we used HeLa cells infected with Gram negative pathogenic bacteria, *Escherichia coli* 25922 or *Pseudomonas aeruginosa*, as well as with commensal bacteria *Lactobacillus reuteri*. The expression of all integrins decreased following *E. coli* or *P. aeruginosa* infection, except for beta-6 which increased. However, infection with *L. reuteri* caused no significant change in integrin expression. It is known that high expression of beta-6 integrin can prevent apoptosis during cell detachment implicating its role in the progression of some cancers. Therefore, up-regulation of beta-6 integrin during bacterial infection can potentially contribute to the development of cervical cancer. Funding: Northern Cancer Research Foundation

Leptin polymorphism and cancers in the population of Northwestern Ontario

Presenting Author

Kylie Williams, Department of Chemistry, Lakehead University

Authors

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Abstract

Leptin is a hormone initially identified to be involved with the obesity, and later studies showed its functions in regulating body metabolism to regulate energy uses, and thus control appetite. It has been linked to diseases associated with obesity, such as diabetes and cardiac diseases. There has been a recent increase in the role that leptins play in cancer development. Biochemical studies showed that it plays a major role in production of growth hormones that stimulate growth of tumours and in angiogenesis. Leptins was also found to stimulate the production of proteases that promote invasion of cancer cells. Prior studies have shown that certain polymorphisms in the leptin gene and the leptin receptor are correlated with increased risk and disease progress in breast and lung carcinomas, and the list of cancers continue to grow, including those of the colon, liver, prostate, etc. In this on-going study, we examined the polymorphisms that have been correlated with cancers in the genes of leptin (LEP) and its receptor (LEPR) in individuals from Northwestern Ontario. The DNA was collected from the blood of individuals who were diagnosed with breast, lung or colon cancer, as well as healthy (non-cancerous) controls. We also included individuals with breast cancers carrying mutations in BRCA1 or BRCA2. We will present the findings on the correlations of the polymorphisms with incidences of cancers, to ascertain if they may be useful genetic markers for predicting cancer development and outcomes.

The effect of skeletal muscle 5'-ectonucleotidase activation and inhibition on the production of adenosine in the interstitial space

Presenting Author

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Abstract

It has been suggested that muscle contraction is needed for ATP release and interstitial adenosine production via ecto-5'-nucleotidase. Whether elevated interstitial ATP alone in the absence of muscle contraction can increase interstitial adenosine production has yet to be examined. Anesthetized rats had microdialysis fibers inserted into the gastrocnemius muscle of each leg and perfused with saline (control) and then either 1) 60 μ M ATP or 2) 60 μ M ATP followed by 60 μ M ATP+500 μ M AOPCP (ecto-5'-nucleotidase inhibitor) for 20 minutes at a rate of 5 μ l/min. In vitro probe loss of ATP was determined to be $10.7 \pm 0.4\%$, resulting in a loss of >6 μ M of ATP into the interstitium. Dialysate adenosine concentrations increased ($P < 0.05$) from 0.119 ± 0.018 to 0.300 ± 0.040 μ M during ATP perfusion while adenosine formation decreased ($P < 0.05$) from baseline (0.094 ± 0.021 μ M) to 0.018 ± 0.006 μ M during ATP+AOPCP perfusion. The magnitude of increase in interstitial adenosine concentrations are comparable to those seen during muscle contraction or systemic hypoxia. These results clearly demonstrate that elevated interstitial ATP concentrations alone are sufficient to stimulate adenosine production via the ecto-5'-nucleotidase. Hence, adenosine production can be stimulated in resting skeletal muscle independent of muscle contraction.

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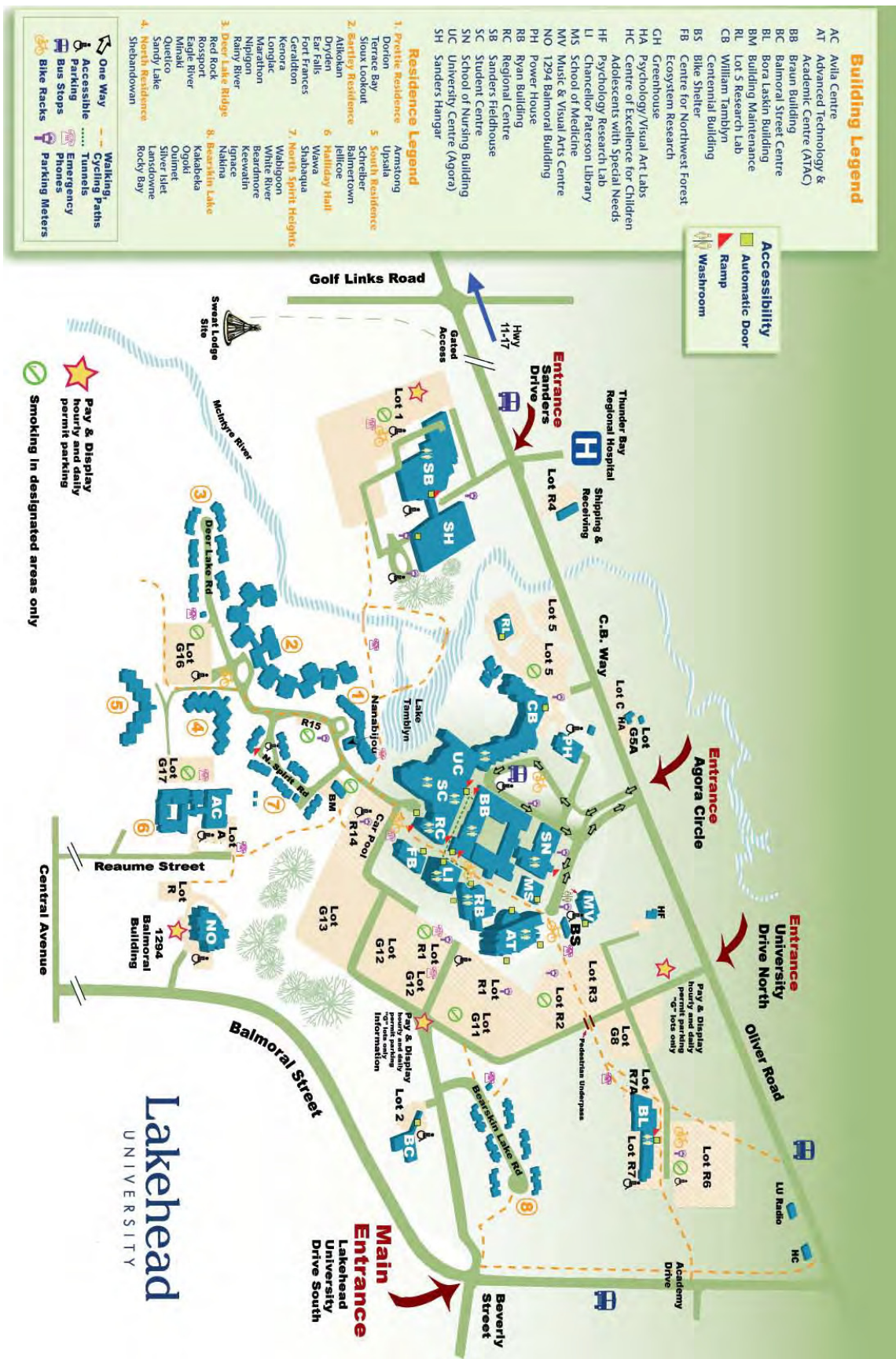
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