

Inaugural School of Health Conference 2024
Student Poster Competition

Directory of Poster Abstracts

May 29, 2024

Table of Contents

	Poster #
<p>Novel Brain Computer Interface Recognizes Human s Creativity Using Electroencephalography <i>Morteza Zangeneh Soroush, Concordia University; Morteza Zangeneh Soroush; 1; Yong Zeng; 1; 1: Concordia Institute for Information Systems Engineering, Gina Cody School of Engineering and Computer Science, Concordia University, Montreal, QC H3G 2W1, Canada.</i></p>	1
<p>In Shift and In Variance: Assessing the Robustness of HAR Deep Learning Models with IMU Sensors <i>Azhar Ali Khaked, Concordia University; Azhar Ali Khaked; 1; Nobuyuki Oishi; 2; Daniel Roggen; 2; Paula Lago; 1; ; 1: Department of Electrical and Computer Engineering, Concordia University; 2: Wearable Technologies Lab, University of Sussex</i></p>	2
<p>How does the protein source in a ketogenic weight loss diet affect body composition and substrate oxidation? <i>Rachel Abramczuk, Concordia University, Health, Kinesiology, and Applied Physiology; Rachel Abramczuk; 1,2; Anjalee I. Wanasinghe; 1,2; José A. Morais; 3; Elena Zhao; 2; Michael A. Tsoukas; 4; Sylvia Santosa; 1,2; ; 1: Department of Health, Kinesiology, and Applied Physiology, Concordia University; 2: Metabolism, Obesity, and Nutrition Laboratory, School of Health, Concordia University; 3: Division of Geriatric Medicine, Department of Medicine, McGill University Health Centre; 4: Division of Endocrinology, Department of Medicine, McGill University Health Centre</i></p>	3
<p>Does the effectiveness of booster COVID-19 vaccines change over time? Results from a Living Evidence Synthesis focused on the Omicron period. <i>Ariany Marques Vieira, Concordia University, Health, Kinesiology and Applied Physiology; Ariany M Vieira; 1,2; Nana Wu; 1,2; Keven Joyal-Desmarais; 1,2; Comfort Sanuade; 1,2; Paula AB Ribeiro; 1; Jovana Stojanovic; 1,3; Simon L Bacon; 1,2; ; 1: META Group, Montreal Behavioural Medicine Centre, CIUSSS du Nord-de-l'Île-de-Montréal, Montreal, Canada.; 2: Department of Health, Kinesiology, and Applied Physiology, Concordia University, Montreal, Canada.; 3: Canadian Agency for Drugs and Technologies in Health (CADTH), Ottawa, Canada</i></p>	4
<p>Barriers and enablers influencing dietary modification following metabolic/bariatric surgery: a systematic review <i>Reyhaneh Yousefi, Concordia University, Department of Health, Kinesiology, & Applied Physiology; Reyhaneh Yousefi; 1,2; Simon Bacon; 1,2; Fabiana Lorencatto; 3; ; 1: Montréal Behavioural Medicine Centre (MBMC), Centre intégré universitaire de santé et de services sociaux du Nord-de-l'Île-de-Montréal (CIUSSS-NIM), Canada; 2: Department of Health, Kinesiology, and Applied Physiology, Concordia University, Montréal, Canada; 3: Centre for Behaviour Change, University College London, London, UK</i></p>	5
<p>Age Prediction Using Smartwatch Based Electrocardiogram (ECG) <i>Azfar Adib, Department of Electrical and Computer Engineering, Concordia University; 1. Azfar Adib; Department of Electrical and Computer Engineering, Concordia University; 2. Dr. Wei-Ping Zhu; Department of Electrical and Computer Engineering, Concordia University; 3. Dr. M. Omair Ahmad; Department of Electrical and Computer Engineering, Concordia University</i></p>	6
<p>Reviving Failed Antibiotics: Evaluating the Drivers of Antibiotic Resensitization to Optimize Antibiotic Recycling <i>Farhan Rahman Chowdhury, Concordia University, Biology; Farhan R Chowdhury; 1; Brandon L Findlay; 1,2; ; 1: Department of Biology, Concordia University, Montréal, Québec H4B 1R6, Canada; 2: Department of Chemistry and Biochemistry, Concordia University, Montréal, Québec H4B 1R6, Canada</i></p>	7
<p>Optimizing Deep Learning Architectures for Facial Expression Recognition in Healthcare Applications <i>Armin Nabaei, Concordia University, Engineering; First Person: Armin Nabaei; #MAsc Computer Engineering, Concordia University; Second Person: Dr. William E. Lynch (Admin Supervisor) #ECE Department/Concordia University</i></p>	8
<p>Making Waves: Exploring The Effects of Aquatic Therapy on Muscle Strength in Chronic Low Back Pain <i>Chanelle Montpetit, Concordia University, Health, Kinesiology and Applied Physiology; Chanelle Montpetit; 1; Nicolas Vaillancourt; 1; Brent Rosenstein; 1; ; Geoffrey Dover; 1,2; Najmeh Khalini-Mahani; 3; Christina Weiss; 2; Lee Ann Papula; 2; Antonys Melek; 2; Maryse Fortin; 1,2,4; ; 1: Department of Health, Kinesiology and Applied Physiology, Concordia University, Montreal, Canada; 2: School of Health, Concordia University, Montreal, QC, Canada; 3: McGill Centre for Integrative Neuroscience, Montreal Neurological Institute, Montreal, QC, Canada; 4: CRIR - Centre de réadaptation Constance-Lethbridge du CIUSSS COMTL, Montreal, QC, Canada</i></p>	9
<p>Adverse childhood experiences moderate longitudinal changes in leptin but not adiponectin. <i>Sara Matovic, Concordia University, Psychology; Sara Matovic; 1; Christoph Rummel; 2; Elena Neumann; 2; Jean-Philippe Gouin; 1</i></p>	10
<p>A bio-cognitive network analysis of Alzheimer's disease using neuroimaging, genetic, and neuropsychological test performance data from the COMPASS-ND dataset. <i>Nicholas Grunden, Concordia University, Psychology; Nicholas Grunden; 1,2,3,4; Natalie Phillips; 1,2,3,4; ; 1 Psychology Department, Concordia University; 2 Consortium for the Early Identification of Alzheimer's Disease (CIMA-Q); 3 Canadian Consortium on Neurodegeneration in Aging (CCNA); 4 Centre for Research on Brain, Language and Music (CRBLM)</i></p>	11
<p>The ability of acute EEG features to predict persistent post-concussion symptoms in adolescents compared to existing prognostic tools <i>Sofia Iuliano, Concordia University, Health, Kinesiology, and Applied Physiology; Sofia Iuliano; 1; Stefanie Blain-Moreas; 2; Isabelle Gagnon; 2; Elizabeth Teel; 1; ; 1: Department of Health, Kinesiology, and Applied Physiology, Concordia University; 2: School of Physical and Occupational Therapy, McGill University</i></p>	12
<p>Associations between physical activity and weight change in individuals undergoing bariatric surgery <i>John O'Neill, Concordia University, Health Kinesiology and Applied Physiology; John O'Neill (MBA), 1,2 Tair Ben-Porat (PhD), 1,2 Kim L. Lavoie (PhD), 1,3 Simon L. Bacon (PhD), 1,2 for the REBORN team 4; ; 1 Montreal Behavioural Medicine Centre, CIUSSS-NIM, Montreal, Quebec, Canada.; 2 Department of Health, Kinesiology, and Applied Physiology, Concordia University, Montreal, Quebec, Canada.; 3 Department of Psychology, UQAM, Montreal, Quebec, Canada.; 4 CIUSSS-NIM, Montreal, Quebec, Canada</i></p>	13
<p>Normative changes in the functional dynamics of the healthy aging human brain <i>Amanda Gross, Concordia University, Psychology; Amanda Gross; 1; Shima Yaghoubian; 1; Christopher Steele; 1; ; 1. Department of Psychology, Concordia University</i></p>	14

	Poster #
Music-based cognitive training for adults with MDD: A pilot feasibility study <i>Melissa Tan, University of Toronto, Music; Melissa Tan; 1; Steffi Friyia; 1; Sakina Rizvi; 2; Michael Thaut; 1; ; 1: University of Toronto, Faculty of Music, Toronto, Canada; 2: St. Michael's Hospital, ASR Suicide and Depression Studies Unit, Toronto, Canada</i>	15
The Relationship between Corticokinematic Coherence and Motor Sequence Learning <i>Alesar Hamati, Concordia University, Department of Psychology; Alesar Hamati; 1,2; Jhelum Paul; 1,2; Christopher Steele; 1,2; ; 1: Department of Psychology, Concordia University; 2: Concordia University</i>	16
Emotion States Exploration through EEG Frequency Analysis <i>Harsheen Sohanpal, Computer Science, Concordia University; Morteza Zangeneh Soroush; 1; Harsheen Sohanpal; 2; ; 1: Information Systems Engineering, Concordia University; 2: Computer Science, Concordia University</i>	17
The Use of Rhythmic Speech Cuing® and Vocal Intonation Therapy® for Speech Intelligibility in Parkinson's Disease: A Case Study <i>Julia Bissessar, University of Toronto, Faculty of Music; Julia Bissessar, BA; 1; Kathrin Mertel, MA; 1; Corene Hurt-Thaut, PhD; 1; ; 1: Faculty of Music, University of Toronto</i>	18
Exploring the Impact of Musical Speech Stimulation (MUSTIM)® on Word-Retrieval Abilities in Anomic Aphasia Post-Stroke <i>Leah Lee, University of Toronto, MMus in Applied Music and Health, Faculty of Music; Leah Lee, BMus; 1; Melissa Tan, MA; 1; Corene Hurt-Thaut, PhD; 1; ; 1: Faculty of Music, University of Toronto</i>	19
Exploring Stochastic and Circadian Rhythms Features in Depression Classification <i>Melika Mirzaseyedi, Concordia University, Department of Electrical and Computer Engineering; Melika Sadat Mirzaseyedi; First Author; 1; Siamak Rajabi; Second Author; 1; Dr. Paula Lago; Supervisor; 1; ; 1: Department of Electrical and Computer Engineering, Concordia University</i>	20
The Influence of Contamination-Related Cognitive Distortions in the Relationship Between Repugnant Obsessions and Mental Contamination <i>Julian Leclair-Shefler, Concordia University, Psychology; Julian Leclair-Shefler; 1; Sandra Krause; 1; Adam S. Radomsky; 1; ; 1: Department of Psychology, Concordia University</i>	21
Feasibility of a Fully Virtual Graded Exertion Test in Children with Concussion <i>Julie Coupal, Concordia, University, Health Kinesiology and Applied Physiology; Julie Coupal; 1; Daria Shabanova; 1; Isabelle Gagnon; 2,3 ; Christine Beaulieu; 3; Lisa Grilli; 3; Elizabeth Teel; 1; ; 1: Concordia University, Department of Health, Kinesiology & Applied Physiology, Montreal, Canada; 2: McGill University, Montreal, Canada; 3: Montreal Children's Hospital, Montreal, Canada</i>	22
Higher brain oxygen extraction fraction in coronary artery disease patients is associated with lower cognition and cardiorespiratory fitness in males <i>Ali Rezaei, Concordia University; Ali Rezaei; 1,2; Safa Sanami; 1,2; Brittany Intzandt; 3; Stefanie Tremblay; 1,2; Zacharie Potvin-Jutras; 1,2; Dalia Sabra; 1,2; Julia Huck; 5,6; Amelie Mainville-Berthiaume; 6; Christine Gagnon; 2; Dajana Vuckovic; 7; Josep Iglesias-Grau; 2,8; Thomas Vincent; 2; Mathieu Gayda; 2; Anil Nigam; 2; Louis Bherer; 2,8; Claudine J Gauthier; 1,10; ; 1: Department of Physics, Concordia University; 2: Centre Epic and Research Center, Montreal Heart Institute; 3: Hurvitz Brain Sciences Program, Clinical evaluative Sciences, Sunnybrook Research Institute; 4: Department of Biomedical Science, Université de Montreal; 5: Department of Radiology, Université de Sherbrooke; 6: Department of Psychology, Concordia University; 7: Department of Chemistry and Biochemistry, Concordia University; 8: Department of Medicine, Université de Montreal; 9: School of Health, Concordia University</i>	23
Perineuronal Nets in Dorsal Root Ganglia: Implications for Chemotherapy-Induced Peripheral Neuropathy and Pain Modulation. <i>Allutas Alhamwi, McGill University, Faculty of Dental Medicine and Oral health sciences; Allutas Alhamwi; 1,2; Nicole Scher; 1; Lisbet Hugland; 1,3,4; Emerson Krock; 1,2; ; 1: Alan Edwards Centre for Research on Pain.; 2: Faculty of Dental Medicine and Oral Health Sciences, McGill University; 3: Department of Surgery, Orthopaedic Research Lab, McGill University; 4: Shriner's Hospital for Children, Montreal, Quebec.</i>	24
IgG antibodies from fibromyalgia patients bind more mouse and human gut bacteria <i>Hannah Cho, McGill University, Faculty of Dental Medicine and Oral Health Sciences; Hannah Cho; 1,2; Carolina B. Meloto; 1,2; Luda Diatchenko; 1,2; Emerson Krock; 1,2; ; 1: Faculty of Dental Medicine and Oral Health Sciences, McGill University; 2: Alan Edwards Centre for Research on Pain</i>	25
Acceptability of Smartphone-Based Ecological Momentary Assessment among Adult Survivors of Childhood Cancer with Chronic Pain <i>Jasmine Manan, Concordia University, Faculty of Arts and Science, Psychology; Jasmine Manan1, Claire Galvin1, Nicole M. Alberts1; 1: Department of Psychology, Concordia University, Montréal, Canada</i>	26
Enhancing Emergency Hematological Diagnostics through AI-Assisted Detection of Red Blood Cell Abnormalities <i>Hamza Abu-Zaid, Concordia University, Biology; Hamza Abu-Zaid; 1, 2; Mika Kaeja; 2, 3; Ali Mehdi; 2; Felix Lambert; 2; ; 1: Department of Biology, Concordia University; 2: Pytri; 3: Department of Psychology, Concordia University</i>	27
Grey matter structural plasticity encoding sequence-specific motor learning <i>Jhelum Paul, Concordia University, Psychology Department; Authors: Jhelum Paul; 1 ; Anna-Thekla Jäger; 2,9; Julia Huck; 3,4; Arno Villringer; 2,9; Christine Tardif; 5,6; Claudine Gauthier; 3,4,8; Pierre-Louis Bazin; 2,7; Christopher Steele; 1,2; ; 1: Department of Psychology, Concordia University; 2: Department of Neurology, Max Planck Institute for Human Cognitive and Brain Sciences; 3: Department of Physics, Concordia University; 4: PERFORM Centre, Concordia University; 5: Department of Biomedical Engineering, McGill University ; 6: Montreal Neurological Institute, Montreal ; 7: Faculty of Social and Behavioral Sciences, University of Amsterdam, Netherlands; 8: Montreal Heart Institute, Montreal; 9: Center for Stroke Research Berlin (CSB), Berlin</i>	28
Genetic Network Rewiring Between Distantly Related Eukaryotic Species <i>Vanessa Pereira, Concordia University, Biology; Vanessa Pereira; 1; Rohan Dandage; 1 ; Sakhil Amikishiev; 1; Elena Kuzmin; 1,2; ; 1: Department of Biology, Centre for Applied Synthetic Biology, Centre for Structural and Functional Genomics, Concordia University, Montreal, Canada; 2: Department of Human Genetics, Rosalind & Morris Goodman Cancer Institute, McGill University, Montreal, Canada</i>	29

- A survey: Enhancing Liver Trauma Diagnosis through Deep Learning-based CT Imaging Segmentation** 30
Niloofar Tavakolian, Concordia University, Computer Science; Niloofar Tavakolian; 1; Prof Ching Yee Suen; 1; Dr Azadeh Nazemi;; 1; Department of Computer Science & Software Engineering, Concordia University
- Applying the temporal sampling method to reading** 31
Dasha Vanichkina, McGill University, Psychology; Dasha Vanichkina; 1; Nicole Dranitsaris; 2; Alexandre Reynaud; 2,3; ; 1. Department of Psychology, McGill University; 2. Department of Ophthalmology, McGill University; 3. RI-MUHC
- Implementing Cultural Security of BIPOQ and Migrant Communities in HIV Services in Montreal and the Quebec Environments** 32
Matheus da Silva Neves, Concordia University; Matheus Neves; Departament of Graduate Studies, Individualized Program, Concordia University; Gilbert Emond; Applied Human Sciences, Concordia University
- Strength Characteristic in Sub-Elite Male and Female Alpine Skiers** 33
Renée Junge, McGill University, School of Physical and Occupational Therapy; Renée Spencer Junge B.Sc, CATA(C), D.O.; 1; Félix Croteau PT, PhD; 1; Samuel Laroix B.Sc Kin; 2; Richard Preuss PT, PhD; 1; Shawn Robbins PT, PhD; 1; ; 1 McGill University, School of Physical and Occupational Therapy; 2 Université de Sherbrooke, Faculté des science de l'activité physique
- The Safety and Feasibility of an At-Home, Virtually Administered Graded Exertion Protocol in Children Clinically Recovered and Non-Recovered from Concussion** 34
Daria Shabanova, Concordia University, Health Kinesiology and Applied Physiology; 1. School of Health Concordia University; 2. McGill University, Montreal, Canada; 3. Montreal Children's Hospital, Montreal, Canada
- Towards standard testing to evaluate exoskeleton efficacy for construction workers** 35
Malcolm Dunson-Todd, Concordia University, Building, Civil, and Environmental Engineering; Malcolm Dunson-Todd; 1; Mohadeseh Kafiyani Safari; 1; Yusheng Huang; 1; ; 1: Gina Cody School of Engineering and Computer Science, Concordia University
- Narrative Futurity in Later Life: Rethinking life story work to address loneliness** 36
John Neufeld, Concordia University, Department of Sociology and Anthropology; John Neufeld; Department of Sociology and Anthropology, Concordia University
- Exploring intra-network connectivity in the olfactory network across the Alzheimer's disease spectrum: An analysis of COMPASS-ND data** 37
Tristin Best, Concordia University, Psychology; Tristin Best; 1,2; Nicole Grant; 1,2; Kristina Coulter; 1,2; Natalie Phillips; 1,2; ; 1: Concordia University; 2: Canadian Consortium on Neurodegeneration in Aging (CCNA)
- Pression artérielle au repos, à l'effort maximal, et prédiction des performances cognitives chez des adultes âgés avec facteurs de risque cardiovasculaire.** 38
Corentin Duquesne, Centre de recherche et centre EPIC, Institut de cardiologie de Montréal; Corentin Duquesne; 2; Mathieu Gayda; 1, 2; Pierre-Olivier Magnan; 1, 2; Christine Gagnon; 2; Thomas Vincent; 2; Florent Besnier; 1, 2; Emma Gabrielle Dupuy; 1, 2; Haniéh Mohammadi; 2, 3; Chiheb Klai; 2; Nicolas Martin; 2; Martin Juneau; 1, 2; Daniel Gagnon; 2, 4; Claudine Gauthier; 2, 5, 6; Tudor Vrinceanu; 2; Anil Nigam; 1, 2; Louis Bherer; 1, 2, 7; ; Affiliations :; 1 : Département de médecine, Faculté de Médecine, Université de Montréal; 2 : Centre de recherche et centre EPIC, Institut de cardiologie de Montréal; 3 : Laboratoire d'imagerie optique et moléculaire, Institut d'ingénierie biomédicale, Polytechnique Montréal; 4 : Ecole de kinésiologie et des sciences de l'activité physique, Faculté de médecine, Université de Montréal; 5 : Département de physique, Université de Concordia; 6 : Centre PERFORM; 7 : Centre de recherche, Institut universitaire de gériatrie de Montréal
- Effect of sleep stages on fNIRS hemodynamic response to epileptic discharges.** 39
Edouard Delaire, Concordia University, Physics; Edouard Delaire;1; Chifaou Abdallah;2,3; Makoto Uji;4; Zhengchen Cai;2; Erica Minato;2; Shahla Bakian-Dogaheh;1; Eliane Kobayashi;2; Laure Peter-Derex;5; Birgit Frauscher;2; Thien Thanh Dang-Vu;6; Christophe Grova;1,3,2 ; ; 1: Multimodal Functional Imaging Lab, Physics Dpt / PERFORM Centre, Concordia University, Montreal, QC, Canada, ; 2: Montreal Neurological Institute, McGill University, Montreal, QC, Canada, ; 3: Multimodal Functional Imaging Lab, Biomedical Engineering Department, McGill University, Montreal, QC, Canada, ; 4: RIKEN CBS, Wako, Saitama, Japon; 5: Lyon 1 University, Lyon, Auvergne-Rhône-Alpes, France; 6: Concordia University, Montreal, QC, Canada
- Beyond diseased cell models: Endogenous tagging in iPSCs to study cytokinesis in healthy human cells** 40
Nhat Pham, Concordia University, Biology Department; Mathieu C. Husser; 1; Nhat P. Pham; 1; Chris Law; 1,2; Flavia R. B. Araujo; 3; Vincent J.J. Martin; 1,3; Alisa Piekny; 1,2,3,4; ; 1: Biology Department, Concordia University; 2: Center for Microscopy and Cellular Imaging, Concordia University; 3: Center for Applied Synthetic Biology, Concordia University; 4: School of Health, Concordia University
- Determining the role of obesity in triple negative breast cancer progression** 41
Alexandra Perlman, Concordia University, Biology; Alexandra Perlman; 1; Ryan Chicoine; 1; Christina Dembegiotis; 1; Claire Plissonneau; 2; Elena Kuzmin; 1; Sylvia Santosa; 2; Alisa Piekny; 1; ; 1. Department of Biology, Concordia University; 2. Department of Health, Kinesiology & Applied Physiology, Concordia University
- Systematic analysis of mitochondrial carrier functional redundancy using complex genetic interaction analysis** 42
Brittany M. Greco, Department of Biology, Concordia University; Brittany M. Greco 1, Keyan Sarab Dadelahi 1, Traver Hart 3, John G. Doench 4, Elena Kuzmin 1,2; 1Department of Biology, Centre for Applied Synthetic Biology, Centre for Structural and Functional Genomics, Concordia University; 2Department of Human Genetics, Rosalind and Morris Goodman Cancer Institute, McGill University; 3Department of Bioinformatics and Computational Biology, MD Anderson Cancer Center, University of Texas; 4Genetic Perturbation Platform, Broad Institute of MIT and Harvard, Cambridge
- FocalErrorNet: Uncertainty-aware focal modulation network for inter-modal registration error estimation in ultrasound-guided neurosurgery** 43
Soorena Salari, Department of Computer Science and Software Engineering; Soorena Salari; 1; Amirhossein Rasoulia; 1; Hassan Rivaz; 2; Yiming Xiao; 1; ; ; 1: Department of Computer Science and Software Engineering, Concordia University; 2: Department of Electrical and Computer Engineering, Concordia University

- Surveying the tumor suppressive genetic network underlying chr4p deletion in TNBC** 44
Joseph Del Corpo, Concordia University, Biology; Joseph Del Corpo;1; Rohan Dandage; 1; Lea Harrington; 2,3; Elena Kuzmin;1,4; ; 1: Centre for Applied Synthetic Biology, Department of Biology, Concordia University, Montreal, Quebec, Canada 2: Institute for Research in Immunology and Cancer, Department of Medicine, Université de Montréal, Montreal, Quebec, Canada; 3: Department of Biochemistry, University of Toronto, Toronto, Ontario, Canada 4: Rosalind & Morris Goodman Cancer Institute, Department of Human Genetics, McGill University, Montreal, Quebec, Canada
- Comparative Analysis of Traditional and Trefethen BMI Using NHANES 2011-2018 Data: Implications for Health Outcome Predictions** 45
Tania Cretella, Concordia University, Biology and Science College; Tania Cretella; 1,2; Lisa Kakinami Ph.D.; 3,4 ; Simone Brugiapaglia Ph.D.; 3; ; 1: Department of Biology, Concordia University; 2: Science College, Concordia University; 3: Department of Mathematics and Statistics, Concordia University; 4: School of Health, Concordia University
- Advanced Blind Source Separation with Bounded Multivariate Generalized Gaussian Mixture Model: Integrating to the IVA Framework** 46
Ali Hamid Algumaei, Information system engineering; Ali Algumaei, Muhammad Azam, and Nizar Bouguila; ; Concordia Institute for Information Systems Engineering, Concordia University, 1455 Boulevard; de Maisonneuve O, Montreal, H3G 1M8, Qc, Canada;
- Effects of Androgen Receptor Signalling and Circadian Clock Gene Expression on Metabolic Functions in Male and Female Mice.** 47
Sofia Benavides Amaya, Concordia University, Psychology; Sofia Benavides Amaya; 1; Amanda Szubinski; 1; Andree Stevens; 1; Carlos Alvarado; 3; Miltiadis Paliouras; 3; Andreas Bergdahl; 2; Mark Trifiro; 3; Konrad Schöttner; 1; Shimon Amir; 1; ; 1: Center for Studies in Behavioral Neurobiology, Department of Psychology, Concordia University; 2: Department of Health, Kinesiology & Applied Physiology, Concordia University; 3: Department of Medicine, Division of Experimental Medicine, Lady Davis Institute for Medical Research, Jewish General Hospital
- Developing an anillin inhibitor for the treatment of liver cancer** 48
Natasha Letourneau, Concordia University; Natasha Letourneau; 1; Ioanna Tountas; 1; Juliette Gennaro; 1; Sarah Taylor; 2; Pat Forgiione; 2; Alisa Piekny; 1; ; 1: Department of Biology, Concordia University; 2: Department of Chemistry and Biochemistry, Concordia University
- Chromatin-sensing machinery controls cortical polarity during cell division** 49
Cecilia Brancheriau, Concordia University, Biology; Cecilia Brancheriau, Kevin Larocque, Alex Perlman, Vo Chi Mai Hong, Alisa Piekny
- Bmal1 in an Aversion Circuit Influences Alcohol Drinking Behaviour in Mice** 50
Vanessa Hasenhundl, Concordia University, Psychology; Vanessa Hasenhundl; 1; Georges Elias; 1; Cassandra Goldfarb; 1; Shimon Amir; 1; Konrad Schöttner; 1; ; 1: Centre for Studies in Behavioural Neurobiology, Department of Psychology, Concordia University
- The relationship of dietary protein to energy metabolism, body composition, and muscle function in individuals undergoing bariatric surgery** 51
Lyne Al-Nabelsi, Concordia University, Health, Kinesiology, and Applied Physiology; Lyne Al-Nabelsi; 1,2; Tiffany Moey; 1,2 ; Niloufar Ghaderian; 1,2; José A. Morais; 3; Simon L. Bacon; 1,2; Sandra Peláez; 4; Amin Andalib; 3; Oliver Court; 3; Sebastian Demyttenaere; 3; Phil Vourtzoumis; 3; Théa Demmers; 1; Sylvia Santosa; 1,2; ; 1: School of Health, Concordia University; 2: Department of Health, Kinesiology, & Applied Physiology, Concordia University; 3: McGill University; 4: Université de Montréal
- Brain structure and functional connectivity markers of brain and cognitive reserve in older adults with, or at risk for, Alzheimer's disease** 52
Kristina Coulter, Concordia University, Psychology; Kristina Coulter; 1; Tanya Dash; 2 ; Tristin Best; 1; Nicole Grant; 1; Ana Ines Ansaldo; 3 ; Natalie Phillips; 1; ; 1: Department of Psychology, Concordia University; 2: Department of Communication Sciences and Disorders, University of Alberta; 3: École d'orthophonie et d'audiologie, Université de Montréal
- Biomechanical Changes in the Lumbar Spine Following a Winter Ultramarathon: A Case Report & Literature Review** 53
Cleo Bertrand, Concordia University, Health, Kinesiology & Applied Physiology; Cleo Bertrand; 1; Daniel Wolfe; 1; Tristan Castonguay; 1; Julie Lamoureux; 1; Geoffrey Dover; 1,2; Maryse Fortin; 1,2; ; 1: Department of Health, Kinesiology & Applied Physiology, Concordia University; 2: School of Health, Concordia University
- All-night EEG-fNIRS as a novel tool for investigating sleep physiology** 54
*Shahla Bakian Dogaheh, Concordia University, Physics department, School of Health; Shahla Bakian Dogaheh;*1,2; Edouard Delaire;1,2; Gabriel D. Pinilla-Monsalve;7; Mathilde Reyt;3,7; Chifaou Abdallah;3; Habib Benali;9; Julie Carrier;10; Birgit Frauscher;8; Jean Marc Lina;5; Laure Peter-Derex;6; Thien Thanh Dang-Vu;2,4,7; Christophe Grova;1,2,3; ; 1:Physics Department,Concordia University,Canada; 2:School of Health,Concordia University,Canada; 3:McGill University,Canada; 4:Department of Health, Kinesiology & Applied Physiology,Concordia University; 5:Département de Génie Electrique, Ecole de Technologie Supérieure,Canada; 6:Centre de Médecine du Sommeil et des Maladies respiratoires, University Hospital of Lyon; 7:Centre de recherches de l'Institut universitaire de gériatrie de Montréal (CRIUGM), CIUSSS du Centre-Sud-de-l'île-de-Montréal,Canada; 8:Departments of Neurology & Biomedical Engineering, Duke University,USA; 9:Concordia University,Canada; 10:Université de Montréal,Canada*
- The Functional Role of Chromosome 4p Loss in Triple Negative Breast Cancer** 55
Lynn Karam, Concordia University, Biology; Lynn Karam; 1; Rohan Dandage; 1; Michael Schwartz; 2; Anastasia Gherghi; 1; Paria Asadi; 1; Alysh Orr; 1; 1; Belen Hernandez; 1; Sylvia Santosa; 3; Andreas Bergdahl; 3 ; Elena Kuzmin; 1,4; 1: Department of Biology, Center for Applied Synthetic Biology, Center for Structural and Functional Genomics, Concordia University, Montreal, Quebec, Canada; 2: Department of Biochemistry, McGill University, Montreal, Quebec, Canada ; 3: Department of Health, Kinesiology & Applied Physiology, Concordia University, Montreal, Quebec, Canada; 4: Rosalind & Morris Goodman Cancer Institute, Department of Human Genetics, McGill University, Montreal, Quebec, Canada
- Associations between a new definition of excess weight in children and self-reported health** 56
Amy Badi, Concordia University, Environment, Geography, & Planning; Amy Badi; 1; Lisa Kakinami; 2,3; Andraea van Hulst; 4; ; 1 Department of Geography, Environment, & Planning, Concordia University, Montréal ; 2 Department of Mathematics and Statistics, Concordia University, Montréal; 3 School of Health, Concordia University, Montréal; 4 Ingram School of Nursing, McGill University, Montréal

- Exploring the Interaction of Age and Presence of Insomnia on Sleep Spindle Density in Females** 57
Claire Dymont, Concordia University, Psychology; Claire Dymont; 1,2,3,4; Nyissa A. Walsh; 1,2,3,4; Aurore A. Perrault; 1,2,3,4; Nathan E. Cross; 1,2,3,4; Emma-Maria Phillips; 1,3,4; Antonia Maltezos; 1,2,3,4; Loïc Barbaux; 1,2,3,4; Oren M. Weiner; 1,2,3,4; Florence B. Pomares; 1,2,3,4; Jean-Phillipe Gouin; 3,4,5; Thien Thanh Dang-Vu; 1,2,3,4; ; 1. Sleep, Cognition, & Neuroimaging Lab, Department of Health, Kinesiology, & Applied Physiology, Concordia University, Montreal, Canada; 2. Centre for Studies in Behavioural Neurobiology, Concordia University, Montréal, Canada; 3. Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal, Canada; 4. School of Health, Concordia University, Montreal, Canada; 5. Stress, Interpersonal Relationships and Health Laboratory, Department of Psychology, Concordia University, Montreal, Canada
- Relationship between inflammatory biomarkers and skeletal muscle fatty infiltration: A systematic review.** 58
Leila Jamshidi, Department of Health, Kinesiology & Applied Physiology, Concordia University; L Jamshidi; 1; H Zahedi; 1; P Darlington; 1,2; V Pepin; 1,2; M Fortin; 1,2; 1: Department of Health, Kinesiology and Applied Physiology, Concordia University, Montreal, Canada; 2: School of Health, Concordia University, Montreal, Canada
- Accelerated Re-entrainment to Changes of the Light-Dark Cycle in Androgen Receptor Mutant Mice - a Novel Role of AR Signalling in Photic Entrainment?** 59
Andree Stevens, Concordia University, Psychology; Andree Stevens1, Amanda Szubinski1, Sofia Benavides Amaya1, Carlos Alvarado2, Miltiadis Paliouras2, Mark Trifiro2, Shimon Amir1, Konrad Schöttner1; ; 1.Center for Studies in Behavioral Neurobiology, Department of Psychology, Concordia University; 2.Department of Medicine, Division of Experimental Medicine, Lady Davis Institute for Medical Research, Jewish General Hospital
- Optimizing Preoperative Frailty Screening through Patient Engagement: Exploration of the Self-Administered Clinical Frailty Scale in Elective Colorectal Surgical Patients** 60
Karelle Côté, McGill University, Human Nutrition; Karelle Côté, BSc;1; Popi Kasvis, RD, PhD;1; Chelsia Gillis, RD, PhD, CNSC;1; ; 1: School of Human Nutrition, McGill University
- Daily sleep quality variations and cognitive fluctuations in aging** 61
Mary Brooks, Concordia University; Mary Brooks; 1; Randa El-Chami; 1; Marie-Anick Savard; 1; Hugo R Jourde; 1; Emily BJ Coffey; 1,3
- Surface functionalization with Au nanoparticles and a model antibody as a biosensing platform for protein detection** 62
Linan Cui, McMaster University, Department of Biomedical Engineering; Linan Cui; 1; Ayse Turak; 1,2,3; Kyla Sask; 1,4; ; 1: School of Biomedical Engineering, McMaster University; 2: Department of Engineering Physics, McMaster University; 3: Department of Physics, Concordia University; 4: Department of Materials Science and Engineering, McMaster University
- The Effect of Multilingualism on the Executive Function of Older Adults With, or at Risk for, Alzheimer's Disease.** 63
Vanessa Boulos, Concordia University, Psychology; Vanessa Boulos; 1; Kristina Coulter; 1; Natalie Phillips; 1; ; 1: Department of Psychology, Concordia University
- Characterizing the functional role of chromosome 4p deletion and mapping its synthetic lethal interactions in multiple cancer types** 64
Anastasia Gherghi, Concordia University, Biology; Anastasia Gherghi;#1 Alain Pacis;#2 Rohan Danadage;#1 Andrew Lynch #3 Toby M. Baker #3; Guillaume Bourque #2; Peter Van Loo #3; Elena Kuzmin #4; #1 Department of Biology, Center for Applied Synthetic Biology, Concordia University; #2 McGill Genome Centre; #3 MD Anderson Cancer Center; #4 Rosalind and Morris Goodman Cancer Institute, McGill University
- Trimodal exercise is effective in improving physical and functional health-related quality of life in cancer survivors living with chemotherapy induced peripheral neuropath** 65
Sarah Kubal, Concordia University, Health, Kinesiology and Applied Physiology; Sarah Kubal;1,2; MariaLuisa Vigano;5; Sarah Habib;2; Georgina Cama;2; Popi Kasvis;4; Antonio Vigano;2,3; Robert D. Kilgour;1,2; ; 1. Department of Health, Kinesiology & Applied Physiology, Concordia University; 2. McGill Nutrition and Performance Laboratory, McGill University Health Centre; 3. Department of Supportive and Palliative Care, McGill University Health Centre; 4. School of Human Nutrition, McGill University; 5. Division of Experimental Medicine, McGill University
- The Power of Letting Go: Enhancing Well-Being through Goal Disengagement in Older Adulthood** 66
Dalia Ibrahim, Concordia University, Psychology; Dalia Ibrahim;1; Dr. Carsten Wrosch;1; Jasmine Kotsiopoulos;1; ; 1. Personality, Aging, and Health Research Laboratory, Concordia University
- The Short-Term Physical and Psychological Effects of a Comprehensive Speech and Motor Neurologic Music Therapy (NMT)® Protocol for the Treatment of Dystonia** 67
Victoria Yuan, University of Toronto, Faculty of Music; Victoria Yuan; 1; Sahara Haylestrom; 1; Michael Thaut; 1; Corene Hurt-Thaut; 1; 1: Music and Health Science Research Collaboratory, Faculty of Music, University of Toronto, Toronto, Ontario, Canada
- Understanding sensory-psychosocial-cognitive relationships in mild cognitive impairment: Does psychosocial function mediate the relationship between sensory loss and cognitive function?** 68
Sana Rehan, Concordia University, Psychology; Sana Rehan; 1; Natalie Phillips; 1; ; 1: Department of Psychology, Concordia University
- Relationship Between Thoracolumbar Fascia Morphological Changes and Erector Spinae Epimuscular Fat Distribution in Chronic Low Back Pain** 69
François Philippe Caron, Department of Health, Kinesiology and applied Physiology, Concordia Uni.; Caron, F.P.; 2; Naghdi, N.; 2; Anstruther, M.; 2; Bertrand, C.; 2; Fortin, M.; 1,2
- Corticomuscular Representation in Motor Sequence Learning** 70
Vanessa Raspa, Concordia University, Psychology; Vanessa Raspa;1; Jhelum Paul;1; Christopher Steele;1
- Routine Recognition for Remote Elderly Care Using wearables** 71
Sayed Shamma Alia, Concordia University; Sayeda Shamma Alia; 1; Paula Lago; 1; ; 1: Concordia University

Effects of animal vs plant-based protein in a hypocaloric ketogenic diet on regional subcutaneous adipose tissue (SAT) T cells in individuals with obesity

72

Anjalee Wanasinghe, Concordia University, HKAP; Anjalee I. Wanasinghe,a,b, Rachel Abramczuka,b, José A. Moraisa,d, Michael Tsoukase, Elena Zhaoa, Suiyang Lia, Sylvia Santosa,a,b,c

Change in body image dissatisfaction over two years in adolescents who undergo bariatric surgery

73

Hector Luca O. S. Silva, Concordia University, HKAP; Hector Luca O. S. Silva 1, Biagina-Carla Farnesi 2, Julius Erdstein 2,4, Tamara R. Cohen 2,5,6 and Angela S. Alberga 1,2,3,4; ; 1. Department of Health, Kinesiology & Applied Physiology, Concordia University, Montreal, Quebec, Canada; 2. Center of Excellence in Adolescent Severe Obesity, Division of Adolescent Medicine, Montreal Children's Hospital, Westmount, Quebec, Canada.; 3. Department of Pediatrics, Faculty of Medicine, McGill University; 4. Research Institute of the McGill University Health Research Center (RI-MUHC); 5. Food, Nutrition and Health, Faculty of Land and Food Systems, The University of British Columbia, Vancouver, BC, Canada; 6. BC Children's Hospital Research Institute, BC Children's Hospital, Vancouver, BC, Canada

Adipose tissue T cells and macrophages vary regionally with sex in healthy lean individuals

74

Muhammad Ilyas Nadeem, Concordia University, HKAP; Muhammad Ilyas Nadeem a, Claire Plissonneau a, Kerri Z. Delaney abc, Pierre Garneau d, Henri Atlas d, Radu Pescarus d, Anne-Sophie Studer d, José A. Morais e, Sylvia Santosa a

Novel Brain Computer Interface Recognizes Human s Creativity Using Electroencephalography

Morteza Zangeneh Soroush, Concordia University; Morteza Zangeneh Soroush; 1; Yong Zeng; 1; 1: Concordia Institute for Information Systems Engineering, Gina Cody School of Engineering and Computer Science, Concordia University, Montreal, QC H3G 2W1, Canada.

Creativity is essential for human beings to think beyond established norms and overcome problems and create new solutions, products, services, etc. To address current and future challenges, it is imperative to study creativity, particularly through neurocognition which involves investigating the brain's activity in creativity tasks. It helps to study creativity and enhance it.

Despite extensive theoretical exploration, the neural underpinnings of creativity remain largely unexplored. The advent of neuroimaging and computational tools has propelled the use of brain-computer interfaces (BCIs) in examining brain functions and integrating human cognition with technology. While BCIs have explored various domains like emotion detection, motor control, etc., creativity remains underexplored within this framework. This gap motivated us to develop a novel approach utilizing electroencephalography (EEG) to study creativity.

Creativity includes two primary phases: divergent thinking, where multiple ideas are generated, and convergent thinking, where these ideas are refined and combined into the best solution. Our research introduces an innovative nonlinear EEG analysis technique using two types of entropy measures tailored to the brain's complex nature. Previous studies primarily focused on linear and frequency-based analyses that fail to capture the brain's non-linear complex dynamics.

Our suggested features represented the intricate dynamics across different brain lobes during two phases of creativity. Our findings indicate that divergent thinking is characterized by more complex brain dynamics (in temporal and parietal lobes) than convergent thinking.

By identifying significant neural patterns and physiological responses associated with these creativity phases, our method informs neurofeedback and brain stimulation aimed at fostering creativity. This novel approach lays the groundwork for future studies, offering a new persp

keywords: creativity brain computer interaction eeg

Poster # 1

In Shift and In Variance: Assessing the Robustness of HAR Deep Learning Models with IMU Sensors

Azhar Ali Khaked, Concordia University; Azhar Ali Khaked; 1; Nobuyuki Oishi; 2; Daniel Roggen; 2; Paula Lago; 1; ; 1: Department of Electrical and Computer Engineering, Concordia University; 2: Wearable Technologies Lab, University of Sussex

Deep Learning (DL)-based Human Activity Recognition (HAR) models have achieved high accuracy in detecting human activities from Inertial Measurement Unit (IMU) readings. However, their performance is typically tested on lab-collected datasets with minimized human-induced variabilities. This oversight leads to poor performance in practical scenarios. This study challenges DL HAR models by subjecting them to positional, orientation, and device variabilities, simulating real-world scenarios. We collected IMU data from multiple sensors attached to various positions on 17 participants' bodies while they performed daily activities. These activities included walking and multiple stages of food-prep. Our data was used to train three prominent DL HAR models-DeepConv, TinyHAR, and AttendAndDiscriminate. We trained and tested these models using Leave-One-Out cross-validation (LOCV) and analyzed the performance change due to variabilities. We introduced a novel assessment method by comparing the change in model performance with the shift in Maximum Mean Discrepancy (MMD) distribution between the training and testing datasets. Our approach links between domain shifts caused by variability and the impact on DL model performance.

Our Tests with 17 participants showed an decrease in average f1 score due to variability. However, the result wasn't consistent across all participants and models. To explain this behavior, we used MMD as a metric to quantify the domain shift due to variability and drew a relationship between the change in MMD and the change in the f1 score. Concluding, the more significant the difference in MMD, the more the drop in the f1 score.

The proposed methodology offers a unique procedure for assessing DL HAR models, enabling a analysis of their robustness against variabilities seen in real-world scenarios. This new approach holds the potential to enhance the evaluation of future DL HAR models, ensuring their applicability across diverse human activities.

keywords: har wearable sensors deep learning

Poster # 2

How does the protein source in a ketogenic weight loss diet affect body composition and substrate oxidation?

Rachel Abramczuk, Concordia University, Health, Kinesiology, and Applied Physiology; Rachel Abramczuk; 1,2; Anjalee I. Wanasinghe; 1,2; José A. Morais; 3; Elena Zhao; 2; Michael A. Tsoukas; 4; Sylvia Santosa; 1,2; ; 1: Department of Health, Kinesiology, and Applied Physiology, Concordia University; 2: Metabolism, Obesity, and Nutrition Laboratory, School of Health, Concordia University; 3: Division of Geriatric Medicine, Department of Medicine, McGill University Health Centre; 4: Division of Endocrinology, Department of Medicine, McGill University Health Centre

Background: Ketogenic diets, diets high in fat and protein and low in carbohydrates, have been shown to be effective for weight loss. Recently, plant-based diets and protein sources have gained in popularity as they are thought to be a healthier alternative to animal-based protein sources. There is limited evidence as to whether protein source impacts ketogenic dietary outcomes.

Objective: To compare whether protein source affects body composition and substrate oxidation following a 12-week high-protein ketogenic diet (KD).

Methods: People with obesity were recruited and randomized to receive a 12-week high-protein KD which included plant- (PP) or animal- (AP) based protein supplements. Body composition was assessed through dual energy x-ray absorptiometry (DEXA) and substrate oxidation was assessed via indirect calorimetry before and after the intervention.

Results: The PB (n=13, 37±10y, BMI:37.9±4.2kg/m²) and AB (n=13, 42±11y, BMI:35.4±3.7kg/m²) groups were well-matched at baseline. Following the intervention, both groups had similar reductions in total weight (p<0.001), BMI (p<0.001), fat mass (p<0.001), and fat-free mass (p<0.001) with similar changes in regional fat distribution. Both groups exhibited similar decreases in resting energy expenditure (REE) (p=0.034) and respiratory exchange ratio (RER) (p<0.001), though there was a time*group trend (p=0.056) for RER. The AP group showed a greater decrease (p=0.0056) in RER than the PB group, indicating better fat utilization after the intervention.

Conclusion: The source of protein (AP or PP) in a ketogenic diet did not affect changes in weight or regional fat. Though similar changes in body weight and composition occurred, the AP may have had better fat oxidation than the PP group.

Financial support: MITACS accelerate grant. SS holds a CRC Tier 2 in Clinical Nutrition.

keywords: obesity nutrition ketogenic diet plant

Poster # 3

Does the effectiveness of booster COVID-19 vaccines change over time? Results from a Living Evidence Synthesis focused on the Omicron period.

Ariany Marques Vieira, Concordia University, Health, Kinesiology and Applied Physiology; Ariany M Vieira;1,2; Nana Wu;1,2; Keven Joyal-Desmarais;1,2; Comfort Sanuade;1,2; Paula AB Ribeiro;1; Jovana Stojanovic;1,3; Simon L Bacon;1,2; ; 1 : META Group, Montreal Behavioural Medicine Centre, CIUSSS du Nord-de-l'Île-de-Montréal, Montreal, Canada.; 2: Department of Health, Kinesiology, and Applied Physiology, Concordia University, Montreal, Canada.; 3: Canadian Agency for Drugs and Technologies in Health (CADTH), Ottawa, Canada

Background: COVID-19 vaccination is important to mitigate disease spread and complications. COVID-19 vaccine effectiveness (VE) for two doses decreases over time, especially against Omicron. Booster doses are recommended but understanding their duration of protection is crucial for the timing of additional boosters.

Objective: To review the long-term VE of booster doses against COVID-19 infections, hospitalizations, and deaths.

Methods: A rapid systematic review on the VE of COVID-19 vaccines approved in Canada (BNT162b2, mRNA-1273, ChAdOx1/AZD1222, and Ad26.COV2.S). Studies with a baseline VE, a follow-up =84 days, and comparing unvaccinated individuals were included. Three-level meta-analytic models were used to pool VE estimates.

Results: 12 studies found VE against COVID-19 infections was 67 (95 CI: 56-76) at baseline and decreased to 42 (21-58) at 112-139 days after the booster dose. The pooled effect for 7 VE studies against COVID-19 hospitalizations was 89 (82-93) at baseline and decreased to 71 (51-83) by 112-139 days. The VE against deaths started at 86 (72-93) and decreased to 83 (63-92) 112-139 days after the booster vaccination (2 studies).

Conclusion(s): COVID-19 booster protection against Omicron infection is modest at first and declines substantially. In contrast, protection against hospitalization and deaths begins at a higher level and appears to be largely maintained over time. During the Omicron spread, getting a booster dose protects against hospitalization and death. Engaging in additional protection measures and another vaccine booster may be relevant after 139 days. Information that behavioural scientists can use to develop interventions.

keywords: covid vaccines effectiveness

Poster # 4

Barriers and enablers influencing dietary modification following metabolic/bariatric surgery: a systematic review

Reyhaneh Yousefi, Concordia University, Department of Health, Kinesiology, & Applied Physiology; Reyhaneh Yousefi; 1,2; Simon Bacon; 1,2; Fabiana Lorencatto; 3; ; 1: Montréal Behavioural Medicine Centre (MBMC), Centre intégré universitaire de santé et de services sociaux du Nord-de-l'Île-de-Montréal (CIUSSS-NIM), Canada; 2: Department of Health, Kinesiology, and Applied Physiology, Concordia University, Montréal, Canada; 3: Centre for Behaviour Change, University College London, London, UK

Background: Eating behaviour and diet are core health behaviours linked to metabolic/bariatric surgery (MBS) outcomes. The aim of this work is to identify and synthesize studies reporting modifiable barriers and enablers associated with post-operative dietary modification.

Methods: We searched PubMed, EMBASE, PsycINFO, Cochrane Library, and Scopus for relevant quantitative and qualitative studies until February 2023. Data, including participant quotations, interpretive summaries, survey results, and reported barriers/enablers were extracted and deductively coded into domains from the Theoretical Domains Framework. Inductive thematic analysis was conducted to describe the role each domain plays in dietary change. Domains that were more frequently coded and for which more themes were generated were judged more likely to influence dietary behaviour.

Results: Thirty-five primary studies were included. We identified 5 theoretical domains ['environmental context and resources' (60 of included studies), 'emotions' (54), 'beliefs about consequences' (52), 'behavioural regulation' (46), and 'social influences' (34)] that were related to postoperative dietary behaviours. Examples of barriers included poor nutrition-focused care services provided by the healthcare system and the impact of poor control over negative emotions and problematic relationships with food leading to emotional eating. Some regarded the impacts of surgery-induced physiological food intolerances (e.g., dumping syndrome) as a barrier to healthy eating, while others considered it as an enabler in helping to avoid unhealthy foods.

Conclusion: Across a variety of contexts, we identified common barriers to and enablers of dietary change that could be targeted in interventions aiming to improve dietary behaviours in patients undergoing MBS.

keywords: bariatric metabolic surgery obesity barrier

Poster # 5

Age Prediction Using Smartwatch Based Electrocardiogram (ECG)

Azfar Adib, Department of Electrical and Computer Engineering, Concordia University; 1.Azfar Adib; Department of Electrical and Computer Engineering, Concordia University; 2.Dr. Wei-Ping Zhu; Department of Electrical and Computer Engineering, Concordia University; 3.Dr. M. Omair Ahmad; Department of Electrical and Computer Engineering, Concordia University

In our ongoing research, we are developing an age prediction framework utilizing Electrocardiogram (ECG) data obtained from a FITBIT Sense Smartwatch. Data were obtained from 172 people of different age groups. This approach integrates certain techniques including band-pass filtering, discrete wavelet decomposition-reconstruction, and a deep neural network architecture featuring 1D CNN and LSTM. Initially, we pursued age prediction using this methodology, but observed a notable clustering of predicted ages around a specific range corresponding to adulthood. This observation prompted a shift towards age classification. In terms of age classification, specially differentiating between adults and non-adults (age-verification), our method demonstrates accuracies up to 86%. We are particularly focusing to

identify the threshold where predicted ages exhibit this saturation phenomenon. Identifying this critical threshold holds significant promise for facilitating the practical implementation of ECG-based anonymous age verification systems.

keywords: ecg age prediction age verification

Poster # 6

Reviving Failed Antibiotics: Evaluating the Drivers of Antibiotic Resensitization to Optimize Antibiotic Recycling

Farhan Rahman Chowdhury, Concordia University, Biology; Farhan R Chowdhury; 1; Brandon L Findlay; 1,2; ; 1. Department of Biology, Concordia University, Montréal, Québec H4B 1R6, Canada; 2. Department of Chemistry and Biochemistry, Concordia University, Montréal, Québec H4B 1R6, Canada

Background: Antibiotic resistant bacteria claim millions of lives every year, with numbers projected to hit 10 million by 2050. Evolution of resistance massively outpaces novel antibiotic development. New strategies are needed to combat antibiotic resistance.

Objectives: In this study, we investigate the feasibility of antibiotic recycling: restoring susceptibility to existing antibiotics that previously failed due to resistance (i.e. antibiotic resensitization), and develop strategies to improve recycling success.

Methods: High-throughput bacterial evolutions were performed using the Soft Agar Gradient Evolution (SAGE) platform developed in our lab. Antibiotic resistance profiles were quantified using microdilution assays.

Results: Previous attempts to resensitize antibiotics have focused on using collateral sensitivity (CS), an evolutionary trade-off in which resistance evolution to one antibiotic renders bacteria susceptible to another. To evaluate the importance of CS, we evolved resistance against the antibiotic gentamicin (GEN) in *Escherichia coli*. These populations showed widespread CS towards another antibiotic, piperacillin (PIP). Despite this CS, PIP could not resensitize GEN-resistant bacteria, showing that CS does not drive antibiotic resensitization. Inspired by prior research from our laboratory, we attempted to achieve resensitization by leveraging the fitness burden of resistance evolution. Treating the GEN- and PIP-resistant bacteria with a third antibiotic nitrofurantoin (NIT) imposed significant fitness costs, restoring GEN-sensitivity in the majority of the strains (with PIP-resistance remaining unchanged) and making GEN an effective antibiotic against bacteria that were once GEN-resistant.

Conclusion: We propose that application of 3 carefully selected antibiotics in a sequence is a more effective approach for successful antibiotic recycling which may reduce the emergence of resistance in prolonged antibiotic therapies.

keywords: antibiotic resistance antibiotic recycling

Poster # 7

Optimizing Deep Learning Architectures for Facial Expression Recognition in Healthcare Applications

Armin Nabaei, Concordia University, Engineering; First Person: Armin Nabaei; #MASC Computer Engineering, Concordia University; Second Person: Dr. William E. Lynch (Admin Supervisor) #ECE Department/Concordia University

This work details the development and optimization of a novel deep learning model for healthcare applications, integrating concepts from U-Net, Inception, and VGG architectures with advanced learning strategies. Key highlights include:

- ***Model Design:** Utilizes Convolution and Deconvolution layers to discern intricate patterns in facial expressions, enhancing accuracy in medical diagnostics and patient monitoring.
- ***Architecture Emphasis:** Prioritizes feature sparsity and detail orientation to preserve relevant information, improving data handling efficiency and localization precision.
- ***Auxiliary Classifier:** Enhances model capability by processing images across multiple scale feature maps, crucial for learning complex facial expressions.
- ***Regularization Technique:** Introduces a novel approach to modify the Cross-Entropy function and implements a soft-margin variant of the SoftMax function to improve class distinction and consolidation.
- ***Customized Adam Optimizer:** Addresses challenges in convergence by incorporating an exponentially weighted moving average as a bias term, stabilizing model performance during training and testing.
- ***Objective:** Aims to advance facial recognition technologies in healthcare, particularly for diagnosing and monitoring patient conditions through facial expressions, demonstrating superior accuracy and robust performance across various tasks.
- ***Testing and Validation:** Rigorously tested on established datasets like FER-2013, RAF-DB, and CK+, showcasing effectiveness in facial expression recognition and potential to enhance healthcare delivery.
- ***Contribution to Healthcare:** Offers a balanced and efficient model prepared to contribute substantially to the healthcare field, leveraging facial application technologies for improved diagnostic precision and patient care.

keywords: deep learning model medical diagnostics

Poster # 8

Making Waves: Exploring The Effects of Aquatic Therapy on Muscle Strength in Chronic Low Back Pain

Chanelle Montpetit, Concordia University, Health, Kinesiology and Applied Physiology; Chanelle Montpetit; 1; Nicolas Vaillancourt; 1; Brent Rosenstein; 1; Geoffrey Dover; 1,2; Najmeh Khalini-Mahani; 3; Christina Weiss; 2; Lee Ann Papula; 2; Antonys Melek; 2; Maryse Fortin; 1,2,4; ; 1: Department of Health, Kinesiology and Applied Physiology, Concordia University, Montreal, Canada; 2: School of Health, Concordia University, Montreal, QC, Canada; 3: McGill Centre for Integrative Neuroscience, Montreal Neurological Institute, Montreal, QC, Canada; 4: CRIR - Centre de réadaptation Constance-Lethbridge du CIUSSS COMTL, Montreal, QC, Canada

Background: Chronic low back pain is associated with impaired paraspinal and gluteal muscle function. Despite exercise therapy being a first-line conservative treatment for chronic low back pain, fear-avoidance beliefs can limit physical activity engagement in individuals with chronic low back pain. Aquatic therapy, by reducing spinal loading, promotes movement capacity and facilitates exercises otherwise challenging on land. To our knowledge, no studies have explored the effects of aquatic therapy on paraspinal/gluteal strength.

Objectives: To investigate the effects of an aquatic therapy (AT) exercise intervention versus standard care (SC) on 1) paraspinal muscle strength and 2) gluteal (gluteus maximus, gluteus medius) muscle strength

Methods: This pilot study included thirty-four participants with non-specific chronic low back pain who were randomly assigned to each group (AT n=18; SC n=16). Both groups completed a 10-week supervised intervention program (2 sessions/week). Baseline and post-intervention assessments included lumbar extension (MedEx) and gluteal (hand-held dynamometer) strength tests. Strength was measured in newtons of force (N). Two-way repeated measures ANOVA were used to assess changes in muscle strength outcomes within and between-groups.

Results: Both groups showed significant improvements in lumbar extensor strength (AT MD= 35.28N, $p<0.001$; SC MD=32.06N, $p=0.003$), gluteus maximus strength (AT MD=51.78N, $p<0.001$; SC MD=45.30N, $p<0.001$) and gluteus medius strength (AT MD=66.41N, $p<0.001$; SC MD=50.58N, $p<0.001$) across timepoints. No group*time interaction was found.

Conclusion: This project provides valuable insight into the effects of aquatic therapy versus standard care on paraspinal and gluteal muscle strength. Notably, the aquatic therapy group demonstrated a significant increase in gluteal and lumbar extensor strength, highlighting its potential for improving musculoskeletal health in individuals with chronic low back pain.

keywords: chronic low back pain aquatic

Poster # 9

Adverse childhood experiences moderate longitudinal changes in leptin but not adiponectin.

Sara Matovic, Concordia University, Psychology; Sara Matovic;1 ; Christoph Rummel;2 ; Elena Neumann;2 ; Jean-Philippe Gouin;1

Adverse childhood experiences (ACE) are associated with an increased risk of developing chronic health conditions in adulthood, including cardiometabolic disease and obesity. Adipokines, such as leptin and adiponectin, play vital roles in biological processes regulating appetite, metabolism, and immune activation. Cross-sectional studies suggest that adipokines may be altered among individuals exposed to ACE. The aims of this study were to 1) examine whether ACE moderates longitudinal changes in leptin and adiponectin over 30 months in adults, 2) examine whether chronic caregiving stress further moderates changes in adipokines, after accounting for BMI and sociodemographic variables. This longitudinal study includes 192 middle-aged (mean 46.93 years old) mothers of adolescents with developmental disabilities (n=109; higher caregiving stress group) and mothers of typically developing adolescents (n=84; lower caregiving stress group). Blood samples, height and weight were collected across three timepoints spanning 30 months to measure adipokines and BMI. Retrospective accounts of ACE using the Childhood Trauma Questionnaire, and sociodemographic variables were collected at Time 1. Multilevel models showed that leptin and adiponectin significantly increased over time in our sample. ACE moderated changes in leptin but not in adiponectin, such that individuals who experienced greater ACE had larger increases in leptin over time. Chronic caregiving stress did not moderate changes in adipokines. Changes in BMI from Time 1 to 3 moderated changes in adipokines, such that increases in BMI were associated with increases in leptin and decreases in adiponectin over time. The moderating role of ACE on changes in leptin remained after accounting for changes in BMI and sociodemographic factors. These findings suggest that ACE may increase vulnerability to poor health outcomes in adulthood through its influence on longitudinal changes in leptin.

keywords: adverse childhood experiences adipokines obesity

Poster # 10

A bio-cognitive network analysis of Alzheimer's disease using neuroimaging, genetic, and neuropsychological test performance data from the COMPASS-ND dataset.

Nicholas Grunden, Concordia University, Psychology; Nicholas Grunden; 1,2,3,4; Natalie Phillips; 1,2,3,4; ; 1 Psychology Department, Concordia University; 2 Consortium for the Early Identification of Alzheimer's Disease (CIMA-Q); 3 Canadian Consortium on Neurodegeneration in Aging (CCNA); 4 Centre for Research on Brain, Language and Music (CRBLM)

Background: The brain-behavior relationship in the Alzheimer's disease (AD) spectrum involves interactions between numerous biopsychosocial factors. Network analysis can be utilized to capture the multiple associations between cognitive and biological factors in bio-cognitive networks [1]. Thus, the goals of this exploratory study were (1) to identify salient bio-cognitive relationships within different risk states for AD, and (2) to compare network structures generated by these relationships across different clinical groups.

Methods: Measures from the COMPASS-ND cohort [2] were used to construct mixed graphical models [3] for cognitively normal (CN, n = 89) aging, subjective cognitive decline (SCD, n = 120), mild cognitive impairment (MCI, n = 316), and AD (n = 127) groups. Neuroanatomical, genetic, cognitive, and sociodemographic variables were selected for group models. Analyses included determination of prominent within-group network structures and comparison of networks across clinical groups.

Results: Sex was highly influential in all group networks, with male sex widely associated with poorer performance on cognitive tests. Being female was associated with higher white matter burden in SCD, MCI, and AD groups. Higher white matter burden was associated with older age, especially in the SCD and MCI groups. Lower hippocampal volume was linked to lower scores on delayed memory scores in MCI and AD groups. Finally, APOE e4 carrier status was associated with younger age in MCI and AD groups. It was also associated with being female in SCD and MCI groups.

Conclusion: Network analysis applied to bio-cognitive data is a promising method for researchers to harness multivariate complexity and clarify the brain-behavior associations expressed during earlier stages of AD risk.

References: [1] doi: 10.1016/j.neubiorev.2021.07.027 [2] doi: 10.1017/cjn.2019.27 [3] doi: 10.18637/JSS.V093.I08

keywords: cognitive aging network analysis neuropsychology

Poster # 11

The ability of acute EEG features to predict persistent post-concussion symptoms in adolescents compared to existing prognostic tools

Sofia Iuliano, Concordia University, Health, Kinesiology, and Applied Physiology; Sofia Iuliano;1 ; Stefanie Blain-Moreas;2 ; Isabelle Gagnon;2 ; Elizabeth Teel;1 ; ; 1: Department of Health, Kinesiology, and Applied Physiology, Concordia University; 2: School of Physical and Occupational Therapy, McGill University

Introduction: Many adolescents with concussion will experience persistent post-concussion symptoms (PPCS) lasting beyond 1-month post-injury. Current prognostic tools for PPCS, the 5P Clinical Risk Score (5P rule) and physician prediction, are subjective and only moderately accurate. Electroencephalography (EEG) can identify changes in brain function after concussion, but its prognostic capability is unknown. Our objective was to determine if EEG can more accurately predict PPCS than current prognostic tools. **Methods:** Thirty-four adolescents (12.9 \pm 2.2 years, 20 males) with concussion participated. The treating physician rated the likelihood of PPCS from 0 (not likely) to 100 (likely) based on their clinical judgment. Participants completed a resting-state EEG and the 5P rule assessments 6.4 \pm 2.4 after injury and the Post-Concussion Symptom Inventory (PCSI) 28.9 \pm 1.9 days post-injury. PPCS was defined as an increase of ≥ 7 points on the PCSI. Logistic regression established predictive capacity, with DeLong's test used to compare EEG and clinical tools. **Results:** Twelve (35.2%) participants developed PPCS at 1-month. Independent t-tests showed three EEG features significantly differed between groups (yes/no PPCS). These features were combined into a multivariable model which performed with an AUC=0.71, 100 sensitivity, and 22 specificity. The 5P model had an AUC=0.66 (75 sensitivity, 45.9 specificity), while the physician prediction model had an AUC=0.55 (71.4 sensitivity, 38.9 specificity). DeLong's test confirmed that the EEG model did not differ from the 5P ($p=0.60$) or physician prediction ($p=0.32$) models. **Conclusion:** EEG does not significantly outperform existing prognostic tools in predicting PPCS. Although brain function is altered after concussion, it does not appear to be a useful metric to predict PPCS in adolescents. Future studies should evaluate other assessments for the prediction of PPCS to improve current prognostic tools.

keywords: persistent post concussion symptoms eeg

Poster # 12

Associations between physical activity and weight change in individuals undergoing bariatric surgery

John O'Neill, Concordia University, Health Kinesiology and Applied Physiology; John O'Neill (MBA), 1,2 Tair Ben-Porat (PhD), 1,2 Kim L. Lavoie (PhD), 1,3 Simon L. Bacon (PhD), 1,2 for the REBORN team 4; ; 1 Montreal Behavioural Medicine Centre, CIUSSS-NIM, Montreal, Quebec, Canada;; 2 Department of Health, Kinesiology, and Applied Physiology, Concordia University, Montreal, Quebec, Canada;; 3 Department of Psychology, UQAM, Montreal, Quebec, Canada;; 4 CIUSSS-NIM, Montreal, Quebec, Canada

Background: Bariatric surgery offers unprecedented weight-loss results for individuals living with obesity. However, long-term weight maintenance (WM) is challenging for patients post-surgery. Weight regain is common and its underlying reasons are complex. Physical activity (PA) has been shown to be a key component of WM in a number of settings, but our understanding of its role in the context of bariatric surgery is less clear, especially for pre- vs. post-surgical PA levels.

Purpose: Using a longitudinal cohort, the associations between patients' PA pre- and post-surgery and their weight change from pre- to 6-months post-surgery were explored.

Methods: A total of 111 patients undergoing bariatric surgery from a single hospital site (86 females; mean (SD) age and baseline BMI = 42 (10.3) years and 47.1 (7.17) kg/m², respectively) participated. They completed the Godin Leisure Time Questionnaire (GLTQ) and had anthropometrics measured 6 months pre- and post-surgery (weight change = post-pre), excess weight loss (EWL) was calculated using standard methods. Due to skewness, participants were split by activity: GLTQ=0 - sedentary (n pre =18, n post =40), GLTQ>0 - some PA (n pre =93, n post =71).

Results: Adjusted GLM's (accounting for sex, age, ethnicity, baseline BMI, education, and income) found that there were no differences in weight change (p=0.810) nor EWL (p=0.771) between those who were sedentary vs. some PA pre-surgery. Adjusted GLM's (also accounting for baseline PA) found trends for differences in weight change (p=0.067) and EWL (p=0.071), with individuals who engage in some PA losing more weight than those who were sedentary.

Conclusions: This study suggests that post-surgery PA may be needed to enhance post-surgical WM, independent of pre-surgery PA levels. Longer term follow-up and further exploration of the nature of the most effective PA regimens is needed to effectively enhance clinical practice.

keywords: physical activity bariatric surgery weight

Poster # 13

Normative changes in the functional dynamics of the healthy aging human brain

Amanda Gross, Concordia University, Psychology; Amanda Gross; 1; Shima Yaghoubian; 1; Christopher Steele; 1; ; 1. Department of Psychology, Concordia University

Amid increases in global life expectancy and the growing impact of age-related cognitive decline on both individuals and society, investigating the health aging human brain is imperative. This study explores age-related changes through an analysis of temporal dynamics in neural activity, offering insights into the functional resilience and vulnerabilities of the aging brain. A sample of 100 adults (50 females, age range = 36 to 89 yo) were randomly selected from the Human Connectome Project in Aging for the analysis of resting-state functional magnetic resonance imaging data. We employed detrended fluctuation analysis to estimate a mean Hurst exponent (HE) across gray matter regions for each participant, a measure reflecting alterations in temporal neural complexity. Non-parametric permutation testing, adjusted for family-wise error ($p < 0.05$), examined the relationship between age and HE. Results revealed no significant global gray matter decline in HE with age. However, significant regional HE declines at the voxel level in the superior frontal gyrus, middle frontal gyrus and insular cortex were observed. These findings suggest that age-related changes in neural complexity within brain regions critical for executive functioning, reasoning, and emotional processing may contribute to the cognitive decline associated with aging. Given the regional vulnerabilities observed, further investigation into the potential involvement of compensatory mechanisms to support overall neural function with age is warranted. This research sheds light on the brain's complex aging process, providing insights into the dynamic relationship between temporal neural activity and cognitive functioning.

keywords: functional dynamics healthy aging hurst

Poster # 14

Music-based cognitive training for adults with MDD: A pilot feasibility study

Melissa Tan, University of Toronto, Music; Melissa Tan; 1; Steffi Friyia; 1; Sakina Rizvi; 2; Michael Thaut; 1; ; 1: University of Toronto, Faculty of Music, Toronto, Canada; 2: St. Michael's Hospital, ASR Suicide and Depression Studies Unit, Toronto, Canada

Background: Cognitive challenges in attention and executive function worsen over time in individuals with Major Depressive Disorder (MDD), persisting beyond acute episodes with no targeted treatments. Neurologic Music Therapy (NMT) is proven to be effective for cognitive function for brain injuries and developmental disabilities. The interactive aspects of music-based interventions using rhythm, active listening, and composition exercises suggests that NMT could be effective in addressing cognitive dysfunction faced in adults with MDD.

Objectives: Aims of this pilot study are to obtain preliminary data on the effectiveness of short-term NMT on attention and executive function, depression levels, and suicide risk in adults with MDD. Feasibility and acceptability of music-based cognitive training will be assessed.

Methods: Adults ages 18+ with MDD experiencing suicidal ideations participated in 8 weeks of 45-minute individual in-person NMT sessions. Neurocognitive computerised tasks and questionnaires regarding suicidal ideation, depressive symptoms, and quality of life were completed before and after the intervention. Participants also provided feedback on feasibility and acceptability of the intervention.

Results: Preliminary results show improvements in short term and working memory (Digit Span Forward and Backward Tests), and inhibitory control (Stroop Test). On average, the Beck Suicidal Scale of Ideation scores decreased. Participant feedback indicated that NMT was helpful as they noticed improvements in attention and executive function in their daily activities.

Conclusion: This is the first study using NMT interventions, specifically examining the use for cognitive function for adults with MDD and suicide risk. The results of this study will be vital in advancing our knowledge in effective non-pharmaceutical interventions that address cognitive function in adults with MDD and will provide necessary data to build on for future randomised controlled trials.

keywords: neurologic music therapy depression suicide

Poster # 15

The Relationship between Corticokinematic Coherence and Motor Sequence Learning

Alesar Hamati, Concordia University, Department of Psychology; Alesar Hamati; 1,2; Jhelum Paul; 1,2; Christopher Steele; 1,2; ; 1: Department of Psychology, Concordia University; 2: Concordia University

Navigating our daily lives involves learning and accurately performing numerous continuous motor actions, such as cycling or typing, most of which demand a significant degree of balance, coordination, and proprioceptive awareness. The proper functioning of proprioception, our body's sensory system, is thus key to the optimal execution of these motor actions. In this study, we investigated the extent to which proprioceptive feedback contributes to the early learning of a continuous motor task of varying levels of complexity. To do so, we proposed the use of Corticokinematic Coherence (CKC), an indirect marker of proprioception, that measures the synchronization between a brain signal and a kinematic signal. We recruited twenty healthy right-handed participants who had to perform a sequential pinch force task (SPFT) while simultaneously collecting their electroencephalography (EEG) and force signals. Results revealed heightened reliance on proprioception when performing the complex vs, the simple task, which was reflected by higher levels of CKC. However, behavioural data indicated that when participants improved and demonstrated early learning of the complex task, their reliance on proprioception appeared to decrease which was evidenced by a decrease in CKC levels. Finally, our analysis did not find a correlation between behavioral data and CKC levels.

keywords: proprioception motor learning corticokinematic coherence

Poster # 16

Emotion States Exploration through EEG Frequency Analysis

Harsheen Sohanpal, Computer Science, Concordia University; Morteza Zangeneh Soroush; 1; Harsheen Sohanpal; 2; ; 1: Information Systems Engineering, Concordia University; 2: Computer Science, Concordia University

Emotions affect our daily-life by orienting actions and modulating motivation. Our feelings play a crucial role in different aspects such as decision making, human communication and learning.

Although we might consider emotions as regular and natural phenomena, they are actually complex mechanisms about which we have a limited knowledge. The brain, as a highly complex biological system, goes through complex and nonlinear dynamics to enable the humans to percept and express emotions. In spite of numerous neurophysiological and psychological models of emotions which have recently been introduced, the brain dynamics correspondent to different emotional states are still hotly debated. In addition, due to hundreds of emotions one can experience in different situations, human feelings have remained largely unknown in terms of their origin and mechanisms.

Our study introduces a novel approach to dissect brain activity during different emotional states according to the widely accepted arousal-valence model of emotions using electroencephalography (EEG). Our method leverages EEG frequency-based analysis, examining sub-bands like theta, delta, alpha, beta, and gamma, to discern their relevance across different states of emotions. Additionally, we explore brain topography maps to identify significant brain regions and EEG channels associated with each emotional states such as high arousal-high valence, high arousal-low valence, low arousal-high valence, low arousal-low valence. We employ a robust EEG dataset (DEAP) which has been widely used by previous studies.

Our findings demonstrate the efficacy of our method in unraveling the neurocognitive aspects of emotions. By elucidating brain activity patterns in emotional states, our study serves as a foundational exploration for future research endeavors. Researchers can build upon our work to refine and validate their methodologies, utilizing our insights into fundamental brain behavior in emotion neurocognition.

keywords: emotion recognition eeg frequency analysis

Poster # 17

The Use of Rhythmic Speech Cuing® and Vocal Intonation Therapy® for Speech Intelligibility in Parkinson's Disease: A Case Study

Julia Bissessar, University of Toronto, Faculty of Music; Julia Bissessar, BA; 1; Kathrin Mertel, MA; 1; Corene Hurt-Thaut, PhD; 1; ; 1: Faculty of Music, University of Toronto

Parkinson's Disease (PD) is a progressive neurodegenerative disorder affecting millions worldwide, with speech impairment being a common symptom. While conventional therapies often fall short in addressing speech issues comprehensively, Neurologic Music Therapy (NMT)® offers promising avenues for improvement. This study examines the effects of NMT® interventions, specifically Rhythmic Speech Cueing (RSC)® and Vocal Intonation Therapy (VIT)®, on the speech intelligibility of an individual with PD. Using a voice-centered NMT® protocol, improvements were noted in speech intelligibility, articulation accuracy, and facial muscle mobility post-intervention. Additionally, a reduction in unrelated pauses in reading tasks and enhanced self-perception of voice quality were observed. While maximum phonation time remained stable, maintaining posture and breath support were highlighted as crucial factors. This protocol, adaptable for individual needs, offers valuable insights for music therapists and other healthcare professionals. Further research should explore group interventions and extend the application to other voice conditions, illuminating the potential of music-based therapies in enhancing communication outcomes and improving quality of life.

keywords: neurologic music therapy neuroscience parkinson

Poster # 18

Exploring the Impact of Musical Speech Stimulation (MUSTIM)® on Word-Retrieval Abilities in Anomic Aphasia Post-Stroke

Leah Lee, University of Toronto, MMus in Applied Music and Health, Faculty of Music; Leah Lee, BMus: 1; Melissa Tan, MA: 1; Corene Hurt-Thaut, PhD: 1; ; 1: Faculty of Music, University of Toronto

This research presentation investigates the efficacy of Musical Speech Stimulation (MUSTIM)®, a neurologic music therapy (NMT)® technique, on the speech skills of a female individual diagnosed with anomic aphasia post-left-hemisphere stroke. Over a 10-week period, the MUSTIM intervention was implemented during sessions for 30 minutes. The intervention began with a baseline assessment, evaluating the client's baseline language abilities through image description tasks. Subsequently, the musical conversation phase introduced a unique musical element to dialogue, with the researcher providing harmonic support for the client's improvised melodies. The use of harmonic tension and resolution during questioning aimed to enhance the client's musical responses. The intervention concluded with a transition back to spoken language, assessing any improvements in word-retrieval abilities. The Mississippi Aphasia Screening Test (MAST), specifically its image-description task using the cookie theft image from the Boston Diagnostic Aphasia Examination (BDAE), measured the client's progress. Qualitative data, including sentence counts and maximum words per sentence, were also analyzed. Results indicated a notable increase in sentence production, from 2 sentences and 11 maximum during initial assessment to 4 sentences with 18 words in the final reassessment. While some sessions showed variations in sentence complexity post-exercise, overall, MUSTIM demonstrated a positive impact on language output and complexity in an anomic aphasia patient post-stroke. Although these findings underscore the potential of tailored therapeutic strategies like MUSTIM in stroke rehabilitation, there is a need for future research with this intervention as this is a single-participant study.

keywords: neurologic music therapy aphasia neuroscience

Poster # 19

Exploring Stochastic and Circadian Rhythms Features in Depression Classification

Melika Mirzaseyedi, Concordia University, Department of Electrical and Computer Engineering; Melika Sadat Mirzaseyedi; First Author; 1; Siamak Rajabi; Second Author; 1; Dr. Paula Lago; Supervisor; 1; ; 1: Department of Electrical and Computer Engineering, Concordia University

With mental health challenges on the rise, worsened by the aftermath of COVID-19, tackling depression is crucial. There's a shortage of professionals, and we need more effective tools. Our study explores continuous monitoring with wearable devices and machine learning to evaluate if we can use them to predict or detect depression. This is because relying solely on self-reports has limitations, and we need more reliable, ongoing measures.

We aim to evaluate which features from wearable sensor data can be used as predictors of depression. Our study takes a comprehensive approach by examining both statistical features (Mean, Std, Median, etc.) and circadian rhythm features (Amplitude, Mesor, Period, etc.) derived from continuous wearable data from two different datasets (Depression and GLOBEM dataset). This strategy aims to capture the multifaceted nature of depression, offering a deeper analysis beyond self-reported data. We employ several machine learning methods like Random Forest, SVM, Gradient Boosting, and others, resulting in an 82 balanced accuracy in identifying depression within specific groups of the Depression dataset. Similarly, employing depression detection algorithms on the GLOBEM dataset based solely on Physical Activity data yielded a 68 balanced accuracy. Notably, features associated with circadian rhythm outperformed traditional statistical features.

In interpreting these findings, we assess wearable device features for depression indicators. We acknowledge study limitations, like small dataset and short observation, prompting further research combining circadian and statistical features on larger datasets for validation. Furthermore, in our next phase, we intend to utilize more extensive and diverse sensor data from the Globem dataset, including sleep features, to build upon our findings.

Wearable data features can complement self-reported information to give us a better understanding of depression.

keywords: circadian amp statistical features depression

Poster # 20

The Influence of Contamination-Related Cognitive Distortions in the Relationship Between Repugnant Obsessions and Mental Contamination

Julian Leclair-Shefler, Concordia University, Psychology; Julian Leclair-Shefler; 1; Sandra Krause; 1; Adam S. Radomsky; 1; ; 1. Department of Psychology, Concordia University

Contamination-related obsessive-compulsive disorder (OCD) symptomatology can arise from misappraisals of repugnant intrusive mental events (e.g., thoughts, memories, or images), a phenomenon known as mental contamination (MC). Contamination thought-action fusion (CTAF) and contamination sensitivity (CS) are cognitive distortions believed to play a critical role in the onset and maintenance of MC. However, the potential mediating roles of CTAF and CS in the relationship between repugnant thoughts and MC have not been investigated thoroughly. A sample of undergraduates ($N = 564$) completed validated questionnaires of these constructs, and a parallel mediation analysis was used to examine the extent to which CTAF and CS explained the relationship between repugnant obsessions and MC. It was hypothesized that a significantly positive direct effect of repugnant obsessions on MC would be found, with significant indirect effects through CTAF and CS. As hypothesized, repugnant obsessions positively predicted MC ($\beta = .499$, $SE = .050$, $p < .001$), and the indirect effects through CS ($\beta = .176$, $95\text{ CI} = [.129, .226]$), and CTAF to a lesser extent ($\beta = .050$, $95\text{ CI} = [.009, .096]$), were significant. Despite this study's cross-sectional design, these findings suggest that CTAF, and particularly CS, may be important cognitive therapy intervention targets for clients experiencing MC triggered by repugnant obsessions (i.e., self-contamination). Further, the present findings warrant experimental investigation of CTAF's and CS's potential causal roles in self-contamination-related OCD.

keywords: mental contamination cognitive distortions obsessions

Poster # 21

Feasibility of a Fully Virtual Graded Exertion Test in Children with Concussion

Julie Coupal, Concordia University, Health Kinesiology and Applied Physiology; Julie Coupal; 1; Daria Shabanova; 1; Isabelle Gagnon; 2,3 ; Christine Beaulieu; 3; Lisa Grilli; 3; Elizabeth Teel; 1; ; 1: Concordia University, Department of Health, Kinesiology & Applied Physiology, Montreal, Canada; 2: McGill University, Montreal, Canada; 3: Montreal Children's Hospital, Montreal, Canada

Background: Graded exertion tests (GXT) are important tools for concussion management. However, existing protocols require large equipment and in-person supervision. The Montreal Virtual Exertion (MOVE) protocol is a telehealth compatible GXT for children with concussion but has only been tested in pseudo-virtual conditions.

Objective: To determine if a fully virtual administration of the MOVE protocol is feasible in children with concussion.

Methods: Children with concussion (n=19, 12.9 +/- 2.6 years old) completed the MOVE protocol over Zoom. The MOVE protocol consists of seven, progressively intense plyometric exercises. Each exercise is performed for 60sec, with a 60sec rest period between stages to capture feasibility outcomes. Linear mixed models evaluated exertion testing outcomes, while categorical feasibility outcomes were analyzed using chi-square tests.

Results: A significant interaction effect for heart rate was observed ($F(3.5, 45.52) = 3.7, p < 0.001$), with asymptomatic children (change in HR = 97.5 +/- 23.8) experiencing greater increases in HR throughout the MOVE protocol than symptomatic children (change in HR = 67.8 +/- 29.4 bpm). Perceived exertion (change in RPE = 5.1 +/- 1.3, $p < 0.001$) and symptom (change in symptom = 1.4 +/- 1.4, $p = 0.038$) scores increased throughout the protocol. A main effect of group was also observed for symptom scores (asymptomatic: 0.06 +/- 0.24; symptomatic: 2.38 +/- 1.54, $p = 0.002$). Outcomes were less likely to be captured during the 60sec rest period for asymptomatic (18 (42.9) missed) than symptomatic children (10 (12.5) missed; $p < 0.001$). No group differences were observed for exercises performed correctly ($p = 0.34$) and for the full minute ($p = 1$).

Conclusion: The MOVE protocol can be feasibly administered through a fully virtual format. A no-equipment, virtually administered GXT such as the MOVE protocol can remove barriers to exercise testing and broaden access to best practice concussion management strategies.

keywords: concussion paediatric feasibility graded exercise

Poster # 22

Higher brain oxygen extraction fraction in coronary artery disease patients is associated with lower cognition and cardiorespiratory fitness in males

Ali Rezaei, Concordia University; Ali Rezaei; 1,2; Safa Sanami; 1,2; Brittany Intzandt; 3; Stefanie Tremblay; 1,2; Zacharie Potvin-Jutras; 1,2; Dalia Sabra; 1,2; Julia Huck; 5,6; Amelie Mainville-Berthiaume; 6; Christine Gagnon; 2; Dajana Vuckovic; 7; Josep Iglesias-Grau; 2,8; Thomas Vincent; 2; Mathieu Gayda; 2; Anil Nigam; 2; Louis Bherer; 2,8; Claudine J Gauthier; 1,10; ; 1: Department of Physics, Concordia University; 2: Centre Epic and Research Center, Montreal Heart Institute; 3: Hurvitz Brain Sciences Program, Clinical evaluative Sciences, Sunnybrook Research Institute; 4: Department of Biomedical Science, Université de Montreal; 5: Department of Radiology, Université de Sherbrooke; 6: Department of Psychology, Concordia University; 7: Department of Chemistry and Biochemistry, Concordia University; 8: Department of Medicine, Université de Montreal; 9: School of Health, Concordia University

Coronary artery disease (CAD) is the most prevalent cardiovascular disease condition and is linked to cerebrovascular damage and cognitive decline, particularly in executive functions. Our understanding of the nature of brain changes and how they are linked to cognition is currently limited, though there are indications that brain structure and vascular health are both impacted. Because brain function relies on consistent oxygen delivery and CAD is known to be associated with both vascular and metabolic dysfunctions outside the brain, oxygen extraction fraction (OEF) is likely to be a valuable biomarker. OEF assesses the balance between oxygen usage and delivery and OEF is affected in various diseases, including Alzheimer's disease and stroke. However, the effect of CAD on OEF remains unclear, and any link with cognition is unknown. Recent progress in Quantitative Susceptibility Mapping (QSM) now allows noninvasive and accurate cerebral OEF measurements.

Additionally, some of the effects of CAD can be mitigated by rehabilitation programs that include exercise. Exercise has also been shown to improve brain health and cognition, though its exact effects on the brain are still under investigation and the effect of cardiorespiratory fitness on OEF is unknown. Finally, important sexual dimorphisms have been observed in the presentation of CAD, where females often have a preserved ejection fraction, in cognition, and in the effect of exercise.

This study explores the sex-specific effects of CAD on OEF, and the relationships between OEF, cognition, and cardiorespiratory fitness. CAD was found to be associated with higher OEF, while higher OEF was found to be associated with poorer executive function and fitness, though only in males. More data is needed, as well as complementary information from perfusion imaging to fully disentangle these effects.

keywords: coronary artery disease mri oef

Poster # 23

Perineuronal Nets in Dorsal Root Ganglia: Implications for Chemotherapy-Induced Peripheral Neuropathy and Pain Modulation.

Allutas Alhamwi, McGill University, Faculty of Dental Medicine and Oral health sciences; Allutas Alhamwi; 1,2; Nicole Scher; 1; Lisbet Hugland; 1,3,4; Emerson Krock; 1,2; ; 1: Alan Edwards Centre for Research on Pain.; 2: Faculty of Dental Medicine and Oral Health Sciences, McGill University; 3: Department of Surgery, Orthopaedic Research Lab, McGill University; 4: Shriners' Hospital for Children, Montreal, Quebec.

Background:

Perineuronal nets (PNNs) regulate the neuronal activity in the brain and spinal cord and PNN remodelling has previously been linked to neuropathic. However, it is unclear whether PNNs are present in the Dorsal Root Ganglia (DRG) and whether they regulate primary nociceptor function.

Objective:

The objective is to characterize PNNs in human and mouse DRG and determine how changes in PNNs regulate chemotherapy-induced peripheral neuropathy (CIPN).

Methods:

To examine PNNs presence around cell bodies in human and mouse DRG, we used immunofluorescence staining and confocal microscopy. Human DRG were obtained via collaboration with Transplant Quebec. CIPN was induced by injecting 8-10-week-old female BALB/c mice with 2 mg/kg cisplatin for three consecutive days. Pain-like behaviour was evaluated with von Frey testing and the Hargreaves test.

Results:

We found that the cell bodies of sensory neurons are surrounded by PNNs characterized as Wisteria floribunda agglutinin (WFA)-binding and aggrecan-positive structures. Decorin and Biglycan were also localized in perineuronal structures. Mice injected with cisplatin developed mechanical and thermal hypersensitivity and cisplatin induced a loss of collagen type I in the DRG. Moreover, we found that cisplatin induced loss of WFA staining, which is a marker for PNNs. Lastly, we found that there is increased macrophage proliferation and enhanced neutrophil infiltration in the DRG following exposure to cisplatin, suggesting a potential role in ECM remodelling.

Discussion & Conclusion:

Identifying PNNs in DRG will help us understand how cisplatin-driven extracellular matrix (ECM) remodeling is linked to CIPN and pain. Our initial findings set the stage for mechanistic studies investigating how the DRG ECM regulates pain-like behaviour.

keywords: extracellular matrix macrophages cipn drg

Poster # 24

IgG antibodies from fibromyalgia patients bind more mouse and human gut bacteria

Hannah Cho, McGill University, Faculty of Dental Medicine and Oral Health Sciences; Hannah Cho; 1,2; Carolina B. Meloto; 1,2; Luda Diatchenko; 1,2; Emerson Krock; 1,2; ; 1.Faculty of Dental Medicine and Oral Health Sciences, McGill University; 2.Alan Edwards Centre for Research on Pain

Introduction:

We previously found that transferring IgG from fibromyalgia (FM) patients into mice induces pain-like behaviour. The FM IgG binds satellite glial cells in the dorsal root ganglia and glia-binding IgG is elevated in FM patients with more severe pain. These findings suggest that IgG autoantibodies could drive a subset of FM. However, why FM autoantibodies develop remains unclear. The gut microbiome is altered in FM patients and is linked to pain in humans and mice. Therefore, one possibility is that FM autoantibodies develop through cross reactivity with gut microbiota. Our initial study aims to establish methodology for quantifying circulating IgG binding to gut bacteria.

Methods:

IgG was purified from primary FM (n=8) and healthy control (HC) serum (n=13) using Protein G columns. Purified IgG was incubated with mouse and human gut bacteria and then with fluorescently conjugated antibodies against IgG (Alexa Fluor 647) and a bacterial DNA stain (SytoBC). IgG binding was quantified using a BD LSR Fortessa flow cytometer and data was analyzed in FlowJo.

Results:

FM IgG binding to mouse gut bacteria is increased compared to HC IgG. FM IgG binding to human gut bacteria is also increased compared to HC IgG. Moreover, IgG binding to mouse gut bacteria was positively correlated with the previously reported levels of IgG binding to satellite glial cells (SGC).

Conclusions: IgG from FM patients has increased binding to mouse and human gut bacteria, suggesting that there is abnormal immune activity in the gut lumen of FM patients. Future studies will identify bacteria that are cross reactive with fibromyalgia autoantibodies.

keywords: pain neuroscience fibromyalgia gut microbiota

Poster # 25

Acceptability of Smartphone-Based Ecological Momentary Assessment among Adult Survivors of Childhood Cancer with Chronic Pain

Jasmine Manan, Concordia University, Faculty of Arts and Science, Psychology; Jasmine Manan¹, Claire Galvin¹, Nicole M. Alberts¹; ¹: Department of Psychology, Concordia University, Montréal, Canada

Background: Ecological momentary assessment (EMA) involves real-time repeated symptom assessment, and can provide insights into the daily pain experiences of individuals with chronic pain, including childhood cancer survivors. Despite this, no studies have examined the acceptability of smartphone-based EMA among survivors, which may be related to low EMA completion rates observed in the literature.

Methods: Adult survivors of childhood cancer with chronic pain (N=73, mean[SD] age= 45.3 [8.9] years, 52.1 female, 34.4 years since diagnosis) who had participated in an EMA study involving daily and weekly assessment of pain (i.e., daily/weekly diaries) completed an adapted version of the Acceptability E-Scale as well as validated self-report measures of depression, anxiety, and fear of cancer recurrence. Descriptive statistics were used to examine acceptability (total score range=0-40), and Pearson correlation was used to examine associations between baseline psychological factors (depression, anxiety, fear of recurrence) and overall acceptability.

Results: The mean level of overall acceptability among survivors was 34.3 (SD= 5.6, range= 19-40). Survivors reported a high level of ease of use with 70/73 (95.9 %) describing the daily/weekly diary as easy or very easy to use. A high level of satisfaction was also reported with 62/73 (84.9 %) being either satisfied or very satisfied with the diary. No statistically significant correlations were found between acceptability and baseline psychological factors.

Conclusions: These findings provide evidence that smartphone-based EMA is an acceptable assessment method among childhood cancer survivors with chronic pain. It appears that psychological factors may not play a large role in overall acceptability. However, further research is needed to examine these associations in a larger sample as well as other potential factors (e.g., chronic pain duration) that may be related to EMA acceptability and completion rates.

keywords: acceptability digital health childhood cancer

Poster # 26

Enhancing Emergency Hematological Diagnostics through AI-Assisted Detection of Red Blood Cell Abnormalities

Hamza Abu-Zaid, Concordia University, Biology; Hamza Abu-Zaid; 1, 2; Mika Kaeja; 2, 3; Ali Mehdi; 2; Felix Lambert; 2; ; 1: Department of Biology, Concordia University; 2: Pytri; 3: Department of Psychology, Concordia University

The fast and accurate diagnosis of emergencies in hematology is crucial for the effective treatment of conditions such as acute leukemia and severe anemia. Manual microscopy, flow cytometry, and other traditional hematological methods are effective but also time-consuming and rely on not-so-easily available hematology specialists. In some critical and time-sensitive situations, this could result in unwanted, or rather lethal, delays. This study shows the potential of Pytri's artificial intelligence tool in detecting abnormal red blood cells from peripheral blood smears and improving emergency diagnosis with speed and accuracy. Training this tool involved annotating a dataset consisting of 200 images of blood smears from patients presenting with various hematological conditions using the Roboflow annotative software, where classifications of different red blood cell abnormalities were created. The final trained product makes highly accurate detections in these images in seconds, such as the presence of codocytes, which indicates that the individual has thalassemia. Although it is treatable, early detection of RBC abnormalities is important to prevent any lethal outcomes that are caused by diagnostic delays. It also has the potential to eliminate Poisson noise and any uncertainties, which is a challenge in hemocytometry counting. As with most methods, AI detection has a margin of error, however taking serial images with rapid detection can keep the uncertainty at a minimum. The use of this AI tool in emergency departments could improve the early detection of critical hematological conditions, which allows appropriate treatments to be applied promptly, keeping in mind that it also could reduce the burden on medical laboratory scientists. Future research will focus on using Pytri with existing hospital information systems and determining its impact on decision-making in clinical situations and patient management in real-world emergencies.

keywords: hematology healthcare poisson

Poster # 27

Grey matter structural plasticity encoding sequence-specific motor learning

Jhelum Paul, Concordia University, Psychology Department; Authors: Jhelum Paul; 1 ; Anna-Thekla Jäger; 2,9; Julia Huck; 3,4; Arno Villringer; 2,9; Christine Tardif; 5,6; Claudine Gauthier; 3,4,8; Pierre-Louis Bazin; 2,7; Christopher Steele; 1,2; ; 1: Department of Psychology, Concordia University; 2: Department of Neurology, Max Planck Institute for Human Cognitive and Brain Sciences; 3: Department of Physics, Concordia University; 4: PERFORM Centre, Concordia University; 5: Department of Biomedical Engineering, McGill University ; 6: Montreal Neurological Institute, Montreal ; 7: Faculty of Social and Behavioral Sciences, University of Amsterdam, Netherlands; 8: Montreal Heart Institute, Montreal; 9: Center for Stroke Research Berlin (CSB), Berlin

Learning complex sequential motor skills over time induces modifications across different spatial locations and temporal scales in the motor network of the brain. Identifying the regions where specific sequences of motor movements are learned and represented is a key step towards understanding human neuroplasticity. To disambiguate plasticity related to skill movement vs. learning, the present study followed an experimental (LRN) and control group (SMP) trained over 5 consecutive days on a sequential pinch force task (SPFT) to assess differential grey matter structural plasticity. Two groups of participants (20/group) were scanned at 4 time points (days 1, 2, 5 and 17 with no training after day 5) with functional and structural MRI at 7T. Here we used, T1-weighted MP2RAGE images and applied voxel-based morphometry analysis and looked at an interaction effect between groups and time (days 1, 2, 5). We assessed differences in learning stages using flexible factorial GLMs with threshold-free cluster enhancement. We found significant group interactions, characterized by greater change in LRN relative to SMP, in the left superior parietal lobule (SPL) and precuneus during late learning and left precuneus, left angular gyrus (AG) and right SPL during overall learning. Post-hoc ROI analyses revealed that GM volume (GMV) increases in LRN were matched by decreases of a similar magnitude in SMP. We identified sequence-specificity in left SPL and AG where increases in the LRN was more than decreases in the SMP group. Our findings provide initial evidence that learning a complex skill may induce GMV increases while habituating to a simple task leads to GMV decreases as has been seen in functional MRI studies. Also, our findings in SPL and AG, are consistent with its role in spatial transformations, visuospatial perception and motor memory consolidation. We observed positive association with performance in left AG indicating better optimization in learning complex sequence.

keywords: grey matter structural plasticity motor

Poster # 28

Genetic Network Rewiring Between Distantly Related Eukaryotic Species

Vanessa Pereira, Concordia University, Biology; Vanessa Pereira; 1; Rohan Dandage; 1; Sakhil Amikishiev; 1; Elena Kuzmin; 1,2; ; 1: Department of Biology, Centre for Applied Synthetic Biology, Centre for Structural and Functional Genomics, Concordia University, Montreal, Canada; 2: Department of Human Genetics, Rosalind & Morris Goodman Cancer Institute, McGill University, Montreal, Canada

Synthetic lethal (SL) interactions are an example of a genetic interaction that occurs when a combination of mutations in different genes results in lethality, which would not be expected from the combined effects of individual viable single mutants. The extent of genetic interaction network conservation differs from genome sequence conservation between species. Two distantly yeast species, *S. cerevisiae* and *S. pombe*, diverged ~500 Mya and despite 75 genome conservation, they display 29 genetic interaction network conservation. While *C. elegans* and *H. sapiens* diverged ~600 Mya. Here, we investigate genetic network rewiring by studying the genetic interactions that underlie conditional essentiality of single mutants between *S. cerevisiae*, *S. pombe*, *C. elegans*, and *H. sapiens*, whereby a gene is essential (ES) in one species but nonessential (NES) in another. We have extensively studied *S. cerevisiae* - *S. pombe* orthologs, where 9 are conditional NES (*S. pombe* ES, *S. cerevisiae* NES), of which 46 are rewired by SL digenic interactions. Single mutant fitness, phenotype rate and genetic interaction degree differentiate conditional NES genes that were rewired by SL interactions suggesting that they are functionally important in *S. cerevisiae*. We observe that conditional NES genes and their rewiring SL interactions are co-expressed, co-localized, co-annotated, shared protein-protein interactions and showed similar phenotypic profiles, suggesting that genetic rewiring of ES genes is local. When extending these findings to *C. elegans* and *H. sapiens*, 14-23 of orthologs are conditional ES between species. Preliminary results reveal that 14-17 of conditional NES genes in *C. elegans* are rewired by SL interactions that share a functional connection similar to yeast. Understanding the rewiring of gene essentiality and how it is modulated by genetic interactions may reveal principles of genetic network conservation and shed light on SL therapeutic strategies for human disease.

keywords: genotype phenotype synthetic lethality

Poster # 29

A survey: Enhancing Liver Trauma Diagnosis through Deep Learning-based CT Imaging Segmentation

Niloofar Tavakolian, Concordia University, Computer Science; Niloofar Tavakolian; 1; Prof Ching Yee Suen; 1; Dr Azadeh Nazemi; ; 1: Department of Computer Science & Software Engineering, Concordia University

This research explores the integration of Machine Learning (ML) techniques with Computed Tomography (CT) imaging for the diagnosis of liver injuries sustained from abdominal trauma. The primary objective is to enhance diagnostic accuracies and reduce the time delays commonly associated with traditional CT scan interpretations by radiologists, which are often subject to human error and variability.

This study investigated the use of advanced ML algorithms, particularly the modified U-Net architectures for image segmentation and Convolutional Neural Networks (CNNs) for feature classification. These algorithms are specifically tailored to identify and assess liver injuries, capable of automatically processing CT images to distinguish between healthy tissue and traumatically injured areas with high precision. The methodology employs these robust models to analyze extensive datasets of CT scans, thereby improving the reliability, efficiency, and speed of trauma diagnosis.

The results have demonstrated significant improvements in the diagnostic procedures for liver injuries.

In summary, the use of ML models in conjunction with CT imaging represents a substantial advancement in the diagnostic processes for assessing abdominal trauma. This approach does not only boosts diagnostic accuracy but also drastically reduces the time required for medical evaluations, potentially improving patient outcomes through quicker and more precise treatment interventions. The findings strongly advocate for the broader adoption and continuous development of ML applications in medical imaging to effectively address various diagnostic challenges in trauma care, and suggest a shift towards more automated and sophisticated diagnostic techniques that can support rapid clinical decision-making in emergency settings. This study underscores the transformative potential of integrating ML with traditional imaging techniques to revolutionize trauma diagnosis and management.

keywords: liver trauma detection deep learning

Poster # 30

Applying the temporal sampling method to reading

Dasha Vanichkina, McGill University, Psychology; Dasha Vanichkina; 1; Nicole Dranitsaris; 2; Alexandre Reynaud; 2,3; ; 1. Department of Psychology, McGill University; 2. Department of Ophthalmology, McGill University; 3. RI-MUHC

In the past, it has been shown that normally sighted individuals are not significantly benefitted when reading with two eyes versus one. However, this question has been mainly evaluated through eye tracking methods. Despite the lack of differences previously found, we believe that there may be different patterns of brain activity during binocular and monocular reading. Thus, to evaluate this theory, we applied a novel random temporal sampling method which allows us to make inferences about brain oscillation patterns. In this study we investigated whether there were differences in reading efficiency along the temporal sampling domain during binocular and monocular reading.

To quantify participants' reading efficiency, we used the random temporal sampling technique at the accuracy level of 50 . On each trial, participants read the target word to the best of their ability, as varying levels of temporal noise impeded their reading, and they attempted to sort the word into one correct category out of four possibilities. If participants were reading monocularly, one of their eyes was covered with an eyepatch.

We saw that participants generally found the monocular condition to be harder, which was reflected by their superior binocular performance. Therefore, we can conclude that there indeed may be differences in brain oscillations during binocular and monocular reading.

Previously, the random temporal sampling method has been used to detect differences in the brains of individuals diagnosed with ADHD; hence, we believe that it can also be used to identify biomarkers of other neurological disorders such as amblyopia.

keywords: binocular monocular reading amblyopia

Poster # 31

Implementing Cultural Security of BIPOQ and Migrant Communities in HIV Services in Montreal and the Quebec Environments

Matheus da Silva Neves, Concordia University; Matheus Neves; Department of Graduate Studies, Individualized Program, Concordia University; Gilbert Émond; Applied Human Sciences, Concordia University

This abstract presents a study that highlights the pressing need for culturally sensitive measures within HIV services for Black, Indigenous, and People of Colour (BIPOC) and migrant communities in Montreal and Quebec. Focusing on the historically vulnerable Haitian migrant community, particularly prominent among the Black demographic in Quebec, the research emphasizes the critical importance of vigilant monitoring of the HIV epidemic within this community. Migrant populations originating from regions with heightened HIV prevalence also require attention due to their increased susceptibility to subpar health outcomes throughout various stages of migration. Contributing factors to this heightened risk include sociocultural influences linked to migrant status, economic transitions, limited healthcare access, and integration challenges within host country healthcare systems. Addressing these complexities through culturally sensitive HIV services is vital for implementing effective prevention and management strategies within these communities. Efforts to combat racism within the context of HIV/AIDS involve fostering inclusive and culturally sensitive healthcare systems, promoting education and awareness, and advocating for policies addressing social determinants of health. Collaboration between communities, policymakers, and healthcare providers is essential to ensure equitable and effective HIV/AIDS responses for individuals of all racial and ethnic backgrounds. Addressing these multifaceted challenges necessitates a comprehensive approach encompassing strategies to enhance physical access, reduce financial barriers, improve care quality, and bridge geographical gaps in healthcare services. Implementation of targeted interventions and support mechanisms tailored to the specific needs of BIPOC immigrant communities can contribute to closing existing gaps and fostering more equitable access to HIV diagnosis and treatment services.

keywords: cultural safety bipoc living with

Poster # 32

Strength Characteristic in Sub-Elite Male and Female Alpine Skiers

Renée Junge, McGill University, School of Physical and Occupational Therapy; Renée Spencer Junge B.Sc, CATA(C), D.O.; 1; Félix Croteau PT, PhD; 1; Samuel Laroix B.Sc Kin; 2; Richard Preuss PT, PhD; 1; Shawn Robbins PT, PhD; 1; ; 1 McGill University, School of Physical and Occupational Therapy; 2 Université de Sherbrooke, Faculté des science de l'activité physique

Background: Prevalence of knee injuries is high in Alpine skiing. Strength is a modifiable risk factor which may decrease the risk of injuries, however little is known about the strength characteristics in sub-elite alpine skiers.

Objective: To quantify strength parameters for the quadriceps and hamstrings in sub-elite alpine skiers. The secondary objective is to compare male vs female skiers and compare strength values to elite world cup skiers.

Methods: Cross-sectional design (7 males, 8 females) at the end of the pre-season training period using a CON-TREX® isokinetic dynamometer in a knee protocol with 3 modes: 60 deg/s con, 180 deg/s con, 60 deg/s ecc.

Unpublished data of pre-season testing of 8 female elite skiers was available for the first two test modes.

Variables of interest include peak torque, peak torque/kg, torque @ 0.2s, rate of force development, power, work and fatigue for the hamstrings and quadriceps. Results will be presented as descriptive statistics and comparisons will be done using t-tests.

Results: Preliminary results at 60 deg/s con suggest that sub-elite males produce more knee extension torque (268 ± 24 N) than sub-elite females (197 ± 13 N). Once normalized per bodyweight there was no significant difference between males (2.9 ± 0.2 N/kg) and females (2.6 ± 0.3 N/kg). Sub-elite males only showed a significantly greater knee flexion torque (1.6 ± 0.13 N/kg) than sub-elite females (1.3 ± 0.12 N/kg). Sub-elite females produce the same torque per body weight in both extension and flexion (2.6 ± 0.32 and -1.3 ± 0.12 N/kg) as elite females (2.6 ± 0.3 & 1.3 ± 0.3 N/kg).

Conclusion: Sub-elite Male skiers were significantly stronger than female skiers in absolute strength but when normalized per kg, there was no significant difference. Sub-elite females have similar strength characteristics to elite females. Sub-elite female skiers demonstrate large knee strength demands, therefore strength training with appropriate goals is important for injury prevention.

keywords: dynamometry female athlete alpine ski

Poster # 33

The Safety and Feasibility of an At-Home, Virtually Administered Graded Exertion Protocol in Children Clinically Recovered and Non-Recovered from Concussion

Daria Shabanova, Concordia University, Health Kinesiology and Applied Physiology; 1. School of Health Concordia University; 2. McGill University, Montreal, Canada; 3. Montreal Children's Hospital, Montreal, Canada

The Montreal Virtual Exertion (MOVE) protocol is a telehealth-compatible, equipment-free graded exertion test (GXT) for children with concussion, but its safety when administered in a fully virtual setting is unknown. Our objective was to determine whether the MOVE protocol is safe when administered remotely to asymptomatic and symptomatic children with concussion. Nineteen children with concussion (age= 13 +/- 3 years; 13 symptomatic patients) completed two at-home study visits over Zoom Enterprise; an initial visit during which the MOVE protocol was performed (mean= 31 +/- 27 days post-injury) and a 24hr follow-up to measure additional safety outcomes. The MOVE protocol consists of seven, progressively intense exercises performed for 60 seconds, followed by a 60-second rest period. The Post-Concussion Symptom Inventory (PCSI), symptom limited activities (SLA), and adverse events were assessed at both visits. Linear mixed models and Fisher's exact tests were conducted. Four (30.7%) MOVE protocol sessions were stopped early due to acute symptom increases in symptomatic patients versus none (0) in asymptomatic patients ($p=0.25$). Asymptomatic patients (Initial: 0.7 +/- 0.8, Follow-Up: 0.5 +/- 0.8) had significantly lower symptom scores than symptomatic patients (Initial: 17.2 +/- 11.8, Follow-Up: 16.2 +/- 14.4, $F(1,17)=10.3$, $p=0.005$) on the PCSI, but scores for both groups remained stable over the 24-hour period. Similarly, activity limited symptoms were generally higher in the symptomatic group (mean: 1.7 +/- 1 vs. 0 +/- 0), but no main (time) or interaction effects were observed ($p>0.05$). The MOVE protocol is safe when remotely administered in symptomatic and asymptomatic children with concussion. Future studies should evaluate safety and feasibility in larger samples at more acute time points post-injury as well as the potential of the MOVE protocol for designing individualized exercise prescriptions for symptomatic patients.

keywords: exercise virtual concussion safety feasibility

Poster # 34

Towards standard testing to evaluate exoskeleton efficacy for construction workers

Malcolm Dunson-Todd, Concordia University, Building, Civil, and Environmental Engineering; Malcolm Dunson-Todd; 1; Mohadeseh Kafiyan Safari; 1; Yusheng Huang; 1; ; 1: Gina Cody School of Engineering and Computer Science, Concordia University

Construction workers are at risk for musculoskeletal disorders (MSDs) due to the strenuous and variable activities and environments of the construction trades. Occupational exoskeletons (OEs) are a promising solution to prevent MSDs. However, their broad adoption in the construction industry depends on developing realistic standard methods to assess their efficacy in lab settings. Considering the lack of existing standard methods to evaluate OEs, our research is towards controlled, realistic, and repeatable tests to evaluate exoskeletons for specific construction trades and construction project types. The explored OE type, construction trade, and project type was back-support exoskeletons (BSEs) for rebar workers assembling concrete slab reinforcement. The test was designed based on ergonomic risk factors and indices and the realism of the test variables was verified in consultation with experienced reinforcing ironworker instructors. An initial implementation of the test was conducted in collaboration with a steel trade school, involving nine experienced students at the end of their seven-month professional degree, where realistic rebar installation tasks were performed with and without a passive BSE. Results revealed significant reductions in lower-back muscle activity. Subjective opinions indicated minimal discomfort and favorable perceptions regarding health, safety and acceptability. Further evaluations were conducted through a short-term field test with Hydro-Québec where the physical conditions of three experienced construction workers were tracked by muscle activity, heart rate, and motion capture sensors to assess the OE's effects. Future work involves evaluating multiple passive and active exoskeletons and designing tests for more construction trades and OE types. It also involves exploring the use of Virtual and Augmented Reality in standard tests, and using machine learning with motion capture data to simulate workers in 4D Building Information Modeling.

keywords: occupational exoskeleton construction standard testing

Poster # 35

Narrative Futurity in Later Life: Rethinking life story work to address loneliness

John Neufeld, Concordia University, Department of Sociology and Anthropology; John Neufeld; Department of Sociology and Anthropology, Concordia University

As Canadian seniors continue to experience increasing feelings of social or emotional loneliness, there is growing need for interventions. Narrative gerontology, which considers how people age biographically, has demonstrated that personal autobiographies (life stories) offer generative ways for seniors to process and adapt to change. Existing assumptions of old age defined by physical, cognitive, or social decline tend to overshadow the potential for personal growth or self-acceptance made possible through social interactions such as developing and sharing life stories.

Methods: We conducted a guided literature review and synthesized information on subjective views of loneliness, temporality, and aging from approximately 200 articles representing multiple disciplines (e.g., sociology, anthropology, gerontology, philosophy, psychology). Using narrative gerontology as a guiding framework, we examined our synthesized data to better understand the relationship between story and later life loneliness.

Results: Our analysis led to the development of narrative futurity, a construct which describes a type of outward narrative projection of self. Although about the person, life stories become detached from the person, allowing people to see outside of themselves, much like a movie is projected on a screen. The forward movement of storying then becomes a way to transcend any present challenges such as loneliness, potentially leading to increased meaning in their lives.

Discussion: Overall, researchers should consider the ways in which life stories are more than memories and experiences from the past. These stories provide pathways for engaging with self, the physical body, and personal identity in the present and perhaps more importantly in the future. Narrative futurity is therefore an important developing concept to explore in future research, especially its potential to bridge gaps on loneliness.

keywords: narrative gerontology loneliness ageing future

Poster # 36

Exploring intra-network connectivity in the olfactory network across the Alzheimer's disease spectrum: An analysis of COMPASS-ND data

Tristin Best, Concordia University, Psychology; Tristin Best; 1,2; Nicole Grant; 1,2; Kristina Coulter; 1,2; Natalie Phillips; 1,2; ; 1: Concordia University; 2: Canadian Consortium on Neurodegeneration in Aging (CCNA)

Background: Olfactory dysfunction is a prevalent and early symptom of Alzheimer's disease (AD) and often precedes the core cognitive and memory impairment features of the disorder. Previous work has suggested changes in functional connectivity related to olfaction across the AD spectrum, however, few have examined these changes in those with subjective cognitive decline (SCD).

Method: Participants included individuals with SCD (n =131), mild cognitive impairment (MCI; n =352), AD (n =156), and cognitively unimpaired older adults (n =97) who served as controls from the COMPASS-ND cohort. Independent components analysis was used to identify the olfactory network (ON). We compared intra-network connectivity in the ON between groups and related these findings to olfactory performance and measures of cognition.

Results: We observed groupwise deficits in olfactory and cognitive function in MCI and AD groups relative to controls ($p < 0.01$), but not between the SCD and control groups. We expect to find stepwise alterations in functional connectivity within the ON across the AD spectrum, with the greatest deficits in AD and subtle changes in SCD. Further, we expect these changes to relate to poorer olfaction and cognitive performance.

Conclusion: These expected findings would suggest early changes in the olfactory network underlying olfaction and cognition. These data contribute to the potential utility of measuring olfactory performance as a non-invasive and reliable biomarker in SCD for conversion to later stages of the AD continuum.

keywords: olfaction alzheimer disease functional

Poster # 37

Pression artérielle au repos, à l'effort maximal, et prédiction des performances cognitives chez des adultes âgés avec facteurs de risque cardiovasculaire.

Corentin Duquesne, Centre de recherche et centre EPIC, Institut de cardiologie de Montréal; Corentin Duquesne; 2; Mathieu Gayda; 1, 2; Pierre-Olivier Magnan; 1, 2; Christine Gagnon; 2; Thomas Vincent; 2; Florent Besnier; 1, 2; Emma Gabrielle Dupuy; 1, 2; Hânieh Mohammadi; 2, 3; Chiheb Klai; 2; Nicolas Martin; 2; Martin Juneau; 1, 2; Daniel Gagnon; 2, 4; Claudine Gauthier; 2, 5, 6; Tudor Vrinceanu; 2; Anil Nigam; 1, 2; Louis Bherer; 1, 2, 7; ; Affiliations :; 1 : Département de médecine, Faculté de Médecine, Université de Montréal; 2 : Centre de recherche et centre EPIC, Institut de cardiologie de Montréal; 3 : Laboratoire d'imagerie optique et moléculaire, Institut d'ingénierie biomédicale, Polytechnique Montréal; 4 : Ecole de kinésiologie et des sciences de l'activité physique, Faculté de médecine, Université de Montréal; 5 : Département de physique, Université de Concordia; 6 : Centre PERFORM; 7 : Centre de recherche, Institut universitaire de gériatrie de Montréal

Contexte : Une pression artérielle (PA) de repos (PA_{repos}) élevée est associée à de moins bonnes performances cognitives et à un déclin cognitif chez les âgés, alors que la qu'une PA à l'effort maximal (PA_{max}) élevée est associée à un risque accru d'événements cardiovasculaires indépendamment de la PA_{repos}. Aucune étude n'a évalué la relation entre la PA_{max} et les performances cognitives, comparativement à la PA_{repos}.

Objectif : Déterminer si la PA_{max} est prédictive des performances cognitives chez des âgés.

Méthode : 141 participants âgés (70±6 ans), avec FRCV ont réalisé une batterie de 17 tests neuropsychologiques ainsi qu'une épreuve d'effort maximale. Durant celle-ci, les pressions artérielles systolique au repos (PAS_{repos}), à l'effort maximal (PAS_{max}), diastolique au repos (PAD_{repos}) et à l'effort maximal (PAD_{max}) ont été mesurées grâce à un tensiomètre (Tango M2, Suntechmedical, Chine). Les tests cognitifs ciblaient la cognition globale (MoCA), la mémoire de travail, la vitesse de traitement (DSST, TMT-A), les fonctions exécutives (Stroop, TMT-B) et la mémoire épisodique (RAVLT). Des régressions linéaires multiples ajustées pour l'âge, le sexe, l'éducation et l'hypertension ont également été réalisées pour voir si les paramètres de PA (PAS_{max}, PAD_{max}, PAS_{repos}, PAD_{repos}) prédisaient les performances cognitives.

Résultats : La PAS_{max} prédit les performances au RAVLT 2 ($R^2=0,20$, $p=0,035$), RAVLT rappel immédiat ($R^2=0,26$, $p=0,012$) et TMTB ($R^2=0,26$, $p=0,014$), tandis que la PAS_{repos} est prédictive des performances au DSST ($R^2=0,34$, $p=0,006$) et le TMTA ($R^2=0,30$, $p=0,010$).

Conclusion : La PAS_{max} prédit les performances pour la mémoire et les fonctions exécutives alors que la PAS_{repos} prédit les performances de vitesse psychomotrice chez les âgés. Ces résultats suggèrent que l'évaluation de la PAS_{max} et PAS_{repos} pourrait être utile et complémentaire dans une perspective de prise en charge préventive du déclin cognitif chez les âgés.

keywords: blood pressure cognition cardiovascular risk

Poster # 38

Effect of sleep stages on fNIRS hemodynamic response to epileptic discharges.

Edouard Delaire, Concordia University, Physics; Edouard Delaire;1; Chifaou Abdallah;2,3; Makoto Uji;4; Zhengchen Cai;2; Erica Minato;2; Shahla Bakian-Dogaheh;1; Eliane Kobayashi;2; Laure Peter-Derex;5; Birgit Frauscher;2; Thien Thanh Dang-Vu;6; Christophe Grova;1,3,2 ; ; 1: Multimodal Functional Imaging Lab, Physics Dpt / PERFORM Centre, Concordia University, Montreal, QC, Canada, ; 2: Montreal Neurological Institute, McGill University, Montreal, QC, Canada, ; 3: Multimodal Functional Imaging Lab, Biomedical Engineering Department, McGill University, Montreal, QC, Canada, ; 4: RIKEN CBS, Wako, Saitama, Japon; 5: Lyon 1 University, Lyon, Auvergne-Rhône-Alpes, France; 6: Concordia University, Montreal, QC, Canada

Strong interactions between sleep and epilepsy have been demonstrated with an increase in epileptic activity during non-rapid eye movement sleep [1,2]. However, the influence of the sleep stage on the hemodynamic response to epileptic discharges remains unknown. Functional Near-Infrared Spectroscopy (fNIRS), a wearable technique sensitive to both cortical hemodynamic fluctuations of oxyhemoglobin (HbO) and deoxyhemoglobin (HbR), has been considered an emerging technique for sleep monitoring [3]. In this preliminary work, we propose personalized EEG/fNIRS whole-night monitoring as a promising tool to study sleep, where personalized fNIRS maximizes signal sensitivity to targeted cortical regions and allows accurate localization of the hemodynamic responses to epileptic activity [4,5].

Whole-night personalized EEG-fNIRS monitoring on 5 focal epilepsy patients (21-42 years old). EEG electrodes were glued in the 10-20 layout using clinical adhesive before installing fNIRS channels targeting the patient's specific epileptogenic focus (EF) and its homologous contralateral region. To study the effect of sleep on the hemodynamic response to IEDs, we localized the hemodynamic response using a bootstrapping approach coupled with Maximum Entropy on the mean (cMEM)[5] to consider the same number of iEDs in each sleep stage. We then used a hierarchical Bayesian allowing us a quantitative comparison of the effect of sleep stages on the hemodynamic response to IEDs.

Our preliminary results suggest that fNIRS responses to IEDs seemed to be influenced by the underlying sleep stage. We found a significant difference in the shape (amplitude/time of first peak) of the hemodynamic response between N2 and N3 in 3 patients.

1. Frauscher B, et al. *Neurobiol Dis.* (2019)
2. Lambert I, et al. *Epilepsia.* (2018)
3. Ren H, et al. *Front Neurol.* (2020)
4. Cai Z, et al. *Hum Brain Mapp.* (2022)
5. Cai Z, et al. *Hum Brain Mapp.* (2021)

keywords: epilepsy sleep neurovascular coupling nirs

Poster # 39

Beyond diseased cell models: Endogenous tagging in iPSCs to study cytokinesis in healthy human cells

Nhat Pham, Concordia University, Biology Department; Mathieu C. Husser; 1; Nhat P. Pham; 1; Chris Law; 1,2; Flavia R. B. Araujo; 3; Vincent J.J. Martin; 1,3; Alisa Piekny; 1,2,3,4; ; 1: Biology Department, Concordia University; 2: Center for Microscopy and Cellular Imaging, Concordia University; 3: Center for Applied Synthetic Biology, Concordia University; 4: School of Health, Concordia University

Understanding how different genes function at the cellular level is an important aspect of human health research. The cell cycle is dysregulated in cancers and is targeted by chemotherapies, but we have little knowledge of how the cell cycle works in most human cells. Cytokinesis describes the physical separation of a cell into two at the end of mitosis, and we found that cytokinesis occurs differently in different cell types. Endogenous tags, such as fluorescent proteins, can be used to study proteins in their native environment in live cells. However, few human cell lines have been generated with endogenous tags due to the low efficiency of precise genomic integration by homology-directed repair. Recently, an engineered split mNeonGreen protein was used to generate a library of 1,310 endogenous tags in HEK293 (human embryonic kidney epithelial) cells. The mNeonGreen protein was split into a large fragment (mNG2(1-10)) and a short fragment (mNG2(11)) that reconstitute fluorescence when co-expressed. We created a similar system in human induced pluripotent stem cells (iPSCs) which have the potential to be differentiated into any cell type. To do this, we engineered human iPSCs to express the mNG2(1-10) fragment. We then tagged multiple proteins with mNG2(11) in parallel, and isolated clonal cell lines where histones, actin, tubulin, anillin, and RhoA are endogenously tagged with the mNG2(11) fragment. We then developed live imaging protocols to quantitatively characterize cytokinesis and found striking differences in the localization of these proteins between iPSCs and HeLa (human cervical cancer) cells, a commonly used cell line. This suggests that different molecular mechanisms regulate cytokinesis in iPSCs compared to HeLa cells, highlighting the need to study cytokinesis in normal cells. Future work will use these cell lines to uncover the mechanisms controlling cytokinesis in different cell types.

keywords: cytokinesis ipscs endogenous tags crispr

Poster # 40

Determining the role of obesity in triple negative breast cancer progression

Alexandra Perlman, Concordia University, Biology; Alexandra Perlman; 1; Ryan Chicoine; 1; Christina Dembegiotis; 1; Claire Plissonneau; 2; Elena Kuzmin; 1; Sylvia Santosa; 2; Alisa Piekny; 1; ; 1. Department of Biology, Concordia University; 2. Department of Health, Kinesiology & Applied Physiology, Concordia University

Approximately 1/8 women in Canada will be diagnosed with breast cancer. Triple negative breast cancer (TNBC) lacks receptors that are used for targeted therapeutics and has the poorest prognosis compared to other breast cancers. In the past 4-5 decades, TNBC severity has increased, and the age of onset has decreased. This correlates with a rise in obesity, and previous studies revealed that obesity from childhood correlates with higher cancer mortality in adulthood. Obesity occurs when there is an excess of adipose tissue (body fat). Adipose tissue is complex, and its cellular characteristics could differ depending on the depot location and if the individual was obese from childhood. Tumours are also heterogenous, and different genetic profiles could respond differently to cues that drive their progression. Thus, the mechanisms by which adipose tissue contributes to cancer progression are not clear. To test this, we are using conditioned media collected from biopsied adipose tissue or differentiated adipocytes from obese patients grown in vitro and determining its effect on TNBC cell growth and migration. We found that media from adipose tissue from two different subcutaneous fat depots or differentiated adipocytes from obese individuals had no effect on the growth of MCF10A (non-cancer breast epithelial) cells, while one of the adipose tissue depots caused an increase in the growth of MDA MB 157 TNBC cells. However, the effect on migration was complex. Media from adipose tissue caused a decrease in the migration of MCF10A cells, while differentiated adipocytes caused an increase in their migration, as well as the migration of hs578t and MDA MB 157 TNBC cells. Since adipose tissue also contains other cell types, their cues could decrease migration, while adipocytes could increase migration. We are continuing to do more studies and will identify the molecular factors driving changes in TNBCs. Our findings could reveal how to consider obesity in treatment regimes.

keywords: tnbc obesity extracellular vesicles

Poster # 41

Systematic analysis of mitochondrial carrier functional redundancy using complex genetic interaction analysis

Brittany M. Greco, Department of Biology, Concordia University; Brittany M. Greco 1, Keyan Sarab Dadelahi 1, Traver Hart 3, John G. Doench 4, Elena Kuzmin 1,2; 1Department of Biology, Centre for Applied Synthetic Biology, Centre for Structural and Functional Genomics, Concordia University; 2Department of Human Genetics, Rosalind and Morris Goodman Cancer Institute, McGill University; 3Department of Bioinformatics and Computational Biology, MD Anderson Cancer Center, University of Texas; 4Genetic Perturbation Platform, Broad Institute of MIT and Harvard, Cambridge

Higher-order genetic interactions or complex genetic interactions occur when an unexpected phenotype is observed upon the mutation or deletion of two or more genes which is not normally observed with a single perturbation of each gene. Due to the frequency of complex genetic interactions, they are thought to potentially affect the biology of inheritance. In this work, we use budding yeast as a model organism to investigate complex genetic interactions of mitochondrial carriers; a conserved eukaryotic gene family to understand how they buffers each other's loss and contribute to genomic robustness. Mitochondrial carriers regulate the import and export of metabolites across the cytosol and mitochondrial matrix illustrating their vital role in cellular metabolism and human diseases. We used Synthetic Genetic Array (SGA) haploid selection methods to construct 666 double mutant query strains involving 31 unique yeast mitochondrial carrier orthologous genes that have been directly implicated in human diseases. We will generate triple mutant knockouts with trigenic-SGA to study their higher-order interactions to understand how the combination of the perturbations of three genes affect the fitness of a cell. In parallel, we will also study digenic and trigenic interactions among human mitochondrial carrier genes using the IN4MER CRISPR-Cas12a multiplex platform comprising 71,000 guideRNA constructs targeting all possible double and triple combinations of the 53 human mitochondrial carrier genes. We will integrate this data with genome-wide association studies (GWAS) which will allow us to gain insight into the heritability of mitochondrial carrier gene family related diseases as well as the close the gap between the genotype-to-phenotype relationship.

keywords: genotype phenotype correlations mitochondrial

Poster # 42

FocalErrorNet: Uncertainty-aware focal modulation network for inter-modal registration error estimation in ultrasound-guided neurosurgery

Soorena Salari, *Department of Computer Science and Software Engineering; Soorena Salari; 1; Amirhossein Rasoulian; 1; Hassan Rivaz; 2; Yiming Xiao; 1; ; 1; Department of Computer Science and Software Engineering, Concordia University; 2: Department of Electrical and Computer Engineering, Concordia University*

In brain tumor resection, accurate removal of cancerous tissues while preserving eloquent regions is crucial to the safety and outcomes of the treatment. However, intra-operative tissue deformation (called brain shift) can move the surgical target and render the pre-surgical plan invalid. Intra-operative ultrasound (iUS) has been adopted to provide real-time images to track brain shift, and inter-modal (i.e., MRI-iUS) registration is often required to update the pre-surgical plan. Quality control for the registration results during surgery is important to avoid adverse outcomes, but manual verification faces great challenges due to difficult 3D visualization and the low contrast of iUS. Automatic algorithms are urgently needed to address this issue, but the problem was rarely attempted. Therefore, we propose a novel deep learning technique based on 3D focal modulation in conjunction with uncertainty estimation to accurately assess MRI-iUS registration errors for brain tumor surgery. Developed and validated with the public RESECT clinical database, the resulting algorithm can achieve an estimation error of 0.59 ± 0.57 mm.

keywords: registration inter modal error estimation

Poster # 43

Surveying the tumor suppressive genetic network underlying chr4p deletion in TNBC

Joseph Del Corpo, Concordia University, Biology; Joseph Del Corpo;1; Rohan Dandage; 1; Lea Harrington; 2,3; Elena Kuzmin;1,4; ; 1: Centre for Applied Synthetic Biology, Department of Biology, Concordia University, Montreal, Quebec, Canada 2: Institute for Research in Immunology and Cancer, Department of Medicine, Université de Montréal, Montreal, Quebec, Canada; 3: Department of Biochemistry, University of Toronto, Toronto, Ontario, Canada 4: Rosalind & Morris Goodman Cancer Institute, Department of Human Genetics, McGill University, Montreal, Quebec, Canada

Triple-negative breast cancer (TNBC) is a breast cancer subtype lacking targetable biomarkers, resulting in the worst prognosis compared to other breast cancer subtypes. TNBC is characterized by many large copy number variants that result in the deletion and amplifications of many genes, with TP53 being the only common oncogenic driver. Using TCGA data and in-depth functional genomic analysis of TNBC patient-derived xenografts, our group showed that chr4p is a recurrently deleted region in basal breast cancer, in which TNBC is an enriched subtype. This deleted region correlated with poor prognosis and a highly proliferative state. In this study, we set out to survey the tumor suppressive genetic network underlying the TNBC-specific chr4p deletion. Using an arrayed CRISPR-Cas12a screening approach, I am generating a panel of mutant cell lines deleted for 112 protein-coding genes residing within chr4p that demonstrate a robust decrease in gene expression upon the loss of chr4p in basal breast cancer. The MCF10a series of cell lines is used for mutant cell line construction. MCF10a is an established normal human breast epithelial model system with a normal, diploid karyotype. We will also include other cell line derivatives (MCF10a(-E7-Bcl2)) that show basal anchorage-independent growth in 3D to assess cell transformation. Preliminary data showed that MCF10a cells exhibit a high level of editing efficiency (> 80%) using a ribonucleoprotein (RNP) based CRISPR-Cas12a system with respect to a set of control loci, which include AAVS1, TP53, TSC1, BCL2 and TERT. The resulting panel of single gene deletion mutant cell lines will be characterized for their effects on proliferation, apoptosis, cell transformation and senescence. Ultimately, this study will provide an in-depth understanding of the functional consequences of large copy number variants in TNBC and provide new insights into avenues for precision oncology.

keywords: tnbc breast cancer cas

Poster # 44

Comparative Analysis of Traditional and Trefethen BMI Using NHANES 2011-2018 Data: Implications for Health Outcome Predictions

Tania Cretella, Concordia University, Biology and Science College; Tania Cretella; 1,2; Lisa Kakinami Ph.D.; 3,4 ; Simone Brugiapaglia Ph.D.; 3; ; 1: Department of Biology, Concordia University; 2: Science College, Concordia University; 3: Department of Mathematics and Statistics, Concordia University; 4: School of Health, Concordia University

Background: Due to the limitations of body mass index (BMI), an alternative formula has been proposed to account for varying heights (Trefethen's BMI). This study examines the comparative effectiveness of these two measures in assessing health outcomes.

Methods: Data were from the 2011-2018 National Health and Nutrition Examination Survey (NHANES; N=9730; 49.23 male; average age: 39.42 years). Health indices included total (TC) and high-density lipoprotein (HDL) cholesterol, and TC/HDL ratio. Analyses incorporated the sampling design and survey weights. BMI was calculated as $\text{weight}(\text{kg})/\text{height}(\text{m})^2$, while Trefethen's BMI was calculated as $1.3 * \text{weight}(\text{kg})/\text{height}(\text{m})^{2.5}$. Bland-Altman plots, correlations, and multiple linear regression models adjusting for age, sex, and race/ethnicity were considered. Both BMI measures were categorized as weight status: Normal or overweight; and obesity class I, II, and III based on the cutpoints of <30, 30-34.99, 35-39.99, and ≥ 40 , respectively.

Results: Both BMI measures strongly correlated with each other ($r=0.992$; $p<0.001$) although correlations were stronger in individuals with normal or overweight and obesity class III ($r>0.496$; $p<0.001$) compared to those with obesity class I and II ($r>0.127$; $p<0.001$), which was confirmed by the Bland-Altman plots. While HDL was weakly correlated with BMI measures ($r>0.063$; $p<0.001$), the correlations were stronger with Trefethen's BMI. Linear regression results were consistent for HDL: compared to normal or overweight, obesity class I, II, and III using the Trefethen categories were associated with $B=-8.21$, $B=-10.94$, $B=-11.93$, respectively, all $p<.0001$). These were stronger than those using the traditional BMI categories.

Conclusion: Trefethen's BMI often showed stronger associations with health measures than traditional BMI, indicating a potentially more sensitive health risk measure, though further research is needed given its strong correlation with BMI.

keywords: obesity bmi trefethen nhanes health

Poster # 45

Advanced Blind Source Separation with Bounded Multivariate Generalized Gaussian Mixture Model: Integrating to the IVA Framework

Ali Hamid Algumaei, Information system engineering; Ali Algumaei, Muhammad Azam, and Nizar Bouguila; ; Concordia Institute for Information Systems Engineering, Concordia University, 1455 Boulevard; de Maisonneuve O, Montreal, H3G 1M8, Qc, Canada;

This work discusses blind source separation (BSS), a common method used to separate mixed signals. We introduce novel algorithm called IVABMGGMM (independent vector analysis with a bounded multivariate generalized Gaussian mixture model). IVABMGGMM assumes second-order correlation within support component vectors, which provides more flexibility for extracting knowledge from the data. Notably, this developed model overcomes ICA constraints in multivariate data by leveraging second and higher-order statistics, enhancing its adaptability to diverse data shapes. The main contributions for this work include introducing the IVABMGGMM model to address the ICA limitation in multivariate data, validating our proposed model on resting state fMRI and ECG datasets, identifying the affected brain regions in individuals with schizophrenia using IVABMGGMM components, and extracting the fetal ECG signal from the mixing pregnant ECG signal.

We utilized COBRE schizophrenic dataset to validate the proposed model aimed at distinguishing between patients with schizophrenia and healthy controls. We additionally conducted our IVABMGGMM to extract the fetal ECG signals from mixed maternal ECG and noise signals. To highlight the IVABMGGMM performance, we employed different BSS metrics including signal-to-distortion ratio (SDR), signal-to-interference ratio (SIR), SAR, SNR and ISI to assess its effectiveness in distinguishing between schizophrenic patients and healthy subjects, as well as in extracting fetal ECG signals.

We validated the proposed model using schizophrenic data to test its capability to distinguish schizophrenic patients from healthy subjects. Also, we conducted our model to extract the fetal ECG signal from the pregnant ECG signals. We emphasized the enhancement of our proposed model in effectively distinguishing between various classes compared to baseline models like IVA and ICA. We identified the affected schizophrenic brain regions using the IVABMGGMM components.

keywords: blind source separation bounded multivariate

Poster # 46

Effects of Androgen Receptor Signalling and Circadian Clock Gene Expression on Metabolic Functions in Male and Female Mice.

Sofia Benavides Amaya, Concordia University, Psychology; Sofia Benavides Amaya; 1; Amanda Szubinski; 1; Andree Stevens; 1; Carlos Alvarado; 3; Miltiadis Paliouras; 3; Andreas Bergdahl; 2; Mark Trifiro; 3; Konrad Schöttner; 1; Shimon Amir; 1; ; 1: Center for Studies in Behavioral Neurobiology, Department of Psychology, Concordia University; 2: Department of Health, Kinesiology & Applied Physiology, Concordia University; 3: Department of Medicine, Division of Experimental Medicine, Lady Davis Institute for Medical Research, Jewish General Hospital

Androgen receptors (ARs) are ligand-dependent nuclear transcription factors that play a central role in reproductive, cardiovascular, metabolic, and neural processes. Male mice with a humanized androgen receptor genotype (AR-19Q) develop non-alcoholic fatty liver and metabolic syndrome (MetS)-like phenotypes, and preliminary work suggests that alterations in clock gene expression in tissues regulating metabolic homeostasis may be a contributing factor. We assessed daily changes in blood glucose levels and clearance as well as liver mitochondrial respirometry and gene expression in AR mutant male and female mice. AR mutant mice displayed reduced blood glucose clearance during the light phase, while liver mitochondrial respiration remained unchanged. Interestingly, *Per1* transcription is constitutively upregulated in the liver, indicating a potential link to dysregulations in fat metabolism and the development of fatty liver phenotypes, which may cause hyperglycemia subsequently. This model therefore provides the basis to investigate mechanism of MetS and how it affects physiology and behavior.

keywords: metabolic syndrome circadian clocks androgen

Poster # 47

Developing an anillin inhibitor for the treatment of liver cancer

Natasha Letourneau, Concordia University; Natasha Letourneau; 1; Ioanna Tountas; 1; Juliette Gennaro; 1; Sarah Taylor; 2; Pat Forgione; 2; Alisa Piekny; 1; ; 1: Department of Biology, Concordia University; 2: Department of Chemistry and Biochemistry, Concordia University

Cytokinesis is a highly controlled process that occurs at the end of the cell cycle. Cytokinesis occurs due to the assembly and constriction of a RhoA-dependent contractile ring, which pinches in the plasma membrane and to cleave the cell into two daughters. Anillin is a protein that anchors the ring to the membrane and is recruited by binding to active RhoA. Anillin is highly overexpressed in multiple cancers, and the threshold requirement for anillin is significantly higher for some cancer cells compared to others. Therefore, a molecule that inhibits anillin has the potential to be used as a targeted anti-cancer therapy. In support of this, depleting anillin transcripts by RNAi in mice caused liver cancer tumor regression, and mice regained healthy tissue function. However, RNAs are difficult to deliver as a therapy, and it is desirable to find a compound that could inhibit anillin function and be developed as a drug. In collaboration with Dr. Forgione's group (Chemistry & Biochemistry) we strategically designed compounds predicted to disrupt the anillin-RhoA binding interface to decrease anillin function. Compounds were screened for efficacy using an in vitro assay called bimolecular fluorescence complementation, where fluorescence is reconstituted when two halves of a fluorescent protein interact. We generated proteins containing the RhoA-binding domain from anillin and active RhoA fused to the C-terminal and N-terminal halves of the yellow fluorescent protein Venus, respectively, and showed that they reconstitute fluorescence. Of approximately 40 compounds that were tested at 10 μ M, compound 1089 reduced fluorescence by nearly 0.5-fold, and several other compounds reduced fluorescence to a lesser extent. We added 1089 to HepG2 (hepatocellular carcinoma) cells and observed an increase in cytokinesis failure. We are currently synthesizing new derivatives of 1089 with higher efficacy that could be developed as a novel, targeted anti-cancer therapy.

keywords: cytokinesis anillin cancer

Poster # 48

Chromatin-sensing machinery controls cortical polarity during cell division

Cecilia Brancheriau, Concordia University, Biology; Cecilia Brancheriau, Kevin Larocque, Alex Perlman, Vo Chi Mai Hong, Alisa Piekny

Cytokinesis occurs by the ingression of a ring at the end of mitosis to form two daughters. The ring is tightly controlled to ensure that the daughters inherit proper fate and ploidy. We discovered a chromatin-sensing pathway that positions the ring between the segregating chromosomes. Ran and importins are key components of this pathway, and we found that importin-binding controls the localization of the ring protein anillin. Importins change their localization in response to chromatin-associated Ran activity, however, they have not been studied in cytokinesis. Cytokinesis occurs differently in triploid HeLa (cervical cancer) cells and diploid HCT116 (colorectal cancer) cells, and we

hypothesize that cells with higher ploidy (DNA content) rely more on the chromatin sensing pathway for cytokinesis. To study importins in cytokinesis, I endogenously tagged importin- β 1 with mNeonGreen in HeLa and HCT116 cells and performed live imaging studies. In both cell types, importin- β 1 localization was very dynamic and moved in response to chromatin position. However, importin- β 1 accumulated near the ring in HeLa cells, but not in HCT116 cells where it was more uniform. Next, we determined how increasing HeLa cell size independent of ploidy impacts importin- β 1 and anillin localization. HeLa cells with mNeonGreen-tagged importin- β 1 or anillin were cultured in hypotonic media to make them

bigger. Both importin- β 1 and anillin localization changed to look more like HCT116 cells. Next, to test importin- β 1 function, I built an optogenetic tool where importin- β 1 is fused to CRY2-Clust, which is capable of rapid oligomerization upon blue light exposure. By activating this tool in specific regions of the cell during cytokinesis, I will induce spatiotemporal changes in importin- β 1 and determine its requirement for the localization of anillin. These mechanistic studies will reveal how the chromatin-sensing pathway works, which could be ideal to target as an anti-cancer therapy.

keywords: cytokinesis importin anillin polyploidy cancer

Poster # 49

Bmal1 in an Aversion Circuit Influences Alcohol Drinking Behaviour in Mice

Vanessa Hasenmundl, Concordia University, Psychology; Vanessa Hasenmundl; 1; Georges Elias; 1; Cassandra Goldfarb; 1; Shimon Amir; 1; Konrad Schöttner; 1; ; 1: Centre for Studies in Behavioural Neurobiology, Department of Psychology, Concordia University

A strong association has emerged between circadian clock gene expression and alcohol drinking behaviour. However, a causal role of these genes and the neural pathways through which they may influence alcohol intake remain largely undetermined. Recent findings demonstrate a novel role of Bmal1 in striatal control of alcohol consumption, producing sex-specific effects wherein male consumption is amplified when the gene is deleted and female consumption is repressed. We explored potential connections in the mesolimbic and nigrostriatal dopaminergic pathways, and beyond, affecting striatal function and alcohol consumption in male and female mice. Our areas of interest, the lateral habenula (LHb) and the central nucleus of the amygdala (CeA) function as a part of the reward system and harbor circadian clocks. Therefore, we ablated Bmal1 in the LHb (experiment 1) and in the CeA (experiment 2) and assessed alcohol drinking behaviour. In both experiments, alcohol consumption was significantly higher in male knockout mice compared to controls. Conversely, female knockout mice drank significantly less than the female control mice. Knockout animals, regardless of sex, were more strongly deterred by the addition of quinine to the alcohol. These findings indicate a shared link between CeA and LHb function and the sex- and striatal subregion-specific regulation of alcohol consumption, presumably through regulation of dopamine synthesis and release in the mesolimbic and nigrostriatal pathway. The potential underlying mechanisms include sex-specific innervations of Bmal1 and clock-controlled genes. Overall, these results help to elucidate the sexually dimorphic role of Bmal1 in brain circuits regulating alcohol drinking behaviour.

keywords: circadian clock genes aversion circuit

Poster # 50

The relationship of dietary protein to energy metabolism, body composition, and muscle function in individuals undergoing bariatric surgery

Lyne Al-Nabelsi, Concordia University, Health, Kinesiology, and Applied Physiology; Lyne Al-Nabelsi; 1,2; Tiffany Moey; 1,2; Niloufar Ghaderian; 1,2; José A. Morais; 3; Simon L. Bacon; 1,2; Sandra Peláez; 4; Amin Andalib; 3; Oliver Court; 3; Sebastian Demyttenaere; 3; Phil Vourtzoumis; 3; Théo Demmers; 1; Sylvia Santosa; 1,2; ; 1: School of Health, Concordia University; 2. Department of Health, Kinesiology, & Applied Physiology, Concordia University; 3. McGill University; 4. Université de Montréal

Introduction: Post-bariatric surgery, individuals are at great risk of nutritional deficiencies and lose a significant amount of fat-free mass. The impact of these post-surgical changes is not well characterized. The aim of this study is to investigate the relationship between post-surgical dietary protein intake and its effects on energy metabolism, body composition, and muscle function in individuals undergoing bariatric surgery.

Methods: We recruited 42 patients undergoing bariatric surgery (Age: 41.4 +/- 0.98 yrs; BMI: 49 +/- 0.14 kg/m²) to undergo study visits pre-surgically (baseline), and at 3- and 6-mos post-surgically. At each visit, dietary intake (24-hr food recall and 3-day food record), body composition (DXA scan), and muscle function (handgrip strength test (HGT) and 6-minute walk test (6MWT)) were assessed.

Results: There was an increase in fat-free mass (FFM) ($p < 0.001$) and improved 6MWT ($p = 0.001$) from baseline to 6-mos. At baseline, a greater FFM was associated with higher HGT ($p = 0.0029$) and similarly, a greater FFM was associated with higher 6MWT ($p = 0.0003$). At baseline, there was a weak, positive correlation between higher average protein intake (Avg Pro) and HGT ($r = 0.30$, $p = 0.05$). At 3-mos, a greater FFM was related to improved 6MWT ($p = 0.02$), and similarly at 6-mos ($p = 0.026$). No correlation was observed between Avg Pro intake and FFM nor between Avg Pro intake and HGT or 6MWT ($p > 0.05$).

Conclusion: These preliminary data indicate that higher FFM post-bariatric surgery may enhance muscle functionality as observed by the 6MWT. Further analyses will be required to obtain a comprehensive understanding of the underlying relationships and to reinforce current dietary protein nutritional guidelines for this population.

Funding: SS holds a CRC Tier 2 - Clinical Nutrition. The study was funded by a grant from the Canadian Foundation for Dietetic Research.

keywords: obesity bariatric surgery protein metabolism

Poster # 51

Brain structure and functional connectivity markers of brain and cognitive reserve in older adults with, or at risk for, Alzheimer's disease

Kristina Coulter, Concordia University, Psychology; Kristina Coulter; 1 ; Tanya Dash; 2 ; Tristin Best; 1 ; Nicole Grant; 1 ; Ana Ines Ansaldo; 3 ; Natalie Phillips; 1 ; ; 1: Department of Psychology, Concordia University; 2: Department of Communication Sciences and Disorders, University of Alberta; 3: École d'orthophonie et d'audiologie, Université de Montréal

Background: Being multilingual is proposed to protect against cognitive decline in aging. Greater brain and cognitive reserve have been observed in multilinguals with mild cognitive impairment (MCI) and Alzheimer's disease (AD), compared to their monolingual peers (Duncan et al., 2018). However, previous research has focused on structural, and not functional, brain measures, with little research on earlier at-risk populations. We used structural and resting-state functional MRI methods, to examine brain and cognitive reserve related to multilingualism in older adults with, or at risk for, AD.

Method: Participants include cognitively unimpaired older adults (n = 48), older adults with subjective cognitive decline (n = 102), MCI (n = 174), and AD (n = 40), from the COMPASS-ND (Data Release 6) and CIMA-Q (Data Release 12) cohorts. Within diagnosis groups, multilinguals and monolinguals were matched on age, sex, education, and cognitive function. Cortical thickness and volume of brain regions associated with language control (e.g., inferior frontal gyrus) and AD (e.g., medial temporal regions) were used to examine structural evidence of reserve.

Result: Preliminary analyses show no structural evidence of greater brain reserve in language-related areas for multilinguals compared to monolinguals. However, reduced hippocampal volume was observed for monolingual older adults with AD, but not multilinguals.

Conclusion: These findings suggest that multilingualism contributes to reserve in the form of brain maintenance in the context of AD. Future work will examine resting-state functional connectivity markers of cognitive reserve.

keywords: bilingualism dementia brain reserve cognitive

Poster # 52

Biomechanical Changes in the Lumbar Spine Following a Winter Ultramarathon: A Case Report & Literature Review

Cleo Bertrand, Concordia University, Health, Kinesiology & Applied Physiology; Cleo Bertrand; 1; Daniel Wolfe; 1; Tristan Castonguay; 1; Julie Lamoureux; 1; Geoffrey Dover; 1,2; Maryse Fortin; 1,2; ; 1: Department of Health, Kinesiology & Applied Physiology, Concordia University; 2: School of Health, Concordia University

Introduction. Ultramarathon (UM) racing is a growing sport. While regular exercise is beneficial, the consequences of ultra-endurance running on musculoskeletal (MSK) health are largely unknown. Low back pain (LBP) is a common complaint among athletes and non-athletes alike. It is a leading cause of disability, yet its complex etiology is poorly understood. Imaging techniques such as magnetic resonance imaging (MRI) and ultrasound shear wave elastography (SWE) have been used to detect potential predictors of LBP. To our knowledge, no study has examined the physiological effects of an UM on the lumbar spine (LS). Our aims were (1) to describe acute biomechanical changes in the LS following a 627-km winter UM in a single athlete with a history of LBP and, (2) to provide a review on UM racing and MSK outcomes, with a focus on the LS. **Methods.** MRI was used to acquire T2-weighted and IDEAL fat-water images of the lumbar intervertebral discs, facet joints (FJs) and paraspinal muscles pre- and post-race. Disc height, disc T2 mean signal intensity (MSI), FJ effusion (FJE), muscle cross-sectional area (CSA), MSI, and fat-signal fraction (FSF) were measured and compared. Ultrasound SWE was used to quantify changes in multifidus (MF) stiffness. **Results.** Post-race decreases in disc height and MSI suggested minor dehydration. Reductions in muscle CSA, MSI and FSF may have resulted from a loss of intramuscular fat. Lower post-race MF stiffness may have indicated decreased muscle tone and contractile capacity. Bilateral FJE and severe L5-S1 disc degeneration were observed pre- and post-race. **Conclusions.** Our findings suggest that an extreme UM race was likely not linked to detrimental changes in the LS of an UM runner with LBP. Further research focusing on the biomechanical responses to UM racing in athletes with and without LBP is needed to shed light on the intricate mechanisms that may contribute to the development, persistence, and prevention of LBP.

keywords: ultramarathon lumbar spine imaging

Poster # 53

All-night EEG-fNIRS as a novel tool for investigating sleep physiology

*Shahla Bakian Dogaheh, Concordia University, Physics department, School of Health; Shahla Bakian Dogaheh;*1,2; Edouard Delaire;1,2; Gabriel D. Pinilla-Monsalve;7; Mathilde Reyt;3,7; Chifaou Abdallah;3; Habib Benali;9; Julie Carrier;10; Birgit Frauscher;8; Jean Marc Lina;5; Laure Peter-Derex;6; Thien Thanh Dang-Vu;2,4,7; Christophe Grova;1,2,3; ; 1:Physics Department,Concordia University,Canada; 2:School of Health,Concordia University,Canada; 3:McGill University,Canada; 4:Department of Health, Kinesiology & Applied Physiology,Concordia University; 5:Département de Génie Electrique, École de Technologie Supérieure,Canada; 6:Centre de Médecine du Sommeil et des Maladies respiratoires, University Hospital of Lyon; 7:Centre de recherches de l'Institut universitaire de gériatrie de Montréal (CRIUGM), CIUSSS du Centre-Sud-de-l'île-de-Montréal,Canada; 8:Departments of Neurology & Biomedical Engineering, Duke University,USA; 9:Concordia University,Canada; 10:Université de Montréal,Canada*

Introduction: Sleep is not only characterized by Electroencephalography(EEG) signatures, but also by brain hemodynamic activity. Simultaneous EEG/functional Near-Infrared Spectroscopy(fNIRS) emerges as a promising wearable multimodal approach for prolonged sleep monitoring, allowing to measure hemodynamic fluctuations of cortical oxygenated (HbO) and deoxygenated (HbR) hemoglobin concentration changes. Due to limitations associated with short sleep duration or limited spatial coverage in previous studies, the physiology of sleep-related hemodynamic processes and their spatio-temporal organizations remains poorly understood.

We propose whole-night personalized EEG/fNIRS, using an optimized locally dense montage to maximize fNIRS sensitivity to targeted bilateral frontoparietal regions, allowing to investigate sleep-state-specific patterns of HbO/HbR oscillations in healthy subjects.

Method:EEG were scored along American Academy of Sleep Medicine manual. We applied our fNIRS workflow (Cai et al.,2021), optimizing the position of fNIRS sensors to target bilateral frontoparietal regions. Standard fNIRS pre-processing was applied. To disentangle oscillatory from aperiodic(1/f) components of HbO signals, we applied time-frequency analysis using Morse analytical wavelet.HbO time-frequency results were considered to estimate HbO power spectra for each stable sleep state including REM phasic and tonic states.

Results:Our results, based on 5 subjects(2 females, 18-35years, mean sleep efficiency:90.3), show sleep-state-specific signatures of hemodynamic oscillations, around 0.005 and 0.01Hz during tonic vs phasic REM, around 0.03-0.06Hz during N2, and ~0.2Hz during N3, suggesting respiration oscillations.

Conclusion:we propose whole-night personalized EEG/fNIRS as a new versatile modality to study sleep physiology, reporting specific spectral signatures of HbO oscillations in different sleep states including for the first time REM phasic and tonic hemodynamic characteristics.

keywords: sleep sleep physiology hemodynamic characteristics

Poster # 54

The Functional Role of Chromosome 4p Loss in Triple Negative Breast Cancer

Lynn Karam, Concordia University, Biology; Lynn Karam; 1; Rohan Dandage; 1; Michael Schwartz; 2; Anastasia Gherghi; 1; Paria Asadi; 1; Alysh Orr; 1; Belen Hernandez; 1; Sylvia Santosa; 3; Andreas Bergdahl; 3; Elena Kuzmin; 1,4; 1: Department of Biology, Center for Applied Synthetic Biology, Center for Structural and Functional Genomics, Concordia University, Montreal, Quebec, Canada; 2: Department of Biochemistry, McGill University, Montreal, Quebec, Canada; 3: Department of Health, Kinesiology & Applied Physiology, Concordia University, Montreal, Quebec, Canada; 4: Rosalind & Morris Goodman Cancer Institute, Department of Human Genetics, McGill University, Montreal, Quebec, Canada

Chromosome 4p (chr4p) loss is a recurrent large chromosomal deletion in basal breast cancer, the predominant molecular subtype of triple-negative breast cancer (TNBC), associated with the worst prognosis and a proliferative state. Analysis of publicly available pooled genome-wide CRISPR-Cas9 screen data, obtained from DepMap, identified synthetic lethal interactions specific to chr4p deletion in basal breast cancer, enriched for oxidative phosphorylation, DNA replication, and repair, and translation. Here, we investigate the mechanisms underlying chr4p loss synthetic lethal interactions in basal breast cancer. We conducted validations of the previously quantified synthetic lethal interactions using individual lentiviral-sgRNA constructs targeting 23 candidate genes with 2 sgRNA per gene in 6 basal breast cancer cell lines. Consistent with our computational analysis, decreased viability due to gene loss-of-function mutations was observed in chr4p-delete compared to copy-neutral cell lines resulting in an overall confirmation rate of 61%. To follow up on the synthetic lethal interactions with oxidative metabolism, we investigated mitochondrial function using high-resolution respirometry assay to show that chr4p loss is associated with lower routine respiration and higher proton leak respiration indicating perturbed mitochondrial function. These findings were consistent with decreased protein abundance of mitochondrial respiratory complexes I-V. Mitochondrial immunofluorescence staining revealed an expanded mitochondrial network suggesting of a compensatory mechanism. Glutathione peroxidase 4, which prevents ferroptosis, was among the confirmed synthetic lethal interactions and consistently chr4p deletion cells were sensitized to ferroptosis activators and suppressed ferroptosis inhibitors. Ultimately, this study will provide insight into the functional role of large chromosomal deletions in cancer revealing potential novel therapeutic avenues for precision oncology.

keywords: basal breast cancer large chromosomal

Poster # 55

Associations between a new definition of excess weight in children and self-reported health

Amy Badi, Concordia University, Environment, Geography, & Planning; Amy Badi: 1; Lisa Kakinami: 2,3; Andraea van Hulst: 4; ; 1 Department of Geography, Environment, & Planning, Concordia University, Montréal ; 2 Department of Mathematics and Statistics, Concordia University, Montréal; 3 School of Health, Concordia University, Montréal; 4 Ingram School of Nursing, McGill University, Montréal

Objective: Given developmental periods in childhood, raw body mass index (BMI) values are not used. Instead, sex and age-adjusted BMI z-scores are computed from reference curves. However, absolute excess weight values vary widely based on the child's age and sex but are oversimplified with BMIz values. For instance, an 8-year-old boy with a BMIz of 1 translates to 3.1kg excess weight. However, at age 16, a BMIz of 1 translates to 9.6 kg excess weight. This study investigates the relationship between excess weight and health across different children's ages. Methodology: Data from the Quebec Longitudinal Study of Child Development's (QLSCD) cohort were used (N= 385, 44 male) at the following mean age time points: 7 years (T1), 8 (T2), 10 (T3), 12 (T4), 13 (T5), and 15 (T6). Excess weight was calculated as: $BMI_{actual} - \text{age- and sex-specific } BMI_{zscore0}$ (the average BMIz score). For example, $BMI_{zscore0}$ for an 8-year-old male is 15.7; an 8-year-old male with a BMI of 18.3 would have an excess weight of 2.6 kg. Associations between excess weight and parental or self-reported health were assessed with two-sample t-tests, scatterplots, and correlations. Results: The average excess weight (kg) for each time point was 0.77, 1.36, 3.25, 4.79, 5.70, and 3.46 for T1-T6 respectively. Correlation between excess weight at 7, 8, and 13 years old ranged from 0.64-0.80 (all $p < .001$), but the other time points were not correlated. Excess weight was generally lower for those with excellent health versus those with less excellent health (T1: 0.62kg vs 1.01kg; T3: 3.09kg vs 3.52kg, and T5: 6.01kg vs 5.18kg, respectively), but the differences were not statistically significant. Conclusion: There is a need for better definitions to capture 'excess weight' in growing children, but this study did not provide evidence for a link between the proposed definition and self-reported health. Studies with larger samples and other health outcomes, including cardiometabolic measures, are needed.

keywords: bmi children excess weight

Poster # 56

Exploring the Interaction of Age and Presence of Insomnia on Sleep Spindle Density in Females

Claire Dymont, Concordia University, Psychology; Claire Dymont; 1,2,3,4; Nyissa A. Walsh; 1,2,3,4; Aurore A. Perrault; 1,2,3,4; Nathan E. Cross; 1,2,3,4; Emma-Maria Phillips; 1,3,4; Antonia Maltezos; 1,2,3,4; Loïc Barbaux; 1,2,3,4; Oren M. Weiner; 1,2,3,4; Florence B. Pomares; 1,2,3,4; Jean-Phillipe Gouin; 3,4,5; Thien Thanh Dang-Vu; 1,2,3,4; ; 1. Sleep, Cognition, & Neuroimaging Lab, Department of Health, Kinesiology, & Applied Physiology, Concordia University, Montreal, Canada; 2. Centre for Studies in Behavioural Neurobiology, Concordia University, Montréal, Canada; 3. Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal, Canada; 4. School of Health, Concordia University, Montreal, Canada; 5. Stress, Interpersonal Relationships and Health Laboratory, Department of Psychology, Concordia University, Montreal, Canada

Intro: Chronic insomnia (CI) is a prevalent sleep disorder in females, often associated with reports of cognitive impairments. High sleep spindle density (SD) is associated with increased sleep-dependent memory consolidation and sleep continuity in the face of disturbances. In good sleepers (GS), SD is subject to normal decrease in age. Less is known in lifespan trajectory for individuals with CI.

Objectives & Hypotheses: We aimed at evaluating the effects of age and CI on SD in females. We expected lowest SD in older females (OF; 45-69) with CI, followed by OF GS, younger females (YF; 18-44) with CI, and YF GS groups, respectively.

Methods: We studied 148 females [63 GS (31.83 ± 14.83 ; 18-67) & 85 CI (47.12 ± 13.53 , 21-69)] during one night of sleep. PSG recordings included 24 scalp-EEG (512 Hz sampling rate), EOG and EMG (Somnomedics, Germany), scored according to AASM guidelines. Spindle density was automatically detected (Lacourse method, 2019) on central channels (Fz, Pz, Cz). 2x2 factorial ANOVAs with Welch's tests determined interactions between sleep groups and age groups on SD.

Results: At electrode Cz, there was a significant main effect of both sleep group and age group, with the CI and OF group exhibiting significantly lower SD than GS and YF, respectively [Sleep: $F_{Welch}(1, 135) = 78.29$, $p < .001$, $\eta^2 = .37$; Age: $F_{Welch}(1, 135) = 12.05$, $p < .001$, $\eta^2 = .08$]. Interactions showed CI as affecting SD more than age alone but was most impactful when females were older and had insomnia. This was consistent across most electrodes.

Conclusion: The impact of CI on SD appears to be modulated by age. Future research should explore this relationship by menopausal status and consider other measures of sleep spindles, such as spectral analysis.

keywords: sleep spindles women health

Poster # 57

Relationship between inflammatory biomarkers and skeletal muscle fatty infiltration: A systematic review.

Leila Jamshidi, Department of Health, Kinesiology & Applied Physiology, Concordia University; L Jamshidi; 1; H Zahedi; 1; P Darlington; 1,2 ; V Pepin; 1,2; M Fortin; 1,2; 1: Department of Health, Kinesiology and Applied Physiology, Concordia University, Montreal, Canada; 2: School of Health, Concordia University, Montreal, Canada

Background: Skeletal muscle quality plays a pivotal role in maintaining mobility and quality of life. Recent studies suggest that lower muscle quality (e.g., fatty infiltration) is a predictor of morbidity and mortality risks across different populations. While chronic inflammation (e.g., cytokines) likely play a significant role in reducing muscle quality, we are unaware of any reviews that have summarized the existing evidence regarding the possible relationship between inflammatory biomarkers and intra-muscular fatty infiltration.

Methods: A systematic literature search was conducted in the databases PubMed, Scopus, and Web of Science. Only full texts and original peer-reviewed studies were included, without restriction on date. Longitudinal cohort and cross-sectional studies with a minimum of eight patients, that measured inflammatory biomarkers and intra-muscular fatty infiltration using validated methods were included. Methodological quality was assessed independently by two reviewers using STROBE.

Results: Ten studies met our inclusion criteria and were included in this review, for a total of 1909 participants. The populations studied included patients with dysphagia, lupus erythematosus, chronic obstructive pulmonary disease, HIV, rheumatoid arthritis, lumbar disc herniation, sedentary young and old adults, and elderly with sarcopenia. The overall methodological quality of the included studies varied from low to high. Six studies reported significant positive correlations between fatty infiltration and the level of inflammatory biomarkers, specifically CRP, IL-6, and TNF- α .

Conclusion: The results suggest that higher level of inflammatory biomarkers is associated with lower muscle quality (more fatty infiltration) in a wide variety of populations. This highlights the need for personalized clinical interventions to address systemic inflammation and protect muscle health, particularly in those at risk of or suffering from muscle loss due to chronic conditions or aging.

keywords: inflammatory biomarkers skeletal muscle fatty

Poster # 58

Accelerated Re-entrainment to Changes of the Light-Dark Cycle in Androgen Receptor Mutant Mice - a Novel Role of AR Signalling in Photic Entrainment?

Andree Stevens, Concordia University, Psychology; Andree Stevens¹, Amanda Szubinski¹, Sofia Benavides Amaya¹, Carlos Alvarado², Miltiadis Paliouras², Mark Trifiro², Shimon Amir¹, Konrad Schöttner¹; ; 1.Center for Studies in Behavioral Neurobiology, Department of Psychology, Concordia University; 2.Department of Medicine, Division of Experimental Medicine, Lady Davis Institute for Medical Research, Jewish General Hospital

Androgen receptors are ligand-dependent nuclear transcription factors that play a central role in reproductive, cardiovascular, metabolic and neural processes. Male mice with a humanized androgen receptor genotype (AR-19Q) develop metabolic syndrome-like phenotypes, and preliminary results indicate that a dysregulation of the circadian clock might be a contributing factor. This work therefore assesses the function of the central circadian pacemaker in AR-19Q mice by investigating locomotor activity rhythms under various light-dark conditions. AR-19Q mice displayed higher levels of wheel running activity and re-entrained to changes of the light-dark cycle faster than WT controls. Interestingly, accelerated re-synchronization to shifts in the LD cycle do not appear to be primarily caused by increased activity feedback on the master circadian pacemaker as indicated by data collected using motion detectors. Further investigation of the underlying mechanism will be helpful in the development of novel strategies to alleviate rhythm disturbance caused by shiftwork or jetlag.

keywords: metabolic syndrome androgen receptor circadian

Poster # 59

Optimizing Preoperative Frailty Screening through Patient Engagement: Exploration of the Self-Administered Clinical Frailty Scale in Elective Colorectal Surgical Patients

Karelle Côté, McGill University, Human Nutrition; Karelle Côté, BSc;1; Popi Kasvis, RD, PhD;1; Chelsia Gillis, RD, PhD, CNSC;1; ; 1: School of Human Nutrition, McGill University

Frailty, characterized by reduced physiological resilience, poses significant risks for surgical outcomes. Identifying and treating frailty is a preoperative priority. The Clinical Frailty Scale (CFS), a 9-point subjective frailty screening tool, stands out for its simplicity and predictive power. This study aimed to assess the concordance between preoperative self-reported frailty status using the CFS and healthcare professionals (HCPs) assessments among colorectal patients. We also aimed to explore the association between self-reported frailty status with measures previously linked to frailty.

We retrospectively analyzed preoperative assessments of colorectal surgery patients from November 2018 to September 2020. Patients and 2 HCPs assessed frailty using the CFS. Patients were categorized as fit (CFS 1-2) or at risk of frailty (CFS =3) based on self-reported frailty status. Frailty agreement was assessed with Fleiss and Cohen's kappa. Group differences were analyzed using Welch's t-test or Mann-Whitney test for continuous variables, and chi-square test for categorical variables.

In the sample (n=97), 48 were at risk of frailty, while 52 were fit. Frailty status agreement between patients and HCPs was moderate (? = 0.505). Pairwise agreement of frailty status was moderate: physiotherapist (? = 0.455) and dietitian (? = 0.456), whereas agreement between HCPs' was substantial (? = 0.677). None of the fit patients were malnourished, whereas 13 of at-risk patients were moderately-severely malnourished (p=0.003). Physical performance, including handgrip strength, sit-to-stand, gait speed, daily steps, and 6-minute walk distance were significantly lower in at-risk patients. Patients at risk of frailty reported more problems with pain, self-care, activity, and mobility, but not anxiety/depression. Thus, while patients recognized their frail health status with moderate agreement, more research is needed to determine if self-reported CFS reliably predicts clinical outcomes.

keywords: frailty patient reported outcome surgery

Poster # 60

Daily sleep quality variations and cognitive fluctuations in aging

Mary Brooks, Concordia University; Mary Brooks; 1; Randa El-Chami; 1; Marie-Anick Savard; 1; Hugo R Jourde; 1; Emily BJ Coffey; 1,3

As we age, there are normative changes to both sleep characteristics and cognitive functioning. Over 40 of older adults report occasionally or regularly having difficulty falling asleep or staying asleep. Variations in sleep quality and their interaction with cognitive function is not well understood, in part because means of objectively measuring sleep quality and cognition over multiple nights in the home environment has not been possible. The objective of this study is to characterize the association between sleep quality and daily fluctuations in cognitive performance in older adults.

We recruited 19 healthy older adults aged 60 - 75. Participants completed several questionnaires relating to sleep, cognitive functioning, and general health and demographics. To measure sleep, participants wore an electroencephalography (EEG) headband over the course of 14 nights. Every morning, participants completed a sleep diary and two cognitive tests: the Simon Switch Task and the Go No-Go task, which measure cognitive flexibility, inhibition, reaction time, and sustained attention. We explore and document the relationships between a variety of sleep metrics used commonly in sleep research and their relationship to executive function. We also contrast and compare the degree of variability found between subjects, and within subjects over multiple nights.

Better understanding the relationships between brain function and sleep on a daily basis will be an important contribution to sleep research. Specifically, this work will highlight components of sleep that are most relevant for next-day cognitive function, which can then be targeted by therapeutic interventions (e.g., closed-loop auditory stimulation to increase sleep spindles). We also demonstrate successful procedures for objectively studying sleep quality and cognition over multiple nights in older adults' home environments, and provide empirical support for design choices in future sleep studies.

keywords: sleep cognition aging

Poster # 61

Surface functionalization with Au nanoparticles and a model antibody as a biosensing platform for protein detection

Linan Cui, McMaster University, Department of Biomedical Engineering; Linan Cui; 1 ; Ayse Turak; 1,2,3 ; Kyla Sask; 1,4; ; 1: School of Biomedical Engineering, McMaster University; 2: Department of Engineering Physics, McMaster University; 3: Department of Physics, Concordia University; 4: Department of Materials Science and Engineering, McMaster University

Gold nanoparticles (AuNPs) are powerful tools for biosensing applications, including protein detection as they possess unique optical, electronic, and chemical properties that make them ideal for detecting molecular interactions at the nanoscale. Functionalizing AuNPs with specific biomolecules such as antibodies or aptamers can achieve high detection sensitivity, specificity, and selectivity in complex biological fluids such as blood.

Reverse micelle deposition (RMD) uses amphiphilic di-block copolymers in a non-polar solvent to acts as nanoreactors to produce highly uniform, well-dispersed NPs with controlled size and spacing. With the addition of precursor salts that diffuse into the polar core of the reverse micelle, size tunable NPs can be produced. The size is dependent on the ratio of precursor salt added to the solution with respect to the number of P2VP units, referred to as the 'loading ratio.' "Loaded" micelles are solution deposited and plasma etched to remove the polymer shell, leaving behind a well-ordered array of NPs.

AuNPs ranging from 5nm to 20nm were synthesized by increasing the loading ratio of HAuCl₄ and then spin-coated onto Si substrates. Physical adsorption of I125 radiolabeled immunoglobulin G (IgG) as a model antibody was measured by incubating at RT for 2 h. Sodium iodide (NaI) was added to the IgG solution at a concentration of 5 to avoid overestimation by suppressing the sorption of free iodide to Au surfaces. The result shows that an equivalent quantity of IgG was adsorbed onto AuNP functionalized Si surfaces compared to the Si substrate fully coated with Au. After an overnight SDS elution, more IgG remained on the sample surfaces than the blank Si control, indicating that these AuNPs can not only increase the surface area but also exhibit a stronger binding with IgG. The potential for further biochemical modifications to such AuNP arrays opens up new avenues for targeted sensing capabilities with fewer resources consumed.

keywords: gold nanoparticles biosensing protein antibody

Poster # 62

The Effect of Multilingualism on the Executive Function of Older Adults With, or at Risk for, Alzheimer's Disease.

Vanessa Boulos, Concordia University, Psychology; Vanessa Boulos; 1; Kristina Coulter; 1; Natalie Phillips; 1; ; 1: Department of Psychology, Concordia University

Compared to monolinguals, multilinguals may have greater executive function abilities, consisting of a set of mental skills involved in working memory, mental flexibility, and self-control. The brain's ability to use alternative skills to cope with challenges, called cognitive reserves, is also theorized being greater in multilinguals than monolinguals. However, literature shows mixed results. Few studies examined the relationship between multilingualism and executive function in individuals with neurodegenerative disease, when cognitive reserve is most likely to play a role. We used data from the Comprehensive Assessment of Neurodegeneration and Dementia study (COMPASS-ND; Data Release 7), to examine the association between language status and executive function performance on the Stroop Test and Trail Making Task (TMT), across cognitively unimpaired older adults (CU; $n = 130$), older adults with subjective cognitive decline (SCD; $n = 135$), mild cognitive impairment (MCI; $n = 241$), and Alzheimer's Disease (AD; $n = 94$). Multilinguals statistically performed better than monolinguals, on the Stroop Test's inhibition/switching condition ($F(1, 486) = 8.10, p = .005, \eta^2p = 1.64 \times 10^{-2}$). Multilinguals performance was not statically different from monolinguals on the inhibition ($F(1, 526) = 1.07, p = .030, \eta^2p = 1.97 \times 10^{-2}$) nor TMT ($F(1, 517) = .92, p = .339, \eta^2p = 1.77 \times 10^{-3}$) conditions. We observed the multilingualism's advantage present among populations rarely researched. However, the multilingualism advantage was only present on one of the three performance conditions.

keywords: alzheimer disease multilingualism executive

Poster # 63

Characterizing the functional role of chromosome 4p deletion and mapping its synthetic lethal interactions in multiple cancer types

Anastasia Gherghi, Concordia University, Biology; Anastasia Gherghi; #1 Alain Pacis; #2 Rohan Danadage; #1 Andrew Lynch #3 Toby M. Baker #3; Guillaume Bourque #2; Peter Van Loo #3; Elena Kuzmin #4; #1 Department of Biology, Center for Applied Synthetic Biology, Concordia University ; #2 McGill Genome Centre; #3 MD Anderson Cancer Center; #4 Rosalind and Morris Goodman Cancer Institute, McGill University

Chromosome 4p (chr4p) deletion is a genetic aberration occurring in ~65 of triple-negative breast cancer (TNBC), a subtype of breast cancer which lacks targeted therapy and results in the worst outcome. Previous research in our group has shown that chr4p deletion is evolutionary early and is associated with increased proliferation. Analysis of DepMap CRISPR-Cas9 genetic screens identified genes essential for the survival of TNBC with chr4p deletion. These chr4p-specific synthetic lethal interactions were involved in DNA damage repair and metabolism. Chr4p is recurrently deleted in other cancers thus discovering pan-cancer genetic interactions should shed light on new avenues for targeted therapies. The goal of this project is to investigate the functional role of chr4p deletion in multiple cancers and map its synthetic lethal interaction network. Molecular timing analysis showed that in bladder, stomach, lung, and esophageal cancers chr4p deletion occurred early in cancer progression. Furthermore, the analysis of copy number status in these cancers revealed a lack of minimal deleted region encompassing a large fraction of the chromosome arm. This deletion is associated with a reduction of expression of the majority of chr4p genes. Global transcriptomic profiling of chr4p loss revealed that multiple cancers showed an increase in expression of genes involved in cell cycle and DNA replication and reduction in immune system activation. Since multiple cancer types with chr4p loss show molecular commonalities, we analyzed the DepMap CRISPR-Cas9 genetic screens to identify their synthetic lethal interactions, revealing genes involved in regulation of actin cytoskeleton, apoptosis and mTOR signalling pathway. Validating these synthetic lethal interactions will be instrumental in revealing the genes that buffer the loss of chr4p. Ultimately, this study will advance our understanding of mechanisms that buffer cancer aneuploidies and reveal novel precision medicine approaches.

keywords: pan cancer aneuploidy synthetic lethality

Poster # 64

Trimodal exercise is effective in improving physical and functional health-related quality of life in cancer survivors living with chemotherapy induced peripheral neuropath

Sarah Kubal, Concordia University, Health, Kinesiology and Applied Physiology; Sarah Kubal;1,2; MariaLuisa Vigano;5; Sarah Habib;2; Georgina Cama;2; Popi Kasvis;4; Antonio Vigano;2,3; Robert D. Kilgour;1,2; ; 1. Department of Health, Kinesiology & Applied Physiology, Concordia University; 2. McGill Nutrition and Performance Laboratory, McGill University Health Centre; 3. Department of Supportive and Palliative Care, McGill University Health Centre; 4. School of Human Nutrition, McGill University; 5. Division of Experimental Medicine, McGill University

Introduction: Chemotherapy-induced peripheral neuropathy (CIPN) is experienced by up to 80 of cancer survivors. CIPN can alter a patient's physical function and health-related quality of life (HRQoL). Although exercise has been shown to influence CIPN, it is unknown what effect exercise will have on HRQoL with or without Cannabidiol (CBD).

Methods: Participants (n=10) in this observational study received a tri-modal exercise program (aerobic, resistance and balance) after baseline (V1). Exercise was prescribed for at least 3x a week, including one supervised weekly session for sixteen weeks. A titrated dose (up to 6ml /day) of CBD was added to the exercise program from 8-weeks (V2) to 16-weeks (V3) as tolerated. The trial outcome index (TOI) and neurotoxicity (Ntx) scores were calculated at each visit for HRQoL and neuropathic symptomatology using the FACT-GOG-Ntx v.4. A 1x3 repeated measures ANOVA was conducted to determine differences in TOI and Ntx from baseline (V1) to 8 weeks (V2) and 16 weeks (V3) of training. Established minimal clinical important difference (MCID) values were used for clinical significance.

Results: Over 16-weeks of training, there was a statistically significant increase in TOI ($F(2, 18) = 18.9, p < .001, \text{partial } \eta^2 = .677$) and Ntx ($F(2, 18) = 12.4, p < .001, \text{partial } \eta^2 = .579$). Bonferroni post-hoc tests uncovered TOI differences from V1 to V2 (60.4 ± 14.3 vs 71.5 ± 14.4 points; $p < .027$) and V1 to V3 (60.4 ± 14.3 vs 79.9 ± 12.5 points; $p < .001$). The Ntx improved significantly between V1 and V3 (29.5 ± 7.6 vs 38.3 ± 7.4 ; $p < .001$) and from V2 to V3 (31.5 ± 7.32 vs 38.3 ± 7.4 ; $p < .035$). From V1 to V3, 8/10 participants scored a TOI above the MCID, and 6/10 participants scored above the MCID for the Ntx.

Conclusion:

The results demonstrate the beneficial effects of 16-weeks of exercise on HRQoL in cancer survivors with CIPN. Whether CBD had a synergistic effect on TOI and Ntx with exercise remains to be determined.

keywords: cancer survivor exercise cannabidiol cbd

Poster # 65

The Power of Letting Go: Enhancing Well-Being through Goal Disengagement in Older Adulthood

Dalia Ibrahim, Concordia University, Psychology; Dalia Ibrahim;1; Dr. Carsten Wrosch;1; Jasmine Kotsiopoulos;1; ; 1. Personality, Aging, and Health Research Laboratory, Concordia University

Research on the goal adjustment theory (GAT) has shown that shifting the energy put on an unattainable goal into a more achievable goal can be beneficial for a person's well-being. However, the level of adaptiveness will depend on life circumstances; the more opportunities there are to compensate for the unachievable goals, the more adaptive GAT is. This is especially relevant when studying older adults, since they tend to experience difficulties achieving their goals due to health-related constraints. It was shown that goal disengagement (GD) capacity protects older adults' well-being, while goal reengagement (GR) capacity facilitates the pursuit of another goal, which also benefits their well-being. Yet, research on how purpose in life (LP) and the number of goals moderate the interaction between GD and well-being in older adults is lacking. In this research, we both attempt to replicate past findings on the influence of goal adjustment on subjective well-being (i.e., negative and positive affect, symptoms of depression). We also explore the moderated interactions between GD and well-being. To test this, we used the Montreal Health and Aging Study (MAHS) longitudinal data set where 267 older adults, aged 59 to 93, self-reported their goal adjustment capacity, their level of purpose in life, a list of their goals, as well as their age, sex, and level of education. Results from a multiple regression analysis show that, over the course of 2 years, GR capacity has an important influence on well-being when paired with high GD capacity. Additionally, for both low and high LP, high GD capacity improved well-being. No statistically significant interactions were seen with number of goals.

keywords: goal adjustment theory older adults

Poster # 66

The Short-Term Physical and Psychological Effects of a Comprehensive Speech and Motor Neurologic Music Therapy (NMT)® Protocol for the Treatment of Dystonia

Victoria Yuan, University of Toronto, Faculty of Music; Victoria Yuan; 1; Sahara Haylestrom; 1; Michael Thaut; 1; Corene Hurt-Thaut; 1; 1: Music and Health Science Research Collaboratory, Faculty of Music, University of Toronto, Toronto, Ontario, Canada

This clinical research project examined the short-term effects of a targeted clinical protocol of speech and motor Neurologic Music Therapy (NMT)® techniques for the treatment of dystonia. Dystonia is a complex neurological movement disorder characterized by involuntary sustained or repetitive muscle contractions, with diverse clinical manifestations and causes. NMT is an emerging and promising adjunct treatment for dystonia.

The objective was to examine the efficacy of the protocol during synchronous virtual sessions on adults diagnosed with dystonia by collecting clinical data measuring short-term changes in perceived pain, tension, and mood over the course of each session. It was predicted that there would be significant short-term reductions in pain and tension and an increase in mood from pre- to post-session.

This study used a pre-post design over 12 synchronous group sessions held once per week for 60 minutes via Zoom. Sessions were co-led by 3 student therapists and supervised by an accredited Music Therapist. Participants included adults diagnosed with dystonia ($n = 2-6$, varying per week); mean age of participants was 74 years ($SD = 8.52$). The intervention protocol consisted of a warmup, Vocal Intonation Therapy (VIT)®, Oral Motor and Respiratory Exercises (OMREX)®, Therapeutic Singing (TS), Patterned Sensory Enhancement (PSE)®, Rhythmic Auditory Stimulation (RAS)®, a PSE-based cool down, and a closing song. The changes in participants' perceived pain, tension, and mood were measured through self-report assessments pre- and post-session. Statistical analysis was performed using the Wilcoxon signed rank test for paired samples.

Results suggest that the NMT intervention contributed to a significant decrease in perceived pain and tension, and a significant increase in perceived mood, from pre- to post-session. 3 out of 32 measures showed statistically significant changes ($p = 0.05$). 20 out of 32 measures showed clinically meaningful changes.

keywords: dystonia neurologic music therapy voice

Poster # 67

Understanding sensory-psychosocial-cognitive relationships in mild cognitive impairment: Does psychosocial function mediate the relationship between sensory loss and cognitive function?

Sana Rehan, Concordia University, Psychology; Sana Rehan; 1; Natalie Phillips; 1 ; ; 1: Department of Psychology, Concordia University

Background: Sensory and psychosocial factors are risk factors for Alzheimer's disease (AD). We explore whether sensory loss leads to communication and mobility difficulties, thereby reducing social engagement and contributing to cognitive decline. The interactive sensory-social-cognitive relationship remains unexplored in older adults with mild cognitive impairment (MCI), who are at-risk for AD.

Method: Using the COMPASS-ND dataset (Release 7), we assess sensory loss (e.g., pure-tone hearing, contrast sensitivity), cognitive test performance (e.g., memory, executive function, processing speed, verbal fluency), and psychosocial factors (e.g., anxiety, social support) in 351 individuals with MCI. Our objectives were to: 1) describe sensory-psychosocial function in this group and 2) determine if psychosocial function indirectly mediates the link between sensory loss and cognitive function.

Results: Individuals with MCI demonstrated mostly minimal scores on anxiety and depression questionnaires and reported adequate quality of life and social support. Psychosocial variables did not indirectly mediate pathways between sensory loss and cognitive performance. However, hearing loss was directly associated with phonemic fluency, whereas contrast sensitivity was directly associated with delayed recall and executive function. There were no significant relationships between sensory loss and psychosocial function. There were significant associations between quality of life and performance on delayed memory and processing speed.

Conclusion: Our findings suggest that psychosocial function may not mediate, but moderate, the relationship between sensory function and cognitive performance.

keywords: cognitive aging dementia psychosocial function

Poster # 68

Relationship Between Thoracolumbar Fascia Morphological Changes and Erector Spinae Epimuscular Fat Distribution in Chronic Low Back Pain

François Philippe Caron, Department of Health, Kinesiology and applied Physiology, Concordia Uni.; Caron, F.P.; 2; Naghdi, N.; 2; Anstruther, M.; 2; Bertrand, C.; 2; Fortin, M.; 1,2

Introduction: Chronic low back pain (CLBP) is a leading cause of disability worldwide. The thoracolumbar fascia (TLF), an important stabilizing structure, has recently emerged as a possible contributor to CLBP. Decreased TLF length has been associated with increased TLF thickness in CLBP patients. No study has examined the length of the anterior, posterior and middle TLF layers, nor the TLF surface of contact (SC) with paraspinal muscle epimuscular fat (EMF) in relation to CLBP. The aim was to determine whether there is a link between CLBP status and severity and EMF cross-sectional area (CSA), TLF SC, thickness, and layer lengths. **Methods:** Data from 27 CLBP patients and 25 matched controls was used. CLBP severity was quantified via numeric pain rating scale. Manual segmentation of magnetic resonance imaging (MRI) reconstructed fat images was used to measure TLF layer lengths, EMF SC and CSA in the lumbar spine (LS). TLF thickness was measured on LS ultrasound images. ANCOVA was used to compare group differences between TLF and EMF measurement. Multilinear regression was used to examine the relationship of the aforementioned with pain severity. **Results:** TLF thickness at L5 was significantly greater in CLBP participants compared to controls. TLF thickness at L4, TLF layer lengths, EMF CSA and SC did not predict CLBP nor severity. **Conclusions.** This study provides evidence that TLF layer lengths and EMF SC are not linked to CLBP status and pain severity, with the exception of TLF thickness at L5. Future research should examine the entire LS to determine if the summation of small changes may have a larger impact than isolated changes. Future studies should also explore the maximal force production of the erector spinae muscle in relation to the EMF.

keywords: thoracolumbar fascia chronic low back

Poster # 69

Corticomuscular Representation in Motor Sequence Learning

Vanessa Raspa, Concordia University, Psychology; Vanessa Raspa;1; Jhelum Paul;1; Christopher Steele;1

Motor sequence learning is integral to fundamental and complex activities of daily living. Yet assessments of neuroplasticity associated with motor learning often focus solely on the brain, overlooking the critical involvement of the peripheral nervous system. This thesis proposes the use of corticomuscular coherence as a marker of functional plasticity in the corticospinal pathway linking motor cortical activity with muscular activity. Specifically, this research investigates differences in the modulation of coherence when acquiring simple versus complex motor sequences. Additionally, corticomuscular coherence was evaluated throughout sequence acquisition to assess learning-related changes. Twenty participants performed a sequential-pinch force task while electroencephalography and electromyography measures were collected simultaneously. The Canonical Coherence algorithm optimized corticomuscular coherence detection during data analysis. Correlational analyses revealed a significant increase in corticomuscular coherence as task performance improved, suggesting a positive relationship between motor proficiency and the synchronization between cortical and muscular activity. No evidence was found in support of sequence complexity as a modulating factor of corticomuscular coherence. These findings underscore the importance of assessing corticomuscular coherence in understanding the mechanisms of motor learning and plasticity. The observed correlation between corticomuscular coherence and task performance suggests that enhanced neural synchronization within the corticospinal pathway reflects a key aspect of functional plasticity. This synchronization may facilitate more efficient communication within the motor system, supporting motor skill acquisition. Overall, incorporating corticomuscular coherence analysis provides a comprehensive approach to studying motor learning, encompassing both central and peripheral nervous system contributions to functional plasticity.

keywords: motor sequence learning cmc plasticity

Poster # 70

Routine Recognition for Remote Elderly Care Using wearables

Sayeda Shamma Alia, Concordia University; Sayeda Shamma Alia; 1; Paula Lago; 1; ; 1: Concordia University

As global life expectancy rises, healthcare for seniors is a growing concern. Researchers are exploring wearable sensors for remote elderly care. These sensors allow continuous health monitoring while protecting privacy.

One study area is Routine Recognition, where sensors help identify daily routines, aiding in medical assessments, especially for cognitive decline in the elderly. Existing research often focuses on younger populations, not fully addressing elderly needs. It's vital to tailor methodologies for elderly routines and cognitive assessment, considering activity sequences and time relationships.

In our research, we first looked at various datasets to understand daily activities. We then focused on the CASAS dataset from elderly individuals, which has missing labels, sparse data, and noise. To handle missing labels, we tried label propagation and similarity-based methods. However, these methods struggled with minimal labeled data, particularly when participants had only 0.1 labeled data. We also found that understanding the relationship between day, time, and activities is crucial for accurate routine recognition. Therefore, we are considering the development of a new labeling method tailored to these considerations, as this may offer a more promising solution. Moving forward, our focus shifted to identifying routines based on the sequence of activities, hypothesizing that this sequence is crucial. Our initial small-scale experiment supported this hypothesis, but further refinement of our methodology is necessary for significant improvements.

In conclusion, the next steps in our research involve refining our methodology to handle missing data more effectively and designing a new approach for labeling activities based on their sequence. By balancing data collection, label accuracy, and preserving the privacy and independence of seniors, we aim to improve healthcare technology for better elderly care, prioritizing their comfort and autonomy.

keywords: routine activity elderly healthcare activity

Poster # 71

Effects of animal vs plant-based protein in a hypocaloric ketogenic diet on regional subcutaneous adipose tissue (SAT) T cells in individuals with obesity

Anjalee Wanasinghe, Concordia University, HKAP; Anjalee I. Wanasinghe,a,b, Rachel Abramczuka,b, José A. Moraisa,d, Michael Tsoukase, Elena Zhaoa, Suiyang Lia, Sylvia Santosa,a,b,c

Adipose tissue(AT) immune cells play a key role in obesity associated AT inflammation. Regional changes in AT immune profiles in response to surgically induced weight loss has been widely studied, effects of diet induced weight loss remain largely underexplored. The objective of this study was to compare T cell phenotypes in regional SAT depots following a 12-week hypocaloric high protein ketogenic diet(HPKD) supplemented with animal (AP) or plant-based protein (PP) in individuals with obesity.

14 participants (BMI>30 kg/m²,18-60 years) were recruited and randomized into HPKD supplemented with either AP or PP. Pre & post intervention SAT samples from abdominal(abSAT) and femoral(fmSAT) regions were collected. AT immune cells were isolated after digestion, stained, and quantified via flow cytometry. Cells were presented as cells/gram of tissue and percentage of stromal vascular fraction(SVF).

There was a significant weight loss and an improvement in BMI in all the participants. The PP exhibited a significant increase in abSAT cytotoxic T cells (CD3+CD8+CD45RA-) (p=0.029) and T helper(Th) cells (CD3+CD4+CD45RA-),(p=0.013) when compared to the AP group (p=0.481, p=0.289 respectively). There was no significant difference in their naïve populations (CD45RA+) following intervention. Interestingly, in fmSAT, both groups exhibited a significant increase in mature Th cells (CD3+CD4+CD45RA-, p=0.001), naïve Th cells (CD3+CD4+CD45RA+, p=<0.001), and mature cytotoxic T cells (CD3+CD8+CD45RA-,p=0.001). fmSAT naïve cytotoxic T cells (CD3+CD8+CD45RA-) were only significantly increased (p=0.008) in PP group. These changes were not significant when presented as a SVF except for naïve Th cells in fmSAT.

Our results indicate HPKD led to a significant improvement in weight loss outcomes. However, protein source appears to influence the regional T cell response to weight loss. This response seems to be more pronounced in fmSAT whe

keywords:

Poster # 72

Change in body image dissatisfaction over two years in adolescents who undergo bariatric surgery

Hector Luca O. S. Silva, Concordia University, HKAP; Hector Luca O. S. Silva 1, Biagina-Carla Farnesi 2, Julius Erdstein 2,4, Tamara R. Cohen 2,5,6 and Angela S. Alberga 1,2,3,4; ; 1. Department of Health, Kinesiology & Applied Physiology, Concordia University, Montreal, Quebec, Canada; 2. Center of Excellence in Adolescent Severe Obesity, Division of Adolescent Medicine, Montreal Children's Hospital, Westmount, Quebec, Canada.; 3. Department of Pediatrics, Faculty of Medicine, McGill University; 4. Research Institute of the McGill University Health Research Center (RI-MUHC); 5. Food, Nutrition and Health, Faculty of Land and Food Systems, The University of British Columbia, Vancouver, BC, Canada; 6. BC Children's Hospital Research Institute, BC Children's Hospital, Vancouver, BC, Canada

Background: Adolescent metabolic and bariatric surgery (MBS) is an emerging area of care for adolescents living with severe obesity, yet, the psychological impact on body image dissatisfaction (BID) post-rapid weight loss, remains underexplored.

Objective: To describe the changes in BID among female and male adolescents who underwent MBS from pre-surgery to 2 years post-surgery.

Methods: Eleven patients (mean age 16.8 years old, 64 female) who were at least two years post-MBS completed the Figure Rating Scale (FRS), pre-surgery and 24 months post-surgery. The FRS features numbered body shapes (1-7) which increase incrementally in size. A discrepancy score (current minus ideal body shape rating) indicates BID. Body mass index (BMI) was calculated at both time points, and a t-test was conducted to compare differences pre and post-surgery.

Results: There was a significant decrease in patients' BMI (from 50.4 to 37.5 kg/m², p=0.004) and discrepancy score (from 3 to 1.9, p=0.03) from pre-surgery to 24-months post-surgery. There were no significant differences in BMI and discrepancy score between females and males at either time points. However at 24-months post-surgery only, females perceived their current body shape as significantly smaller (5.6 vs 7.8, p=0.03) than males, and desired a significantly smaller body shape (3.9 vs 5.3, p=0.05) as well.

Conclusion: Two years following MBS, there was a significant improvement in body image dissatisfaction among patients. This highlights the importance of supporting adolescent mental health during surgical follow-ups and promoting positive self-image to sustain the improvements in BID beyond 24 months post-surgery.

keywords:

Poster # 73

Adipose tissue T cells and macrophages vary regionally with sex in healthy lean individuals

Muhammad Ilyas Nadeem, Concordia University, HKAP; Muhammad Ilyas Nadeem a, Claire Plissonneau a, Kerri Z. Delaney abc, Pierre Garneau d, Henri Atlas d, Radu Pescarus d, Anne-Sophie Studer d, José A. Morais e, Sylvia Santosa a

Introduction: It is well established that males have a greater risk of metabolic disease than premenopausal females. The microenvironment of different AT depots has distinct inflammatory characteristics and immune cell profiles, uniquely contributing to systemic inflammation and metabolic disease risk. The study aimed to investigate the regional differences in subcutaneous adipose tissue (SAT) immune cell profiles in males and females.

Methods:

A total of 26 healthy lean participants (premenopausal females n=14, age, BMI and males n= 12, age, BMI) were recruited from the Montreal, Quebec, Canada. Abdominal and femoral SAT was collected via needle aspiration biopsies. After collagenase digestion, immune cells were isolated and quantified from SAT using flow cytometry.

Results:

Compared to females, males had greater abdominal T Cells (CD3+, p=0.006), mature and naive T helper cells (CD3+CD4+, p=0<0.01 and CD3+CD4+CD45RA+ p= 0.05) and mature and naive cytotoxic t cells (CD3+CD8+, p=0.02 and CD3+CD8+CD45RA+ p<0.01). Macrophages (CD68+ and CD68+CD206+ p= 0.89) did not differ between males and females within the abdominal depot. When examining the thigh SAT depot, males and females had similar presence of T cells and macrophages.

Conclusion:

Our study reports difference in immune cell profile of different regions between females and males. In healthy lean individuals, there were sex differences where males had greater T cell populations in abdominal but not thigh SAT. As males are at greater risk of metabolic disease than premenopausal females, the role of these T cells in metabolic perturbations should be further investigated.

Funding: Research relating to this abstract was funded by CIHR.

keywords:

Poster # 74