Inspiring Hope: Global Connections

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with
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15th Annual Geriatric Services Conference
Vancouver, British Columbia
Realities of an Aging Population

- The number of people age 60+ has tripled since 1950
- The combined senior population will reach 2.1 billion by 2050
- An estimated 25-30% of people age 85+ have dementia
- The number of people living with dementia is expected to triple to 152 million by 2050
- The estimated annual global cost of dementia is $USD 818 B; more than 1% of global GDP
Global Initiatives
Disclosures and Disclaimers

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Disclosures

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None

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» CIHR: Vice Chair, INMHA IAB & Standing Committee on Ethics
» MSFHR Research Leaders Forum

Disclaimers:
Data and results are from a search of publicly accessible information, peer review and grey literature, and on-the-ground knowledge; method intended to yield examples of initiatives, not a comprehensive list. Special emphasis on ethics, legal, and social issues.
Global Journey

- National initiatives
- Multinational initiatives
- International Brain Initiative
- March Madness, Global Inspiration

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National Initiatives

CIHR Institute of Aging

- Canadian Longitudinal Study on Aging 2001-2033
  50,000 men and women over 45 followed until 2033 or death
- Mobility in Aging Initiative (June 2005 – Ongoing)
  Biological to environmental challenges associated with mobility
- eHealth Innovations Initiative
  Improve cost-effectiveness of patient and population-centred care
- CIHR Dementia Research Strategy
  Canadian Component – CCNA
  - 8 national platforms pooling and drawing on big data
  - Comprehensive Assessment of Neurodegeneration and Dementia (COMPASS-ND) Study
International Component

International Collaborative Research Strategy for Alzheimer's Disease

- Wellicome Trust-MRC-Canada
  United Kingdom
- France-Québec-Canada
  France
- Network of Centres of Excellence in Neurodegeneration (COEN)
  7 partner countries in Europe
- Alzheimer's Disease Neuroimaging Initiative (ADNI)
  United States
- EU Joint Programme Neurodegenerative Disease Research (JPND)
  European Union Initiative with 27 partner countries
- Canada-China
  Joint Program with the National Natural Science Foundation of China
  China
National Initiatives

Centre for Aging and Brain Health Innovation (2015)

• $124M investment to accelerate development, validation, commercialization, dissemination and adoption of innovative products, services and best practices to support brain health and aging


Brain Canada

• $240M to support 224 projects, more than 900 researchers, and 113 institutions across Canada

• Largest investment in brain health and aging in Canadian history

• 94 partners across research institutions, governmental agencies, and health charities

• 65 funded studies on neurodegenerative diseases
National Dementia Strategy (Bill C-233)

• National Strategy for Alzheimer's Disease and Other Dementias Act received Royal Assent (June 2017)
• Collaboration and expertise of 400+ researchers
• Conference convened by Minister of Health will inform the details of the strategy (May 2018)

Canadian Brain Research Strategy (Unfolding)

➤ Build, Understand, Address … Apply

Enable innovation in a range of relevant societal systems and inform responsive, evidence-based policies.
Pan-Canadian Consortium on Ethics and Neurotechnology
Sunnybrook-UBC Neuroethics Collaboration (2018)

- Dedicated Canadian research effort on ethical implications of advanced neurotechnology
- Evaluate impact and ethical, legal, and social implications of neurotechnology for neurodegenerative diseases, including:
  - First-in-human Phase 1 MR-guided focused ultrasound trials for Alzheimer’s disease
  - Novel neurotechnologies for treatment-resistant psychiatric diseases that develop over the lifespan

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National Initiatives

National Institute on Aging

- Division of Aging Biology
- Division of Behavioral and Social Research
- Division of Geriatrics and Clinical Gerontology
- Division of Neuroscience

*Shared mission*

- Improve understanding of the aging brain, Alzheimer's disease, and other neurodegenerative diseases.
- Develop interventions to address AD and other age-related neurological conditions
National Initiatives

University of Iowa Center on Aging

• Aging Mind and Brain Initiative
  • Research, education, and outreach to enhance the cognitive well-being and societal vitality of the aging population
• Seniors Together in Aging Research (STAR) Registry
  • Registry of research volunteers to help connect individuals interested in participating in research studies

MIT Picower Institute Aging Brains Initiative

• Systems approach integrating neuroscience, fundamental biology and genetics, investigative medicine, engineering and computer science, economics, chemistry, urban planning, and artificial intelligence
National Initiatives

UK Dementia Research Institute

- Joint £290 M investment from the Medical Research Council, Alzheimer’s Society, and Alzheimer’s Research UK
- 400 scientists across UCL, Cambridge, Cardiff, Edinburg, Imperial College London, Kings College London
- Research relevant to all dementias, including Alzheimer’s disease, Parkinson’s disease, frontotemporal dementia, vascular dementia, and Huntington’s disease
National Initiatives

Pasteur Institute Projet Transverselle - Vieillissement et longévité

- Transdisciplinary working group, complementary themes:
  - Mutations and repairs
  - Cellular senescence
  - Stem cells
  - Physiology of aging

L’équipe AVENIR INSERM “Plasticité génomique et vieillissement”

- Rejuvenated cells from elderly donors aged over 100 reprogrammed into pluripotent stem cells

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1000 German Brains Study

- Role of subjective well-being and personality traits as moderators of aging processes

  ➢ Ethical implications (ELSA) of research in delimiting normal from pathological aging

German Center for Neurodegenerative Diseases

- More than 1,000 researchers and 80 research groups investigating the similarities and differences of various brain diseases

- Identify new diagnostic markers and develop new preventive and therapeutic approaches

  ➢ Population studies and health care research
National Initiatives

Brain Bank of the Brazilian Aging Brain Study Group

• 1600 healthy brains and pathologies to “unravel brain processes and related neurodegenerative diseases”
National Initiatives

Spanish Alliance of Neurodegenerative Diseases: Neuroalianza

• Non-profit strategic partnership for health
  • CEAFA (Spanish Confederation for Associations of Relatives of People with Alzheimer and other Dementias)
  • FEP (Spanish Parkinson Federation)
  • EME (Multiple Sclerosis Spain)
  • ASEM (Spanish Federation of Neuromuscular Diseases)
  • ADELA (Spanish Association for Amyotrophic Lateral Sclerosis)

➢ Raise awareness about the challenges that progressive aging poses for society

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National Initiatives

UNSW Center For Healthy Brain Ageing
  • International center of excellence in multidisciplinary research into the aging brain
    • Genetics and proteomics, molecular biology and stem cells neuroimaging, clinical, epidemiological and sociological research and established aging cohort studies

Australian Imaging, Biomarkers & Lifestyle Flagship Study of Aging
  • 1,100 persons longitudinal assessment
  • Biomarkers, cognitive characteristics, and health and lifestyle factors associated with the development of AD
Neuroprosthetics

• Studies of neurite growth in the formation of networks using guide nanowires
• Memory prostheses to recover and enhance encoding of cognitive information in humans with memory disruptions

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Deep Brain Stimulation

• Frontal lobe targets for symptomatic executive function impairments and anterior fornix to slow cognitive decline
Non-invasive brain stimulation

- TMS and tDCS for the treatment of symptoms associated with dementia and Parkinson’s

- Benefits of tDCS stimulation on:
  - Cognitive (language, memory, inhibitory control, number acuity, dual tasking) and motor task performance
  - Specific brain areas

- Repeated [r]TMS for cognitive performance of patients with frontotemporal dementia
Global Journey

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Multinational Aging Initiatives

- WHO Global Dementia Observatory (2017)
- US Center for Strategic & International Studies Global Aging Initiative
- 90-member Alzheimer’s Disease International, including Alzheimer’s Canada

- Non-biomedical research into the causes and progression of conditions associated with aging
- Support materials for those suffering from dementia and their caregivers
AD Neuroimaging Initiative (ADNI)

- Longitudinal, multicenter study designed to develop clinical, imaging, genetic, and biochemical biomarkers for the early detection and tracking of AD
- A private-public partnership launched in 2004
- $27 million contributed by 20 companies and two foundations through the NIH, $40 million from the NIA
- Initial five-year study (ADNI-1) extended by two years in 2009
- Further renewed in 2011 (ADNI-2) and 2016 (ADNI-3)
- 59 acquisition sites across the USA, with others in Canada, Australia and Argentina

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ADNI

• Management of incidental findings across protocols


• Prediction of disease and at-risk intervention

Canada, Netherlands, UK, and Ireland

Weston Health Institute Fellows Program

• $11M per year to accelerate the development of therapeutics for neurodegenerative diseases of aging
• Provide training in brain health, leadership, and dementia prevention to promising leaders in medicine and science
Canada, Cuba, China

  - Basic mechanisms of dementia, early biomarkers of Alzheimer’s disease, clinical translation of research, and assess the impact of lifestyle on aging and dementia

- China-Cuba Laboratory Far Frontier Research in Translational Neurotechnology
  - Early imaging diagnosis and treatment of AD
  - Assessment technology

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Alzheimer Europe

Strengthen the European dementia movement

- Provide a voice to people with dementia and their carers
- Make dementia a European priority
- Promote a rights-based approach to dementia
- Five-country survey on the "Value of Knowing": public perceptions, experience, and knowledge of Alzheimer's disease
- Research into the differences in European health systems
- Research on types of research and clinical trials and the benefits, risks and drawbacks of participating in research.

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European Collaboration on Dementia

• **Network of all European players active in dementia**
  - Cochrane Dementia and Cognitive Improvement Group
  - European Alzheimer's Disease Consortium
  - European Association of Geriatric Psychiatry
  - Federation of European Neurological Societies
  - International Association of Gerontology
  - North Sea Dementia Research Group

• Six priority areas:
  • Prevalence rates
  • Guidelines for diagnosis, treatment, non-pharmacological interventions, risk reduction, and prevention strategies
  
  ➢ **Socio-economic cost of Alzheimer’s disease**
  ➢ **Social support systems**
Global Brain Health Institute

• $180 M philanthropic funded managed by the Atlantic philanthropies for Trinity College Dublin and University of California, San Francisco

• Reduce the scale and impact of dementia around the world by training and supporting a new generation of leaders to translate research evidence into effective policy and practice.

• Focus on underserved and resource poor regions of the world
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“Researchers working on brain initiatives from around the world recognize that they are engaged in an effort so large and complex that even with the unprecedented efforts and resources from public and private enterprise, no single initiative will be able to tackle the challenge to better understand the brain.”
Global Neuroethics
Mission Statements

Canada Brain Research Strategy

- Create a stronger, healthier, more resilient society

Korea Brain Initiative

- Open the road to treatments that can prevent and cure brain diseases
- Develop innovative approaches and strategies to cope with a rapidly ageing society
Mission Statements

US BRAIN Initiative

• Revolutionize the understanding of Brain Research through Advancing Innovative Neurotechnologies® (BRAIN)

• Produce a new dynamic picture of the brain that shows how individual cells and complex neural circuits interact in both time and space

  ➢ *Neuroethical challenges in neural engineering*

European Human Brain Project

• Accelerate neuroscience, computing and brain-related medicine through strategic alignment of scientific research programs in fundamental neuroscience and advanced simulation and multi-scale modelling

  ➢ *ELSA issues, including data sharing and privacy*

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Mission Statements

Japan Brain/MINDS Project
- Build a multiscale marmoset brain map
- Create transgenic lines for brain disease modeling
- Integrate translational findings from the clinical biomarker landscape

Australian Brain Alliance (initiated 2016; ongoing campaign through the Royal Society of Australia)
- Advance industries in neurotechnology
- Develop treatments for debilitating brain disorders
- Produce high-impact transdisciplinary

China Brain Project (anticipated for 2018)
- Improve diagnosis and prevention of brain diseases
- Drive information technology and artificial intelligence inspired by the brain

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A Global Summary

• Tremendous activity worldwide
• Canada is playing a leading role, creatively and with new innovation
• International co-ordination has come a long way but has a way still to go to maximize the real potential of leveraged multinational collaboration
• Success on the national and international landscapes is the key to promoting brain health in aging and addressing the complexities of the burden of associated brain disease
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March Madness …

*is not just about basketball*

Kristine Chapman and Judy Illes: Stem cells claims are ahead of the science

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Healthy aging research at UBC expands with $24-million gift

ARTS & HUMANITIES

Mar 7, 2018 | For more information, contact Brian Kladko

A $24-million donation to the University of British Columbia’s faculty of medicine will expand research aimed at helping people live longer and enjoy a better quality of life in their later years.

The donation, from businessman, philanthropist and UBC alumnus Edwin S.H. Leong, is the largest gift that UBC’s medical school has ever received from an individual.

"My wish is for everybody to live long and die peacefully, and I believe healthy aging is the key to that," said Leong. “This is an investment in people, and I have great confidence
“Four neuroscientists working in the UK, Belgium and Germany … won the world’s most valuable prize for brain research… Bart De Strooper (London and Leuven), Michel Goedert (Cambridge), Christian Haass (Munich) and John Hardy (London) for their groundbreaking research on the genetic and molecular basis of Alzheimer’s disease … …revolutionizing our understanding of the changes in the brain that lead to Alzheimer’s disease and related types of dementias.

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