Alzheimer Society Research Program - 2012

Biomedical Doctoral Awards

Chulmin Cho, McGill University, Jewish General Hospital, Lady Davis Institute
Project: Therapeutic importance of drebrin in amelioration of synaptic dysfunction in Alzheimer's disease

Dementia is linked to the loss of synapses, or structures where signals are transmitted between brain cells. This project aims to uncover how synapses are lost so that treatments can be developed to stop or reverse Alzheimer’s disease.

This project aims to uncover how synapses, or structures where signals are transmitted between brain cells, are lost in the early stages of Alzheimer’s disease. Synapse loss is more closely linked to dementia than other hallmarks of the disease, including brain plaques and tangles. Understanding how this loss occurs could provide clues for treatment. In particular, this project will determine whether the loss of a protein called drebrin has an important role to play in the loss of synapses.

Félix Jules, Université de Montréal, Centre de Recherche de l'hôpital Maisonneuve-Rosemont
Project: Characterization of a novel therapeutic target for the treatment of Alzheimer’s disease

The brains of people with Alzheimer’s disease have high levels of Beta-APP Cleaving Enzyme (BACE), an enzyme involved in changing amyloid precursor protein (APP) into plaque-forming amyloid beta. Blocking BACE could help reduce the amount of amyloid-beta peptide and provide new treatments for Alzheimer’s disease.

The brains of people with Alzheimer’s disease often contain plaques, formed from clumps of misfolded toxic protein fragments called amyloid beta. Researchers believe these plaques are partially responsible for the disease. Amyloid beta fragments form when enzymes ‘snip’ amyloid precursor protein (APP) into smaller pieces. The Beta-APP Cleaving Enzyme (BACE) makes the first snip. Those with Alzheimer’s disease have high levels of BACE in their brains. Understanding the biology of BACE could lead to new therapies for Alzheimer's disease.

Patricia Leighton, University of Alberta
Project: Uncovering mechanisms of A-beta 42 toxicity and normal roles of amyloid precursor protein (APP) using zebrafish models of Alzheimer’s disease

This project uses zebrafish to study how a protein fragment called amyloid beta damages the brains of people with Alzheimer's disease. Researchers could use this information to create drugs to stop or reverse the associated cognitive decline. Work will also examine amyloid beta precursor protein (APP) which breaks down to form toxic amyloid beta. Because APP seems to protect neurons, it is important to develop therapies that can block amyloid beta without getting in the way of APP's protective work.

The brains of people with Alzheimer’s disease often contain plaques, formed of clumps of misfolded proteins fragments called amyloid beta. Amyloid beta produced by neurons in one area of the brain triggers the death of nearby neurons. Amyloid beta also triggers the formation of tangles in the brain which disrupt signals from one neuron to another. Understanding how amyloid beta does this will help researchers design drugs to stop or reverse the progression of the disease. By genetically modifying zebrafish to show signs of Alzheimer's disease, more can be learned about the destructive work of amyloid beta and help better understand the role of amyloid beta precursor protein (APP), which breaks
down to form amyloid beta protein fragments. Because APP seems to protect neurons, it is important to develop therapies that can block amyloid beta without inferring with APP's protective work.

Maxime Montembeault, Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal
Project: La caractérisation des déficits sémantiques et de ses bases anatomiques chez les patients atteints de la maladie d'Alzheimer et de démence sémantique

People with dementia often have trouble communicating which can sometimes lead to social isolation. These difficulties can also complicate how certain forms of dementia, including Alzheimer's disease (AD) and Semantic dementia (SD), are diagnosed and differentiated. By relating the symptoms of AD and SD to brain function, the results of this study could help distinguish the two disorders earlier and point the way to new interventions (such as language rehabilitation programs) to help maintain a person’s ability to communicate, as well as help target other treatments more effectively.

Franck Petry, Université Laval
Project: Effet du diabète de type 1 sur la pathogénèse de tau in vivo

While we do not know exactly what causes Alzheimer’s disease, our genes and environment probably play important roles. One risk factor that has been identified is diabetes, but it's not clear how diabetes increases the risk. Using mice, this project will explore how Type 1 diabetes might lead to Alzheimer’s disease. Understanding this relationship will have important implications for preventing and treating Alzheimer’s, including the possible use of anti-diabetic drugs.

Maria Lisa Putorti, McGill University
Project: Effects of Caspase-6 gene polymorphisms in Alzheimer's disease

Certain forms of a protein called Caspase6 increase the risk of Alzheimer’s disease while other forms decrease it. Differentiating these forms could help develop a diagnostic test and drugs to decrease those forms associated with Alzheimer’s disease.

The brains of people with Alzheimer’s disease contain greater amounts of a protein called Caspase-6 (Casp6), compared to those without the disease. This protein is responsible for the degeneration of neurons. But there are different forms of Casp6 and the role each of them plays is unknown. Certain forms of Casp6 increase the risk of Alzheimer’s disease while others decrease it. Identifying the different forms and levels of Casp6 in the DNA of people with Alzheimer’s compared to those without the disease could lead to new diagnostic tests and drugs to decrease forms of Casp6 associated with Alzheimer’s disease.

Deborah Schwartz, Baycrest Centre for Geriatric Care (Toronto)
Project: The impact of visceral fat and sex-steroid hormones on brain health

Obesity appears to increase the risk of dementia, especially when fat builds up in the abdominal cavity between organs. This project will sample 1,000 teens and their parents to assess the impact of this type of fat on brain health and the role of sex hormones in its build-up.

Obesity appears to increase the risk of dementia, especially when fat builds up in the abdominal cavity between organs. Older women may be at increased risk because estrogen drops after menopause, triggering their bodies to store more fat in the abdominal area. Estrogen also protects the brain from degenerating. This project will use a large population sample, the Saguenay-Youth Parent Study, consisting of 1,000 adolescents and their parents, to examine the effects of abdominal fat on brain health and the role sex and sex hormones play. Understanding risk factors for dementia is important for prevention and treatment strategies.
Amanda Tyndall, Hotchkiss Brain Institute, University of Calgary

Project: Cardiovascular fitness modulation of cerebrovascular reserve and cognition in older adults

*It remains unclear why physically active older adults have increased brain blood flow and better cognition. A study of 250 people between the ages of 55 and 75 aims to learn more about the effects of physical fitness on brain blood flow and its connection to improved brain function.*

People over the age of 55 experience declines in normal brain function and brain blood flow. Previous studies show that physically active older adults have increased brain blood flow and better cognition, but it is unclear why. To determine the reasons, 125 sedentary women and 125 sedentary men between the ages of 55 and 75 will be studied, taking baseline measurements of their physical fitness, brain blood flow and cognition. These groups will be retested after three months of exercise and once more after six months. This study could provide insights into how well exercise protects against Alzheimer’s disease and other dementias.

Yanlin Wang, University of Alberta

Project: Role of the insulin-like growth factor-II (IGF-II) receptor in beta-amyloid metabolism and its implications in Alzheimer’s disease pathology

*This project will study the ability of the insulin-like growth factor II (IGF-II) receptor to protect neurons in people with Alzheimer’s disease by studying cultured neurons, mice genetically modified to have Alzheimer’s and post-mortem human brain tissues in people with Alzheimer’s.*

Many researchers believe Alzheimer’s disease is caused by an overproduction and accumulation in the brain of toxic beta amyloid protein fragments. In neurons, the endosomal-lysosomal (EL) system is an important area for generating and clearing beta-amyloid. The insulin-like growth factor II (IGF-II) receptor is also responsible for transporting and regulating enzymes involved in these processes. Previous studies suggest increasing the function of the IGF-II receptor may protect neurons, whereas decreasing it can lead to neuron death after brain injury or exposure to toxins. To better understand why this happens, this research project will investigate cultured neurons, mice genetically modified to have Alzheimer’s and post-mortem human brain tissues in those with Alzheimer’s. Findings could point the way to early diagnosis and treatments.
Biomedical Post-doctoral Awards

Élizabeth Beauchesne, McGill University

Role of chronic hypertension-induced cerebrovascular oxidative stress and impaired abeta amyloid clearance across the blood-brain barrier in the pathogenesis of Alzheimer’s dementia

Hypertension is associated with oxidative stress, which can damage the brain’s blood vessels and may be linked to the accumulation of toxic beta proteins that cause Alzheimer’s disease. Studying mice genetically modified to have Alzheimer’s will increase understanding of this process.

Many researchers believe Alzheimer’s disease is caused by an overproduction and accumulation in the brain of toxic beta amyloid protein fragments. While it’s not clear why this happens, we know proteins in the brain’s blood vessels play a role in clearing away beta amyloid. People with Alzheimer’s have damaged brain blood vessels, which may explain why beta amyloid accumulates. We don’t know why the brain’s blood vessels are damaged in those with Alzheimer’s, but we suspect oxidative stress has something to do with it. Since hypertension is associated with oxidative stress and hypertension is a risk factor for Alzheimer’s, this project will study their contribution to beta amyloid accumulation in mice genetically modified to have Alzheimer’s. A new class of nutraceutical antioxidant agents (Nrf2 inducers) will also be tested on Alzheimer’s mice with hypertension to see whether the drugs can prevent or reduce amyloid beta clearance problems.

Carrie Esopenko, Baycrest Geriatric Centre

Project: A multimodal neuroimaging and behavioural examination of the relationship between repetitive traumatic brain injuries and aging in retired National Hockey League players

This project will assess the relationship between repetitive concussions and aging on the brains of retired National Hockey League players, using cognitive testing and neuroimaging. The goal is to pinpoint brain biomarkers associated with concussions and aging, allowing for early diagnosis of changes in the brain that could lead to dementia.

This project will assess the relationship between repetitive concussions and aging in the brains of retired National Hockey League players. Studies show the greater the severity of the concussion, the greater the brain atrophy and functional changes. Research also shows that increasing age is linked to greater structural and functional brain changes. However, it’s not clear how concussion and age interact to affect brain health as we get older. Using cognitive tests and neuroimaging, this project will examine NHL alumni to pinpoint brain biomarkers associated with concussions and aging. A biomarker is a physical or chemical change in a person that indicates whether they have a disease and how far along it is. It allows doctors to diagnose a patient early, even before symptoms appear. In this case it could allow for early diagnosis of changes in the brain that could lead to dementia.

Shireen Hossain, McGill University

Project: Defining the process of aggregate-formation of AB42 peptide in Alzheimer’s disease and its relevance to toxicity and disease

The brains of people with Alzheimer’s disease often contain plaques, made up of clumps of misfolded toxic proteins fragments called amyloid beta. This project will study cells and mice genetically modified to have Alzheimer’s to better understand how these fragments form and how they cause the disease.

The brains of people with Alzheimer’s disease often contain plaques, made up of clumps of misfolded toxic protein fragments called amyloid beta. Researchers believe these plaques are partially responsible for Alzheimer’s. These protein fragments are formed from a larger protein – the amyloid beta precursor protein (APP) – after it is ‘snipped’ by a series of enzymes. The resulting amyloid beta fragments include the non-toxic AB40 and AB38 fragments, as well as the toxic, plaque-forming AB42 fragment. Studying cell cultures and mice genetically modified to have Alzheimer’s disease will provide a clearer picture of how AB42 is created and leads to the disease. Findings could help researchers develop drugs to stop its accumulation.
Biomedical Grants

Isabelle Aubert, Sunnybrook Research Institute
Project: Treatments using MRI-guided focused ultrasound to improve adult neurogenesis and cognitive functions in a pre-clinical model of Alzheimer's disease

*When people have Alzheimer's disease, their brain cells die. Using a combination of ultrasound and magnetic resonance imaging (MRI), this project aims to stimulate the brain to self-repair.*

When people have Alzheimer's disease, their neurons die. This project aims to stimulate the brain to repair itself. In particular, the project will identify ways of improving neurogenesis, a process involving the birth and maturation of neurons that contribute to memory and will study the effectiveness of combining ultrasound with magnetic resonance imaging (MRI). Previous work shows ultrasound applied on the cranium can help drugs find their way to targeted areas of the brain without the need for brain surgery. Preliminary research also suggests ultrasound itself stimulates the formation of new neurons. Using Alzheimer's mice, the project will test how effective ultrasound is in promoting neuron formation, as well as test how well MRI-guided ultrasound delivery of drugs to targeted areas of the brain helps those neurons develop and survive.

Liisa Galea, University of British Columbia
Project: Estrone- versus Estradiol-based HRTs effects on cognition and brain plasticity: interaction with reproductive experience

*Different hormone replacement therapies (HRT) have different concentrations of the estrogens estrone and estradiol. This project will determine the effects of these HRTs on brain health and memory. Because motherhood can change the brain’s ability to respond to different estrogens, the project will also examine the effects of various HRTs in mothers and non-mothers.*

Different hormone replacement therapies (HRT) have different effects on dementia and cognition in women. This could be because different types of estrogens are used in HRT – estrone and estradiol. This project will investigate HRTs with different concentrations of these estrogens to determine their effect on brain health and memory in young and older adult female rodents and in postmenopausal women. Because motherhood can change the brain’s ability to respond to different estrogens, the project will also examine how various HRTs affect mothers versus non-mothers. In particular, work will focus on the health of the hippocampus, a region of the brain where brain cells continue to grow throughout our lives. People with Alzheimer’s disease lose neurons in the hippocampus. Measuring the effects of different HRTs on the health of the hippocampus could reveal what type of HRT is best for brain health.

Sheena Josselyn, Hospital for Sick Children, University of Toronto
Project: Examining the role of AMPA receptor endocytosis in the memory deficits associated with Alzheimer's disease

*This project will study whether a decrease in the expression of a brain protein called AMPAR causes memory problems in mice.*

Many researchers believe Alzheimer's disease is caused by an overproduction and accumulation in the brain of toxic beta amyloid protein fragments. Recent studies of cells suggest that increased amyloid beta decreases the surface expression of a key protein in the brain called AMPAR. But it’s not clear whether this causes memory problems in living creatures. Using Alzheimer's mice, this study will test whether disrupting the decrease in AMPAR expression can improve memory.
Georges Levesque, Laval University

Project: Ribozyme as a new therapeutic molecule

*The brains of people with Alzheimer’s disease often contain plaques, made up of clumps of misfolded toxic protein fragments called amyloid beta. This study aims to reduce the accumulation of amyloid beta in the brain by creating a gene-therapy based on ribozymes.*

The brains of people with Alzheimer’s disease often contain plaques, made up of clumps of misfolded toxic protein fragments called amyloid beta. Researchers believe these plaques are partially responsible for Alzheimer’s disease. These protein fragments are formed from a larger protein – the amyloid beta precursor protein (APP) – after it is ‘snipped’ by a series of enzymes. The resulting amyloid beta fragments include the plaque-forming AB40-42 fragments. This study aims to find ways to reduce AB40-42 accumulation in the brain by developing a therapy based on ribozymes (i.e., RNA enzymes, catalysts to biochemical reactions) to regulate APP.

JoAnne McLaurin, University of Toronto

Project: In situ concerted expression of growth hormone and prolactin rescue defects in neurogenesis in the TgCRND8 mouse model of AD

*A study of the effect of a molecule (AZD-103) on the survival and function of neurons in mice genetically-modified to have Alzheimer’s disease could help researchers move AZD-103’s research in humans.*

The brains of people with Alzheimer’s disease contain protein fragments called amyloid beta which are toxic to brain cells. A small molecule called scyllo-Inositol (AZD-103) that inhibits amyloid beta in Alzheimer-ridden mice was previously identified. AZD-103 not only prevented Alzheimer’s-like memory problems, but also reversed these symptoms. AZD-103 was later tested on humans in clinical trials, showing severe side effects for the higher two doses. The lower dose, however, was considered safe and showed signs for improving cognition in those with mild Alzheimer’s disease, but not in those with moderate disease. This suggests AZD-103 may have different effects at different stages of the disease or that a mix of drugs is necessary as the illness progresses. Gaining a better understanding of the effect of AZD-103 on the survival and function of neurons in mice will help AZD-103 get to the stage where it can be evaluated in humans.

Romina Mizrahi, Centre for Addiction and Mental Health, University of Toronto


*Studying the links between brain inflammation and Alzheimer’s disease could advance early diagnosis techniques and treatments.*

People with Alzheimer’s disease can have inflammation of the brain, which is often accompanied by loss of brain structure and function. Inflammation can lead to the production of toxic molecules that kill brain cells. Research has already developed a way to quantify inflammation in the living human brain: a radioactive dye tags onto a protein called TSPO, producing signals read by a positron emission tomography (PET) scanner. Healthy brains have very low TSPO levels. Injured or inflamed brains have high levels. If high TSPO levels are found in those with Alzheimer’s, compared to those with healthy brains, it would suggest people with Alzheimer’s suffer from brain inflammation. The project will also examine whether people with certain gene variants are more likely to develop inflammation, which would increase their risk of Alzheimer’s, and will determine whether inflammation is related to loss in brain structure and memory problems, rather than merely accompanying them. Research findings could open new insights into early diagnosis and improved treatments.
Hemant Paudel, Lady Davis Institute, McGill University

Project: Restoration of synapse loss in Alzheimer's disease by replenishment of drebrin in the CNS

Synapses are tiny gaps between neurons, across which signals pass. Researchers believe problems with synapses are linked to dementia. But what if synapses in people with Alzheimer's disease can be repaired?

Synapses are tiny gaps between neurons, across which signals pass. Researchers believe problems with synapses are linked to dementia, and that the loss of a protein called drebrin plays an important role in malfunctioning synapses. Drebrin is found only in dendrites, which are extensions of neurons and transmit signals received from other neurons. Some researchers believe decreased drebrin levels damage the dendrites, which impairs synapses and leads to cognitive impairment. Studies suggest the damage can be alleviated by boosting the drebrin level in the brain. This study will investigate ways of replenishing drebrin in the brains of Alzheimer's mice. The ultimate goal is to repair and restore normally functioning synapses in people with Alzheimer's disease.

Emmanuel Planel, Université Laval

Project: Real-time imaging of brain immune responses in mouse models of tauopathies

This project will genetically modify a mouse so that certain proteins or enzymes will give off light, indicating a genetic process linked to Alzheimer's disease is active in the mouse. This will give researchers the insight they need to develop tools for early diagnosis and drugs to treat the disease.

Mice genetically modified to have Alzheimer's can yield important insights into brain function that researchers can build on to develop tools for early diagnosis and treatment. This project aims to develop a biophotonic mouse — a mouse with fluorescent proteins or luminescent enzymes. The proteins or enzymes will give off light indicating a genetic process linked to the disease is active in the mouse. This will allow researchers to study real-time biological processes as they occur in living animals. More specifically, this model mouse will give insight into processes associated with brain injuries and repair such as immune response, damage neurons, regeneration and the formation of new brain cells.

Eric Smith, University of Calgary

Project: Neuropsychological and cerebral blood flow profile of cerebral amyloid angiopathy

Toxic beta amyloid protein accumulates in the brain to cause Alzheimer's disease, but it can also deposit in the brain's arteries, leading to bleeding in the brain. This research will pinpoint the different effects of each amyloid protein on brain function, allowing doctors to make better diagnoses.

Alzheimer's disease is caused by the accumulation of toxic beta amyloid protein fragments in the brain. Beta amyloid can also deposit in the brain's arteries, leading to cerebral amyloid angiopathy, which can cause hemorrhagic strokes or bleeding in the brain. Most people with Alzheimer's have some degree of cerebral amyloid angiopathy, and most cerebral amyloid angiopathy patients have some signs of Alzheimer's. New research shows cerebral amyloid angiopathy affects cognitive function, possibly because of reduced blood flow. However, there are no studies in living people differentiating the effects of cerebral amyloid angiopathy versus Alzheimer's disease. Studying those with cerebral amyloid angiopathy, Alzheimer's disease, mild cognitive impairment due to Alzheimer's disease, and those without cognitive problems will pinpoint differences in blood flow and cognition. Results could help doctors make better diagnoses by distinguishing between cerebral amyloid angiopathy and Alzheimer's disease.
Biomedical Young Investigator Grants

Simon Duchesne, Université Laval

Project: Automated hippocampal segmentation certification: a necessary step for trajectory research in Alzheimer's disease

A biomarker is a physical or chemical change in the body that indicates disease and how far along it is. Doctors can use biomarkers to diagnose someone with Alzheimer's disease earlier, to offer treatment when it's most effective. This study aims to develop a biomarker based on atrophy in a region of the brain called the hippocampus.

Accurate diagnosis and prognosis of Alzheimer's disease is difficult, particularly in people with Mild Cognitive Impairment (MCI), which puts them at high risk for Alzheimer's disease. The goal of this project is to combine biomarker information and sophisticated statistical analysis to improve diagnosis and prognosis. A biomarker is a physical or chemical change in the body that indicates disease and how far along it is. It allows doctors to diagnose a patient earlier, even before symptoms appear. Developing biomarkers for Alzheimer's disease is important because treatment works best in the early stages. Atrophy in a region of the brain called the hippocampus is a biomarker for the progress of Alzheimer's disease. Combining information about this atrophy into a statistical model will help track the disease through time.

Maria Carmela Tartaglia, University of Toronto

Project: Assessing changes in social cognition and personality in neurodegenerative diseases and determining their neuroanatomical correlates

This study will describe how different neurodegenerative diseases attack different areas of the brain, affecting personality and behaviour. Findings could lead to targeted strategies for dealing with different neurodegenerative diseases and help caregivers better understand why the person they are caring for behaves the way they do.

People with dementia can experience personality changes as well as loss of self-awareness and empathy. This can cause significant distress for them and their caregivers. There is growing evidence that injury to specific areas of the brain is associated with changed perception, regulation, or control of emotion and behaviour. Different forms of neurodegenerative disease such as Alzheimer's, Parkinson's and Frontotemporal dementia also attack different areas of the brain. A greater understanding of how these diseases impact personality and behaviour can help design targeted strategies for these diseases and help caregivers better understand behavioural and personality changes in the person they're caring for.
Quality of Life Doctoral Awards

Cassandra Brown, University of Victoria
Project: Loneliness, social cognition, and social participation in carers for partners with dementia

*Interviews with 2,476 older adults will help examine the sequence of loneliness, social support, and social participation among caregivers of family members with Alzheimer's disease. Interview results will point toward opportunities to reduce caregivers’ loneliness.*

Caring for a family member with Alzheimer’s disease can lead to loneliness when caregivers feel they lack social support. But perceived social support is based on a person’s own evaluation of the quality and quantity of their social relationships. That means it does not necessarily match with how often they see family and friends. This suggests that for those who feel unsupported, the solution may not be as simple as providing additional opportunities for social interaction. The sequence of loneliness, social support and social participation among caregivers of family members with Alzheimer’s disease will be examined, based on interviews with 2,476 older adults who participated in the Longitudinal Aging Study Amsterdam. A pilot study will also be conducted to see if the results can be generalized to Canadian caregivers with the hope of creating interventions for caregivers’ loneliness.

Allison Cammer, University of Saskatchewan
Project: An examination of nutrition care policy and care staff decision-making practices regarding rural long-term care residents with dementia

*This project will determine nutrition care policy in rural long-term care homes, with attention to how residents with dementia and their caregivers make decisions about food. Eating is one of life’s pleasures and can help improve the quality of life for people with dementia.*

This project will determine the state of nutrition care policy in rural long-term care homes and particularly, how residents with dementia and their caregivers make decisions about food. Understanding the decision-making process can inform better, more effective, system-wide nutrition care policies and practices to foster quality nutrition. Eating is one of life’s pleasures and can help improve the quality of life for people with dementia.

Sienna Caspar, University of British Columbia
Project: The Influence of institutional texts on the provision of person-centred care in long-term care settings

*Long-term care (LTC) staff do their best to practice person-centred care that respects a person’s preferences and life history and improves well-being. Unfortunately, most LTC staff can’t sustain this type of care. The goal of this project is to better understand why and to identify new potential solutions.*

Long-term care (LTC) staff do their best to practice person-centred care that respects a person’s preferences and life history and leads to their well-being and engagement in meaningful activity. This is in contrast to the type of care based on routines and on completing specific tasks. Person-centred care is essential to the quality of life of people with dementia, who represent half of LTC residents in Canada. Unfortunately, most LTC staff can’t sustain this type of care. The focus of this project is to better understand why and to identify new potential solutions by exploring the day-to-day work of front-line care aides and investigating how replicable texts influence their work. A replicable text is any document that is written or drawn and can be reproduced or copied such as mission statements, policies and procedures, job descriptions and physician orders.
Correne DeCarlo, University of Victoria
Project: Biological aging: predicting age-related cognitive decline

A person’s biological age (BioAge), or the state of their physiology, is a good tool for assessing risk for dementia. However, biological aging models don’t take into account a wide range of biological, physiological and environmental factors. The focus of this project is to improve the ability of BioAge to predict age-related cognitive decline.

While our ability to learn and remember things decreases with age, there is little insight into what causes these changes. Recent research shows a person’s biological age (BioAge), including measures of physiology, may be a better tool for predicting risk for these problems. However, BioAge models don’t take into account a wide range of biological, physiological and environmental factors linked to dementia. The goal of this study is to improve the accuracy of BioAge to predict age-related cognitive decline and to evaluate whether BioAge is a better tool than simple aging for predicting the risk of Alzheimer’s disease. To achieve this, the study will use data from a cross-sectional, interdisciplinary investigation of cognitive aging involving 150 participants from the Victoria area. There is no cure for Alzheimer’s, but identifying those at risk early can inform lifestyle changes or offer other treatments to stop or delay the disease.
Quality of Life Post-doctoral Awards

Joshua Armstrong, Dalhousie University
Project: Clinico-mathematical approach to the fog of Alzheimer's disease: Application of novel mathematical methods to large health databases

Alzheimer’s disease is a complex disease with multiple risk factors and characterized by densely networked aging brains, different rates of progression and a wide range of associated risk factors for death. Using sophisticated mathematical methods to examine data from three different aging studies could advance our understanding of the disease.

Alzheimer’s is a complex disease involving multiple risk factors, densely networked aging brains, different rates of progression and a wide range of associated risk factors. This means studying factors in isolation often doesn’t provide much insight into the disease. This project focuses on understanding the complexity of Alzheimer’s disease and other dementias by using sophisticated mathematical methods to examine data from three different aging studies. Mathematical tools recently developed in disciplines outside of health sciences (e.g., computer science, applied mathematics, data mining and machine learning) can improve our knowledge of the health, well-being and care of older adults.

Lana Ozen, Lakehead University
Project: The efficacy of Mindfulness-Based Cognitive Therapy (MBCT) to improve depression symptoms and quality of life in individuals with Alzheimer’s disease and their caregivers: a pilot study

People with Alzheimer’s disease forget things and have trouble concentrating and they and their caregivers can become depressed. This project will show whether Mindfulness-Based Cognitive Therapy (MBCT) can lessen depression, increase attention spans and improve quality of life in those with Alzheimer’s disease and their caregivers.

People with Alzheimer’s disease forget things and have trouble concentrating. In addition, they and their caregivers can become depressed. This project will show whether Mindfulness-Based Cognitive Therapy (MBCT) can lessen depression, increase attention spans and improve quality of life for those affected by the disease and their caregivers. MBCT combines intensive training in mindfulness meditation with Cognitive Behavioural Therapy. Studies show the meditation component creates changes in areas of the brain associated with our ability to pay attention. This form of meditation can help those impacted by Alzheimer's disease become more aware of their depressive thinking, leading to improved ways of coping. If successful, MBCT could delay institutionalization, taking pressure off the health-care system and improving the quality of life of people with Alzheimer’s disease and their caregivers.

Kaitlyn Roland, University of Victoria
Project: Concurrent motor and cognitive symptoms influence well-being of male and female spouse-caregivers to persons with dementia

Despite the unique challenges associated with different types of neurodegenerative disease, no one has assessed their individual impact on the well-being of spouse-caregivers. By studying a sample of live-in spouse-caregivers, this research project aims to gain a better understanding of how each disease impacts their well-being.

Alzheimer’s disease causes cognitive problems while Parkinson’s causes motor impairment. Parkinson’s associated dementia causes a combination of the two. Despite the unique challenges associated with each disease, no one has assessed their individual impact on the well-being of spouse-caregivers. This
Rozanne Wilson, University of British Columbia

Project: Communication strategies training for formal caregivers assisting residents with moderate to severe Alzheimer’s during activities of daily living

*Helping people with moderate to severe Alzheimer’s disease with their day-to-day needs can be frustrating when they struggle to communicate. This project will assess the potential of a new communication training program to help caregivers in long-term care homes improve the quality of care.*

Helping people with moderate to severe Alzheimer’s disease with their daily needs can be frustrating. Their cognitive decline makes it hard for them to communicate. This project will assess the potential of a new communication training program to help caregivers in long-term care homes improve the quality of care and life of those with the disease. Current communication training programs are not always effective and have not been tested to see if they actually help caregivers take care of residents. Our previous research documents a variety of verbal and non-verbal task-focused communication strategies that caregivers have successfully used, and which our current project will assess for inclusion in a communications training program.
Quality of Life Grants

Dr. Hélène Kergoat, Institut universitaire de gériatrie de Montréal
Project: Validation d’un outil de dépistage des troubles visuels dans la démence modérée à severe

Many residents living in nursing homes have dementia or are cognitively impaired. They also tend to have a host of other health problems, including neurodegenerative disorders. Vision is a common concern. Problems with a person’s sight often go unrecognized, reducing overall health and well-being. This study will explore ways of testing vision in people with cognitive impairment. By correcting vision problems, this test could improve mental and physical health as well as quality of life.

Dr. Carol Hudon, Centre de recherche de l'Institut universitaire en santé mentale de Québec
Project: Validation d’une intervention ciblant les caractéristiques du fardeau et les besoins de soutien de personnes ayant un proche avec un trouble cognitif léger amnésique

People with Alzheimer’s disease are often cared for by informal caregivers, including friends and family. While these caregivers provide crucial support, the strain may put them at risk for depression and social isolation. Although researchers have been looking at ways of supporting caregivers of those diagnosed with Alzheimer’s disease, very little work has addressed the needs of those caring for people at the earliest stages of the disease (before diagnosis is made). This study will create a new intervention to support caregivers, giving them the tools they need to fulfill their role and maintain their well-being at the same time. Improving the way informal caregivers are supported could also reduce the overall costs of caring for people with Alzheimer’s disease.

Dr. Katherine McGilton, Toronto Rehabilitation Institute - University Health Network
Project: An intervention to improve interactions between staff and residents with dementia

Staff at long-term care homes often have trouble communicating with residents, many of whom have Alzheimer’s disease, reducing the quality of care. This three-part project will provide staff with a training and support system designed to help them effectively communicate with residents.

Most people with severe Alzheimer’s disease live in long-term care (LTC) facilities. Caring for them can be challenging because up to 90 per cent have behavioural problems. This leads to staff turnover, which has a negative effect on quality of care. One of the major problems is that nurses have trouble communicating with and understanding residents. Often nurses have no training to help them talk to people with Alzheimer’s disease. This project will provide LTC workers with a Resident Centered Communication Intervention (RCCI). The intervention consists of three parts: developing an individualized communication care plan for each resident, a one-day workshop for care workers and a care worker support system to help them when they put the communication plan into practice.

Dr. Alex Mihailidis, University of Toronto
Project: Toward developing an assistive technology framework for older adults with Alzheimer’s disease and other dementias: A user-centered design approach

Most assistive technology devices designed to help those with Alzheimer’s disease with daily tasks and to help them remain in their own homes, never make it to the marketplace. That’s because they aren’t designed with the user in mind. This project aims to create design guidelines for these technologies based on real users’ needs.

Most assistive technology devices to help those with Alzheimer’s disease remain independent in their own homes never make it to the marketplace. This is because they aren’t designed with the user in mind and lack a standardized approach. The goal of this project is to overcome these limitations by creating
design guidelines for assistive technologies that help people with Alzheimer’s carry out daily tasks. Questionnaires and focus groups will help determine users’ and caregivers’ needs for assistive technologies and the social factors that shape those needs. Results will help define technical design guidelines for developers of those technologies.

Dr. Shannon Spenceley, University of Lethbridge
Project: Moral distress in the care of persons with Alzheimer’s disease in residential care facilities

Staff at long-term care homes sometimes struggle with the moral distress of being unable to care for residents in a way they feel is appropriate, especially when the home is short-staffed. This project will examine the causes of moral distress, how common it is and its impact, so that managers understand how to best support staff.

Staff at long-term care homes sometimes struggle with ethical decisions about how to best care for residents with dementia. They may feel they know the right thing to do, but can’t do it. For example, a nurse caring for someone who is agitated knows she needs to calm him down, however, she is also aware that drugs prescribed to reduce agitation can cause side effects and that non-drug strategies are available. But these non-drug strategies may require extra time and if a facility is short-staffed the nurse may feel she can’t do the right thing. This can lead to moral distress, which is a significant contributor to burnout and influences quality of care. Interviews of staff in several facilities in southern Alberta will be conducted over two years to discover the causes of moral distress, how common it is and its effects. The research will help managers understand how to best support staff.