Twenty Brilliant Canadians And Twenty Reasons Why The World Is Watching Them So Closely.

STROKE
Gaining movement again

PARKINSON’S
Clearing the FoG

AUTISM
Finding the root cause in stem cells

M5
Reaching remote patients

BIPOLAR DISORDER
Learning where it happens

ISOLATION-INDUCED ANXIETY
Helping kids deal with lockdowns

MENTAL HEALTH
Updates from the front lines

CHILDHOOD BRAIN CANCER
Detecting earlier, treating better

ALZHEIMER'S
Boosting the brain's natural defences

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Canada Has Rapidly Become One of the Top 5 Brain Research Countries in the World. Our Secret? Brain Canada Bets on Our Brilliant Early-Career Scientists, and Their Bold Explorations.

The human brain is the last great mystery of human health. So incredibly powerful. So dazzlingly complex. We won’t solve these mysteries by thinking small. Meet the next generation of scientists who dare to think big.

Overcoming timid thinking

Canadian emerging brain researchers are starting their careers just as technology is giving them the tools to explore the deepest secrets of the brain. It’s time to dream big with groundbreaking theories. Their work could unlock cures for anything from depression to Alzheimer’s to brain injuries.

Unfortunately, much of Canadian brain research is trapped in a catch-22 funding model. You can’t get funding without research data, but fledgling scientists can’t provide the data without funding. Even top-ranked early-career researchers struggle for that first grant.

Believing in our best

Every year, we ask an independent and international review panel to choose 20 of the most exciting projects from Canadian early-career neuroscientists. Visionary ideas with huge potential to advance our understanding of the brain. Two years in, the Future Leaders in Canada Brain Research Program is already yielding exciting results.

Flipping the off button on chronic pain

Circadian rhythms control just about every bodily system. Including, possibly, untreatable chronic pain. Nadir Ghasemlou wants to know how and why.

Nader’s prime suspects are microglia, immune-like brain cells regulated by these rhythms. By finding ways to regulate circadian rhythms in these cells, he strives to identify the on/off switch not just for neuropathic pain, but also for neurological disorders from autism and Alzheimer’s to MS pain to get worse at that time of day.

“I had the hunch that there were signals in the cells that were causing MS pain to get worse at different times of day. This is the first major grant we’ve gotten specifically looking at the role of these circadian rhythms.”

Dr. Nadir Ghasemlou
Queen’s University

Because every life is touched by brain health

Brain disorders, mental illness, and brain injuries. Together they’re the biggest cause of disability in Canada and the world. They devastate families and cost our nation billions. We can and must do better.

Brain Canada and our partners are leading the way.

We bring bright minds together. We embrace groundbreaking theories. Our strategy has made us a leading nation in brain research.

Discovering a new piece in the autism puzzle

Autism affects 1 in 66 Canadian families, and yet it remains mysterious. Now, Yun Li may have found a clue in the developing cerebral cortex, whose specialized stem cells help brains grow and develop.

According to Yun, these same beneficial stem cells may also be vulnerable to abnormal growth and may trigger autism in some kids. That’s a transformative discovery. One that could help to someday stop or even prevent the disease.

“With this funding, we’ll be able to recruit new members to join the team to really look at this new idea, a new angle of understanding the origin of autism.”

Dr. Yun Li
Hospital for Sick Children

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Join us on this mind-blowing journey

Miraculous brain discoveries are being made daily. It’s the most exciting and promising moment in history. Read on, and follow our advancements at BrainCanada.ca

Dr. Shannon Kolind
University of British Columbia

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Dr. Berenh, Laurent  
University of Sherbrooke  
Quebec

Giving aging brains new life

The cerebrospinal fluid surrounding our brain doesn’t degenerate with age, it remains healthy. The fluid also helps to repair age-related damages, except when it can’t anymore. Berenh, Laurent may have the answer. He discovered why the fluid stops doing its job. So researchers now have a far better target for developing medicines that help aging brains work better and longer.

Dr. Sa’-Ann, Mok  
University of Alberta  
Alberta

Putting epilepsy in the crosshairs

Childhood epilepsy can be hard to treat. Some seizures are resistant to medication and even electrode stimulation. For these young patients, the best option is often to surgically remove part of the brain. Obviously, this is major surgery until you want to remove as little as possible. Chantelle Sephton is partnering with brain surgeons and neurologists. Together, they take a deep look into the brain cortex to switch between internal and external thoughts. This novel dream surgery is zooming in on the exact origin points of seizures.

Dr. Dr. Luke, Milosevic  
University Health Network  
Ontario

Clearing the FoG from Canadians with Parkinson’s

Parkinson’s patients are now seeing a reduction in their “freezing of gait” (FoG) after receiving novel electrotherapy. Electrodes, doctors can reduce some symptoms of Parkinson’s. All except for “freezing of gait” (FoG), which makes it hard to walk and can lead to dangerous falls.

In order to clear the FoG, Luke Milosevic is deploying a new kind of electric stimulation, tethered to FoG’s distinctive signature. This could be a major stroke (pun intended) in turning a disease that kills more than 100,000 Canadians of normal life and dignity.

Dr. Chantelle, Sephton  
Université Laval  
Quebec

Reversing Alzheimer’s. Defensive proteins may hold the key

We know little about Alzheimer’s. But we do know that a major tell-tale signature is when protein clumps start forming in the brain. But brains have special chaperone molecules that help prevent these clumps from forming. So why not in brains with Alzheimer’s?

Sa’-Ann Mok may have an answer. She’s identified a chaperone, DRAILZ, that seems to be a key player in our brain’s defenses against the many non-dreadful diseases. This amazing molecule could someday be harnessed to prevent and possibly even reverse the effects of Alzheimer’s.

Dr. Trevor, Steve  
University of Alberta  
Alberta

Mapping the mysteries of Alzheimer’s memory centre

MRI scans show that the hippocampus — or memory centre — is the first brain region Alzheimer’s attacks. Except that, we just don’t know enough about how this part of the brain is affected. Trevor Steve is using a novel method to map the hippocampus’s curved contours, or more precisely mapping than ever before. And, in the future, for more precise diagnoses, knowledge and therapies.

Dr. Wilton, Nicola  
University of Calgary  
Alberta

“Helping babies bounce back from neonatal stroke”

While strokes in adults are rare, they happen often enough to be the biggest cause of cerebral policy and other disabilities. It’s a devastating outcome. But, according to Greg Sisits, hope’s in the brain’s amazing capacity to recognize and self-repair. He is using novel brain scanning methods to map these young brains’ recovery from stroke. Strengthening the brain’s “wiring” to weakened areas. And, just a hint to build a better brain body map that’ll help guide future brain explorations.

Dr. Derya, Sargin  
University of Calgary  
Alberta

The “how” of memories, brains and brain disorders

How we form short-term memory (what we eat at breakfast) and long-term memory (what we sang in grade school) is deeply mysterious. It’s believed we form short-term memories in the hippocampus and move them to the neocortex during sleep. But if we how? Wilton Nicola is chasing that elusive “how” answer. He’s using lasers to extract cerebral fluid or exposing them repeatedly to PET scanning radiation.

Dr. Dr. Luana, Milosevic  
University of Calgary  
Alberta

Pandemic isolation is hard and hardest on growing brains

Humans are social animals. Which means our young brains don’t fully develop if we isolate. Unhealthy social circumstances can lead to social anxiety disorder, or SAD. Later in life, Derya Sargin has discovered a group of brain cells that may be implicated in this disorder. She’s targeting these cells to find new ways to reduce SAD. Better yet, says Derya, if you want healthy social development in kids, a little play goes a long way.

Dr. Julia, Kam  
University of Calgary  
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Dr. Dr. Sun-Ann, Mok  
University of Toronto  
Ontario

“Get to press a button, and the patient (with Parkinson’s) hears a beep, and then they see their tremor. And they say “Oh, my God!” It’s so, so rewarding.”

Dr. Greg, Sisits  
University of Ottawa  
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Easing the heartbeat of Rett syndrome

There is no cure for Rett syndrome. Not for the heartbeat that affects families that care for children with the disease. We simply don’t know enough, yet. Using cutting-edge technologies, Galen Wright is advancing the world’s understanding of the disease. He believes the brain’s DNA-repair mechanisms are implicated — mechanisms critical not just to beating Rett syndrome, but also beating dozens of other brain diseases.

Fresh clues to solving the riddle of bipolar

One in 50 Canadians has bipolar disorder, a hard-to-treat condition that costs our potential and our lives. Now, Jasmin Lalonde is giving Canadians with bipolar a fresh hope. “He’s dead?” In those with bipolar, the hippocampus may have difficulty forming new neurons. That’s huge. Knowing where bipolar takes root is a giant step toward treating many heartbreaking disorders of the hippocampus — not just bipolar.

“My project is interdisciplinary to the point where it wouldn’t fit into traditional funding mechanisms. So get support from Brain Canada to do this, it’s fantastic.”

Dr. Bratislav Misic
BC University of British Columbia

A head start on reversing the impacts of concussion

Concussion in a child is especially ominous, as it can hinder brain development and have a lifelong impact. Anne Wheeler’s ingenious hypothesis for why this happens? Concussive injury triggers premature brain maturation. Wheeler has found novel ways to mine databases of MRI brain scans to study these developing brain cells. The new teasing method could help parents in better ways to heal childhood concussion.

Seeing inside a child’s complex brain

Functional MRI (fMRI), enhanced by a new approach called hyperalignment, could become a top diagnostic tool for childhood-onset schizophrenia and obsessive-compulsive disorder. The problem is, kids have trouble staying still for a longer brain scan.

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Building virtual brains to study real brain diseases

Our brains are dauntingly complex structures. But BrainMap believes we can use computer modelling to grow virtual brains, ones that are built to work almost like the real thing. This project has two exciting possibilities. First, run test simulations of major diseases (like Parkinson’s and schizophrenia) on virtual brains to understand how they impact real ones. And second, use these bio-mimicking artificial networks to create AI with a higher IQ.

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Treating the unthinkable, brain cancer in kids

Treatment for medulloblastoma is exactly as harrowing as the disease surgery followed by radiation and chemo. Just 60% of affected kids survive this journey — often with lifelong disabilities.

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The views expressed herein do not necessarily represent the views of Health Canada.

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