



CONFIDENTIAL

2019 CANADA GAIRDNER AWARDS RECOGNIZE WORLD-RENOWNED SCIENTISTS FOR TRANSFORMATIVE CONTRIBUTIONS TO RESEARCH THAT IMPACT HUMAN HEALTH

EMBARGOED UNTIL APRIL 2 AT 7:30 a.m. EST

TORONTO, ON (April 2 2019) – On the 60th anniversary of the Canada Gairdner Awards, the Gairdner Foundation is pleased to announce the 2019 Canada Gairdner Award laureates, recognizing some of the world’s most significant biomedical research and discoveries. Laureates receive a \$100,000 cash honorarium and are formally presented with their awards on October 24, 2019 at the annual Canada Gairdner Awards Gala in Toronto.

2019 Canada Gairdner International Award

The five 2019 Canada Gairdner International Award laureates are recognized for seminal discoveries or contributions to biomedical science:

Dr. Susan Band Horwitz, Ph.D.

Distinguished Professor, Rose C. Falkenstein Chair in Cancer Research, Department of Molecular Pharmacology, Albert Einstein College of Medicine, New York

Awarded “For defining novel mechanisms of action and resistance of drugs of natural product origin, most significantly Taxol[®], and promoting their use for treatment of cancer”

The Work: Dr. Susan Band Horwitz is best known for elucidating the mechanism of action of Taxol[®], a natural product obtained from the yew tree, *Taxus brevifolia*. Horwitz discovered that Taxol[®] binds to microtubules in cells, stabilizing them, thereby leading to cell cycle arrest and subsequent tumor cell death. This body of work enabled the successful translation of Taxol[®] into the clinic. It is one of the most frequently prescribed drugs in the world for the treatment of ovarian, breast and lung cancer.

The Impact: Dr. Horwitz' research played a crucial role in encouraging the development of Taxol[®] for use in the clinic. Although no one was interested in Taxol[®] when she began her studies, today it is an important antitumor drug approved by the FDA for the treatment of ovarian, breast and lung carcinomas, as well as Kaposi's Sarcoma. The drug has been given to millions of cancer patients worldwide. Taxol[®] also is used in the preparation of stents for cardiac disease. In addition, Taxol[®] has proven to be an indispensable tool for scientists interested in microtubule structure, dynamics, and function.

Dr. Ronald Vale, Ph.D.

Professor, Cellular Molecular Pharmacology University of California, San Francisco; Investigator, Howard Hughes Medical Institute

Awarded “For the landmark discovery of the motor protein kinesin and pioneering the understanding of its mechanism of action in driving cellular movement processes including cell division and intracellular transport”

The Work: Vale's research has focused on molecular motor proteins, nature's nano-scale machines that convert chemical energy into directed movement. Vale began by asking how materials are transported in neurons, which are highly elongated cells that extend up to a meter in humans. Using squid as a model system, he developed a test-tube system to study this cellular transport process. This work led to the discovery of a new motility-producing molecule, which was named “kinesin”. Vale's laboratory then uncovered the molecular choreography that enables this

1/millionth of an inch machine to drive movement. Collectively, Vale's work has informed, at a broad level, how living organisms generate motion.

The Impact: Dr. Vale's discovery of kinesin and molecular motors transformed the field of cell biology, placing a spotlight on the study of motor proteins. His research has illuminated the fundamental principles that underlie biological motility, an essential attribute of living organisms. The discovery of kinesin led to new tools for studying protein machines more broadly, sparked studies that connected motor proteins to innumerable cellular processes, and contributed to the realization that motility defects underlie various diseases of the nervous system, heart, and other organ systems.

Dr. Timothy A. Springer, Ph.D.

Latham Family Professor of Biological Chemistry and Molecular Pharmacology, Professor of Medicine, Harvard Medical School and Boston Children's Hospital; Chairman, Institute for Protein Innovation

Awarded "For discovery of the first immune system adhesion molecules, elucidation of their roles in antigen recognition and leukocyte homing, and translation of these discoveries into therapeutics for autoimmune diseases"

The Work: Dr. Timothy Springer's work has changed understanding of cell-to-cell interactions that control immune responses and the movement of leukocyte subsets out of the vasculature into tissues. He discovered the first examples of cell recognition receptors and counter-receptors and the first family of integrins. He subsequently showed molecularly how integrins transmit signals between the exterior and interior of cells and enable cell movement. He opened the way for the first therapeutic use of antibodies to cell-cell recognition receptors to treat autoimmune diseases.

The Impact: Dr. Springer's discoveries and world-renowned work have transformed the fields of cell biology and immunology. His discoveries and entrepreneurship have led to an important new class of therapeutics for multiple autoimmune diseases including Psoriasis, Multiple Sclerosis, Ulcerative Colitis, Crohn's Disease and cancer.

Dr. Bruce Stillman, Ph.D., FRS

President, Cold Spring Harbor Laboratory, Cold Spring Harbor, New York

Dr. John F.X. Diffley, Ph.D., FRS FMedSci

Associate Research Director, The Francis Crick Institute, London, U.K.

Awarded "For their pioneering research on the eukaryotic DNA replication cycles including initiation, regulation and responses to DNA damage"

Dr. Stillman:

The Work: Dr. Stillman's research focuses on how chromosomes, including both DNA and chromosome-associated proteins, are duplicated in human cells and in yeast, thereby ensuring accurate inheritance of genetic material from one generation to the next. Missteps in the process can lead to cancer. Dr. Stillman is most widely known for his groundbreaking discovery of the Origin Recognition Complex (ORC), the initiator protein complex that is universal among eukaryotes. His subsequent research determined how the initiation of chromosome replication occurs and how it is regulated. He also highlighted other functions of ORC proteins in cells, including controlling gene transcription and the duplication of centrosomes, structures that orchestrate chromosome separation during mitosis. Mutations in ORC have been linked to Meier-Gorlin syndrome, a condition that results in people with extreme dwarfism.

Dr. Diffley:

The Work: Our very large genomes must be accurately replicated in each cell cycle, no part of the genome should be replicated more than once and replication must be completed before cell

division. Using budding yeast as a model organism, Diffley has shown in molecular detail how DNA replication origins are regulated to ensure once per cell cycle replication. His laboratory has reconstituted the entire chromatin replication pathway using purified proteins. This has led to an understanding of how the replicative DNA helicase is loaded at origins, how it is activated, how it nucleates assembly of the replication machinery and how the replication machinery displaces and re-deposits nucleosomes during replication. He has also shown that DNA damage checkpoints regulate DNA replication on damaged DNA templates by inhibiting replication origin firing and promoting replication fork stability.

The Impact: Each time a cell divides, it must copy its DNA equally into two new cells. If the cell's DNA is not copied precisely before it divides, new cells end up without necessary genetic information which can prevent their division, lead to cell death, or cause many cells to divide out of control, forming a tumour.

By describing the exact sequence of events involved in DNA replication, Stillman and Diffley have provided key insights into how our genome is duplicated and how this process is coordinated with many other essential cellular events, which have implications for understanding genome instability and tumour heterogeneity in cancer.

2019 John Dirks Canada Gairdner Global Health Award

The 2019 John Dirks Canada Gairdner Global Health Award laureate is recognized for outstanding achievements in global health research:

Dr. Vikram Patel, Ph.D., FMedSci

The Pershing Square Professor of Global Health and Wellcome Trust Principal Research Fellow, Department of Global Health and Social Medicine, Harvard Medical School; Professor, Harvard TH Chan School of Public Health; Honorary Professor of Global Mental Health, Centre for Global Mental Health, London School of Hygiene & Tropical Medicine; Adjunct Professor, Centre for Chronic Conditions and Injuries, Public Health Foundation of India, New Delhi; Co-founder, Sangath, India

Awarded “For his world-leading research in global mental health, generating knowledge on the burden and determinants of mental health problems in low- and middle-income countries and pioneering approaches for the prevention and treatment of mental health in low-resource settings”

The Work: Dr. Patel has dedicated his research career to raising the global profile of mental health problems through: epidemiological research demonstrating the burden of mental disorders in low- and middle-income countries, their strong association with poverty and with other public health priorities, such as HIV and child growth and development; and intervention research in which he has applied a systematic approach to the design, delivery and evaluation of contextually appropriate psychosocial interventions provided by lay and community health providers. This has included the primary care treatment of depression, anxiety and alcohol use disorders, the community-based care of people with schizophrenia and autism, and the prevention and treatment of adolescent mental health problems through school-based interventions.

Much of his work has been done in partnership with Sangath, an Indian NGO he co-founded in 1996. Sangath is one of India's leading community-based research organizations which won the MacArthur Foundation International Prize for Creative & Effective Institutions in 2008 and the WHO Public Health Champion of India prize in 2016. Dr. Patel also co-founded the Centre for Global Mental Health and the Mental Health Innovations Network (at the London School of Hygiene & Tropical Medicine) and the Movement for Global Mental Health, the largest global network of individuals and organizations advocating for promoting services and human rights for people living with mental health problems. In 2018, he co-founded the GlobalMentalHealth@Harvard initiative which is developing a suite of innovative, inter-disciplinary, initiatives aimed at implementing and generating knowledge to transform mental health globally.

The Impact: As recently as 10 years ago, it was difficult to even imagine mental health problems being considered as a global health priority; today, the situation is radically different with considerable attention from a diverse range of global health stakeholders, backed by resources, being focused on mental health, particularly in disadvantaged and low resourced contexts. Patel's work and leadership has played a critical role in making this happen. His research has challenged many of the myths surrounding mental health problems in the global context, demonstrating that these problems are universal forms of human suffering; that there is a vicious cycle of deprivation and poor mental health; that mental health problems profoundly affect the physical health and well-being of affected persons; that psychosocial interventions can be effectively delivered by widely available and affordable community based providers; and that the human rights of people with mental health problems to access quality care and to a life with dignity are global concerns. This work and his leadership has made significant contributions to the establishment of the field of global mental health, with priority research, teaching, policy and practice agendas, for example the Grand Challenges in Global Mental Health research initiative, the World Health Organization's flagship mhGAP program on mental health and India's first national mental health policy.

2019 Canada Gairdner Wightman Award

The 2019 Canada Gairdner Wightman Award laureate is a Canadian scientist recognized for outstanding leadership in medicine and medical science throughout their career:

Dr. Connie Jean Eaves, Ph.D.

Distinguished Scientist, Terry Fox Laboratory, BC Cancer; Professor, Department of Medical Genetics, University of British Columbia, Vancouver, BC

Awarded "For her pioneering work and leadership in the study of hematopoietic, mammary and cancer stem cells and her dedicated advocacy for early-career investigators and women in science"

The Work: Dr. Eaves' research has focused on leukemia and breast cancer and the normal tissues in which these diseases originate. Eaves together with her husband, Allen Eaves, and a dedicated group of talented trainees developed methodologies to isolate putative stem cells from living mouse and human tissues, and detect them based on their ability to grow as single cells in specialized tissue cultures or in transplanted mice. This made it possible to quantify blood and mammary gland stem cells in different situations, and discover a hidden population of suppressed normal blood stem cells in patients with leukemia, which has stimulated a search for new therapies. Eaves also showed that leukemic stem cells are actually not dividing most of the time. Her studies of breast cells revealed that similar principles apply to understanding the normal growth of this tissue. More recently, she has developed new methods for creating human leukemia and breast cancer experimentally.

Throughout her distinguished career, Dr. Eaves has demonstrated outstanding national and international leadership. She co-founded the Terry Fox Laboratory at the British Columbia Cancer Agency, was a leader in the Canadian Stem Cell Network and held multiple senior roles in the National Cancer Institute of Canada, where she spearheaded the establishment of the Canadian Breast Cancer Research Alliance to create the first national source of breast cancer research funding in Canada.

In addition to the national and international accolades received throughout her career, Dr. Eaves is recognized for her exceptional commitment to the training of more than 100 scientists from around the world, including many now in senior leadership positions. Dr. Eaves is also a passionate advocate for the advancement of women in science, a commitment that led to her recognition as a Status of Women Canada Pioneer.

The Impact: Dr. Eaves has shown great initiative and immense talent across her five-decade career. Her dedication to multidisciplinary research and to providing the best training possible for aspiring researchers has strengthened Canadian science and garnered international recognition.

Eaves' scientific findings have been paradigm-shifting, driving the field of stem cell research forward. Her provision of reproducible and rigorously quantitative methods for analysing the rare cells responsible for maintaining normal blood and mammary tissues has enabled many new lines of research. Eaves continues to apply cutting-edge technology and elegant experimental design to the most pertinent problems in stem cell biology and cancer research, constantly contributing to the ongoing pursuit of cures.

QUOTES:

“On the 60th anniversary of the Canada Gairdner Awards, the Gairdner Foundation continues to uphold the tradition of honouring the best and brightest researchers from around the world. Whether it is the field of global mental health, stem cell biology or fundamental cell biology and DNA replication, the work of each of this year's laureates is both critical and extraordinary,” said Dr. Lorne Tyrrell, Chair, Board of Directors, Gairdner Foundation.

“2019 is an exciting year for the Gairdner Foundation. On the 60th anniversary of the awards, Gairdner is proud to recognize another outstanding group of laureates. This fall, each of the 2019 Canada Gairdner Award laureates will participate in outreach programs across Canada to share their research and passion for science with graduate students, trainees, post-docs, faculty members and high school students,” said Dr. Janet Rossant, President & Scientific Director, Gairdner Foundation. “I have no doubt that our 2019 laureates will help us to inspire the generation of scientists and researchers, and continue to raise the calibre of scientific conversation across the country.”

About the Canada Gairdner Awards:

Each year seven Canada Gairdner Awards are presented to honour the world's most significant biomedical and global health researchers. The Canada Gairdner International Award is given to five individuals for outstanding international biomedical research, while the Canada Gairdner Wightman Award is given to an individual leader in Canadian medicine. The John Dirks Canada Gairdner Global Health Award recognizes a contribution to health in the developing world. These seven awards both distinguish Canada as a leader in science and elevate the profile of science in Canada. They are Canada's only globally known and respected international science awards. All laureates are chosen by international adjudication committees.

About the Gairdner Foundation:

The Gairdner Foundation was established in 1957 by Toronto stockbroker, James Gairdner to award annual prizes to scientists whose discoveries have had major impact on scientific progress and on human health. Since 1959 when the first awards were granted, 380 scientists have received a Canada Gairdner Award and 89 to date have gone on to receive the Nobel Prize. The Canada Gairdner Awards promote a stronger culture of research and innovation across the country through our Outreach Programs including lectures and research symposia. The programs bring current and past laureates to a minimum of 15 universities across Canada to speak with faculty, trainees and high school students to inspire the next generation of researchers. Annual research symposia and public lectures are organized across Canada to provide Canadians access to leading science through Gairdner's convening power.

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