Closing the gender gap in the life sciences is an uphill struggle

March 7 2019, by John Bergeron

Credit: Alexander Grey from Pexels

The world is celebrating the 108th International Women's Day. The first rallies were held in Austria, Germany, Denmark and Switzerland on March 19, 1911, and focused on women's right to vote, work and hold

public office.

In Canada at the time, women's rights were severely restricted. The common practice of forcing women to leave their jobs after marriage (known as the marriage bar) was in effect. As well, coverture policy in the United Kingdom and its colonies gave the husband sole authority and responsibility over the wife's legal status. Women, especially in male-dominated fields like science, essentially had to choose between marriage and a career.

In Québec, the first female cabinet minister, Claire Kirkland-Casgrain, was responsible for Bill 16 in 1964. This bill gave hope to women by giving back the legal capacity after marriage. In Canada, ending discrimination was finally addressed in the 1970s in part by the Family Law Reform Act and the Canadian Human Rights Act. Society was changing.

Today, celebrations for the continual empowerment of women are dedicated as actual holidays. However, equality and recognition for women remain a continual struggle. The life sciences, as with all professions and disciplines, has had its share of bleak days with discoveries hidden or recognized too late.

Lydia DeWitt

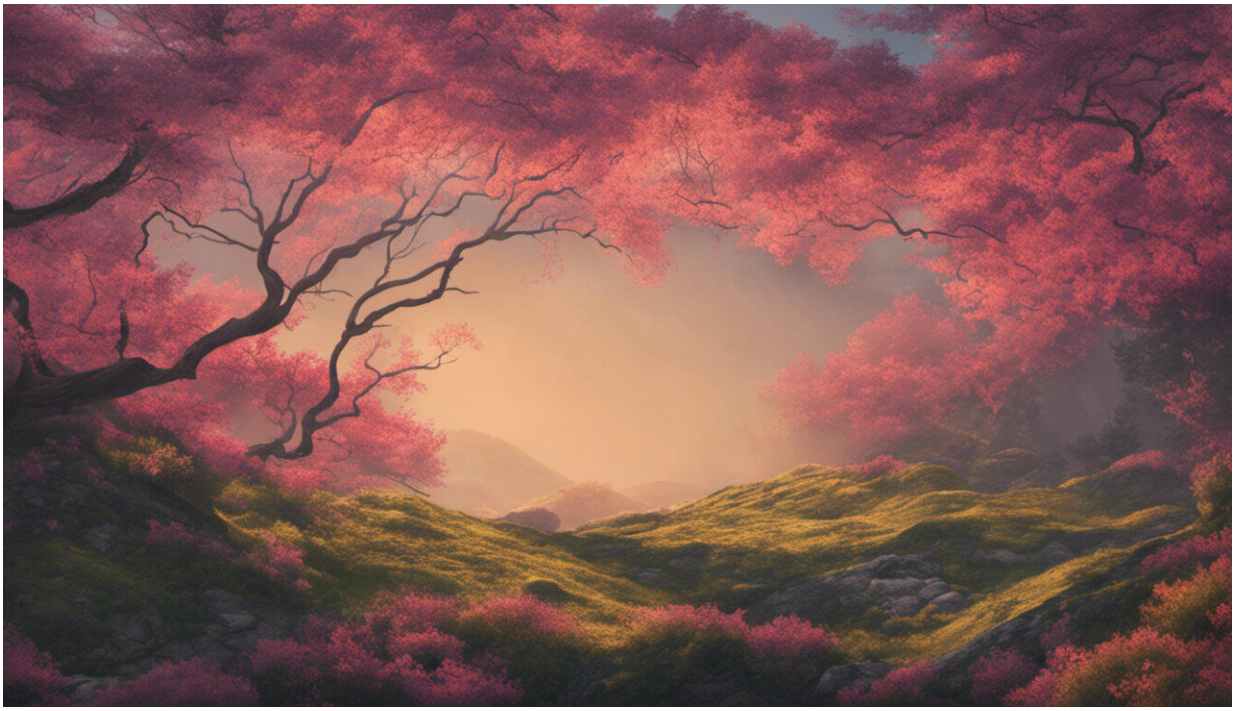
Canada will soon be celebrating the 100th anniversary of the discovery of insulin, its one and only Nobel Prize in medicine awarded to Frederick Banting and John Macleod in 1923. However, the principle and concept were preceded by the pioneering work of American pathologist Lydia DeWitt.

In 1906, DeWitt published a prescient and detailed study in the *Journal of Experimental Medicine*. While studying the what are known as the

islets of Langerhans in the pancreas, DeWitt discovered that this unique area —adjacent to the major digestive cells of the pancreas—could be found in several different species, from amphibians to humans.

DeWitt proceeded to make a soluble extract by successfully isolating the islet of Langerhans cells after tying off the pancreatic ducts. To test if the extract was biologically active, DeWitt added it to a preparation of muscle extract to see if it would affect sugar consumption. It did.

DeWitt concluded that her results "speak with no uncertain voice that the islands manufacture a substance … which favours the glycolytic action of muscle ferment."



Credit: AI-generated image (disclaimer)

Today we understand that the glycolytic action was actually the conversion of the sugar glucose into another substance known as glycogen. DeWitt then suggested a test of the extract to discover "its effect on the experimental diabetes of depancreatized animals and on human diabetics."

Most of the research and conclusions clearly occurred prior to the work of Banting and MacLeod, along with James Bertram Collip and Charles Best, who are credited with the discovery of insulin.

DeWitt's strategy was used by these investigators to surgically tie off the ducts of the pancreas. As DeWitt had found, this led to the loss of the harmful digestive portion of the pancreas while keeping the islets intact. Banting and his team subsequently isolated insulin and injected it into diabetics, as suggested by DeWitt. This led to the recovery of patients from diabetic coma and death.

Rosalind Franklin

Sixty-six years after the publication of the Nobel prize-winning paper by James Watson and Francis Crick on the structure of DNA, English chemist Rosalind Franklin's contributions are only now being recognized. Sadly, Franklin passed away in 1958. As documented repeatedly, Maurice Wilkins —who shared the Nobel Prize with Watson and Crick —had shown Watson one of Franklin's photographs without her permission. Named "Photo 51," the cross-shape pattern clearly identified a double helix.

That these Nobel laureates considered it acceptable to take without permission a decisive piece of data—and take credit for themselves—without acknowledgement to Franklin, who actually made the observation—remains astonishing to this day.

Canadian gender gap

Today, a lot of work still needs to be done to address the continued gender gap in talent selection. This gender gap is pervasive throughout all of biomedicine internationally, as illustrated in a recent issue of *The Lancet* that includes two articles specifically affecting Canada.

In Canadian science and technology programs, women are often the majority of students. Yet faculty recruitment and gender-based salary gaps remain in place. The Canada Excellence Research Chairs remain male-dominated, with only one woman among 25 men selected thus far.

Progress is halting and reluctant and the suspicion is that the entire exercise is more like the effort of Sisyphus, who was condemned to forever roll a large rock up a hill only to find it return to the bottom of the hill just as the summit was within reach.

Proposing a new Canadian model

The 100th anniversary Canadian celebration for the discovery of insulin also highlights that a century later, Canada has not been competitive for a Nobel Prize in medicine. A new direction is needed, and women discovery researchers are a solution.

To redress the imbalance and injustice of the 25:1 male to female ratio in Canada Excellence Research chairs, for example, a pool of highly talented women discovery researchers needs to be recruited and gathered within a single supportive environment.

This is not a radical suggestion. The Janelia Institute in the U.S., the Crick Institute in the U.K. and the European Molecular Biology Lab (EMBL) in Germany are all dedicated to the recruitment of early career

researchers in the life sciences.

They are gathered together under one roof but for only the first 10 to 15 years of their career. This is when transformative discoveries are made.

These scientists then become available for recruitment by universities, research institutes, biotechnology firms, pharmaceutical companies, etc., to assure a culture of genuine excellence with a track record of discoveries. At EMBL, for example, Christiane Nüsslein-Volhard was one-third of the team who received the 1995 Nobel Prize in medicine.

Canada has no such institution. Attempts have been made to address research funding through partial implementation of a Fundamental Science Review. University of Toronto president emeritus David Naylor —also one of the report's authors —wrote that "the biggest source of concern to me is the pace and endpoint for new investments in funding to open grant competitions" with women researchers unduly biased against.

An emphasis on the recruitment of women into a new institute dedicated to the early career researcher may be a solution to be considered seriously.

Provided by The Conversation

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