

## Irene A. Uchida, 1917–2013

Ronald G. Davidson<sup>1,\*</sup>

For so many of us, life seems to be one coincidence after another, some good, some not so much. This might be a good theme for a review of Irene Uchida's (Figure 1) life.

My wife's routine for perusing the daily papers begins with the obituaries, mainly to check on which of our friends and relatives are still on this side of the grass. There in our local paper, "The Spectator," was the notice, under a lovely photograph, "Passed away peacefully on Tuesday, July 30, 2013 in Toronto in her 96th year ..." I sent off a copy of what can only be described as a delightful and informative column written by three of Irene's nieces to Joseph McInerney, the ASHG executive vice president. That precipitated an astonished telephone call from Joe, an old friend and colleague, to tell me that Irene's photograph was on the cover of the August issue of the Journal as part of a series on past presidents of the ASHG — it was simply her turn to be recognized.

Some sort of chronology is essential for any description of a life, but in this case, it is poignant. Irene was born in Vancouver, British Columbia (B.C.), Canada in April, 1917 and named Ayako, which, I'm told, means "splendid" in Japanese. I have no idea how that might be pronounced, but apparently her violin teacher (of course she played the violin ... and the piano, and the organ) had such difficulty with it that she gave the little Ayako a Canadian name, Irene. The family described the young Irene as "feisty, fun loving, and gracious." I could do no better than that and might add that "feisty" soon became a vital characteristic. Irene's parents were church-goers, but the four sisters were more interested in the community activities where Irene, in addition to playing for the church services, provided much of the music for the kids and hung out with a group that became known as "Irene's Bunch."

Irene's father owned two Japanese bookstores in Vancouver. In 1940, Irene completed her second year as a student in English at the University of British Columbia and went to Japan for a visit along with two of her sisters. Irene's mother and the youngest sister were already there to look into the possibility of continuing the youngest children's education in Japan. However, Tokyo was starting to look bleak with shortages, rationing, and other signs of impending war. The family decided to leave, but only Irene made it out of Japan by booking passage in November, 1941, on what turned out to be the last boat

out of Japan before Pearl Harbor. Irene's mother and three sisters were stranded in Japan, where they remained for several years.

Meanwhile, on the other side of the Pacific, Irene and her father were among the thousands of Japanese-Canadians who were uprooted and moved to the B.C. interior, initially to the internment camp at Christina Lake. Because of her two years of university, Irene was asked to come to Lemon Creek (Figure 2) to become the principal of the school attended by the Japanese-Canadian children. The families had to live in shacks that were hastily thrown together to house large numbers of people, and I remember Irene telling me about the "wonderful" views of the sky visible between the slats of the dwellings and other structures. They arrived in the middle of winter to these Rocky Mountain communities where avoiding freezing to death was the number one priority as they struggled to patch the gaps where the snow and frigid winds came in unimpeded.

Irene took on her teaching and administrative responsibilities enthusiastically, and many of the students she taught kept in touch with her for decades after the war. Probably because of her associations with the United Church in Vancouver, the Church personnel were aware of her and she and a handful of others were rescued in 1944 before the end of the war. Through sponsorship by the Church, Irene was able to become a university student again, this time at the University of Toronto. She supplemented the meager funding by getting a job in the predominantly Jewish garment industry on Spadina Avenue in Toronto. I believe that if there were a queen of the group, it would have been Irene. She could sew a zipper into a woman's skirt faster than anyone else—this I heard from "the queen" herself. Naturally, it became her downfall. The other seamstresses lagged far behind Irene and complaints were lodged as she made them look bad. Irene was fired.

Needless to say, the Uchida family never saw the family bookstores again—it was as if they had never existed at all. Properties were auctioned off and although the Japanese-Canadians were promised recompense for confiscated property after the war, it never happened. Irene was among those internees who fought tirelessly for reparations, and finally in 1988, over 40 years later, \$21,000 was awarded to each surviving internee and the reinstatement

<sup>1</sup>Professor Emeritus, Department of Pediatrics, Program in Human Genetics, McMaster University, Faculty of Health Sciences, Hamilton, ON L8S 4L8, Canada

\*Correspondence: [davidsonr@sympatico.ca](mailto:davidsonr@sympatico.ca)

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**Figure 1. Irene as we knew her**

Photo provided by Lynn Yamazaki, from Irene's personal collection.

of Canadian citizenship to those who were deported to Japan.

By 1946, Irene received her undergraduate degree and planned to do a master's degree in social work. Again fate intervened, this time in the person of Norma Ford Walker, then the head of the Department of Zoology and soon to become the director of a newly formed Department of Genetics at the Hospital for Sick Children in Toronto. She taught a zoology class where Irene was enrolled and was so impressed that she convinced her eager and brilliant student to switch to zoology and then genetics. Irene received her PhD in Zoology in 1951 and became a faculty member at the Hospital where she began her studies of the genetics of twins. First came a long-term project to collect what eventually became a registry of twins, one of the largest in North America, that she realized would be extremely useful. The twins themselves were apparently so impressed with Irene's plans regarding the potential for twin studies that they willingly participated not only in her studies but also facilitated the studies of other investigators looking at such issues as intrafamilial correlations of cholesterol levels and coronary artery disease in dizygotic versus monozygotic twins.<sup>1</sup> Irene also collaborated with the pediatricians, studying such issues as the possible role of heredity in the incidence of, for example, various forms of congenital heart disease.<sup>2</sup> Notably, those early studies failed to turn up any differences between monozygotic and dizygotic twins.

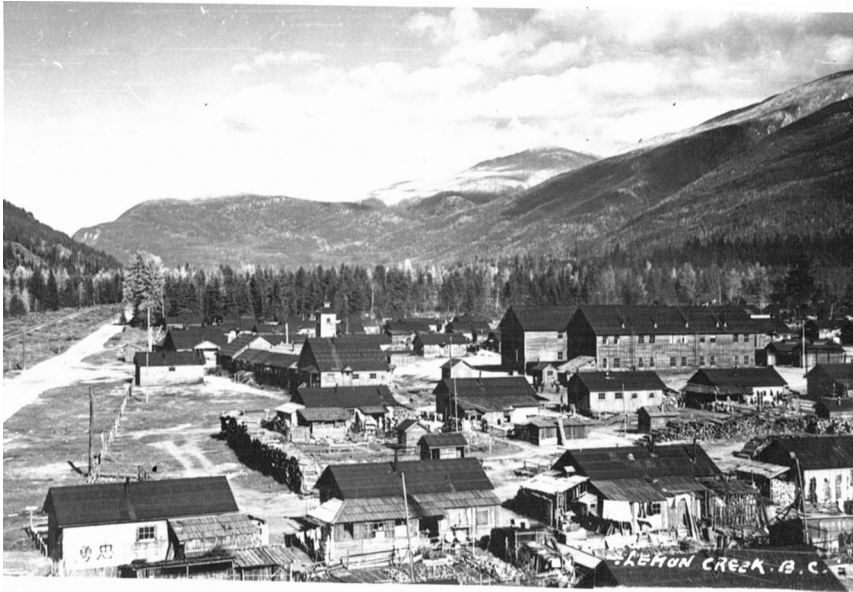
In 1960, she moved to the Department of Medical Genetics at the Children's Hospital, Winnipeg, Manitoba. If I remember correctly, she told me that they offered her more money! The move was preceded by a year of

training at the University of Wisconsin under the guidance of Klaus Patau who later on achieved some notoriety as the discoverer of trisomy 13, initially dubbed Patau's syndrome. There she worked on *Drosophila* chromosomes. That same year, 1959, Lejeune published his landmark work on the cause of Down syndrome, the first demonstration of a chromosome anomaly as the cause of a human disorder—serendipity again.

Shortly after arriving in Winnipeg, Irene was invited to attend ward rounds in the nursery to discuss the cytogenetics of Down syndrome along with a very recently discovered birth-defect syndrome due to trisomy 18, Edward syndrome. As she described the anomalies, a whipper-snapper named Jack Sinclair, later to become head of the newborn nursery in the new medical school at McMaster University in Hamilton, Ontario, raised his hand and said that he thought they currently had such a case in the newborn nursery. Irene, the consummate non-physician, went to have a look, and agreed with the clinical diagnosis. She easily persuaded her lab staff to pause their fruit fly cytogenetics and check out the chromosomes from the blood sample from the nursery. The trisomy was there. Canada suddenly had its first clinical cytogenetics program.

Irene turned her investigative attention from fruit flies to humans in an attempt to gain some insight into the etiology of the extra chromosome in nondisjunction. This led to her setting up a remarkable prospective study of women who had been exposed to diagnostic abdominal radiation. Her hypothesis was that the maternal radiation would increase the risk of nondisjunction in subsequent pregnancies. Children conceived after the diagnostic radiation were compared with children born before any exposure to X-rays. There were 972 children in each category. A significantly higher number of trisomic offspring were born after maternal radiation, obviously supporting the hypothesis. The data were considered to be controversial as a result of possible confounding factors such as later maternal age in the mothers exposed to radiation. Nevertheless, *The Lancet* saw fit to publish the study in 1969.<sup>3</sup>

In 1970, Irene took another study leave, this time as a Medical Research Council (MRC) Visiting Scientist to the University of London and Harwell, the latter the site of the Atomic Energy Research Establishment, from 1940 to the 1990s. Always the eager student, she learned techniques related to studying the effects of radiation on mouse oocytes and spermatocytes, seeking more data to further support her hypothesis on the role of radiation in the etiology of nondisjunction.<sup>4,5</sup> After that, Irene moved on to the new medical school at McMaster University. Pediatrician Jack Sinclair, already at Mac, along with Alvin Zipursky, founding chairman of the department of pediatrics at McMaster, might have had something to do with attracting Irene to Hamilton to set up a genetics program. Irene spent most of the rest of her academic career there, first combining her diagnostic skills based on her



**Figure 2. The town of Lemon Creek, B.C., circa 1940s**

This photograph taken by Henry Shibata and was a part of Irene's personal collection.

nonphysician common sense and careful observation plus her emerging facility with dermatoglyphics to confirm diagnoses days before the chromosome analyses were completed. Soon, the whole discipline was becoming more sophisticated and her laboratory moved from plain old cytogenetics to fluorescent banding patterns in metaphase chromosomes. The clarity and precision of her karyotypes were second to none and before very long, fluorescent in situ hybridization (FISH) and other procedures were added to the cytogenetics armamentarium under the skilled guidance of Irene Uchida. Her last appointment was as Director of Cytogenetics at the Oshawa General Hospital, 1991–1995, where she brought her clinical cytogenetics laboratory skills to an eminent community hospital.

So many areas of research caught Irene's attention over so many productive years for this amazingly hard-working scientist—the etiologic association between spontaneous abortion and a wide variety of chromosome anomalies, the application of new techniques to the identification of individual human chromosomes and fragments, and the loss of telomeric DNA during aging of chromosomes. Her first publication appeared in 1951 and the last in 1993,<sup>6</sup> appropriately, in *The American Journal of Human Genetics*.

Before mentioning her many tributes and awards, I must relate the following: Irene was not fond of talking to large groups but never turned down opportunities to teach children. In one of her talks to kids in the early 1990s, she finished with a "Mystery" that became a surprising prediction. She suggested that geneticists might be able to find out how to deactivate one of the chromosomes in an individual with trisomy. Describing how one of the two X chromosomes is inactivated during embryonic development in all women, she postulated that we might find a technique to deactivate a specific chromosome such as

the extra number 21 or 18 or 13 and thus "cure" the related genetically caused syndrome. In a fascinating paper published in *Nature* this year,<sup>7</sup> the investigators report on manipulating a single gene, XIST, the so-called X-inactivation gene, and transcriptionally silencing the chromosome by coating it with non-coding RNA, thus producing in effect a Barr Body from a chromosome other than the X. This could be a major first step toward potential "chromosome therapy" just as Irene predicted decades ago.

The list of award and honors is too long to present in its entirety but includes:

- The Annual Queen Elizabeth II Lectures, Canadian Pediatric Society—First Invited Speaker, Ross Award
- "Woman of the Year," Winnipeg, Manitoba, 1963
- "Woman of the Century 1867–1967," National Council of Jewish Women, Province of Manitoba. [I suppose that Manitobans can be permitted a bit of hyperbole!]
- One of "25 Outstanding Women," International Women's Year, Ontario Government, 1975
- 1000 Canadian Women of Note, 1867–1967, Media Club of Canada and Women's Press Club of Toronto, 1983
- Founder's Award, Canadian College of Medical Geneticists, 1995
- Honorary Doctor of Science, University of Western Ontario, 1996
- Doctor of Science, honoris causa, McMaster University, 2000

In 1993 Irene was made an Officer of the Order of Canada, Government of Canada. The Order of Canada is the second highest honor the Country can bestow on a citizen; it was presented to her in Ottawa by our Governor General on behalf of Queen Elizabeth II. How close we came to losing her!

Trainees were always a presence in the Uchida laboratory. They started arriving in 1962—two postdoctoral fellows—and just kept on coming from the local areas and from abroad to learn from a scientist who the world would agree was an exacting taskmaster. The postdocs grew to 14 over the years, and the ranks also included two master's degree students, a doctoral candidate, and three who arrived as established professionals from other fields,



**Figure 3. Irene, the gracious hostess, at home**  
Photo credit: Viola Freeman.

such as pediatrics and hematology, to learn the approaches and techniques of cytogenetics that they could apply subsequently to their research.

I met Irene for the first time on a boat cruise in Puget Sound in 1965. The cruise was part of the program for the annual meeting of the ASHG and our long friendship began immediately. She was always impeccably well-dressed, remarkably articulate, and a connoisseur of fine food and drink (Figure 3). Dinner at her home was a wonderful experience because she claimed that only rarely would she bother with Japanese cuisine because it was so complicated to prepare. Instead, she prepared Chinese food. Somehow I fail to recall ever finding even a morsel of Chinese food on my plate, and her tempura literally melted in the mouth.

To finish my essay, a little story. I had been on sabbatical for the usual year and on my return, there was a genetics meeting in Ottawa. Irene, our colleague and friend, Don Whelan, and I were in the bar catching up after the opening sessions. In those days, Irene's favorite Scotch whisky was Chivas, arguably the best of the blends; mine, single

malt. Irene did eventually see the light and became a devotee of the malted barley. We were chatting nonstop as the bartender took our orders. When the drinks arrived, coincidentally Irene and I took those first sips simultaneously. Without a moment's hesitation or any pause in the conversation, we both said that the barman got our drinks mixed up and we switched. Don was nonplussed and exclaimed in admiration that we really knew our scotches. We never told him that Irene always ordered one ice cube, whereas mine would be neat.

May I say in closing that if you are reading this at home, raise your glass and toast a fine lady and great scientist who would really appreciate the gesture!

### Acknowledgments

I sincerely and gratefully thank Irene's three nieces, who provided so much of the family background, particularly for the early days. A special thanks to one of them, Lynn Yamazaki, who acted as my "fact checker" and as a remarkably skilled editor while reading the manuscript. Mary Ann Zadvorny, Irene's secretary during her years at McMaster, gave me an invaluable copy of her CV, and Viola Freeman, cytogenetics chief technologist at McMaster, provided the beautiful photograph of Irene doing her bit as super-hostess.

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